

Land and Resource Mgmt. Plan for the Ochoco NF /Crooked River NG

FEIS

Part A

Part B

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Part A

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Part B

Record of Decision

United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1989

Final Environmental Impact Statement

Land and Resource Management Plan

Ochoco National Forest and Crooked River National Grassland

Caring for the Land...

FINAL ENVIRONMENTAL IMPACT STATEMENT
LAND AND RESOURCE MANAGEMENT PLANS

Ochoco National Forest
Crook, Grant, Harney, and Wheeler Counties, Oregon
and
Crooked River National Grassland
Jefferson County, Oregon

August 1989

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ABSTRACT

The Final Environmental Impact Statement documents, issues, data and information, analyses, processes for preparation, and potential environmental consequences of management alternatives are presented The Plans for management of the 844,640-acre Ochoco National Forest and 111,510-acre Crooked River National Grassland are presented also.

Sixteen alternatives were analyzed in the process; six of these are described in detail in the FEIS Each alternative responds differently to the issues and concerns identified

- Alternative NC, No Change, continues management under the 1979 Timber Resource Plan without the full requirements of the National Forest Management Act of 1976 (NFMA)
- Alternative A, No Action, continues management of the Forest and Grassland under existing plans and policies, but has been updated to include NFMA requirements
- Alternative B-Modified is the forest products industry's preferred alternative, it provides for the highest level of timber outputs of any alternative detailed in the FEIS
- The environmentally preferred alternative is described by Alternative C-Modified It emphasizes resource which do not have market prices (e g , soil, water, wildlife, recreation, aesthetics)
- Alternative E-Departure was the Draft Preferred alternative It featured a departure from even-flow to provide a relatively high level of timber output in the first decade, as well as a mix of other resources over time
- The Final Preferred, Alternative I, is represented by the planning documents issued with the FEIS, and is described in FEIS Alternative I is the result of, and represents, an amalgamation of the public comments and suggestions received on the DEIS and the Supplement to the DEIS, the State of Oregon's involvement, incorporation of new information and legislation, and additional analyses conducted between Draft and Final Alternative I attempts to deal with issues in a reasoned, comprehensive and equitable manner Options are preserved, critical resources are identified and appropriately protected, and reasonable levels of commodity resources are provided The Plans are amendable through the NEPA process if future requirements or changes are deemed necessary

FEIS

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Summary

Summary

Final Environmental Impact Statement for the Land and Resource Management Plan

Ochoco National Forest and Crooked River National Grassland

Purpose and Need

This section is a general summary of the Environmental Impact Statement (EIS). It emphasizes the issues and concerns raised by the public and other local, state and federal agencies, including the Forest Service, regarding management of the Ochoco National Forest and Crooked River National Grassland. It briefly describes the themes of the alternatives and how they were developed, the unavoidable adverse impacts, the irreversible/irretrievable effects of implementation, and the major results of the planning process. The tables show management areas, land uses, and outputs and effects for each alternative.

The purpose of the Final Environmental Impact Statement (FEIS) is to describe alternative plans for managing the Ochoco National Forest and Crooked River National Grassland, including the Preferred Alternative I. The FEIS also describes the affected environment and addresses the consequences of implementing the Preferred and other alternatives considered. A Plan representing any of the alternatives would be in effect for 10 to 15 years, unless revised sooner.

In order to implement the forest planning provisions of the National Forest Management Act (NFMA) (36 CFR 219), preparation of an EIS disclosing a range of alternatives, identifying a preferred alternative and disclosing the environmental effects of the proposed action is required by the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ), and NEPA Regulations as stated in Title 40 of the Code of Federal Regulations, Part 1500, (40 CFR 1500). For purposes of disclosure under NEPA, this EIS and the accompanying Forest and Grassland Plans are treated as a combined document.

Preparation of the Forest Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations (36 CFR219).

Forest Service planning is a continuous, interactive process (CFR 40 CFR 1508.28) tiered to and carried out on organizational levels within the National Forest System. These levels are:

1. National	Resource Planning Act Assessment and Program.
2. Regional	Regional Guide.
3. Forest	National Forest Land and Resource Management Plans (Forest Plans) for National Forest System lands. Tiered to Regional Guide.
4. Project	Site or project specific plans, generally at Ranger District level. Tiered to Forest Plan.

Process and Chronology for the Preparation of the Forest and Grassland Plans

Year	Process
1980	Notice of Intent Published in the Federal Register
1981	Preliminary Identification of Issues and Concerns
1982	Forest Inventory Completed
1984	*Analysis of Management Situation*
1985	Formulation and Analysis of Alternatives
	Evaluation of Alternatives
	Draft Preferred Alternative Selection
1986	Draft Environmental Statement Published
	Public Comment Period
1988	Supplement to DEIS Published
1989	Public Comment Period for the Supplement
	Evaluation of Public Comment
	Formulation, Analysis and Modification of Final Alternative
	Final Plan Published
1990	Plan Implementation, Monitoring and Evaluation

Public Participation

Issue Identification

In the autumn of 1980, the Forest began the task of identifying issues to be addressed in Forest planning. Six meetings with key interest group leaders and individuals were held. In the meetings, 125 preliminary issues, concerns and opportunities (ICO's) were identified. By an iterative process with the public, and through mailings, media, and meetings over the course of several months, these were consolidated into 12 major issues or "planning problems," which are:

1. Timber supply and Forest management
2. Social and economic wants and needs of local communities
3. Livestock grazing or grazing allotments
4. Riparian area management
5. Transportation planning
6. Big game habitat
7. Roadless areas (and Wilderness Study Areas)
8. Scenic resources
9. Old growth forest
10. Fuelwood supply
11. Snag dependent wildlife
12 Winter sports

Public Involvement on the Draft EIS/Plan

The Notice of Availability was published in the Federal Register on September 12, 1986. Over 1,000 copies of the documents were distributed. Each document package contained a "Reviewer's Guide" and "Summary." Over 50 newspaper articles were published, and 20 radio interviews and 39 meetings were conducted on the Draft. The forest products

industry, conservation groups, and snowmobile organizations conducted organized campaigns and information dissemination.

By the end of the 90-day review period, approximately 2,150 responses were received. All responses were acknowledged with reply cards. Over 20,000 comments were coded from the responses.

Summary of Public Comment on the Supplement

The responses received on the Supplement to the DEIS were predominately local in origin. Ninety percent were form letters which came from local mills or mill owners. The form letters stated that they had "no major comments on the Supplement itself," but then went on to repeat issues the mills and timber industry emphasized in the Draft - timber supply and jobs. Over 95% of the comments received on the Supplement did not respond to the issues addressed by the Supplement.

Issue and Public Response Summary

Timber Supply and Forest Management

Major subissues relating to timber supply and forest management have been identified and are discussed separately.

Timber Supply and Sustained Even-flow Yield

Forest products manufacturing is the major industry of the area. Timber accounts for over 95 percent of the National Forest receipts. The Forest has 6.3 Million Board Feet (MMBF) of standing crop. Approximately 50 percent of which is comprised of mature ponderosa pine.

There are 533,177 acres of forest land tentatively identified as suitable for timber production. Of this, the Forest Plan allocates 496,850 acres to the general forest prescription, 92,200 acres to nontimber use such as wildernesses, roadless areas, and old growth, and 255,590 acres in other management areas.

Large fine-grained ponderosa pine is the most commercially valuable tree in Central Oregon. Open park-like stands of mature ponderosa pine are also what people identify the Ochoco National Forest with, and seek out for recreational purposes. Local mills are tooled for large material, although some modification has begun. Ponderosa pine may occur in relatively pure stands, generally on relatively low productivity sites, or associated with other conifer species. The latter are referred to as mixed conifer stands and generally occupy the better sites, but existing mixed conifer stands have a high incidence of insect and disease damage, which reduces value and silvicultural options.

The 1979 Forest Timber Resource Plan established a potential yield of 136.5 MMBF. The programmed harvest for the Forest, under that plan, has been 129.8 MMBF. The present planning effort developed alternative first decade allowable sale quantities in the DEIS ranging from 13.9 MMCF (82 MMBF) to 24.4 MMCF (146 MMBF). (The FEIS ASQ figures range from 15,6 MMCF to 21.9 MMCF.) Three of the DEIS alternatives, including the draft preferred with an ASQ of 123 MMBF, plus an additional 5 MMBF in salvage sales, were departures. Yields or ASQ's exceeding 100 MMBF are not sustainable in board foot measure over time. Because FORPLAN yields were all calculated in cubic feet, the sustained yield in board feet beyond first decade is not readily available in a reliable estimate. The current net annual growth estimated in board feet for the Forest is about 80 MMBF. The harvest on the Forest has been at a historic high, - 153 MMBF in 1985. This high level of harvest was a result of the combination of timber availability and a strong market.

Mill capacity of Crook and Harney Counties alone is estimated to be 385 MMBF annually. Demand for timber currently exceeds supply. The Forest has sold an average of 137 MMBF per annum over the past decade, and cut 110 MMBF, of which 75 percent of

the cut volume was large ponderosa pine. Silvicultural systems applied have been predominately even-aged. Intensive timber management and resultant industrial activity on the Forest has potential to conflict with or impact other resources. Conversely, land allocations for other purposes compete with timber interests, and other management requirements can constrain timber management activities and reduce potential yields.

What the Respondents Said

Timber industry wanted an allowable sale quantity of 137 MMBF, which was the original 1979 Timber Resource Plan potential yield. They also asked for at least 100 MMBF of the ASQ to be in ponderosa pine. They attempted to show that the "commercial forest" land base had been decreased through the suitability determinations and other land allocations in the Draft Plan. Timber industry also wanted a larger salvage program. The conservation community, on the other hand, thought the ASQ for the Forest should be about 90 MMBF. Both industry and the conservationists agreed on the desirability of a sustained even-flow yield, but disagreed on the level of yield which was feasible on a sustained basis.

Ponderosa Pine Management

Large ponderosa pine trees are an important forest resource. They are more valuable and important than other species or second growth. Wood product remanufacturing has been increasing and relies on the high quality lumber milled from the pine. This industry is dependent on large pine (20-inch DBH or larger) that is relatively free of knots. Large ponderosa pine is important to the economy of central Oregon. The majority of pine grows on relatively low productivity sites producing less than 58 cubic feet/acre/year. A quality versus quantity situation exists. Current forestry practices include rapid liquidation of old growth pine stands, even-aged management, and emphasis on fiber (quantity) production. Strategies in the DEIS were designed to produce either maximum cubic foot timber volume on available lands or maximum PNV. These strategies resulted in harvesting stands at 90 to 100 years and producing trees no larger than 14 to 16 inches DBH.

What the Respondents Said

Large ponderosa pine were viewed as a unique product of central Oregon. Small diameter second growth trees were not. The stumpage value of large ponderosa pine is many times greater than second growth. Some segments of the wood products industry would like to know what the supply of pine will be over time in order to plan their business operations. Both industry and other publics do not like even-aged management in ponderosa pine. Both want "selection" harvests, but for different reasons. Intensive management on low productivity pine sites is said not to be appropriate. It was thought that ponderosa pine, because of its uses and the sites involved, should be managed on a board foot (not cubic foot) basis. It was suggested ponderosa pine be inventoried and managed separately, with a separate ASQ established for pine.

Uneven-aged vs Even-aged Silviculture

The use of clearcutting as a silvicultural system on the Forest has increased in the past decade. This is due to implementation of the 1979 Timber Resource Management Plan and prescriptions in mixed conifer that favor more clearcutting and increases in harvest levels as the economy recovered from the recession of the early 1980's. Overstory removal has been applied extensively in ponderosa pine. Clearcut acres under the Draft Plan would start increasing in the second decade as overstory removal opportunities continue to be reduced and management intensity increases.

The harvest methods employed in FORPLAN modeling and yield tables in the Draft Plan and alternatives were based on even-aged management. Uneven-aged management of ponderosa pine appears to be a viable alternative with offsetting advantages and disadvantages. Some limited uneven-aged management was programmed for certain management areas in the Draft Plan.

What the Respondents Said

There was strong support for uneven-aged management by the public and forest industry (albeit, for different reasons) and support for incorporation of uneven-aged management into the Plan. Some publics

see overstory removal as clearcutting. Uneven-aged management was perceived as a method to avoid clearcutting (see Clearcutting, this section) and to reduce conflicts with other resources.

Departure

This issue stems from the Plan (Alternative E - Departure) proposal for an ASQ of 123 MMBF in the first decade, declining to 118 MMBF in the second decade, and 89 MMBF by the fifth decade (20.6 MMCF to 16.1 MMCF). This amounts to a 25 percent reduction over 5 decades. The intent of the departure was to maintain a high timber supply to support community stability during the first decade. The issue, however, is more complex because none of the alternatives are sustainable in board feet over time. It is apparent that the current harvest level will decline over time and a decision as to the rate and to what level over time is needed, i.e. a "glide path" or "stepping down."

What the Respondents Said

Neither forest industry nor conservationists liked the idea of departure. Industry said they needed a dependable (and higher) supply of timber, especially to encourage new business to Central Oregon. Conservationists said departure was a euphemism for rapid liquidation of old growth. The public, for the most part, asked for a "sustained yield" which they seem to equate with nondeclining even-flow. Some felt we were remiss in proposing anything but sustained yield (nondeclining even-flow).

Clearcutting

Of the approximately 35,000 to 40,000 acres currently under contract on the Forest, only about 15 percent are to be clearcut. However, the Forest program in near future years contains substantial acreages of clearcutting in mixed conifer stands. The Draft Plan proposed harvesting 1,444 acres (9 percent of total harvested acres), increasing to 2,208 acres (39 percent of total harvested acres) by the year 2030. Root rot and other insect and disease problems, plus slash disposal needs, make any type of partial removal impractical for most of the mixed conifer stands.

What the Respondents Said

There was almost unanimous opposition to clearcutting from industry, conservation groups, and members of the general public. Reasons cited included the adverse effects it has on other resources; the waste of fast-growing, younger stock and potential crop trees; and the destruction of advanced regeneration. The issue was posed as "clearcutting vs. selection." Some publics perceived overstory removal as clearcutting. Clearcutting ponderosa pine was simply not considered appropriate. Acceptance for clearcutting in mixed conifer was conceded by industry. The uneven-aged issue is related to this issue.

Social and Economic Wants and Needs of Local Communities

Central Oregon's economy is primarily based on its natural resources. Employment levels, community stability, ability to attract new industry and maintain the present, have been linked by some to timber supply levels. Our analyses show that the Forest can not continue to concurrently provide the same amount of timber and amenities over time as is currently provided. As a result, there may be socio-economic conflict under any alternative.

The issue is greater than timber supply alone. Other factors, such as remanufacturing, material (log) transport into and out of the area, automation, market conditions, rate of liquidation of old growth, and ponderosa pine management affect jobs, employment levels, county receipts, community stability, and other businesses and industries that contribute significantly to the economic well-being of the communities.

What the Respondents Said

The forest products industry and many individuals were adamant in demanding a high timber supply to maintain the local economy and jobs. Others pointed out the shortsightedness of this viewpoint and suggested that the rapid conversion of old growth and shift to second growth/fiber management might not be positive in the long run. They collectively believe the important resource is large ponderosa pine.

Second growth is worth $40-60/MBF, old growth $100-300/MBF, so that even if the cut is significantly reduced in order to manage for larger pine, it would contribute more to the economy because of its value, remanufacturing potential, and in the future, possible scarcity. The issue is also interrelated with the departure, uneven-age, and ponderosa pine issues. Still others felt that the high harvest levels would result in the loss of amenity resources that are the reason many people choose to live, work, and recreate in Central Oregon. Nearly all thought that a departure was extremely short-sighted.

Livestock Grazing and Allotment Management

The Forest and Grassland provide summer grazing for about 14,000 cattle and 3,500 sheep, or 75,000 AUM's annually, involving 105 permittees. Changes in public perception about management of the Forest and Grassland in recent years have raised questions of possible conflict between livestock and big game, water quality, riparian conditions, fisheries recreationists and reforestation. Grazing permit administration is tied by law to allotment plans, not the Forest Plan.

What the Respondents Said

Strong criticism was expressed concerning our past performance in administering the grazing program. The public doubts that riparian conditions can be improved and livestock numbers increased simultaneously.

Some said that any significant reduction in livestock grazing would have an adverse effect on the socio-economic base of Crook, Harney, and Jefferson counties and eliminate currently viable ranching units. Still other respondents suggested that full utilization be made of all available forage.

Some respondents requested that additional data about current conditions be presented and that more detailed descriptions of the impacts of livestock use on other resources be provided.

Riparian Area Management

Approximately 20,040 acres, including 815 miles of streams, of the Forest and Grassland are considered the riparian influence zone. Riparian areas receive a disproportionate amount of recreation and grazing use. Our most productive timber sites also occur along stream bottoms. Approximately 6,650 acres of riparian area are considered to be in "poor" condition. Public attention for riparian area management and condition is increasing.

The Draft Plan proposed to manage 9,400 acres of streamside to achieve "excellent" conditions. Structural improvements were proposed to enhance these areas as follows: fencing, 255 miles; large woody debris placement, 14 miles; log weir construction, 300 acres, rock structures, 50 acres; and shrub plantings, 50 acres. The remaining 9,600 acres would be managed for "good" or "fair" condition.

What the Respondents Said

The public is concerned about the impact that grazing, timber harvest, and road building has on riparian areas. Of particular concern is the proposed increase in livestock use of forage and skepticism over the Forest's ability to adequately manage riparian vegetation. The view was presented that all riparian areas should be managed in "good" or better condition. There seemed to be a perception that if riparian areas were in "good condition," there would not be much concern over whether the vegetation was used by livestock or not. Some livestock users recommended that where fencing is employed to manage riparian vegetation, the fenced units should be large enough to be managed as riparian pastures; others wanted more specifics on the proposed riparian program.

Transportation System

The transportation system on the Forest and Grassland totaled 4,554 miles of roads in 1985. About 833 miles (18 percent) are maintained for passenger car use, with the remainder maintained for high clearance vehicles. In the past, roads were constructed to relatively high standards. Recently, economic pressures and more rigorous analysis led the Forest Service to adopt lower road standards.

Under the Draft Plan, the number of miles of road

maintained on the Forest and Grassland would decrease nominally in the future. Roads would be closed when needed to protect soil and water, prevent disturbance of big game, and limit investment loss. Closures could be seasonal or yearlong.

What the Respondents Said

There is strong opinion that the road standards and road density are too high. Seasonal road closures for protection of big game, and road closure after completion of timber sales are generally supported by the public.

The timber industry suggested that the conflicts between roads and big game result from roads being open to use, rather than roads per se. They contend that the needs of big game could be served as well by closing roads as by leaving areas roadless.

Big Game Habitat

The Oregon Department of Fish and Wildlife (ODFW) assigned planning benchmarks of 2,600 elk and 22,600 deer to the Forest and Grassland. The Forest and Grassland have potential habitat to support larger populations of big game than these objectives.

The Draft Plan proposed management for big game habitat would be the primary emphasis on 227,700 acres (approximately 25 percent) of the Forest and Grassland. In these areas, open road density and cover would be managed for high quality big game habitat.

What the Respondents Said

The public desired a larger big game population than what the Draft Plan allowed. They would like more seasonal and permanent road closures. They felt all of the big game winter range should be managed for that purpose, and an increase in the cover-forage ratios for general forest should be made.

Roadless Areas and Wildness Study Areas

The Draft Plan proposed managing Cottonwood Creek, most of Rock Creek, part of Silver Creek, and a small portion of Lookout Mountain for semiprimitive nonmotorized recreation (25,249 acres total). Green Mountain (7,000 acres) was proposed to be managed for semiprimitive motorized recreation.

The Oregon Wilderness Act of 1984 required the Forest Service to review the Deschutes Canyon-Steelhead Falls Wilderness Study Area (WSA) and make a wilderness recommendation in the Forest Plan. The Draft proposed a 5,200-acre wilderness (2,500 acres National Grassland, 2,660 BLM). The total WSA was 18,402 acres. Also, the portion of the Deschutes River flowing through the wilderness study area was being studied for classification under both state and federal wild and scenic river systems. The North Fork Crooked River WSA (1125 acres) was identified as being part of a larger area over which the BLM had the lead.

What the Respondents Said

Public response on this issue was very polarized. Many of those favoring maintaining areas as unroaded on the Forest requested that acreage in each be increased over what was proposed in the Draft Plan. Lookout Mountain was most strongly supported to remain roadless, followed by "Ochoco Canyons," Rock Creek and Cottonwood Creek areas.

Those opposing roadless area management for recreation cited single-use management as the basis for their opposition, and grouped roadless areas with what they felt were other single-use areas, i.e. wilderness, research natural areas, and old growth.

Those commenting on the Deschutes Canyon-Steelhead Falls WSA favored expanding the wilderness to include more area if it was to be recommended as wilderness. There were few comments received on the North Fork Crooked River WSA.

Scenic or Visual Resources

The Draft Plan proposed managing 3,000 acres in the Bandit Springs area and a 7,000 acre area encompassing Crystal Creek, Walton Lake, Round Mountain, Lookout Mountain, Mount Pisgah, and East Point to protect the natural appearance of the landscape. Scenic corridors proposed totalled 52,000

acres, or about 50 percent of the potential roadside viewing of 106,700 acres.

What the Respondents Said

There were relatively few comments from the public on this issue. Most comments favored retaining Highway 26 as a scenic corridor. Some people felt that scenic corridors were just another means of reducing the timber base. The State of Oregon expressed strong concern about maintaining the visual character of the Ochoco Forest over time.

Old Growth Forest

The Draft Plan proposed to provide 26,400 acres specifically allocated (dedicated) to old growth management. Approximately 23,500 more acres of old growth were thought to be available in wilderness and unroaded areas.

The size and distribution of the areas managed for old growth habitat were designed to meet habitat requirements for the pileated woodpecker, a management indicator species.

What the Respondents Said

A great majority of those responding desired a larger allocation for old growth. Some also expressed interest in preserving old growth juniper habitat.

Fuelwood Supply

The Forest currently supplies about 10,000 cords of fuelwood per year. This is expected to decrease after a few decades as harvesting is done in younger stands. There is a large amount of material currently not used because of poor access (distance from road, distance from town) and because of small size. The availability and location of fuelwood is directly related to the timber sale program. Fuelwood gathering often conflicts with leaving adequate number of snags for wildlife.

What the Respondents Said

The people who use fuelwood for heating (which includes a majority of local residents) favored the continued availability or increase in availability of fuelwood.

Snag Dependent Wildlife

The Draft Plan proposed providing 55 percent of the potential snag habitat. Snag levels vary by management area, ranging from 40 percent in areas managed for timber production to 100 percent in wilderness and roadless areas. Fuelwood cutting and timber sales may not be leaving adequate supplies of snags.

What the Respondents Said

Most of the respondents on this issue wanted snags reserved for wildlife. There was concern that the Forest Plan did not adequately protect snag habitat and that too many snags would fall prey to woodcutters and commercial timber sales. Conversely, timber industry strongly requested an expanded salvage program, which could conflict with leaving snags or snag replacement efforts.

Winter Sports

At present, most of the Forest, except for the cross-country ski trails at Bandit Springs, is open to winter recreation, including snowmobiles. The Draft Plan proposed closing the summit of Lookout Mountain (3,000 acres) to snowmobiling.

The greatest limitation to winter recreation on the Forest is the lack of access, which at present is provided almost entirely by roads plowed to access timber sales.

What the Respondents Said

The proposal to close Lookout Mountain to snowmobiling was strongly opposed by snowmobilers. This appeared to be the major issue concerning winter sports that surfaced in the public comments. In contrast, there was little support by cross-country skiers for closing Lookout Mountain, or other areas of the Forest, to snowmobiling. Staff observations of winter use of Lookout Mountain indicate that the conflict between skiers and snowmobilers is normally minimal, and that at present use levels both uses can be accommodated in the area. One suggestion was that separate trails for skiers and snowmobilers to the top of Lookout Mountain be provided.

Additional Issues Not Identified in the Original ICO's

Anadromous Fish

Anadromous fish were not identified as an issue in development of the DEIS and Proposed Forest Plan. Anadromous fish were identified as a concern by several individuals and groups, including a lengthy, technical response from the Columbia River Inter-Tribal Fish Commission (CRITFC). Primary concerns included protection and enhancement of spawning habitat, and the adequacy of the monitoring schedule. Native American groups noted that treaties guarantee protection for anadromous fish habitat.

Historic Trail Preservation-Summit Trail

This management concern developed out of a separate study conducted during the interim between issuance of the DEIS/Plan and Final. The Forest coordinated with the State Historic Preservation Office (SHPO) on details contained in the Final. This trail has been related also to other groups' proposals for an east-west intertie for a cross-state trail system.

Off-Road Vehicle (ORV) Use

This issue re-emerged during the issue validation phase for the Final Plans. It was not an issue of Forest-wide perspective in the Draft Plan phase. It was addressed in the Travel Plan.

Round Mountain

The Oregon Natural Resources Council in comment on the Draft Plan asked that a recreation unit be established for the Round Mountain area. This issue was brought up again by one individual in the validation process and addressed as part of the multiple use decisions.

Validation of Public Participation Process

Incorporation of public involvement into the decisions being reached in the final Forest and Grassland Plans has been an integral step in progressing from the Draft documents released in September 1986. Significant steps were taken during the last four months of final document preparation to insure that direction in the final plans responded accurately to comments received on the Draft. In response to public comment, new information, and legislation significant changes were made in the preferred alternative between Draft and Final. Concurrently, with the alternative modification, the Forest Service worked closely with the public in attempting to validate and/or seek "consent" for the Final Plan. During recent months, 39 meetings with more than 289 key individuals involving more than 70 interest groups or agencies were conducted. A video was developed on uneven-aged management in ponderosa pine and widely viewed and distributed. This networking and collaboration has laid a strong foundation for Plan implementation.

Summary of Changes Between the Draft and Final Preferred Alternative

1. The Forest and Grassland are treated in separate Plans.
2. The land and resource allocations are more refined - there are sixteen management areas in the Grassland Final, compared to eight in Draft; the Forest has twenty-eight in the Final, compared to fourteen in the Draft. (See Chapters 4, Forest and Grassland Plans.)
3. The additional management areas above primarily represent additional allocations for wildlife and recreation. (See Tables 2 and 3, this summary; and Chapter 4, Forest and Grassland Plans.)
4. Timber management in the Final is based on

sustained even-flow with an ASQ of 19 MMCF (115 MMBF 1st decade), compared to Draft which had a departure from even-flow with an ASQ of 20.6 MMCF (123 MMBF 1st decade) declining to 16.1 MMCF in the 5th decade. (See Table 2-8, Chapter 2, FEIS; and Timber Goals and Objectives, Chapter 4, Forest Plan.)

5. The Draft was based primarily on even-aged silviculture, the Final incorporates 100,000 acres of uneven-aged management in ponderosa pine and in the general forest (MA-F22), and additional opportunities, for example, within visual corridors. (See Chapter 2 and Appendix E, FEIS. Also see Standards and Guidelines, Chapter 4, Forest Plan.)

6. Larger rotation diameters are established for ponderosa pine (18" even-age, 20" uneven-age vs. 14-16" in the Draft.) (See Standards and Guidelines, Chapter 4, Forest Plan.)

7. Updating of FORPLAN model with new prescriptions, yield streams, yield tables, and condition classes. (See Appendix B.)

8. Economic analysis revised to reflect new information, schedules, allocations, assumptions, and additional resources such as mineral leases and anadromous fish. (See Appendix B.)

9. Segments of North Fork Crooked River, Deschutes River and Crooked River formally classified under the Oregon Rivers Act, as compared to Draft where their eligibility was reported. An eligibility and suitability analysis has been completed for a 1,370 acre segment of Lower Squaw Creek from the Grassland boundary to its confluence with the Deschutes River. Alternatives B-Modified and I indicated that this segment of Lower Squaw Creek be recommended to Congress for designation as a "scenic river" in the Wild and Scenic River System. (See Chapter 4, Section 2, Forest Plan.)

10. A 5,200 acre wilderness area was proposed in the Draft for the Deschutes Canyon-Steelhead Falls Wilderness Study Area (WSA); in the Final no wilderness is recommended. Instead, a 7,840 acre semiprimitive nonmotorized area is established. Part of the WSA is included in the classified Deschutes Scenic River corridor. (See Chapter 4, Section 3, Forest Plan.)

11. The Draft recommended 38,710 acres of roadless area remain unroaded; the Final recommended 39,730 acres. Green Mountain was proposed for semiprimitive motorized recreation in Draft, and was allocated to multiple use (General Forest, MA-F22) in the Final. The Rock Creek/Cottonwood Creek area to be managed as roadless in the Draft was decreased some. Silver Creek remained essentially the same. Lookout Mountain was planned for 2,930 acres to remain unroaded in the Draft, and is treated as a 15,660 acre management area emphasizing semiprimitive, nonmotorized recreation (7,550 acres) and recreation and wildlife (8,110 acres) with no scheduled timber harvest in the Final. (See Chapter 4, Forest Plan.)

12. Additional emphasis is placed on visual and scenic resources in the Final. An additional 18,080 acres are assigned the visual quality objective of partial retention or greater in the Final. (See Standards and Guidelines, Chapter 4, Forest Plan.)

13. Dispersed recreation sites are identified and recognized as an allocation in the Final; they were not in the Draft. (See Standards and Guidelines, Chapter 4, Forest Plan.)

14. Additional areas with special features or recreational attractions were allocated in the Final that were not in the Draft (e.g. Stein's Pillar, Deep Creek, Lookout Mountain). (See Chapters 4, Plans.)

15. Lookout Mountain (MA-F11) remains open to snowmobiles in the Final; in the Draft it was proposed to be closed. (See Chapter 4, Section 2, Forest Plan.)

16. Developed recreation sites, not included in the Draft, are incorporated into the Final (e.g. Cove Palisades, Haystack). (See Chapter 4, Section 2, Grassland Plan)

17. Areas emphasizing wildlife not included in the Draft are incorporated into the Final (e g ,

Hammer Creek, eagle roosting sites, Rimrock Springs). (See Chapters 4, Sections 2 to 3, Forest and Grassland Plans.)

18. The old growth allocations were changed between the Draft and Final. The old growth identified in the Final is comprised of 95 percent "suitable" stands, compared to 58 percent "suitable" in the Draft, although about 5,000 acres less are dedicated. Old growth juniper is allocated on the Grassland, it was not in the Draft. (See MA-F6, MA-G5, Chapters 4, Sections 2, Forest and Grasslands Plans.)

19. The acreage of winter range allocated for big game stayed the same, with the exception of antelope winter range on the Grassland which was increased; improved spatial distribution of the winter range area was done in the Final. Another allocation representing potential winter range (MA-F21) was identified in the Final. (See Chapters 4, Section 2, Forest and Grassland Plans.)

20. No allocations were made for summer range in the Final, as compared to the Draft which allocated 154,100 acres for big game summer range. Habitat requirements for big game are considered throughout the Forest and Grassland management areas as specified in the standards and guidelines in Chapters 4.

21. Road density objectives are changed - in the Draft they were two mi/section on winter range and four mi/section in the timber/range emphasis; in the Final they range from one mi/section on winter range (seasonally) to three mi/section on general forest. (See Standards and Guidelines, Chapters 4, Forest and Grasslands.)

22. Cover guidelines for elk and deer were changed to reflect natural vegetation capabilities and patterns; more emphasis is placed on mixed conifer for cover. Modeling assumptions for calculating habitat effectiveness were changed. (See Appendix B, FEIS, and Standards and Guidelines, Chapter 4, Forest Plan.)

23. Forage utilization standards for domestic livestock grazing have been standardized by the Region in the Final. A system for prioritizing range allotment planning needs and riparian improvements is established specifically by grazing allotment in the Final, as compared to a general forest approach involving water developments in the Draft. (See Standards and Guidelines, Chapters 4; and Appendices A, Forest and Grassland Plans.)

24. All streamsides will be managed for excellent conditions, compared with the Draft which had two riparian prescriptions. A travel plan is developed in the Final reflecting the land allocations and management direction, compared to the Draft where all areas were open unless otherwise identified. (See Appendix D's; MA-F15 and MA-G9, and Standards and Guidelines, Sections 2 and 3, Chapters 4, Forest and Grassland Plans.)

25. Utility corridors, minerals and land adjustments are addressed more specifically in the Final, than in the Draft. (See Chapters 4, Forest and Grassland Plans.)

26. A Summit National Historic Trail (MA-F7) has been identified and incorporated into all alternatives. Anadromous fish, ORV's and Round Mountain are additional issues identified in the Final, not shown in the Draft. (See Chapter 2, FEIS; and Chapters 3, Forest and Grassland Plans.)

Affected Environment

The land administered by the Ochoco National Forest occupies 844,640 acres within Crook, Harney, Grant and Wheeler Counties. The Crooked River Grassland contains 111,510 acres in Jefferson County. Total population of a six county area, which includes those above plus Deschutes, is approximately 105,000. The area's economy is highly dependent on forest related industry, government agencies, agriculture, recreation and tourism.

The Ochoco, which in the language of the Paiute Indian means "wind in the willow," is characterized by park-like stands of old-growth ponderosa pine

intermingled with mountain meadows. The Ochoco and Maury Mountains, where the Forest occurs, range from 2,200 feet to over 7,000 feet in elevation. The Forest is drained by the Crooked and John Day Rivers. The National Grassland consists of high lava plains, canyons, and volcanic buttes and is drained by the Deschutes River.

For more detailed information the reader is referred to FEIS Chapter 3.

Alternatives Including the Proposed Action

Based on public issues, management concerns and the natural resources involved, the Forest formulated and analyzed 11 implementable alternatives, and eight benchmark alternatives in the DEIS. In addition, a "no change" alternative was presented in a Supplement to the DEIS. As a result of the public response to these alternatives, new information, and legislation, all but three of the above alternatives were dropped in the Final, two were modified, and a new alternative was created. The latter, Alternative I, is the preferred alternative. The status of the alternatives generated in the planning process is displayed in Table S-1. Thus a total of 15 alternatives were fully developed, analyzed and evaluated over the course of the planning process in arriving at the selection of the preferred final.

An analysis of the requirements of NFMA which are incorporated into alternatives was completed. Alternative ways of meeting the management requirements were analyzed and opportunity costs are given in Appendix F.

Preferred Alternative

The preferred Alternative I is represented by a combination of management areas (allocations) that reflect public comment, new information and recent legislation. The National Forest and Grassland are listed separately.

Management Area Allocations

The preferred alternative establishes land allocations which apply to specific uses, resource considerations, natural features or legislatively designated areas. The allocations are mapped as Management Areas (see Alternative I map) and have had preliminary ground truthing. Specific standards and guidelines (prescriptions) have been developed for each management areas.

The management area allocations for the Forest and Grassland are summarized (by resource emphasis) in Tables S-2 and S-3, and they are presented in more detail in Tables S-4 and S-5. Objectives and desired future condition have been described by management area in Chapters 4, Forest and Grassland Plans.

The grouping of management areas for modeling and prescriptions is discussed in Appendix B and Chapter 2 of this FEIS, and summarized on page S-18.

TABLE S-1

DISPOSITION OF ALTERNATIVES CONSIDERED IN THE FINAL

	ALTERNATIVES															
TREATMENT	A	B	B Dep	B Mod 1/	C	C Mod	D	E	E Dep	F	G	H	H Dep	I Pre 2/	NC	CD BNCH 3/
Detailed Alts in DEIS	X	X	X		X		X	X	X	X	X	X	X		X	X
DEIS Alts Detailed in FEIS									X						X	X
DEIS Alts Eliminated in FEIS	X	X	X		X		X	X		X	X	X	X			
New Alts Detailed in FEIS				X		X								X		

/1 Alternative B-Mod represents evolution and change of Alternative B-plus proposed by timber industry Alternative B-Mod is a new industry alternative It is different than B-Departure in the draft, the latter of which was much the same as Alternative B

/2 Preferred Alternative I

/3 Current Direction Benchmark with National Forest Management Act (NFMA), Alternative A in this FEIS

TABLE S-2
RESOURCE EMPHASIS BY ACRES AND % OF FOREST

RESOURCE EMPHASIS	# MGMT AREAS	ACRES	% OF FOREST
TIMBER/FORAGE	2	499,330	59%
WILDLIFE	3	174,620	21%
OLD GROWTH	1	19,250	2%
RECREATION	10	48,350	6%
SCENIC/VISUAL	3	40,110	5%
WILDERNESS	4	37,330	4%
RIPARIAN	1	18,130	2%
RESEARCH	1	4,400	<1%
WILD & SCENIC	2	2,660	<1%
FACILITIES	1	460	<1%
TOTAL		844,640	

TABLE S-3
RESOURCE EMPHASIS BY ACRES AND % OF GRASSLAND

RESOURCE EMPHASIS	# MGMT AREAS	ACRES	% OF FOREST
RANGE/FORAGE	1	59,440	53%
WILDLIFE	3	35,870	32%
RECREATION	4	9,400	10%
RESEARCH	1	110	<1%
RIPARIAN	1	2,110	2%
SCENIC/VISUAL	1	560	<1%
WILD & SCENIC	2	2,740	<1%
OLD GROWTH	1	740	<1%
FACILITIES	2	540	<1%
TOTAL		111,510	

TABLE S-4
CROOKED RIVER NATIONAL GRASSLAND MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	*Acres*	*% Total*	*Resource Emphasis*
MA-G1 Antelope Winter Range	*22700*	*20*	*Wildlife*
MA-G2 Metolius Deer Winter Range	*12740*	*11*	*Wildlife*
MA-G3 General Forage	59440	53	Range
MA-G4 Research Natural Areas	110	<1	Research
MA-G5 Juniper Old Growth	740	1	Wildlife
MA-G6 Crooked River Recreation River	720	1	Wild/Scenic River
MA-G7 Deschutes River Scenic Corridor	650	1	Wild/Scenic River
MA-G8 Squaw Creek	7840	7	Recreation/Wildlife
MA-G9 Riparian	2110	2	Riparian
MA-G10 Rimrock Springs Wildlife	430	<1	Wildlife
MA-G11 Haystack Reservoir	150	<1	Recreation
MA-G12 Cove Palisades State Park	2690	2	Recreation
MA-G13 Lake Billy Chinook View	560	1	Visuals
MA-G14 Dispersed Recreation	90	<1	Recreation
MA-G15 Gray Butte Electronic Site	*80*	*<1*	*Facilities*
MA-G16 Utility Corridors	*460*	*<1*	*Facilities*
TOTAL GRASSLAND ACRES	111510	100	

TABLE S-5
OCHOCO NATIONAL FOREST MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	Acres	% Total	Resource Emphasis
MA-F1 Black Canyon Wilderness	13400	2	Wilderness
MA-F2 Bridge Creek Wilderness	5400	<1	Wilderness
MA-F3 Mill Creek Wilderness	17400	2	Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area	1125	<1	Wilderness

Management Area	Acres	% Total	Resource Emphasis
MA-F5 Research Natural Areas	4400	<1	Research
MA-F6 Old Growth 1/	19250	2	Wildlife
MA-F7 Summit National Historic Trail	9560	1	Recreation
MA-F8 Rock Creek/Cottonwood Creek	11820	1	Recreation
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter	2480	<1	Timber/Range
MA-F10 Silver Creek Area	3110	<1	Recreation
MA-F11 Lookout Mountain Recreation	15660	2	Recreation
MA-F12 Eagle Roosting Areas	570	<1	Wildlife
MA-F13 Developed Recreation	1810	<1	Recreation
MA-F14 Dispersed Recreation	1970	<1	Recreation
MA-F15 Riparian	18130	2	Riparian
MA-F16 Bandit Springs Recreation	1580	<1	Recreation
MA-F17 Stein's Pillar Recreation	1070	<1	Recreation
MA-F18 Hammer Creek Wildlife/ Recreation	2560	<1	Wildlife
MA-F19 Deep Creek Recreation	770	<1	Recreation
MA-F20 Winter Range	64130	7	Wildlife
MA-F21 General Forest Winter Range	107360	12	Timber/Wildlife
MA-F22 General Forest	496850	59	Timber/Range
MA-F23 North Fork Crooked River Recreation Corridor	1830	<1	Recreation
MA-F24 North Fork Crooked River Scenic Corridor	830	<1	Recreation
MA-F25 Highway 26 Visual Corridor	6850	<1	Visuals
MA-F26 Visual Management Corridors	33260	4	Visuals
MA-F27 Round Mountain National Recreation Trail	1000	<1	Recreation
MA-F28 Facilities	460	<1	Facilities
TOTAL FOREST ACRES	844640	100	

1/ Includes 8 old growth units within wilderness, unroaded, and WSA

Summary of Management Area Groupings and Prescriptions for Modeling the Preferred Alternative

Management areas were grouped in the modeling (FORPLAN) process and prescriptions for forest management assigned as shown below.

Group I

92,200 Acres - 11%
No scheduled treatment

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 N.F.C.R. Wilderness Study
MA-F5 RNA's
MA-F6 Old Growth
MA-F7 Summit Trail (preservation)
MA-F8 Rock Creek/Cottonwood Creek Unroaded
MA-F10 Silver Creek Unroaded
MA-F11 Lookout Mountain
MA-F28 Facilities

Group II

18,130 Acres - 2%
Silviculture - Even- or uneven-aged
Rotation Age - 200 years
Diameter 20"+
Average annual cu.ft. volume - 0.2 MMCF

MA-F15 Riparian

Group III

3,240 Acres - less than 1%
Silviculture - Even- or uneven-aged
Rotation age - 300 years
Diameter 30"
Average annual cu.ft. yield - <0.1 MMCF

MA-F12 Eagle Roosting
MA-F17 Stein's Pillar
MA-F19 Deep Creek
MA-F24 N.F.C.R. Scenic River

Group IV

28,110 Acres - 3%
Silviculture - Even- or uneven-aged
Rotation age - Pine 250 years, mixed conifer 200 years
Average annual cu.ft. yield - 0.6 MMCF

MA-F7 Summit Trail(retention)
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs
MA-F25 Hwy 26 Corridor
MA-F26 Visual Management - retention
MA-F27 Round Mountain National Recreation Trail

Group V

32,140 Acres - 4%
Silviculture - Even- or uneven-aged
Rotation age - Pine 200 years, mixed conifer 150 years
Diameter - Pine 27", mixed conifer 22"
Average annual cu.ft. yield - 0.7 MMCF

MA-F7 Summit Trail (partial retention)
MA-F18 Hammer Creek
MA-F23 N.F.C.R. Recreation River
MA-F26 Visual Management (partial retention)

Group VI

64,130 Acres - 8%
Silviculture - Even-aged
Rotation age - Pine 125 years, mixed conifer 90 years
Diameter - Pine 16", mixed conifer 15"
Average annual cu.ft. yield - 0.9 MMCF

MA-F20 Winter Range

Group VII

606,690 Acres - 72%
Silviculture - Even- or uneven-aged
Rotation age - Pine 130 years, mixed conifer 90 years
Diameter - Pine 18", mixed conifer 16" (uneven-aged 20")
Average annual cu.ft. yield - 16.6 MMCF

MA-F9 Rock Creek/Cottonwood Creek Helicopter
MA-F21 General Forest Winter Range
MA-F22 General Forest

Summary Description of Final Alternatives

Alternative NC - NO CHANGE

The "No Change" alternative has been developed as a no-action alternative representing current management plans. It provides for a level of goods and services as defined in unit plans and the 1979 Timber Resource Plan. The alternative does not comply with all provisions of the National Forest Management Act (NFMA), and could not be implemented or used in future management of the Forest without Congressional and/or Secretary of Agriculture action to change the law (see Supplement to the DEIS).

Alternative A - NO ACTION (Current Direction Benchmark in Table 1)

This is the "no action" alternative required by the National Environmental Policy Act. It would continue the present course of action established in plans and policies formulated and approved prior to passage of the NFMA and have been made consistent with present laws and regulations. Relatively high levels of timber production, combined with visual quality objectives, and moderate levels of fish and wildlife, are emphasized in this alternative. In the Draft this alternative was represented by the "Current Direction Benchmark with NFMA."

Alternative B-Modified - FOREST PRODUCTS INDUSTRY PREFERRED

This is the alternative supported by the forest products industry. Alternative B-Modified evolved from Alternative B, B-plus post-Draft discussions and Alternative I. Alternative B-mod. was developed by industry by amalgamating selected aspects of Alternative I with Draft B. The intent is to provide a high level of timber output with some considerations for other resources.

Alternative C-Modified - HIGH AMENITY VALUES

Alternative C emphasizes resources associated with amenity values. For example, riparian areas, scenic corridors, retention of roadless areas, recreation and forest management designed to provide big game habitat. Old growth and snags would also be provided at high levels. Timber and range resources would be managed at comparatively low levels. This is generally the alternative supported by the conservation community.

Alternative E - Departure - DRAFT PREFERRED

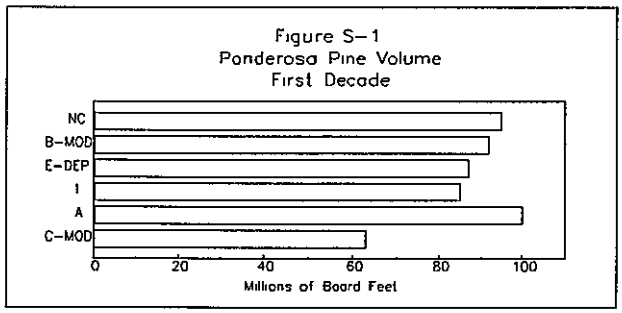
Alternative E-Dep was the Draft preferred alternative. It emphasizes a combination of timber production, roadless recreation, and big game habitat. Timber is scheduled as a departure from nondeclining yield. In other respects, this alternative is based upon, and is the same as Draft Alt. E. Timber harvests are scheduled so that first decade volumes remain close to current levels, and then decline over the next 10 to 50 years. The departure is designed to maintain local economic conditions for the short term. All resources are managed or maintained at least at moderate levels.

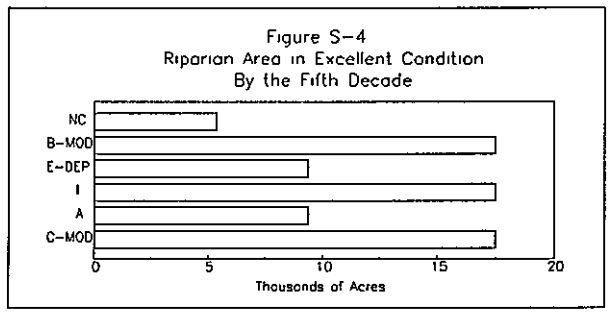
Alternative I - FOREST SERVICE FINAL

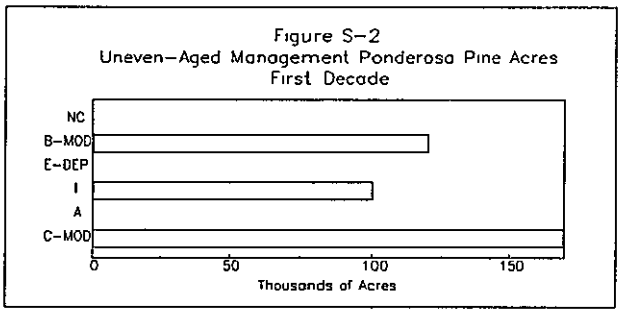
This alternative represents a new alternative evolved from E-Dep., the Draft Preferred Alternative, in response to new information, recent legislation, and public comment. It is the agency's preferred final.

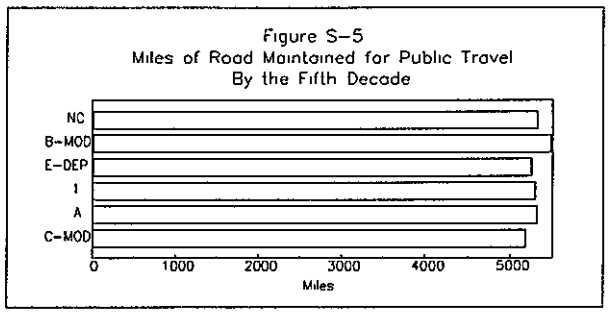
This alternative seeks to maintain a reasonably high level of commodity outputs on a sustained, nondeclining flow. In a complimentary and equitable manner it has also attempted to provide wildlife habitat and recreation resources, as well as preserving the character or setting of the Forest and Grassland over time. Alternative I differs from the Draft preferred E-Departure as noted in the summary of changes between the Draft and Final discussion on pages S-11 through S-13.

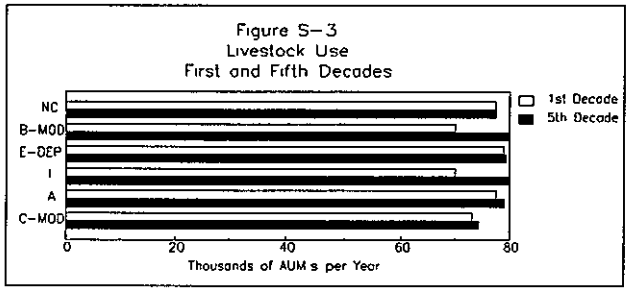
Figures S-1 through S-12 and Tables S-6 through S-9 present summary comparisons between alternatives for resource allocations, outputs, and economics.

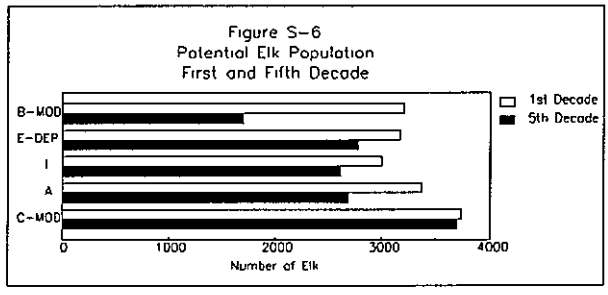












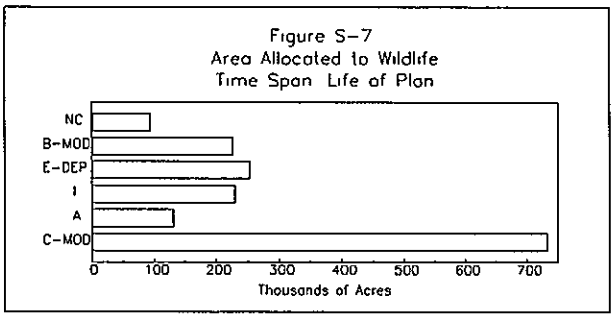


Figure S-7
Area Allocated to Wildlife
Time Span Life of Plan

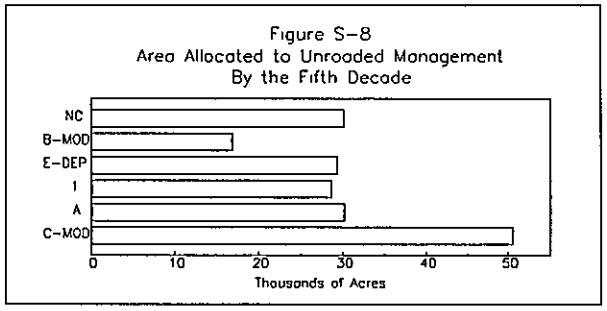


Figure S-8
Area Allocated to Unroaded Management
By the Fifth Decade

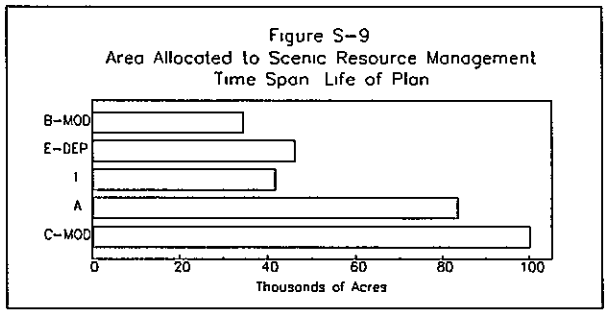


Figure S-9
Area Allocated to Scenic Resource Management
Time Span Life of Plan

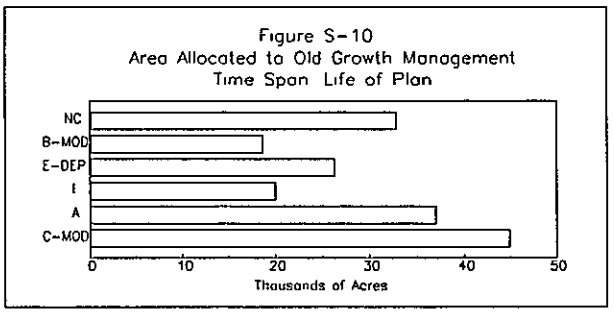


Figure S-10
Area Allocated to Old Growth Management
Time Span Life of Plan

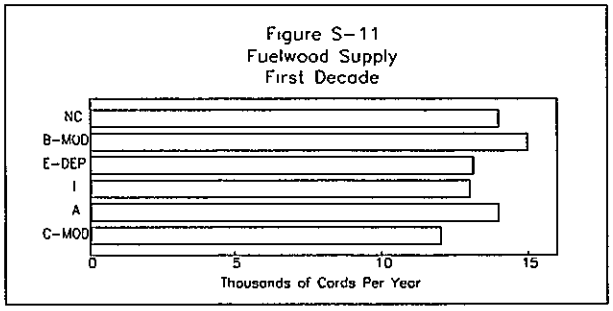


Figure S-11
Fuelwood Supply
First Decade

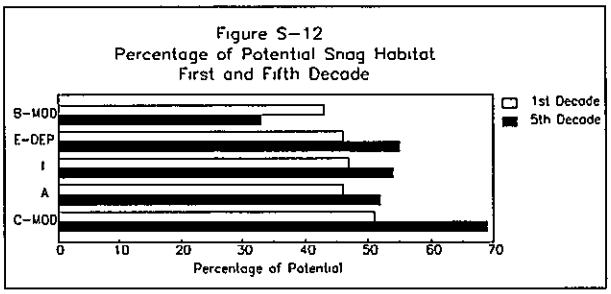


Figure S-12
Percentage of Potential Snag Habitat
First and Fifth Decade

TABLE S-6
RESOURCE EMPHASIS ACREAGES BY ALTERNATIVE

	ALTERNATIVES				
Emphasis	B-Mod	E Dep	I Preferred	A	C-Mod
Wilderness	37,325	39,825	37,325	37,325	47,325
Research Natural Areas	2,145	4,800	4,510	2,230	4,860
Old Growth	18,740	26,340	19,990	36,970	45,030
Cultural	0	0	9,560	0	0
Unroaded Recreation	17,130	27,315	37,060	31,200	40,960
Eagle Roosting	570	570	570	570	570
Developed Recreation	4,650	750	4,650	750	750
Dispersed Recreation	2,060	0	2,060	0	0
Riparian Excellent	18,930	8,260	20,240	3,850	15,550
Riparian Acceptable	0	7,630	0	12,210	0
Special Recreation	3,420	1,580	11,530	0	1,580
Special Wildlife	430	0	2,990	0	0
Big Game Winter Range	35,440	72,310	99,570	32,100	308,150
Big Game Summer Range	0	154,100	0	61,830	378,775
Timber/Wildlife	171,490	0	107,360	0	0
Timber/Range	603,010	555,020	556,290	649,170	0
Wild & Scenic Rivers	5400	4030	5400	4030	4030
Visuals	34,410	46,160	41,670	83,450	101,110
Facilities	1,000	460	1,000	460	460

TABLE S-6 CONTINUED, ACREAGE DOCUMENTATION

Emphasis	Applicable Management Areas
Wilderness	D8, F1, F2, F3, F4
RNA's 1/	D12, F5, G4
Old Growth	D4, F6, G5
Cultural	F7
Unroaded Recreation	D9, G8, F8, F10, F11
Eagle Roosting	F12
Developed Recreation	D11, F13, G11, G12
Dispersed Recreation	D9, D10, F14, G14
Riparian Excellent	D14, F15, G9
Riparian Acceptable	D13
Special Recreation	F11B, F16, F17, F19
Special Wildlife	G10, F18
Big Game Winter Range	D2, F20, G1, G2
Big Game Summer Range	D3
Timber/Wildlife	F21 (F20 for B-Mod)
Timber/Range	D1, F22, G3
Wild & Scenic Rivers 2/	F23, F24, G6, G7, G8 (that portion of Squaw Creek being recommended)
Visuals	D5, D6, D7, G13, F25, F26, F27
Facilities	F28, G15, G16

1/ RNA acreage totals are derived from the final management area mapping and R-2 data base acreage calculations RNA boundaries were slighty modified from the DEIS to the FEIS and consequently the total acreage for the final does not exactly track with that from the DEIS and the discussion of RNA's in Chapter 3 of the FEIS

2/ An eligibility and suitability evaluation has been made for Squaw Creek. A recommendation and interim management guidance for a Wild and Scenic River designation has been made in Alternative B Modified and I For those alternatives, 1,370 of unroaded recreation emphasis has been deleted and added to the Wild and Scenic River emphasis

TABLE S-7
INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO ISSUES, CONCERNS, AND OPPORTUNITIES

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Allowable Sale Quantity (ASQ)							
1st Decade	MMCF	N/A	21 8	20 6	19 0	19 3	15 6
5th Decade	MMCF	N/A	21 8	16 1	19 0	19 3	15 6
1st Decade	MMBF	N/A	130 0	123 0	115 0	115 0	94 0
Average Annual Salvage	MMBF		8	1 5	7	1 4	6
Uneven-Age Mgmt	M Acres	0	120	0	100	0	170
PNV	Million $	380	452	471	475	421	395
Estimated County Receipts	M $'s	Un-known	4 9	5 1	4 9	4 3	3 5
Estimated Change in Jobs	#	Un-known	176	196	118	57	-101
Livestock Use	M AUM's/Yr						
1st Decade		77 5	70 0	79 0	70 0	77 5	73 1
5th Decade		77 5	80 0	79 4	80 0	79 1	74 4
Riparian Areas in Excellent Condition							
1st Decade	M Acres	—	10 0	—	10 0	—	10 0
5th Decade	M Acres	5 4	17 5	9 4	17 5	5 4	17.5
Miles of Primary Road Open and Maintained -End of Planning Period	#Miles	4774	4800	4776	4734	4774	4743
Miles of Roads Closed	#Miles						
1st Decade		694	913	890	1558	694	1520
5th Decade		1734	2123	2082	2185	1734	3224
Deer Population							
5th Decade	#	Un-known	17,210	22,600	22,600	22,600	22,600
Elk Population	#						
1st Decade			3210	3170	3000	3370	3740
5th Decade		Un-known	1700	2780	2620	2690	3700
Acres Allocated-Unroaded 1/	M Acres	29 1	10 7	27 3	38 4	31 2	41 0

Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Scenic Resources							
Preservation	M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70.7	96 8	102 2	155 6
Partial Retention	M Acres	71 4	28 1	59 4	32 4	71 4	61 5
Allocated 2/	M Acres			34 4	46 2	41 7	83 5	101 1
Old Growth (Allocated) 3/	M Acres 32,860		18,740	26,340	19,996	36,970	45,030
Fuelwood Supply	M Cords						
1st Decade		14 0	15 0	13 1	13.0	14 0	12 0
Snag Habitat for Cavity Nesters	% of Potential						
1st Decade		Unknown	43	46	47	46	51
5th Decade		Unknown	33	55	54	52	69
Area Allocated To Recreation Emphasis 4/	Acres		28,630	35,065	58,120	31,950	48,710
Anadromous Steelhead	SHCI 5/ (M Smolt)						
1st Decade		121	121	121	121	121	121
5th Decade		220	220	220	220	220	220
Total Miles of ATV Trails	#Miles						
1st Decade		None	95	0	95	0	95
5th Decade		None	190	0	190	0	190
Round Mountain Recreation Emphasis 6/	Acres	N/A	1,000	0	1,000	0	0

1/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F11, G8)

2/ Total acreage for lands allocated to management areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

3/ Total acreage for lands allocated to management areas with old growth emphasis (D4, F6, G5)

4/ Total acreage for lands allocated to management areas with recreation emphasis (D9, D10, D11, F7, F8, F10, F11, F13, F14, F16, F17, F19, G8, G11, G12, G14)

5/ SHCI. Steelhead Habitat Capability Index, thousands of smolt

6/ Acres on Round Mountain with recreation emphasis (applies to Round Mountain National Recreation Trail)

TABLE S-8
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS 1/
(First Decade Volumes in MMBF)

TIMBER OUTPUT COMPONENT	ACTUAL 1979-88 Annual Ave.		EXISTING 1980 TM Plan	ALTERNATIVES PLANNED VOLUME BY ALTERNATIVE FOR FIRST DECADE					
	Sold	Cut	P.A.H 2/	NC	B-MOD	E DEP	I	A	C MOD
SAWTIMBER (Chargeable)									
Green sales (ASQ)3/	136 9	111 6	127 1	127 1	130	123	115	115	94
Est. pine volume 4/	109 1	87 5	95	95	85	87	82	79	65
Salvage sales	Include	above	2.7	2.7	4	5	4	4	3
SALVAGE SALES & SAWTIMBER (Est. percent change in next five decades) 6/	136 9 5/	111 6	129 8	129 8	134 (-7)	128 (-30)	119 (-10)	119 (-10)	97 (-10)
SAWTIMBER (Nonchargeable) negligable in existing or planned program	0	0	0	0	0	0	0	0	0
SUBMERCHANTABLE (Post, poles, cull)	1 3	1 3	Unestimated in existing or planned progam						
CONVERTIBLE PRODUCTS Firewood 7/	2 7	2 7	unestimated	unesti-mated	7	7	6	7	6
TOTAL (TSPQ)	138 2	110 1			141	135	125	126	103

1/ Note that due to different bases for calculation, these figures may not be directly comparable However, they may be used to show changes in specific comonents for calculations, over time All calculations were done in cubic feet. The volumes in this table are estimates based on board foot/cubic foot ratio

2/ Yield of timber projected for the period of 1980 to 1989, as calculated for the 1980 Timber Management Plan and adjusted for 1984 Oregon Wilderness Bill The Programmed Allowable Harvest (P.A.H.) is the sawtimber from green and salvage sales scheduled for harvest.

3/ Allowable sale quantity calculated for the current land and resource management plan direction, projected into the future using new scientific information, such as yield tables and suitability for timber harvest, and using FORPLAN analysis model

4/ Estimated volume of ponderosa pine that is included in green sale volume

5/ Average volume sold was not adjusted for "buy-back" volume

6/ Reduction in all but E DEP is due to change in BF/CF ratio and estimated reduction in salvage volume as more stands become managed Change in E DEP is mostly due to the planned departure from even flow

7/ Actual firewood volume is based on years 1985 to 1988 Essentially all of this was sold as personal use Planned volume is the estimated amount if firewood available Typically less than half of this will be utilized

TABLE S-9
PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES
(Ranked by Decreasing PNV - Million Dollars)

Alternative/ Benchmark	Present Net Value	*Change*	*Discounted Costs*	*Change*	Discounted Benefits	*Change*
Max PNV Benchmark 7	512		241		754	
Alternative I	475	-37	227	-14	701	-53
Alternative E-Dep	471	-4	221	-6	693	-8
Alternative B Mod	452	-19	262	+41	714	+21
Alternative A	421	-31	238	-26	657	-57
Alternative C-MOD	395	-26	213	-23	608	49
No Change	380	-15	245	+32	653	+45

Environmental Consequences Summary

Effects on Resources that Vary by Alternative

Oregon State Air Quality Implementation Plan

The current Forest and Grassland prescribed fire program is producing 10 to 20 tons/year of total suspended particulates (TSP). This amount varies by alternative. Fugitive dust from construction activities and traffic also occurs.

Cultural Resources

Cultural and archaeological sites will be protected in all alternatives. However, the possibility of damage, vandalism, and discovery of sites will be greater in alternatives that emphasize commodity resources.

Developed Recreation

The Forest maintains 30 developed recreation sites; 96 miles of trail, 15.8 miles of which are designated "National Recreation Trail"; and seven small reservoirs. Alternatives consider the development of additional recreational facilities, including trails, campgrounds and impoundments. The associated recreational activities can result in environmental effects of a local nature, such as vegetation loss, soil compaction, erosion, and conflicts with wildlife, timber harvest activities, and livestock grazing.

Dispersed Recreation

Over 445,000 visitor days of use are received annually, and recreation use continues to increase. This amount of dispersed recreational use calls for controls on off-road vehicle use to prevent noise pollution, damage to soil, vegetation, and aesthetics; and road closures to maintain habitat security for wildlife, to prevent damage to road surfaces, and to prevent conflicts with other resource management activities such as log hauling. The alternatives affect the amount of unroaded area available for semi-primitive and other dispersed recreational activities.

Energy Conservation

Activities on the Forest and Grassland which generally have a positive net energy balance are firewood harvesting and forage production. Generally, all other activities consume more energy than they produce. The average range that energy consumption from planned National Forest activities exceeds energy yields has been estimated to be in the magnitude of three to five billion BTU's/decade.

Fire and Fuels

There are an average 108 wildfire ignitions per year. Prescribed fire is being increasingly used as a management tool. Approximately 15 to 20 thousand acres of slash are treated with prescribed fire annually. Use of fire in management can have effects on soil erosion, short-term appearances, air quality, vegetation productivity, plant community, species composition, and fuels.

Floodplains and Wetlands

Considerations for floodplain management as required by Executive Order 11988, and protection of wetlands, Executive Order 11990, are incorporated into all alternatives.

Human Resource Programs and Civil Rights

The Forest and Grassland will continue to participate in these programs in accordance with the laws, administrative opportunities, and economic availability of programs. Minorities and economically disadvantaged groups will not be adversely affected by any of the alternatives.

Landscape Appearance

Emphasis on maintaining scenic quality within road corridors varies by alternative. Significant effects on landscape appearance are related to timber harvest practices; dispersion of cutting units, protection and

management of riparian areas; and road location, design, and densities, all of which are related to direction in the management prescriptions in Chapter 4 of the Plan.

Livestock Grazing

Livestock grazing is maintained at nearly current levels for most alternatives considered. Livestock grazing activities, if not carefully managed, can cause soil compaction, impact streamside vegetation, affect water quality of stream habitat for fisheries, compete with wildlife, affect plant community composition and productivity over time, and alter the appearance of natural settings. Water developments and salt intended for livestock also benefit wildlife.

Minerals

There is little real difference in the effects on mineral production or mineral leasing between alternatives. The effects on mining operations and mineral leasing would be reflected in operation plans and lease stipulations, for example alternatives proposing unroaded area management and research natural areas could result in attachment of no occupancy stipulations to specific leases. Mineral leasing provides returns to local governments in terms of receipts.

Old Growth Habitat

Old growth habitat is identified for protection and management for purposes of wildlife habitat and genetic diversity. The amount and dispersion varies by alternative. Protection of old growth habitat results in reduced timber harvest levels.

Prime Farmlands, Forestlands, and Rangelands

All the alternatives propose actions which are consistent with the intent of the Secretary of Agriculture direction for protecting and managing prime lands.

Research Natural Areas

Research Natural Areas (RNA's) preserve places for the purpose of research and maintaining genetic diversity. The maximum increase in area proposed for RNA's is 2,630 acres. The designation and protection of RNA's can affect timber harvest level, mineral leasing, road system development and grazing activities. Because of the small acreage involved, these consequences are minimal regardless of alternative.

Riparian

Approximately 800 miles of streamside area, plus wet meadows and lake shores, have been identified on the Forest as riparian areas. While only an estimated two percent of the total Forest and Grassland area is considered riparian, it receives the most intensive and concentrated use of any land area. More than 50 percent of the recreational use occurs there, transportation corridors are located along stream bottoms, grazing in the past has been intense; important wildlife habitats are found there; streamside areas provide productive timber sites; fisheries habitat is dependent, in part, on the condition of streamside vegetation. Nearly all Forest activities have either direct or indirect effects on riparian areas and water quality. Protection and restoration of riparian areas can impact other activities over the short term.

Roads and Off-Road Vehicles

Over 4,550 miles of roads have been constructed on the Forest and Grassland. Management and maintenance of this transportation system requires closures and restrictions at times to protect road surfaces, other resources, and public safety. Travel planning for road and off-road vehicle use has placed more restrictions on vehicles and motorized use of the Forest and Grassland in order to protect resources.

Social and Economic

The Forest and Grassland directly influences a six County area which contains a population of about 110,000. Socio-economic consequences are related to economic stability of communities, livelihoods in terms of numbers and types of jobs, local government revenues, lifestyles, and community cohesion. Alternatives favoring timber and other commodity uses tend to impact livelihoods and lifestyles dependent on amenity values, and vice versa. On this

Forest, the production of net cash returns to the U.S. Treasury, levels of employment, and payments to counties are directly dependent upon the level of timber production. These benefits are less under alternatives that place more emphasis on nontimber issues, such as those associated with wilderness and roadless areas, high levels of scenic quality, and vegetative diversity. The benefits associated with minerals are similar for all alternatives.

Threatened and Endangered Species

The only Federally listed threatened or endangered species observed on the Forest/Grassland are the peregrine falcon and bald eagle. Neither is a known permanent resident. All Federal and State listed species are protected in all alternatives as provided for in the standards and guidelines in Chapter 4 of the Forest and Grassland Plans, or Appendix D of this FEIS.

Formal consultation with the Fish and Wildlife Service (FWS) was initiated through request by the Forest Service in October 1986. The resultant FWS consultation addressed the possible effects of selecting Alternative E- Departure in the DEIS. The consultation was limited to the bald eagle and the peregrine falcon, both federally classified as endangered. The biological opinion of the FWS is that the implementation of Alternative E-Departure in the DEIS would not jeopardize the continued existence of the bald eagle and peregrine falcon.

There has been continued informal consultation between the Ochoco National Forest and FWS since the DEIS. The Feis incorporates a number of changes that have resulted from both the formal and informal consultation. Among them are the allocation of 570 acres to an Eagle Roosting Management Area (MA-F12) for all the alternatives, specific monitoring requirements for threatened and endangered species, and the direction to develop site specific management plans for the roosting sites during implementation of the Forest and Grassland Plans.

Timber Management

Timber production and associated management, and cultural activities have the greatest influence locally on jobs and economics of any resource on the Forest. An array of alternatives ranging from 15.6 million cubic feet production per year to 21.9 million cubic feet is examined in the environmental impact statement. The alternatives considered emphasize utilization of appropriate silvicultural systems which may be either even- or uneven-age depending on field conditions and objectives. Timber management and associated activities such as road construction, reforestation,thinning, harvest, slash disposal, and various site treatments have a wide variety of effects on other resources, particularly soil, water, air, wildlife, fisheries, landscape, recreational experiences, and socio-economics. Practices and management requirements are applied that minimize adverse effects.

Toxic and Hazardous Materials

Activities that may occur on the Forest and Grassland involving the use or disposal of hazardous or toxic materials are required to meet all State and Federal laws and provisions. Therefore, provisions and procedures for dealing with any of these materials are the same for all alternatives.

Unroaded Areas

The areas remaining that have not been designated as wilderness or wild and scenic rivers, totaling 52,880 acres, are treated in the Plans.

The range of alternatives provides for varying degrees of development, or retention of roadless characteristics for semiprimitive recreation.

The most significant conflict of maintaining unroaded areas is with timber production. Approximately 38,430 acres will be managed in an unroaded condition for semiprimitive recreation under the preferred alternative.

Utility and Transportation Corridors

All alternatives recognize State and County road corridors. Utility corridors are also recognized and no alternatives result in any conflict with movement of power or energy throughout the area.

Wild and Scenic Rivers

An inventory conducted by the National Park Service under PL 88-29 and PL 90-252 identified segments of the Deschutes River, Crooked River, and North Fork Crooked River for study and potential classification under the Wild and Scenic Rivers Act. The Oregon Rivers Act of 1988 classified segments of these rivers. All alternatives provide for the protection of the rivers until required planning for their management is complete.

Eligibility and suitability determinations have been made for a portion of the Squaw Creek area. A 7.5 mile segment of the creek, 1,370 acres, from the Grassland boundary to the confluence with the Deshutes River would be managed as a "scenic river." In addition, it would be recommended for inclusion in the Wild and Scenic River System. This preliminary recommendation would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designations of rivers as part of the National Wild and Scenic Rivers System.

Wilderness Establishment

Three wilderness areas totaling 36,200 acres were established under the Oregon Wilderness Act of 1984 on the Ochoco National Forest. A range of options were considered for the Deschutes River-Steelhead Falls area which the Oregon Wilderness Act identified for further study. No wilderness is being recommended. A 7840-acre semiprimitive nonmotorized management area is being established which involves part of the WSA; some of the remaining portion is included in the classified Deschutes Scenic River. North Fork Crooked River area is addressed in a separate study by the BLM. The BLM recommended no wilderness in their draft EIS for this area.

Wildlife

Important game species habitat, namely deer and elk, is afforded some degree of protection in all alternatives, but its management is emphasized in certain ones. Snag and old growth forest habitat is provided at varying levels throughout a range of alternatives. Fish habitat protection is related to those alternatives emphasizing management of riparian areas. Management activities and uses on the Forest and Grassland directly and indirectly affect wildlife and fisheries habitat. Road construction, timber harvest, timber cultural practices, livestock grazing, recreation uses, prescribed fire, and firewood cutting are common activities on the Forest and Grassland which can affect wildlife and fisheries habitat. Alternatives, management requirements, standards and guidelines, and project design incorporate means to minimize impacts on wildlife and their habitat.

Probable Adverse Environmental Effects that cannot be Avoided

Soil displacement or erosion can be expected to result from planned management activities, such as vegetation removal; slash disposal; logskidding; prescribed fire, construction and maintenance of roads, trails, transmission facilities, recreation sites and others. Soil productivity would be maintained except for sites dedicated to roads, skid trails, log landings, recreation sites, and other facilities or uses that may compact the soil, alter soil profile, or deplete nutrients. An estimated one percent of the Forest and Grassland would be occupied by roads or facilities. Experience has shown that temporary road surfaces can be re-vegetated, but the productivity is reduced. Forest-wide an estimated 10 percent of cable-logged areas and 30 percent of tractor-logged areas would experience increases in soil bulk densities or compaction. These factors, in turn, have indirect effects relating to reduced wildlife habitat, vegetation productivity, occurrence and spread of noxious weeds, and increases in stream sedimentation.

Prescribed fire use may be expected to contribute to total suspended particulates (TSP) in the atmosphere, to periodic increases in haze, and may reduce visibility.

The general natural appearance of the landscape and forest would change overtime, with the natural and characteristic features as they exist today giving way to more domination in places by management activities and results of management.

Forest vegetation would be altered in respect to species composition, stand structure, and age. Existing mature forest "suitable" lands would be subject to management treatments. Where feasible, mixed conifer stands would be replaced with currently more economically or silviculturally desirable species (primarily ponderosa pine). Other management treatments include overstory removal of old-growth ponderosa pine from multi-storied stands, resulting in a reduction in basal area, and removal of less desirable species within densely forested areas by thinnings. Intensively managed or regulated forests may provide less habitat for species dependent on old growth forest, snags and down material, and provide less scenic settings, species diversity, and habitat diversity.

Average size of trees that are harvested would change over time to smaller material as old growth and existing mature forest are converted to younger stands. Over time this would have an affect on types of harvest equipment and wood processing, and machinery and manufacturing requirements; and likely will bring a shift towards cubic feet management rather than board feet.

Approximately 93,110 acres on the Forest and Grassland would remain roadless. With the exception of 36,200 acres designated as wilderness, 4030 acres designated as wild and scenic rivers, and 52,880 acres remaining available, opportunities for semiprimitive recreation may decrease over time.

Increased road densities, improvement in access, subsequent increases in human presence, and continuing expansion of management activities can result in reduction of wildlife habitat security, harassment of wildlife, increased road kills, physiological stress in wildlife species resulting in altered behavior and productivity, and changes in hunter attitudes and experiences over time. The preferred alternative provides for road management closures and restrictions which would reduce open road density over the next five decades.

Actions to improve riparian conditions may result in increased costs to grazing management; e.g., in installation of improvements (fencing and water developments), herding, and transport to control stock distribution and use, and possible temporary reductions in animal unit months.

Current procedures cannot insure that all cultural resource sites will be located. Some sites could be inadvertently destroyed or damaged. Such impacts are unavoidable pending advances in inventory techniques.

Forest users would encounter more controls and restrictions over time as management intensity, resource competition, and human populations increase.

Short-Term Uses of the Environment and Maintenance of Long-Term Productivity

From a perspective that each generation is trustee of the environment for succeeding generations, an objective of this Plan is to provide for the proper and continued development of resources in a manner that maintains economic viability, yet maintains local natural heritages, such as, wildlife habitat, outdoor recreation opportunities, water quality, scenic qualities, and livestock grazing. The preferred alternative emphasizes a balanced mix of uses and intensive commodity (timber, range) production on suitable places in order to help provide economic stability, but also attempts to provide for the protection of other resources (soil, water, wildlife habitat, aesthetics).

While the Plan involves harvest of mature timber, sustaining or improving long-term productivity is planned through intensive forest management practices (e.g. reforestation and thinnings). This may result in future utilization of smaller trees to maintain harvest levels over time. Lands were identified as "unsuitable" for sustained yield timber management due to regeneration difficulties. Dispersion of timber harvest activity, retention of old growth, and protection of riparian areas and big game habitat have all been planned to prevent impairment of long-term land and resource productivity.

Construction of roads, mechanical slash piling, and log skidding are short-term uses that can reduce long-term vegetation productivity.

Increases in road densities, improvement in access, subsequent increases in human presence, and continuing management activities have the potential in the near future to affect long-term productivity of wildlife habitats, aquatic systems, and local socio-economic aspects.

Irreversible or Irretrievable Commitment of Resources

This plan deals with both developed and undeveloped or roadless lands. Lands where road systems, plantations, thinnings, and structures are established represent a type of economic commitment that for all practical purposes commits the land to those activities. These investments represent "sunk funds" from an economic standpoint and are not retrievable, nor do they necessarily have any "liquidity," over the planning period.

The specific acres (estimated to be one percent of the total Forest and Grassland area) upon which roads and facilities are constructed, represent a loss of soil and vegetation productivity and unaltered landscape.

Use of rock for road surfacing and construction purposes, estimated to be 200,000 tons annually on the Forest and Grassland, is an irreversible and irretrievable commitment of a resource, but is not considered critical because of the abundance of quality rock in this locale.

Undeveloped and roadless areas once allocated for development will, within a relatively short amount of time, become irretrievably unsuited for wilderness classification. In the case of lands already intensively developed by roading, a high degree of irreversibility exists; whereas, in the case of undeveloped lands, frequently a wide range of management options exist.

Dasmann, et al, in *Ecological Principles for Economic Development*, 1973 (pp. 22-23), recognized six broad development levels for lands, each representing progressively greater commitment of resources. The development levels are:

1) The land can be left in a completely natural state and reserved for scientific study, educational use, wilderness, watershed protection, and its contribution to landscape stability.

2) It can be used as a park, refuge, or reserve with the natural scene remaining largely undisturbed to serve as a setting for outdoor recreation and an attraction to tourism.

3) It can be used for limited harvest of its wild vegetation or animal life, but maintained for the most part in a wild state - serving to maintain landscape stability, support certain kinds of scientific or educational uses, provide for some recreation and tourism, and yield certain commodities from its wild populations.

4) It can be used for more intensive utilization of its wild products as in forest production, pasture for domestic stock (recreation), or intensive wildlife production. In this case, its value as a "wild" area for scientific study diminishes, but it gains usefulness for other kinds of scientific and educational uses. Its value for (some) tourism and outdoor recreation diminishes, but is not necessarily lost. Its role in landscape and watershed stability is changed, but may be maintained at a relatively high level.

5) The wild vegetation and animal life having been removed in part, it can be intensively utilized for the cultivation of planted tree crops, pastures, or farming crops.

6) The wild vegetation and animal life having been almost completely removed, it can be used for intensive urban, industrial, or transportation purposes.

So long as any of the first three choices are taken, the option remains open to change to any of the others. In the fourth choice, the options for restoring the land to any of the first three levels are reduced, but not eliminated. Lands allocated to development are likely to approach the fifth and sixth level over time.

This would largely prohibit any shift to other alternatives on those acres.

For Preferred Alternative I, with the resource allocations proposed herein, 19 percent of the lands are committed to categories of "low" or "moderate" irreversibility; about 80 percent of the land that is proposed for intensive timber culture, transportation systems, special uses, and rangeland management can be categorized as "moderately high." Another one percent would be considered "high" irreversibility of irretrievability for commitment of resources (Table S-10).

Mitigation

Mitigation measures are intended to minimize or eliminate potential conflicts or adverse effects of implementation. Mitigation measures have been developed through interdisciplinary efforts and incorporated into the alternatives at different levels in several different ways.

The standards and guidelines and management area prescriptions in Chapter 4 of the Plans are a fundamental and integral part of these measures, and as such they are a basic and essential part of the Plans.

The allocations play an important role in mitigation by the separation of incompatible uses, impacts and conflicts.

National Forest Management Act (NFMA) requirements were incorporated into the planning process and are reflected in the allocations and standards and guidelines (Chapter 4 of the Forest and Grassland Plans), and are discussed in Appendix B.

"General Water Quality Best Management Practices" (USDA Forest Service, Pacific Northwest Region, November 1988. 86p) are incorporated by reference under requirements of Section 319 of the Clean Water Act, are reflected in the standards and guidelines (Chapter 4 of the Forest and Grassland Plans), and are discussed in Appendix H.

Mitigation measures are developed at the site specific project level of planning, and projects are "tiered" to other planning level measures above.

Coordination with other Agencies

This planning effort involved coordination with major local, county, state, and federal agencies.

The Preferred Alternative is not in substantial conflict with the plans of any other agency.

TABLE S-10

Acreage by Levels of Irreversibility in Alternative I (The Preferred Final for the Forest and Grassland)

	Irreversibility					
Management Areas	Low 1	2	3	4	5	High 6
MA-F1	13,400					
MA-F2	5,400					
MA-F3	17,400					
MA-F4	1,125					
MA-F5	4,400					
MA-F6	19,250					
MA-F7		170	9,390			
MA-F8		11,820				
MA-F9			2,480			
MA-F10		3,110				
MA-F11		7,750	7,910			
MA-F12			570			
MA-F13				1,810		
MA-F14			1,970			
MA-F15			18,130			
MA-F16			1,580			
MA-F17			1,070			
MA-F18			2,560			
MA-F19			770			
MA-F20				64,130		
MA-F21				107,360		
MA-F22				496,850		
MA-F23			1,830			
MA-F24		830				
MA-F25			6,850			
MA-F26			33,260			
MA-F27			1,000			
MA-F28						460
MA-G1				22,700		
MA-G2				12,740		
MA-G3				59,440		
MA-G4	110					
MA-G5		740				
MA-G6		720				
MA-G7		650				
MA-G8		7,840				
MA-G9			2,110			
MA-G10		430				
MA-G11				150		
MA-G12				2,690		
MA-G13		560				
MA-G14			90			
MA-G15						80
MA-G16						460
TOTAL ACRES	61,085	34,620	91,570	767,870	0	1,000
Net Acres - Forest and Grassland 1/	60,860	34,480	90,430	766,750	0	12,000
Percent Total Acres Forest and Grassland	6	4	9	80	0	1

1/ Total acres less roads

Chapter 1

Purpose and Need

Chapter 1

Purpose and Need

Introduction

The Forest and Grassland Plans are major Federal actions with significant effects on the quality of the human environment; therefore, an Environmental Impact Statement is required. The Notice of Intent to prepare an EIS was published in the Federal Register in 1980; the Notice of Availability of the Draft EIS (DEIS) was published in the Federal Register on Sept. 12, 1986. A Supplement to the DEIS was prepared to address timber industry concerns outlined in two appeals, and a Notice of Availability was published in the Federal Register in October, 1989.

This Final Environmental Impact Statement (FEIS) discusses six alternatives, including the actions described in the Forest and Grassland Plans. A reasonable range of alternatives has been explored with an initial look at eleven alternatives in the DEIS. The Supplement to the DEIS, discussed in Chapter 2 of this FEIS, added the No Change (NC) alternative to reflect the continued application of the existing Ochoco National Forest Timber Resource Plan. The public comment to the DEIS has resulted in the formulation of Alternative I, and the modification of Alternatives B and C for the Final. This FEIS also describes the affected environment and the environmental consequences of implementing the alternatives.

The alternatives represent different ways to: 1) address local, regional, and national issues, concerns, and opportunities; 2) provide the mix of uses representing "multiple use"; and 3) provide a flow of goods and services from the Ochoco National Forest and the Crooked River National Grassland. Each alternative generates a different mix of goods and services. Alternatives were evaluated to determine their potential to provide a sustained yield of goods and services in ways that maximize long-term public benefits in an environmentally acceptable manner. The proposed action, Alternative I, provides multiple-uses, goods, and services which maximize long-term net public benefits within the laws and regulations governing National Forests. The definition of "net public benefits," as noted in 36 CFR 219.3, can be summarized as the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs).

The purpose of the FEIS is to document and disclose environmental outcomes to make a reasoned choice among alternatives. Equally important, the FEIS provides the environmental documentation for public review. The DEIS encouraged public participation and comment, and the FEIS reflects that participation and comment. The initial public involvement process and the resultant issues and concerns are discussed in Appendix A to this FEIS. The Forest responses to the public comments on the DEIS are displayed in Appendix I. The major changes between the draft preferred alternative in the DEIS and Preferred Alternative I in the FEIS are discussed in detail in this chapter.

The purpose of the Forest and Grassland Plans is to direct and guide all natural resource management activities on the National Forest and Grassland. The plans meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations (36 CFR 219). The plan period covers the next 10 to 15 years. This period is defined by the NFMA regulations as one decade (36 CFR 219.3 (1982)), while the law permits a 15-year maximum (16 USC 1604 (f)(5)). In the Plan, conditions on the Forest will be evaluated every five years.

Under certain circumstances, the plan may be revised (36 CFR 219.10 (g)(1982), 16 USC 1604 (f)(5)). Chapters 5 of the Forest and Grassland Plans discuss implementation and the Plan amendment or revision process.

A Record of Decision (ROD) accompanies this FEIS and outlines the processes and decisions, and the rationale for the decision. The decision is represented by the two Plans outlined in the proposed action in this FEIS, which is Preferred Alternative I. Information in the FEIS provided the basis from which the Regional Forester made the decision to implement the Plans.

Implementation of the Forest and Grassland Plans will involve project level environmental analysis as discussed in Chapters 5 of the Plans. These analyses will deal with issues and management concerns relating to the specific projects and project areas, and will be in accord with the direction in the two Plans. Project analysis will be tiered to this FEIS.

This FEIS includes a list of acronyms and a glossary of terms to assist the reader. The FEIS and the two Plans each have a table of contents, a list of tables and figures, and an index to assist the reader in locating the various subject areas and discussions.

The approved Plans will not become effective until at least 30 days after the Notice of Availability of the FEIS is published in the Federal Register. See Planning Records, pg. 1-3. Additional information on Regional planning procedures is available from the Director of Planning at the USDA Forest Service, Pacific Northwest Region, 319 S.W. Pine St., P.O. Box 3623, Portland, Oregon 97208.

Planning Process

The Forest Service has a four-level, integrated planning process as required by RPA, NFMA, and the related implementing regulations.

1. National	Resource Planning Act Assessment and Program.
2. Regional	Regional Guide for the Pacific Northwest Region (May 1984).
3. Forest	National Forest Land and Resource Management Plans (Forest Plans) for National Forest System lands. Tiered to Regional Guide.
4. Project	Site or project specific plans, generally at Ranger District level. Tiered to Forest Plan.

At the national level, the RPA program[1/] establishes long range resource objectives based on the present and anticipated supply of, and demand for, various resources. Each of the nine Forest Service Regions is apportioned a share of the National objectives based on that Region's resource capabilities and needs. The RPA assessment is an aggregation of the Region's forest plans.

The Forest Service Pacific Northwest Region resource situation is addressed in the "Regional Guide."[2/] This document apportions National objectives to each National Forest in the Pacific Northwest. In addition, the Regional Guide establishes certain management standards and guidelines.

The environmental analysis process, documented in this FEIS, has considered a reasonable range of alternatives . One of the alternatives consists of the current RPA Program resource objectives identified in the Regional Guide. Analysis of the alterna-

1/USDA Forest Service 1980 A Recommended Renewable Resources Program - 1980 Update FS-346 Wash D C
2/USDA Forest Service 1984. Regional Guide for the Pacific Northwest Region Portland, Oregon

tive's outputs and effects in Forest planning provides valuable information for future Regional and National Assessments and programs. The planning process is iterative; the information from the Forest level flows up to the National level, is utilized in developing the RPA Program, and then is related back to Regional and Forest levels.

Planning at the RPA program level is used to assist Congress in the development, appropriation, and authorization of the agency's annual budget. Since the amount and allocations in the annual budget have a major effect on Forest management activities, many of the Forest's actual outputs and environmental effects are determined to a great degree by the annual budget. The annual budget planning is done at all agency levels in order to support programs on the National Forests.

Forest plans are prepared at the local level (at the applicable Forest headquarters). These plans provide allocations and standards and guidelines, and are generally programmatic in nature.

The planning process specified in the NFMA implementing regulations (36 CFR 219), and the environmental analysis process specified in the CEQ regulations (40 CFR 1500), were used in developing this FEIS and the Forest and Grassland Plans. The general planning steps employed are shown below.

Forest Planning Process Steps

1. Identification of Issues & Concerns
2. Development of Planning Criteria
3. Inventory Data & Information Collection
4. Analysis of the Management Situation
5. Formulation of Alternatives
6. Estimated Effects of Alternatives
7. Evaluation of Alternatives
8. Preferred Alternative Recommendation
9. Environmental Statement
10. Public Review
11. Plan Implementation
12. Monitoring & Evaluation

The chronology for the formulation of the Forest and Grassland plans is as follows:

Year	Process
1980	Notice of Intent Published in the Federal Register
1981	Preliminary Identification of Issues and Concerns
1982	Forest Inventory Completed
1984	Analysis of Management Situation
1985	Formulation and Analysis of Alternatives
	Evaluation of Alternatives
	Draft Preferred Alternative Selection
1986	Draft Environmental Statement Published
	Public Comment Period
1988	Supplement to DEIS Published
1989	Public Comment Period for SEIS Evaluation of Public Comment Formulation
	Analysis and Modification of Final Alternative
	Final Plan Published
1990	Plan Implementation, Monitoring, and Evaluation

On implementation, this FEIS will be a base to "tier" environmental analyses for proposed Forest management activities and projects. Tiering means that environmental analyses conducted for specific Forest projects will reference and be consistent with the direction in the FEIS and Forest or Grassland Plan, and associated documents rather than repeating them (40 CFR 1508.28). Environmental documents for specific projects will then concentrate only on issues unique to those projects. "Monitoring" will be a way to assure that activities are consistent with plan projections, and to determine if, and where changes to the plan may be necessary.

The Forest and Grassland Plans are intended to supersede and/or incorporate all previous land management and resource plans for the Ochoco National Forest and Crooked River National Grassland. On implementation, all activities affecting the Forest and Grassland, including budget proposals, will comply with the Forest and Grassland Plans. In addition, all permits, contracts, and other instruments for the management, use, or occupancy of the National Forest and Grassland will be required to be in conformance with the Plans. Chapters 5 of the two Plans address existing and required plans and their status in relation to the Forest and Grassland Plans.

Planning Records

All of the documents and files that chronicle the Ochoco National Forest and the Crooked River National Grassland's planning process are available for review at the Forest Supervisor's Office, 155 N. Court, P.O. Box 490, Prineville, Oregon 97754. These documents and files (planning records) contain the detailed information used in developing the FEIS and the two Plans. The FEIS, the appendices to the FEIS, and the two Plans reference the planning records.

Regional direction for some procedures, such as management requirements, are available at the USDA Forest Service, Pacific Northwest Region, 319 Southwest Pine St., P.O. Box 3623, Portland, Oregon 97208.

Forest Overview

Located near the geographic center of Oregon, the Ochoco National Forest is unique among its neighboring national forests; it administers the only national grassland in the Pacific Northwest Region. The combined area of the Forest and Crooked River national grassland equals 956,150 acres (net acres: 844,640 Forest acres; 111,510 Grassland acres). The Forest is subdivided into four ranger districts: Big Summit, Paulina, Prineville, and Snow Mountain. The Grassland is administered as a separate unit. The headquarters for both the Forest and Grassland are in Prineville (Figures 1-1 and 1-2).

The National Forest lies in a four county area which includes: Crook (population 13,400), Grant (8,230), Harney (7,350), and Wheeler (1,430). The National Grassland is contained in the boundaries of Jefferson County (12,150).

The National Forest and Grassland directly influence local community lifestyles, recreational activities, and economic well being in these counties. Local economies, like Burns, Hines, Madras, and Prineville, rely on forest products manufacturing and ranching.

The Forest occupies a southwestern extension of the Blue Mountain physiographic province (Franklin and Dyrness, 1973) known as the Ochoco and Maury Mountains. Elevations range from 2,200 feet to over 7,000 feet. The Crooked River National Grassland is a northern physiographic extension of high lava plains containing rolling range country interspersed with deep canyons, mesas, and volcanic buttes. The Deschutes River drains the Grassland. The Crooked River, which is a tributary to the Deschutes, is the largest river that originates from the northern portion of the Forest (Big Summit, Paulina, and Prineville Districts).

Water flowing from the Snow Mountain District enters three systems: the Crooked River, the John Day River, and the Malheur and Harney Lakes area. The area surrounding the Ochoco is referred to as the "High Desert" due to its relatively arid climate and cool average annual temperature. The Forest can be characterized as an island of green rising from within the high mountain desert.

The Ochoco, which in the language of the Paiute Indian means "Wind in the Willows," is characterized by park-like stands of old-growth ponderosa pine intermingled with mountain meadows that are often fringed with aspen. A pastoral aspect is portrayed by cattle grazing the meadows and grassy forest understories. This impression is readily gained as one travels on U.S. Route 26, from Prineville northeast across the Forest to Ochoco Summit.

Figure 1-1

OCHOCO NATIONAL FOREST

VICINITY MAP

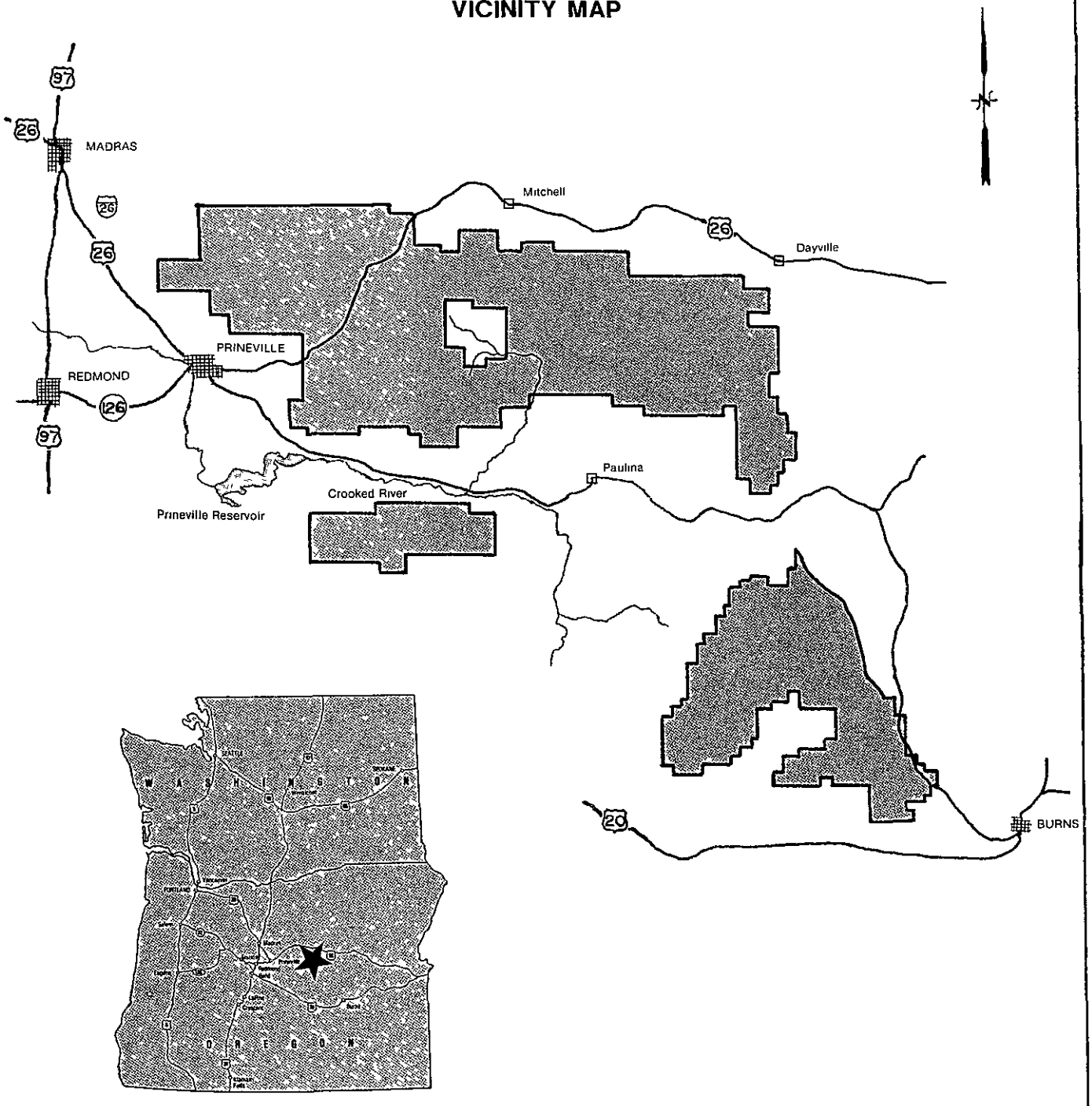
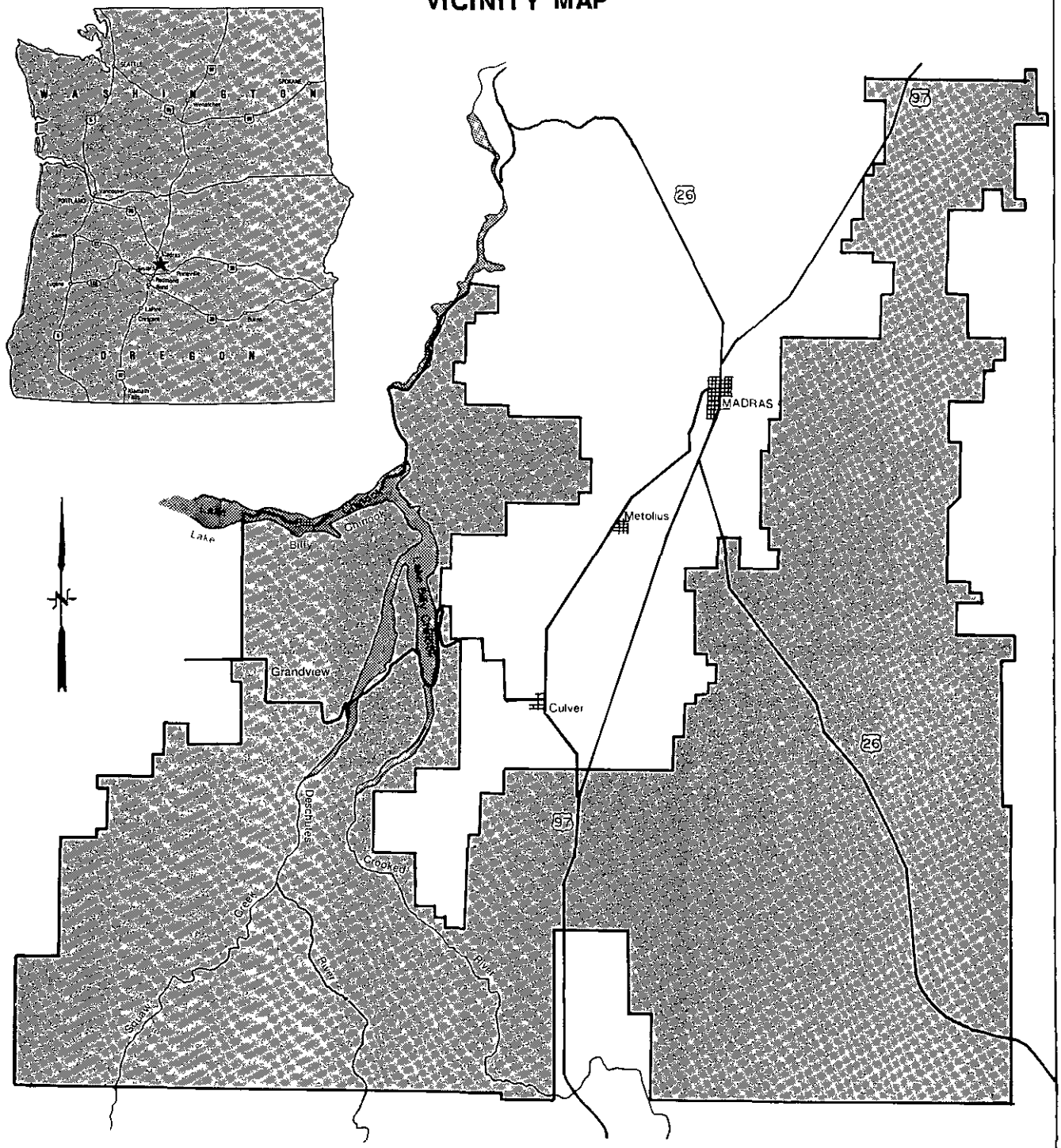


Figure 1-2

CROOKED RIVER NATIONAL GRASSLAND

VICINITY MAP



The Grassland, and approximately a third of the Forest, have vegetation characteristic of the surrounding high desert. Juniper, sagebrush, and grasses predominate as a result of low annual precipitation (less than 10 inches). As elevation increases, stands of ponderosa pines are encountered. The open, park-like pine stands are extensive and compose the largest single forest type found on the Ochoco National Forest. Mixed conifer stands occur on the northern and eastern aspects. These stands are made up of varying proportions of Douglas-fir, ponderosa pine, white fir, and western larch. The Forest also has scattered stands of lodgepole pine at higher elevations. These cover approximately one percent of the total land area, and have been subject to major mortality caused by mountain pine beetle.

The diversity of the vegetation, climate, and geology provides habitat for a wide variety of wildlife and fish species. There are over 375 different species of reptiles, amphibians, birds, and mammals known or expected to occur on the Forest and Grassland. The fisheries resource includes 15 species of game fish and numerous nongame fish species in the Forest and Grassland's reservoirs, lakes, and streams. There are 45 miles of spawning streams used by anadromous fish.

Major recreational opportunities consist of rockhounding, water related recreation, and big game hunting. Agates and thundereggs are a national attraction for rockhounds. Antelope Reservoir, Delntment Lake, Walton Lake, and numerous creeks and rivers provide camping, picnicking, and fishing opportunities. Passage of the Oregon Wilderness Act in 1984 further enhanced the Forest's recreational opportunities by designating three Wildernesses: Black Canyon (13,400 acres), Mill Creek (17,400 acres), and Bridge Creek (5,400 acres). Big game and the Ochoco are synonymous to many hunters throughout the state. Hunting opportunities, provided by mule deer (22,600), Rocky Mountain elk (1750), and pronghorn antelope (750), are major attractions. Total recreational visitation averages 572,000 visitor days annually (see Table 2-8, FEIS Chapter 2); much of this is compressed into the 30-day period coinciding with the hunting seasons. There is one research natural area, with an additional five proposed.

The Forest has an estimated 6.3 billion board feet (MMBF) of standing timber and 533,177 acres classified as suitable for sustained yield timber production. About 137 MMBF of timber has been offered for sale by the Forest annually, with an average cut of 114 MMBF over the past decade. One hundred and five permittees use 75,000 AUM's annually on 90 grazing allotments. Mineral resources include mercury and gold, semi-precious gemstones such as agates and jasper, leasable potential oil and gas deposits, and potential geothermal resources.

Riparian areas include approximately 20,240 acres along 815 miles of streams. Average annual runoff from Forest watersheds is estimated at 574,000 acre feet. Maintaining or improving water quality, soil productivity, and riparian areas are important goals of Forest management activities.

Issues, Concerns and Opportunities

The Ochoco National Forest and Crooked River National Grassland contain varied and complex natural ecosystems which are managed and used by people within the local social and economic setting. The Forest and Grassland meet both local and national demands for resources, goods, and services, and provide opportunities for a diversity of land uses.

Individuals and interest groups have differing and often divergent ideas on how the Forest and Grassland should be managed. Because the resources, land uses, and environmental conditions of the Forest and Grassland are interconnected and finite, managing to emphasize particular resources can cause changes in others. Certain "tradeoffs" may result, and competition for some resources will undoubtedly occur In short, there are practical and natural limits to what the National Forest and Grassland can provide.

An important planning task was determining what goods, services, uses, and environmental conditions people want (or do not want), and the different ways to manage the Forest and Grassland to meet those demands.

"Public issues" were determined and are defined as subjects or questions of widespread public interest relating to management of the National Forest and Grassland. Interests expressed by individuals and groups, and the physical, biological, and legal limits of Forest and Grassland management are incorporated into the public issues and management concerns identified, and used to guide the planning effort.

"Management concerns" are defined as issues, problems, or conditions which limit options or constrain management practices as generally perceived by the agency. These concerns are usually prompted by legal and regulatory requirements or actions necessary to protect or provide other resources at certain levels.

Lastly, "opportunities" were discovered or suggested by both the public and the Forest Service. Opportunities are often the basis for the issues or concerns identified. For example, the opportunity to preserve or develop resources to varying degrees on the National Forest and Grassland has been, and continues to be, the focus of many of the issues.

Identification of Ochoco National Forest and Crooked River National Grassland Issues, Concerns and Opportunities

The first step in the planning process was to identify the public issues, management concerns, and opportunities (ICO's). These ICO's were used to focus the planning effort; they ensured that the resulting Plans provided appropriate and effective management direction that addressed the ICO's.

In autumn of 1980, the Forest began to identify the principal issues to be addressed in the Forest Plan. The approach utilized "interest groups" as a starting point. Individuals representing key interests of conservationists, ranchers, recreationists, sportsmen, the timber industry, and government agencies worked with the Forest's Interdisciplinary Planning Team to establish a base group of issues. This interaction provided the Forest with a consolidated list of 60 issues which were submitted to the public for review.

Critique and comment was received at public meetings and through the mail. Using this information, the planning team again consolidated the issues into seventeen issue statements. These issues were again made available to the public to determine the degree of interest in each. Subsequently, the interdisciplinary team condensed the seventeen issues to twelve by combining related and compatible items (see below).

The DEIS was released for public comment in 1986. Over 2,150 responses were received. From these responses, 25,985 specific comments were identified through coding and analysis. These comments were grouped by similarity and subject, and were evaluated. This provided further clarification and refinement of the twelve ICO's to be addressed in the planning process.

In 1988, a Supplement to the DEIS was prepared and released to the public. It addressed some Forest Industry concerns about management requirements and disclosed opportunity costs associated with their application. It also portrayed a "no change" alternative based on the 1979 Timber Resource Plan and unit plans. The nearly 200 public responses to the Supplement were coded and analyzed similarly to the DEIS comments, grouped by resource or issue, and used to further refine the final ICO's.

Additional information on the formulation, evaluation, and selection of the ICO's is presented in Appendix A. The entire response, materials from the mailings, and the evaluation of public comments are available for review at the Forest Supervisor's Office in Prineville.

The final ICO's identified for the Ochoco National Forest and Crooked River Grassland are summarized as follows:

#1 What Should Be the Level of Timber Production?

Sustained Yield/Even-Flow and Departure

There was unanimous support for sustained yield and even-flow - a reaction to the proposed departure alternative, Alternative E-Departure, for the Ochoco National Forest. There was essentially no support for a departure from an even-flow to maintain high timber supplies for the first decade. Timber industry and dependent publics continued to offer support for sustained yield and an even-flow. Local economic stability and jobs were strongly related to high harvest levels by timber industry and dependent publics. At the other end of the spectrum, conservationists favored a much more conservative harvest level of 75 to 90 MMBF annually. The departure option was seen by industry as an unstable timber supply over time, and a negative influence on business development and stability over time. Conservationists suggested that the departure option was merely a euphemism for the rapid liquidation of old growth forest.

Uneven-aged Management

Timber industry and other groups noted some advantages, and expressed general interest in the Forest exploring uneven-aged management strategies on all or portions of the ponderosa pine stands available for timber management. Generally this silvicultural system is perceived as having the benefit of allowing harvest while providing for other resource needs. It is perceived by industry as means to allow the continuation of high harvest levels in pine while providing a quality log. Conservation groups, and other publics sensitive to even-aged management systems, see this as a means to limit clearcutting, reduce harvest levels, better manage for snag dependent wildlife species, and preserve a forested appearance over time.

Timber Supply/ASQ

Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring within a locale, region, or the nation as a whole. Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology. Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement; attempting to do so would underestimate the biological potential of timber producing lands and make future growth projections impossible. It is Forest Service Policy (FSM 1922.15) to use cubic foot volume as a measurement of long-term sustained yield, as well to regulate the amount of timber to be offered and sold as specified by the allowable timber sale quantity (ASQ), in order to respond to changing technology and product requirements projected for the future (RPA, 1985).

Between 1990 and 2000, the average annual harvest under the Forest Plan will be 19.0 million cubic feet (MMCF) (95 MMBF) , slightly below the current harvest level. The volume of ponderosa pine offered annually for the first decade will average 17.0 MMCF (85 MMBF). This represents a considerable decrease from pine volume sold between 1979 and 1988, which averaged 109 MMBF annually.

The maximum level of timber volume that can be annually produced on a sustainable basis from the Forest is 23.5 MMCF (maximum timber benchmark). Competitive resources will have to be managed at or near minimum levels to sustain this level of timber harvest. This maximum level is 10 percent higher than the current Forest output. Changing the timber harvest level one way or another will probably affect other forms of resource management. The ability to resolve this issue is constrained by the trade-offs that are considered acceptable.

Within Crook and Harney Counties, over 80 percent of the forested land is in public ownership, most of which is administered by the Forest Service. Maximum mill capacity in these two counties, approximately 385 MMBF annually, substantially exceeds timber volumes processed in the past. Many factors have influenced the volume processed (including stumpage prices and expected market conditions), causing actual production to vary considerably from year to year. Recent estimates (1987)

indicate that approximately 280 MMBF (75 percent of maximum capacity) are currently milled annually in Crook and Harney counties. Lack of suitable timber supply from the Ochoco National Forest has been portrayed as the cause of higher stumpage prices, thus reducing the ability of local forest products firms to compete in the market place. Higher timber volumes sold from the Ochoco could be processed locally, possibly leading to lower stumpage prices.

Ponderosa Pine Supply and Tree Size

The species composition of the harvest has also become an element of this issue. Over the years, the majority of the Forest's timber harvest was composed of large ponderosa pine trees. As a result, local sawmills were set up to process large pine logs. While a substantial volume of ponderosa pine remains on the Forest, future harvests will include greater percentages of other species, such as Douglas-fir, western larch, and white fir. The average size of these trees is substantially smaller than the ponderosa pine trees harvested in the past. The change in tree size and species will require local mills to retool for efficient log handling. Other species do not presently have the secondary markets for remilling that pine has. The rate that these less profitable species become part of the Forest's harvest has become a source of concern to local sawmills.

#2 How can Activities on the Forest and Grassland Fulfill Social and Economic Wants and Needs of Local Communities?

The surrounding communities are significantly affected both socially and economically by the resource management carried out on the Forest and Grassland. County revenues from the Forest provide 30 percent of some local counties' total annual receipts. The timber industry and related government agencies account for approximately half of the local area's economic base. The harvest level provided by the Forest contributes a major economic return to the local economy. For example, greater harvest levels attained from the Forest will likely result in more local jobs and income. Additionally, twenty five percent of the Forest's receipts are returned to the counties. Timber is the primary commodity output from the Ochoco National Forest and accounts for more than 90 percent of its receipts. Management of timber also significantly affects economic efficiency.

The large old growth ponderosa pine were particularly noted for their significant value to timber industry, with stumpage valued as much as 30 times greater than second growth timber. A significant amount of support exists for the sustaining the production of large diameter pine (at least 18 inches DBH) over time to maintain the present industry base in Prineville and surrounding communities.

Maintaining large diameter ponderosa pine over time has been incorporated into the Final Plan; even-aged silvicultural systems have been designed to provide an average tree of 18 inches diameter breast high (DBH), and uneven-aged silvicultural systems have been designed to provide ponderosa pine greater than, or equal to 20 inches DBH. Certain management areas in the Final Plan will also provide large ponderosa pine greater than 20 inches DBH, with some, such as the Old Growth Management Area, providing old growth pine with diameters up to their biological potential.

The residents of Central Oregon have expectations of the Forest and Grassland besides timber harvest. Summer livestock grazing on the Forest and Grassland is an essential component of ranching operations in the area. Economically viable ranches contribute to the local economy's tax base and to the social make-up of local communities. Big game hunting, fishing, wilderness use, and other recreational activities are also important to local citizens. By providing these opportunities, the Ochoco National Forest and Crooked River National Grassland supply both monetary and nonmonetary benefits while satisfying social needs. The predicted levels of these opportunities is also an issue.

The ability of the Forest and Grassland to respond to community wants and needs is constrained by the extent of the resources available, the level of public expectations, and the efficiency of resource management.

#3 What is the Appropriate Level of Livestock Grazing and Intensity of Range Management?

Livestock grazing, and the intensity of range management, remains as a major issue for the management of the Forest and Grassland. A primary concern expressed in the public comment on the DEIS is the past and present grazing impacts to the riparian areas and wildlife habitat on the Forest and Grassland. Some felt livestock grazing numbers could not be maintained or increased while simultaneously attaining riparian rehabilitation. Others believed that the economies of Crook, Harney, and Jefferson Counties are dependent on ranching, and that reductions in livestock numbers would have significant adverse effects. All grazing allotments are used and there is constant pressure to increase the numbers of livestock allowed, or to extend the season of pasture use. Permitted livestock numbers have not varied greatly in the past decade. Some increase has occurred as a result of improved range management practices, making more forage available.

Forage is generally not the limiting factor in managing the number and amount of livestock use. Water is usually the limiting factor. Forage far from water sources may be only lightly utilized, while forage near a water source may receive heavy use.

Conflicts generated by the present level of grazing arise from varied points of interest. Primary conflicts occur when grazing in a riparian area degrades water quality and fisheries habitat, when competition exists between livestock and big game for forage, and when livestock have damaged tree seedlings needed for reforestation. Additionally, livestock can have negative impacts on the aesthetics of recreation sites.

The Forest and Grassland will attempt to resolve these issues through adjustment of the animal unit months (AUM's) provided and the extent of the livestock management and range improvement practices conducted. Livestock management techniques, such as herding, fencing, salt and mineral block placement, and water development, minimize the impacts of grazing. Forage may be increased by prescribed burning, timber harvesting, and grass seeding. Under the proposed Forest and Grassland Plans, the number of livestock using riparian areas will be reduced, or subject to better controls, over time to provide for riparian area improvement. This will be offset by: 1) increasing forage production on transitory range, 2) improved forage production resulting from nonstructural range improvements, and 3) construction of 27 water developments to distribute livestock into areas where forage is available but natural water sources are not.

Currently, the Forest and Grassland provide 75 thousand AUM's annually. The Regional Guide for the Pacific Northwest Region has established a goal of 82 thousand AUM's for the Forest and Grassland to be attained in the next decade. The maximum capability of the Forest and Grassland to provide commercial livestock grazing has been estimated at 110 thousand AUM's annually (maximum livestock benchmark). Other resources will have to be managed at or near minimum levels to attain this level. Much of this potential depends on the construction of additional water developments and intensive management practices.

#4 How Should Riparian Areas be Managed to Meet Various Resource Needs?

Approximately 20,240 acres of the Forest and Grassland are within the riparian influence zone. The riparian area condition is poor along 402 miles of streams (about 50 percent of the riparian areas). Though occupying only two percent of the land base, riparian areas offer great potential for increased resource productivity. Riparian areas are very important as fish and wildlife habitats, and contribute significantly to species diversity. Stream margins frequently contain highly productive timber sites. Livestock utilize the vegetation in riparian areas more heavily than in other areas. Their relatively gentle topography makes riparian areas attractive for road locations. A majority of the Forest and Grassland's recreational use occurs in riparian areas; they are often very scenic and provide a refreshing contrast to the much drier surrounding areas.

Concentrated use in these areas has caused conflicts. Vegetation diversity along many riparian areas is presently low. There is an abundance of grass but a limited presence of trees and shrubs. This has negative implications for fisheries, wildlife, and recreational use of the areas. Some trees that once provided shade have been removed by timber harvests. The primary reason for the lack of vegetation diversity is livestock overgrazing the forage in riparian areas. Overgrazing has reduced water quality, eliminated streamside shrubs, caused soil compaction, accelerated erosion, and broken down stream banks. This conflict is particularly difficult to resolve because these areas are vital to livestock for water, provide palatable forage, and naturally provide relatively cool spots for livestock to congregate.

The present transportation system has also had impacts on riparian areas. Roads in riparian areas can be sources of soil erosion and tend to channel and accelerate water flows. A riparian area's ability to moderate water flows and filter out sediment can be decreased, and stream water quality degraded by sedimentation. Sedimentation and warmer water temperatures caused by lack of shade have caused the water in many streams to fall below State water quality standards.

Generally, the less disturbance that occurs in riparian areas, the better the area condition. However, resource use in riparian areas can be compatible with good riparian condition. The extent of each use, and the mitigation practices employed, largely determine the riparian area condition. Riparian areas are relatively resilient and respond to improvement measures. Rehabilitation efforts and the future management of these areas will be addressed. Presently, opinions differ concerning existing conditions and on the management needed to attain the best combination of riparian area use and future productivity.

#5 What Transportation System Should be Provided to Meet Public, Commercial, and Administrative Access Needs?

Forest and Grassland road system needs continues to be a high interest area - the Forest received 1000 comments on this subject on the DEIS. The comments voiced strong sentiments that road standards are too high and that the number of roads on the Forest is excessive. The comments offered support for the closure of roads following completion of projects, timber sales in particular. There was also support voiced for the closure of roads for the protection of big game, erosion control and reduced maintenance costs. This is a departure from the original comments which opposed the closure of roads and areas to access by motorized equipment. Timber industry observed that the number of roads was not the issue, but if the number of roads open to public travel and open road densities were reduced, other resource objectives could be still be attained.

Off-road vehicle use continues to be a growing concern. The roads issue has been expanded to address general access concerns which includes ORV uses of off road areas. A travel plan for the Forest and Grassland addresses road management concerns and will complement the objectives of the various management areas on the Forest and Grassland. Wildlife habitat effectiveness objectives will be partially met through road restrictions and closures. The number of miles of roads maintained open for public travel on the Forest will decrease nominally in the future as a result of these road restrictions and closures for big game habitat protection, erosion control, and public safety.

In the first decade, 840 miles of road will be maintained for passenger car travel and 2,330 miles will be maintained for high clearance vehicles.

By the fifth decade 850 miles will be maintained for passenger cars and 2,270 miles for high clearance vehicles.

Roads will be closed to protect the investment, to protect public safety, to minimize soil erosion and water quality degradation, and to maintain wildlife habitat effectiveness. In the first decade, 1,560 miles of roads would be closed. In the fifth decade, 2,190 miles would be closed. Closures may be seasonal or yearlong.

#6 Should Habitat be Provided for Increased Populations of Big Game?

Habitat for big game was second only to timber in the number of public comments on the Draft. The public continues to be very interested in the production of elk and deer on the Forest. In particular, there was support voiced for population levels of elk in excess of those proposed by the Draft Plan and Oregon Department of Fish and Wildlife (ODFW) goals. Along with outputs, there was expression of support for the management of big game winter range and the management of road systems to attain habitat effectiveness. The management of habitat for antelope is an issue on the Grassland.

The Forest and Grassland contain significant numbers of mule deer, pronghorn antelope, and Rocky Mountain elk. ODFW has identified the desired deer and elk population levels for the wildlife management units encompassed by the Forest and Grassland. There are approximately 2,300 elk on the Forest now, according to a recent census. ODFW's objective (planning benchmark) is for 2,600 Elk. The ODFW objective for deer and antelope populations has already been attained: approximately 23,000 deer and 750 antelope.

The Forest and Grassland Plans will designate important areas of big game range in four management area allocations on 171,490 acres of the Forest and 35,440 acres of the Grassland. Three of these management areas are big game winter ranges. The Plans provide standards and guidelines for the management of cover and road management that will support elk numbers that meet the population objectives. In these areas, road use and cover would be managed to provide high quality big game habitat. Habitat would support 3,000 elk in the first decade, increasing to 2,870 in the second decade, then declining to 2,690 by the fifth decade due to changes in cover and road access.

The Forest and Grassland have the potential to provide habitat for more elk than presently exist. Benchmark analyses indicate the maximum capability of the Forest and Grassland would produce and sustain 23,000 deer and 4,800 elk. It would take approximately 50 years to reach these levels for elk. The number of deer is about the same as current population estimates due to ODFW management of herd size. The primary factors limiting big game habitat are the quality and amount of big game cover and the extent and use of the road system.

Management for other resources or land uses can enhance big game habitat. Timber management and range improvement practices can improve an area's forage production. Measures intended to rehabilitate riparian areas benefit big game habitat. Lands managed for wilderness, roadless values, or old growth habitat generally provide better big game habitat than lands managed intensively for timber production.

#7 How much Roadless Recreation Opportunity Should be Provided?

Unroaded recreational opportunities generated the third highest number of comments on the DEIS. Public comments focused on Lookout Mountain and the Ochoco Canyons area of the Forest. There was strong sentiment for the retention of existing roadless areas by some, while others challenged the designation as limiting and precluding other uses.

When the issue was originally identified, there were ten areas on the Forest and Grassland that met roadless area criteria. Since then, the Oregon Wilderness Act of 1984 created three wilderness areas on the Forest (Bridge Creek, Mill Creek, and Black Canyon). The roadless area question posed by this issue still needs to be resolved for six other areas: Green Mountain, Rock Creek, Cottonwood Canyon, Silver Creek, Lookout Mountain, and Deschutes Canyon-Steelhead Falls. The remaining area, Broadway, was committed to timber harvest and road construction under existing plans in the interim.

Due to its status as a "further planning" area from the RARE II process, the Oregon Wilderness Act directed that a recommendation of non-wilderness be made for the Deschutes Canyon-Steelhead Falls area on the Grassland through the forest planning process.

Allocating areas for unroaded recreation limits the capability of these areas to produce some other benefits. Recreationists that rely on roads for access would not be served by these areas. Lack of immediate access hinders resource management activities and adds to the difficulty of controlling wildfires. Timber harvests are generally not permitted. This limitation results in decreased economic returns from the Forest. In some cases, the inability to manage the timber hinders development of big game habitat.

Lookout Mountain roadless area has received strong interest; specified treatment will be offered in the FEIS. The Rock Creek/Cottonwood Creek area will be dealt with in two new management areas in the Forest Plan in order to address the interest in unroaded recreational opportunities, and the need to make some of these roadless areas available for other resource use opportunities. Cottonwood, most of Rock Creek, and a portion of Silver Creek will be retained as roadless areas and managed for semiprimitive nonmotorized recreation. Green Mountain will be managed as general forest. The Draft proposed semiprimitive motorized recreation which was determined not to be appropriate for the area, and not supported by public comment.

The total wilderness, wilderness study area, and unroaded acreage is 96,228, about 10 percent of the Forest and Grassland (does not include wild & scenic rivers).[3/] Combined, unroaded areas and wilderness will meet the expected demand for semiprimitive recreation until the year 2025. A number of other special management areas have been designated, e.g. Stein's Pillar, which will also contribute recreational opportunities in response to this issue.

Recreation projections for the Ochoco indicate that the demand for unroaded recreation use is continuing to grow, and may exceed the Forest and Grassland's ability to supply such opportunities in the next ten to fifty years.

#8 How Should the Forest and Grassland Manage the Scenic Resources?

Scenic resources continued to receive interest by some publics. The State of Oregon and others expressed concern for maintaining the scenic character or setting over time. Generally the public comments to the DEIS concerned the retention of the scenic corridor along Highway 26. Travelers in the Ochocos often leave with a picture of open ponderosa pine stands interspersed with park-like openings. Other vegetative types are intermingled, but stands of large pine predominate in the primary travel corridors. Scenic corridor management has retained most of these large trees. The extent of visual corridor management across the Forest has been questioned since the large old growth pine is preferred by the local mills, creating pressure to harvest the readily available trees along traveled Forest corridors.

This issue has not been limited to visual corridors. A number of individuals and groups recognize that the visual character of the Ochoco National Forest and the Crooked River National Grassland will change through management over time. Early harvest operations usually removed only scattered individual trees, leaving multistoried stands. More recently, clearcuts have been used to initiate even-aged timber management, while the multistoried stands people have grown accustomed to seeing are being converted to relatively single-storied stands.

The Forest and Grassland Plans will provide a number of scenic corridors where the primary emphasis will meet visual quality objectives to maintain and enhance key scenery. Travel corridors, including major roads, access roads to roadless areas, and a winter sports corridor on the Big Summit District, will be managed for scenic qualities. Scenic corridors will total approximately 40,110 acres, 38 percent of the maximum potential of 106,700 acres. In addition, all management areas for the Forest and Grassland have Forest-wide and management area standards and guidelines which provide guidance on the visual quality objectives (VQO's) and how these VQO's can be met.

3/ Includes designated wilderness, North Fork of the Crooked River Wilderness Study Area, and the total roadless area (using the criteria boundary roadless area figures from Appendix C) less the 650 acres allocated to wild and scenic river designation in Deschutes Canyon

#9 How Much Old Growth Habitat Should be Provided?

Old growth generated over 1000 comments on the DEIS. A majority of the comments supported a larger allocation for old growth. In addition, there was interest in seeing the individual old growth management area size increased over that in the Draft Plan.

A relatively small component of old growth habitat remains across the entire Forest (approximately 93,800 acres). Past logging practices have significantly reduced old growth ponderosa pine. The Forest's remaining old growth habitat is primarily mixed conifer. This imbalance between amounts of old growth habitat in the mixed conifer and pine types results in a poor geographic distribution of wildlife that rely on old growth habitat.

The retention and management of old growth is a significant issue with timber industry. Industry claims that the old growth resource is a critical part of the total short-run timber supply on the Ochoco National Forest. The allocation of existing old growth blocks to a management allocation for the retention and preservation of old stand conditions would reduce the available supply well below the demand. Timber management activities within the allocation would be limited to treatments which enhance or maintain the desired old growth stand structure. As these stands age, they become increasingly vulnerable to insects and disease. While the mortality of old growth trees provides additional wildlife habitat, the risk of loss from wildfire is increased as woody debris accumulates on the forest floor. These potential losses in old growth areas may or may not detract from their value as wildlife habitat, depending on the extent of stand mortality.

In spite of these risks, old growth areas are a valuable component of the Forest. They provide habitat for approximately 100 wildlife species on the Ochoco. These areas also contribute to big game cover requirements. Soil and water conditions in old growth areas are generally favorable due to the absence of disruptive activities. They are often attractive from a visual standpoint, particularly in the pine types, and may be incorporated as parts of scenic or riparian corridors. Old growth can provide unique habitats for certain species, serve as gene pools, and contribute to diversity.

The Forest has allocated 72 stands containing 21,650 acres of old growth to be managed on a "dedicated basis." Of this amount, 20,380 acres are determined to be "suitable" and 1270 acres "capable." Of the 72 stands, seven are within areas allocated to wilderness and RNA's, leaving 19,250 acres actually allocated as dedicated old growth. That old growth dedicated in the management areas for old growth, wilderness, and RNA's amounts to 103 percent of the minimum level estimated to be required by old growth dependent species (21,000 acres), and 23 percent of the maximum old growth available on the Forest (93,800 acres). Out of a total of 1200 acres of existing old growth juniper, the Grassland has 740 acres allocated.

Old growth for the Ochoco National Forest and Crooked River National Grassland has been defined using the Regional definition from the Regional Guide for the Northwest Region, 1984. The size and distribution of areas managed for old growth were designed to meet habitat requirements for the pileated woodpecker, a management indicator species. These areas will also provide habitat for other species dependent upon old growth.

The existing mature stands and designated old growth outside old growth, wilderness, and other special management areas, will be subject to timber harvest. By the year 2030, areas not allocated specifically to the referenced management areas are expected to loose their old growth characteristics.

#10 To What Extent Should Firewood be Provided to meet Demand?

Fuelwood also generated over 1000 comments on the DEIS. A significant portion of this comment came as a form letter response sponsored by forest industry. These comments supported the continuation of fuelwood supplies into the future. The utilization of firewood from the Forest and Grassland has increased many fold in recent years. In years past acquiring firewood was merely a matter of driving out of town and gathering wood from downed logs As competition for wood has increased, the firewood supply has declined.

Demand for firewood from the Forest and Grassland is difficult to estimate. Contributors to the overall supply in the areas using Forest and Grassland firewood include the Bureau of Land Management, Deschutes National Forest, Malheur National Forest, private lands, and sawmills that make unused residues available for firewood. Accessibility, size, species, and the price of other forms of energy are other factors influencing demand.

The amount of firewood collected on the Forest and Grassland varies annually. Based on the Forest's firewood permit system, 10,482 cords were removed in 1984. In 1983, 14,137 cords were removed. Accurate estimates of firewood collected prior to 1983 are not available.

Firewood gathering from the Forest provides several benefits: the public gains in terms of reduced energy costs, many people consider firewood collecting a recreational experience, and the Forest benefits through reduced risk of wildfire loss.

Some conflicts relate to firewood gathering. Wildlife snags near roads, including snags left in cutting units, are often at risk from illegal firewood cutters. Similarly, valuable green trees are sometimes felled illegally for firewood. Use of vehicles to gather firewood has caused soil damage in some cases. Logs gathered for firewood means a loss of feeding, nesting, and reproduction sites for numerous wildlife species. Providing firewood after timber harvesting can cause modifications to planned slash treatments; conversely, prescribed burning of slash has been criticized as consuming potential firewood.

The Forest's ability to provide firewood generally varies directly with the amount of timber harvest that takes place. Firewood gathering from other sources, such as wind-thrown trees and juniper, will still occur as a relatively small portion of the total. To meet a portion of the local demand, this plan will continue to make firewood available to the public at levels commensurate with project activity and available access. The Forest and Grassland alone cannot meet the total local demand, which is estimated at 18,000 cords annually.

#11 How Much Habitat Should be Provided for Wildlife Species Dependent on Snags?

The number of snags (standing dead trees) across the Forest is variable. Snags are fairly abundant in mixed conifer stands found mainly on the Forest's north slopes. On the southern slopes, where ponderosa pine stands predominate, snags are relatively scarce. This scarcity is a result of past salvage harvesting and firewood cutting in the ponderosa pine type.

Snags and down logs are used for nesting and/or shelter by 39 species of birds and 23 species of mammals. The absence of suitable nest sites is usually the limiting factor controlling the population of birds that nest in snags. Where snag densities are low, populations of dependent animals are usually also low. When snags eventually fall they become habitat for ground dwelling wildlife and play an important role in the nutrient cycling process. When snags fall across streams they sometimes create small pools that benefit fisheries and riparian conditions.

Opinions vary on the number of snags the Forest needs to manage. Many woodcutters see them as the best possible source of firewood. Salvage operations aimed at converting solid snags into lumber are viable operations. From this perspective, some people feel that snags left for wildlife are a wasted resource.

The Forest and Grassland will be managed to provide snag habitat at levels appropriate for the management objectives for the respective management area. The overall snag level on the Forest and Grassland, 47 percent, is expected to increase over time, with management, to approximately 54 percent in the fifth decade. The snag level should not go below 40 percent for any of the management areas.

#12 To What Extent Should the Forest Provide for Winter Sports Activities?

The primary factor limiting winter sport opportunities on the Forest is access to higher elevations during the winter months. Use levels at accessible

areas are sometimes high and conflicts have occurred between recreationists. This has been particularly true on Lookout Mountain, a large, relatively flat-topped mountain currently managed as a roadless area. The mountaintop is a favored area by both snowmobile users and cross-country skiers. There is one major trail to the top and conflict between users sometimes results. The current management direction for the area states:

> "No cross country two- or four-wheel motor vehicle travel will be allowed.
>
> Snowmobile use will be permitted in designated areas, at times when it does not conflict with non-vehicle uses.
>
> The primary emphasis will be placed on access by foot or horseback."

The Forest also has requests to manage the Bandit Springs Area for more cross-country skiing opportunities. The Bandit Springs area is located along Highway 26 and provides excellent winter access at the Bandit Springs Rest Area (maintained by the State Highway Division). Currently, a cross-country trail system is managed in the area (approximately 1000 acres in size). There is local interest to further develop the cross-country skiing opportunities in this area.

Additional Issues not Identified in the Original ICO's but Identified as Comments to the Draft or During the Development of Changes From the Draft to the Final

#1 Anadromous Fish

Anadromous fish were not identified as an issue in development of the DEIS and Proposed Forest Plan. Anadromous fish were identified as a concern by several individuals and groups, including a lengthy, technical response from the Columbia River Inter-Tribal Fish Commission (CRITFC). Primary concerns included protection and enhancement of spawning habitat, and the adequacy of the monitoring schedule. Native American groups noted that treaties guarantee protection for anadromous fish habitat.

#2 Historic Trail Preservation - Summit Trail

This issue arose out of a separate study conducted during the interim between issuance of the draft and final documents (Gowan, 1896). The Forest coordinated with the State Historic Preservation Office (SHPO) on details contained in the Final Plan. This trail has also been related to other groups' proposals for an east-west intertie in a cross-state trail system.

#3 Off-Road Vehicle (ORV, ATV, OHV) Use

The off-road issue was one of the 14 original planning issues identified in the scoping phase of the forest planning process. It was dropped as one of the final ICO's; the comments were limited to local problems on the Grassland which were not considered to be of significance to the generation of alternatives for management of the Forest and Grassland. Comments on the DEIS regarding access, both pro and con, concerned road closures. The off-road issue did emerge again during the issue/Final Plans validation phase. Comments were generally opposed to off-road use because of resource impacts and trespass from the National Forest onto private lands.

#4 Round Mountain

The Oregon Natural Resources Council, in comments on the DEIS, asked that a special recreation unit be established for the Round Mountain area. This issue was brought up again by one individual in the validation process.

Summary of Changes Between the Draft and the Final EIS and Plans

Public involvement has been incorporated into the decisions reached in the Final Forest and Grassland Plans; this has been an integral step since the draft documents were released in September 1986. Significant steps were taken during the months of final document preparation to validate that direction in the Final Plan's response to comments received on the Draft. Meetings and contacts with selected groups, individuals, agencies and political leaders were made to:

1. Validate public responses received during the process;
2. Insure that we interpreted what was said ap propriately; and
3. Insure that we did not miss something or overlook stumbling blocks towards success ful implementation.

In response to the comments, new information, and legislation, and where it appeared appropriate, adjustments were made and changes were incorporated into the Final Plans. This was intended to strengthen the Plan decision and build a base of support for effective implementation.

Plan Structures

Draft

The Plan for the National Forest and National Grassland was incorporated into one document.

The National Grassland had 8 management areas in the Draft, and the National Forest had 14 management areas.

Final

Two separate Plans were developed--one for the National Grassland, one for the National Forest--and covered by one Environmental Statement.

In the Final, the Grassland has 16 management areas, and the Forest has 28 management areas.

Grassland Draft

Emphasis	# Mgmt Areas	Acres	%
Timber/Range	1	73,510	65%
Wildlife	1	34,527	31%
Wilderness	1	2,500	2%
Wild/Scenic Rivers	2	734	<1%
Research	2	87	<1%
Riparian	1	559	<1%
		111,379	

Grassland Final

Emphasis	# Mgmt Areas	Acres	%
Range/Forage	1	59,440	53%
Wildlife	3	35,870	32%
Old Growth	1	740	<1%
Visual	1	560	<1%
Wild/Scenic Rivers	2	1370	>1%
Research (RNAs)	2	110	<1%
Recreation	4	10,770	10%
Riparian	1	2,110	2%
Facilities	1	540	<1%
		111,510	

Forest Draft

Emphasis	# Mgmt Areas	Acres	%
Timber/Range	1	491,257	58%
Wildlife	2	190,686	22%
Old Growth	1	26,337	3%
Visual	3	51,773	6%
Wilderness	4	37,154	4%
Wild/Scenic Rivers	2	1,930	<1%
Research	1	4,519	<1%
Recreation	3	32,990	4%
Riparian	2	15,484	2%
		843,721	

Forest Final

Emphasis	# Mgmt Areas	Acres	%
Timber/Range	2	499,330	59%
Wildlife	4	174,620	21%
Old Growth	1	19,250	2%
Visual	2	40,110	5%
Wilderness	4	37,330	4%
Wild/Scenic Rivers	2	2,660	<1%
Research	1	4,440	<1%
Recreation	10	48,350	6%
Riparian	1	18,130	2%
Facilities	1	460	<1%
		844,640	

NOTE: See National Forest Ownership, this section on page 1-37 for explanation of acreage changes from the Draft to the Final.

Summary of Changes

1. Separate plans for the National Grassland and the National Forest.
2. Refinement in management area allocations.
3. Changes in resource emphasis.

Reasons for Change

National Grassland management and direction was overshadowed by the National Forest. The public requested they be separated into two plans.

Additions and changes in management areas (allocations) result from responses to public comments, incorporation of new information, new policies, improved understanding of the processes related to implementation and congressionally designated rivers.

Forest Management and FORPLAN Modeling

Draft

Even-aged silvicultural system. General Forest rotation diameter 14-16". Rotation age 90-100 years. Departure (by vol. first decade).

	ASQ		
Decade	All Spp Cu.Ft.	All Spp Bd Ft.	PP Bd.Ft.
1	20 6	123	87
2	19.7	118	82
3	17.8	99	56
4	16.9	93	52
5	16.1	89	55

Final

Even- and uneven-aged system (uneven-aged systems applied to approx. 100,000 acres ponderosa pine). Diameter for even-aged ponderosa pine=18", mixed conifers=16", uneven-aged=20". Rotation age for ponderosa pine=130 years, mixed conifer=90 years. Sustained yield, even-flow (by cu.ft.vol.); declining volume in ponderosa pine after first decade.

	ASQ		
Decade	All Spp Cu Ft.	All Spp Bd.Ft.	PP Bd.Ft.
1	19.0	115.0	82.0
2			
3	19.0		
4			
5	19.0		

FORPLAN Modeling

The changes from Draft to Final have resulted in differences in FORPLAN modeling. The changes in allocations and related management guidelines have resulted in the development of new yield streams for timber and other resources, silvicultural systems, rotation ages, and decade harvest limitations.

New Prescriptions and Yield Streams applied in FORPLAN Model

Uneven-aged timber management applied to ponderosa pine on general forest (20-inch target size).

Uneven-aged timber management applied to ponderosa pine in special areas with 30-inch DBH target size: Lookout Mountain, Stein's Pillar, Deep Creek, North Fork Crooked River.

Uneven-aged timber management applied to mixed conifer in some special areas.

Extended rotation ages and new thinning cycles for ponderosa pine in general forest.

Extended rotation and stricter decade harvest limitations for special areas.

Changes in the percent cover for big game required by allocation.

More reliance on mixed conifer to produce cover vs. ponderosa pine.

Acres and Timber Yield Tables:

Acres - Condition classes (i.e. the amount of pine sawlogs, saplings, etc.) have been updated from the 1983 information used in the Draft to 1988. This was done to more accurately assess timber harvest scheduling and resultant associated outputs and effects.

Timber Yield Tables -Yield tables were updated to reflect the growth that has occurred in the last five years to more accurately determine outputs and effects.

Summary of Changes

1. Incorporation of uneven-aged management in ponderosa pine where stand structure, condition, and management objectives allow.
2. Larger tree at rotation; general forest ponderosa pine 18-20" versus 14"-16" (wood quality).
3. Sustained even-flow in cu.ft.vol. versus departure (on volume basis).
4. Maintains relatively high volume of ponderosa pine first decade.

5. Large target diameters (27"-30+") for recreation, wildlife and visual emphasis management areas.
6. FORPLAN model yield tables, acres, prescriptions and assumptions changed to reflect updated information (see above).

Reasons for Change

Response to public comment for uneven-aged management, growing larger trees, maintaining historic harvest levels in ponderosa pine, sustained yield even-flow vs. departure, improved and updated information.

Economic Analysis

Changes in schedules, outputs, allocations, effects, assumptions and new information will result in different economic effects and outputs in the final documents.

Incorporation of additional resources into the economic analysis overlooked in the draft documents (mineral leases, anadromous fisheries).

Wilderness Study Area

Draft

Proposed recommending 5,200 acres (2,500 FS, 2,700 BLM) in the Deschutes Canyon-Steelhead Falls Wilderness Study Area for wilderness classification.

Final

No additional wilderness proposed. A 7,840-acre Squaw Creek management area emphasizing semiprimitive, nonmotorized recreation, protection of natural features, and vehicle access management incorporates the core of previously recommended wilderness; the majority of the remainder of the draft proposed wilderness was included in the Deschutes Scenic River Corridor classified by the Oregon Omnibus Wild and Scenic Rivers Act in 1988. An eligibility study for lower Squaw Creek for Wild and Scenic Rivers was completed and the potential identified and preserved.

Summary of Changes

The 5,200 acres recommended for wilderness which was centered on Squaw Creek and the Deschutes River Canyon, was changed to a 7,840-acre special management unit centered on Squaw Creek, classification of the Deschutes River and canyon portion under the Wild and Scenic Rivers Act.

Reasons for Change

The Deschutes Canyon-Steelhead Falls area was determined to be too small to be appropriate for and manageable under the Wilderness Act. The Deschutes River and canyon area was classified and protected under the Oregon Omnibus Wild and Scenic Rivers Act.

Public expressed interest for classification of Lower Squaw Creek under Wild and Scenic Rivers Act. A 1,370-acre segment from the Grassland boundary to the confluence with the Deschutes River has been determined to be suitable for designation as a "scenic river" under the Wild and Scenic River System.

Wild and Scenic Rivers

Draft

Segments of North Fork Crooked River, Crooked River, and Deschutes River eligibility studies completed and management units developed to preserve options for river classification.

Final

Segments of North Fork Crooked River, Crooked River, and Deschutes River classified as Recreational or Scenic Rivers under the Oregon Omnibus Wild and Scenic Rivers Act. Lower Squaw Creek eligibility and suitability determination completed. Recommended for designation as a "scenic river" in the Wild and Scenic River System in Alternatives B-Modified and I.

Summary of Changes

Rivers Designated by Congress.

Lower Squaw Creek evaluated and determined suitable for Wild and Scenic Rivers designation. Recommended for designation as a "scenic river" in Alternatives B-Modified and I.

Reasons for Change

Oregon Omnibus Wild and Scenic Rivers legislation. Lower Squaw Creek evaluation conducted based on public comment and legislative hearings related to above Act.

Roadless Areas

Roadless Area	RARE II **Total Acres**	**Draft** Allocated to **Remain Unroaded**	**Final** Allocated to **Remain Unroaded**
Broadway	8,680	0	0
Green Mtn.	6,630	7,000	0
Rock Ck/Cottonwood Ck	20,340	19,070	11,820
Silver Ck.	11,670	3,230	3,110
Lookout Mtn	15,260	2,950	15,660
Deschutes Canyon-Steelhead Falls WSA	FS 10,000 BLM 3,240	2,500 2,660	7,840
N.Fk.Crooked River WSA	1,300	1,125	1,125
Total (FS Only)	73,880	38,535	39,555

Summary of Changes

1. Green Mountain proposal for semiprimitive motorized recreation (the area remaining roadless) was dropped for reasons of no apparent public interest or support. Soil erodibility and slopes found not to be suitable for that use.
2. The Rock Creek/Cottonwood Creek area to be managed as unroaded was decreased. A portion of the area which was determined to be economical for timber management was allocated to general forest and unroaded helicopter. Steeper areas were reserved for roadless area management, or helicopter logging, to protect watershed, anadromous fisheries, recreation, and wildlife values.
3. Silver Creek area to remain roadless and adjusted to a more manageable boundary along canyon rim.

4. Lookout Mountain was originally designated as a management area in the Ochoco-Crooked River Land Management Plan - 16,581 acres. The original RARE II designation included 15,260 acres. These acreages were further adjusted to 14,273 acres (roadless criteria boundary acres) to reflect changes in management. In the DEIS, the area designated for unroaded recreation was limited to 2,950 acres. In the Final Plan, the Lookout Mountain area to remain unroaded increased from 2,950 acres to 7,550 acres. The area was remapped (see planning process records) to approximate the original unit plan boundary. The difference in acreage is attributable to the inclusion of two old growth patches and the scenic corridor along the Road 42.

   Planning for stand treatments will begin in first decade, but no entry will be scheduled.

5. A portion of the Deschutes River Canyon-Steelhead Falls Wilderness Study Area and an additional area outside the WSA in Squaw Creek are combined to form a 7,840-acre management area emphasizing semiprimitive, nonmotorized recreational opportunities and wildlife habitat management. The 5,200-acre draft wilderness proposal was dropped.

Reasons for Change

Response to public comments. Efforts to address the resource values involved in a more specific manner. Implementation concerns.

Lookout Mountain

Draft

2,950 acres to be managed for semiprimitive nonmotorized recreation; 11,323 acres allocated to general forest, and remainder to old growth areas. The top of the mountain closed to snowmobiling.

Final

A 15,660-acre Lookout Mtn. area treated as one management area within which there is a 7,550-acre mountain top unit, and two old growth areas. The 8,110 acres remaining will be managed with emphasis on recreational and wildlife habitat values and maintaining the character of the Forest over time. No entry needs to be planned until site-specific planning is completed. Road access corridors (Brush Creek and independent mine roads) are incorporated into the management unit. The entire area is open to snowmobiles during specific periods.

Summary of Changes

1. Treatment of entire Lookout Mountain and access corridors as a management area.
2. No entry planned prior to completion of site-specific planning.
3. Increase in unroaded mountain top management area from 2,950 to 7,550 acres.
4. Lower part of the mountain also managed with recreation, wildlife, and forest health emphasis.
5. Open to snowmobiling during specified periods.

Reasons for Change

To respond to public comment, and to address resource values involved in a more specific/responsive manner.

Visual

Draft

The Draft Forest and Grassland Plan, Alternative E-Departure in the DEIS provided for scenic corridor management in three management areas as follows:

Management Area	Visual Quality Objective	Acres Allocated
Retention Foreground	Retention	15,211
Partial Retention Foreground	Partial Retention	31,238
Partial Retention Middleground	Partial Retention	5,324

These areas included the Highway 26 corridor and other key road corridors.

Final

Forest Roads	Retention	Partial Retention	Preservation	Total Acres
Visual Management Corridors	16,150	23,960		40,110
Round Mountain Trail	1,000			1,000
Highway 26	6,850			6,850
Deep Creek	770			770
Bandit Springs Recreation Area	1,580			1,580
Dispersed Recreation Sites	2,060			2,060
Developed Recreation Sites	1,810			1,810
Summit National Historic Trail	5,760	3,760	170	9,560
Lake Billy Chinook View Area	560			560
Total Acres	36,540	27,720	170	64,300

Summary of Changes

1. Immediate/foreground viewing area around recreational developments (campgrounds) assigned a visual management objective.
2. The acreage with visual management objectives increased from 46,449 in the Draft EIS to 64,300 in the Final. The width of the viewing corridor used in calculations was changed from > 2,640 feet to 1,200 feet.
3. Entire Summit National Historic Trail corridor was assigned a visual management objective relative to cultural aspects of the particular trail segment.
4. Round Mountain National Recreation Trail management corridor reduced in width from > 2,640 feet to 1,200 feet
5. Added 560 acres of viewing area from Lake Billy Chinook reservoir on the National Grassland.
6. No middle ground viewing areas allocated as management areas.
7. All management areas assigned a visual quality objective.

Reasons for Change

To incorporate visual management considerations in important foreground viewing areas in a more balanced manner. New information. Discussions with the State of Oregon.

General Recreation

Draft

No camps or designated ATV routes.

Final

New horse camps and two designated ATV routes.

Draft

No allocation of dispersed recreation site management. Discussed in general.

Final

Allocation of 686 sites (3.1 acres/site) across the Forest and Grassland for dispersed recreation - based on Code-A-Site and other inventories on file with specific management direction.

Draft

Bandit Springs winter recreation sports area identified.

Final

Bandit Springs recreation management unit (1,580 acres) allocated; deals with all-season recreational activities.

Draft

Restricted all motorized use on Lookout Mountain summit.

Final

Lookout Mountain open to snowmobile use in winter.

Draft

No recognition of special features or recreational attractions (other than roadless areas, developed recreation, and wildernesses).

Final

Allocation of additional areas emphasizing recreational features or attractions and dispersed recreational opportunities, Stein's Pillar (1,070 acres), Hammer Creek (2,560 acres), Deep Creek (770 acres), Lookout Mtn. (15,660 acres).

Draft

No identification of recreational attractions and developments on the National Grassland. Summit National Historic Trail would be interpreted for public enjoyment.

Final

Identifies and allocates the Summit Trail National Historic Route, with 3 different levels of management intensity per various segments (9,560 acres).

Management area allocations made for Haystack Reservoir, Rimrock Springs Wildlife Viewing Area, and Cove Palisades State Park.

Summary of Changes

1. Increased recognition of importance of dispersed recreational activities on the Forest and Grassland.
2. Incorporation of existing recreational attractions, developments, cultural resources and special features not allocated in the Draft.
3. Lookout Mtn. would remain open to snowmobiles.

Reasons for Change

Improved and more complete information, public comment, and national emphasis (recreation strategy).

Wildlife

Old Growth

Draft

26,400 acres allocated; approximately (58% "suitable," 48% "capable") on National Forest only.

Final

21,650 acres old growth allocated (approximately 95% "suitable," 5% "capable").

1,000 acres of riparian area is recognized as connective habitat between some old growth areas. The connective habitat is allocated in the riparian prescription.

740 acres of old growth juniper allocated on the Grassland.

TABLE 1-1
OLD GROWTH ALLOCATED AND EXISTING ON THE FOREST AND GRASSLAND

		DECADE				
ALLOCATION/EXISTING	UNIT OF MEASURE	1st	2nd	3rd	4th	5th
Allocated to Old Growth Management Area 1/	Acres	19,990	19,990	19,990	19,990	19,990
Unallocated But Preserved Old Growth 2/	Acres	20,500	20,500	20,500	20,500	20,500
Unallocated Old Growth with No Programmed Harvest 3/	Acres	17,100	17,100	17,100	17,100	17,100
TOTAL EXISTING OLD GROWTH 4/	Acres	93,800	83,900	74,200	64,500	55,100

1/ Old Growth Management Areas F6 and G5 (includes capable acres)

2/ Wilderness, Wilderness Study Areas F1, F2, F3, F4

3/ Existing Old Growth in Unroaded Management Areas with no programmed harvest F5, F8, F10, F11A, G5 F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, and F28 (from FORSUM for Alternative I)

4/ Total Existing Old Growth from 1987-1988 Inventory This does not include 1,270 acres allocated to old growth but not presently old growth and 1,200 acres of existing juniper old growth

Winter Range

Draft

76,000 acres of big game winter range to meet Oregon Department of Fish and Wildlife management objectives.

Final

99,570 acres of big game (deer/elk) winter range allocated, but redistributed spatially across the Forest and Grassland.

Identified big game winter range that was not necessary to meet ODFW big game management objectives and therefore, not allocated as winter range, but recognized as a separate management situation called "general forest/winter range," 107,360 acres.

Added 22,700 acres to area identified as antelope winter range on the Grassland.

Summer Range

Draft

154,100 acres were allocated to big game summer range with specified amounts and quality of cover for optimum big game habitat.

Final

No areas specifically allocated for big game summer range. Big game habitat requirements are treated throughout the general forest area.

Bug-proofing of some ponderosa pine stands, if done, would reduce big game habitat effectiveness due to the inability of those stands to provide cover.

Snags

Draft

Specific snag management levels were set by management area, which averaged out to an overall forest level of 55 percent of the potential population for snag dependent species.

Final

Specific snag management levels by management area average 47 percent of the potential population level in the first decade, and reach 54 percent by the fifth decade.

Eagle Roosts

Draft

Management direction provided to preserve the integrity of actual and potential bald eagle winter roost sites, but none were specifically identified.

Final

Eight bald eagle winter roosts are identified. Two are not shown on the map because they are included within old growth areas which have more restrictive management prescriptions.

Site specific management plans for each eagle roost area will be developed in fiscal year 1989 and 1990.

Hammer Creek

Draft

No special management designated in Hammer Creek except for an old growth area.

Final

A 2,560 acre management area is allocated for wildlife and recreation emphasis. It includes an old growth stand and includes a variety of habitat types.

Road Density

Draft

Road density averaged four miles per section in timber/range emphasis and two miles per section in big game emphasis.

Final

Road density averaged three miles per section in general forest and one mile per section seasonally in winter range.

Modeling Assumptions Habitat Effectiveness for Elk

Draft

Assumed potential is four elk per square mile in ponderosa pine types; 10 per square mile in mixed conifer; average six per square mile.

Final

Assumed potential is six elk per square mile in ponderosa pine types; 15 per square mile in mixed conifer, average nine per square mile.

Summary of Changes

1. Reduction of total area allocated to old growth, but increase in quality ("suitable" vs. "capable") of that dedicated, and distribution across the Forest and Grassland improved. Application of concept of "connective habitat." Increased recognition of importance of old growth occurring within other management areas (e.g. wilderness, Lookout Mtn., Stein's Pillar, Deep Creek, etc.).
2. Allocation of old growth juniper on the National Grassland.
3. Improved spatial distribution of winter range allocations.
4. Additional acres of antelope winter range area identified and allocated on the Grassland.
5. Allocation of general forest winter range, in addition to winter range resulting from improved habitat effectiveness.
6. Elimination of big game summer range allocation and consideration of big game habitat requirements in standards and guidelines for all management areas.
7. Snag management level increased on certain wildlife and recreation management areas created since the Draft, but an overall drop in potential population level due to big game summer range allocation change (noted above).
8. Specific identification and management direction for bald eagle winter roosts.
9. Allocation of a Hammer Creek Management Area with an emphasis on wildlife habitat management.
10. Modeling assumptions for habitat effectiveness changed based on new information from ODFW.
11. Emphasis on maintaining habitat with quality and quantity of cover and road density comprising the basis for rating habitat effectiveness.

Reasons for Change

Public comments. Consultation with Oregon Department of Fish and Wildlife. Improved information and intent to improve the ability to implement.

Grazing Management

Draft

Forage utility standards were broken out by slope class and meadows for each management area. They generally were the same, except for those in the Riparian Management Area which were more restrictive.

Final

Forage utilization standards developed by the Region for east-side Forests are used. There is one set of standards for riparian areas and another set for all other management areas not excluded from grazing. The standards are based on vegetation type, range condition, and Forest and Range Experiment Station (FRES) management strategies.

Draft

Allotment improvements were considered with emphasis on water developments across the Forest to improve utilization and distribution.

Final

A system for prioritizing range allotment planning needs and a program estimate for riparian improvements are established on an allotment by allotment basis.

Reasons for Change

Public comments. Provision of means to more effectively address the allotment-specific nature of concerns relating to grazing management, and to tier allotment management planning to the Forest and Grassland.

Travel/TransportationPlanning

Draft

All areas on the Forest and Grassland would be open unless otherwise designated, as determined by other management objectives. The ORV opportunities and closures were outlined in the DEIS (pg. 156), and in the travel plan map published with the DEIS.

Final

Travel access routes and areas designated with respect to management unit objectives.

Two designated ORV trails established, one in the Henderson Flat area on the Grassland and one on the Prineville Ranger District.

Draft

Allocated an area on Green Mountain to semiprimitive motorized recreation.

See road densities discussion under wildlife, pg. 1-30

Final

Changed Draft proposal for semiprimitive motorized recreation on Green Mountain to General Forest.

Summary of Changes

1. More specificity on area closures and designation of routes or roads within managements areas.
2. Refers ORV trail designation to project level implementation.
3. Additional emphasis on ORV management and control.
4. Increased emphasis on improved road management with resultant reduction in open road density.

Reasons for Change

Public comment. Coordination and attainment of other Forest management objectives, e.g. improvement of elk habitat effectiveness, reduction of visual and on-site impacts, and other special area objectives.

Riparian

Draft

Two allocations or prescriptions: "Acceptable" and "Excellent." The latter was assigned to all anadromous fish streams and other high value fish streams.

Final

All streams will be managed under one prescription - "Excellent."

Analysis and scheduling of need for treatment is based on a recently updated (1987) stream condition inventory.

Draft

No "connective habitat" identified or allocated.

Final

Riparian corridors on approximately 40 miles (1,000 acres) of high value streams have been expanded to offer additional protection to these streams and to enhance "connective wildlife habitat."

Summary of Changes

1. Provides a simplified and more direct approach - riparian area manage ment planning and analysis will be made compatible with stream condition.
2. Allotment management planning will have more detailed direction and objectives.
3. Provides a system for prioritizing range allotment planning needs on the Forest.
4. Introduces the concept and value of connective habitat.

Reasons for Change

Clarity in communicating planning details. Responsive to public, agency and internal comment. Provides specific information on objectives and impacts affecting allotment management and planning

Utility Corridors

Draft

Utility corridors are addressed in general terms in the Forest-wide Standards and Guidelines.

Final

Existing utility corridors (rights-of-way) are designated as a management area, 460 acres, in the Grassland Plan. Incorporates Federal Power guidelines and requirements (Western Regional Corridor Study, 1986).

Land Adjustment

Draft

The land adjustment plan shows four categories of land.

Final

A fifth category is added: areas where Congress has directed the Forest Service to acquire non-Federal lands for a designated purpose. The Deschutes Scenic River and the North Fork Crooked River Scenic Corridor fall into this category.

The land adjustment maps are more detailed and based on recent analysis. Lands are placed in adjustment categories according to management area and priority.

Draft

"Consolidate ownership of Cove-Palisades State Park area" is listed as a land adjustment priority.

Final

The issue of ownership patterns for Cove-Palisades State Park is deferred and opportunities for recreation management "partnerships" explored.

National Forest Ownership

Draft

National Forest ownership totaled 955,100 acres: 843,721 acres of National Forest, and 111,379 acres of National Grassland.

Final

National Forest ownership totals 956,150 acres: 844,640 acres of National Forest, and 111,510 acres of National Grassland, due to land exchanges which have occurred since the Draft was prepared.

Minerals and Energy

Draft

Oil and gas leasing activity planning was based on the Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947.

Final

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 changes the way oil and gas leasing will be administered. Regulations governing leasing procedures are expected to be finalized in late 1989.

Draft

Outputs for minerals activities were not adequately addressed in the DEIS (Table IV-6).

Final

Outputs for oil and gas leasing, geothermal leasing, mining claim location and common variety mineral production are discussed in the FEIS.

Draft

The economic analysis does not include revenues from oil and gas leasing.

Final

The economic analysis has been updated to include oil and gas leasing revenues.

Draft

The issue of providing a mining mineral inventory was deferred for resolution outside the Forest Plan.

Final

A mineral potential map and mineral inventory were prepared.

Draft

Approximately 80 percent of the Forest and Grassland were leased for oil and gas.

Final

Forest and Grassland area available for leasing is similar, but only approximately 10 percent of the Forest and Grassland are under lease, due to changes in oil prices.

Draft

No leasing would be allowed on administrative sites.

Final

Leases will be issued with a "no surface occupancy" stipulation on administrative sites.

Draft

Leases would be issued with some restrictive stipulations in old growth areas.

Final

Leases will be issued with a "no surface occupancy" stipulation in old growth areas.

Draft

Approval for mining operations will be given when concerns are mitigated in a responsible and responsive manner.

Final

Under the mining laws, claimants are entitled to access and develop their mining claims. Operating plans will include reasonable and operationally feasible requirements for timely and effective coordination with other resources.

Chapter 2

Alternatives, Including Proposed Action

CHAPTER 2
ALTERNATIVES, INCLUDING THE PROPOSED ACTION

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Chapter 2

Alternatives, Including the Proposed Action

Introduction

This chapter is the heart of the Environmental Impact Statement (EIS). It presents alternative ways of managing the Ochoco National Forest and displays the resource outputs and environmental effects of those alternatives. It also describes how alternatives were developed, how they compare to each other, and how they compare to the way the Forest is currently being managed.

This chapter has three main parts. The first section summarizes the process used to develop the alternatives. A detailed presentation of this analysis is given in Appendix B, Description of the Analysis Process. In the second section, all the alternatives carried forward to the Final EIS are then described in terms of their purpose and management emphasis. In the third, the alternatives are compared to each other in terms of outputs, responsiveness to issues and concerns, emphasized resource outputs, environmental effects, and economic costs and benefits which would occur with each alternative. This information is displayed in tables within this chapter.

Summary of Changes Between the DEIS and FEIS

In this chapter, the changes from the DEIS to this FEIS include a number of alternatives being eliminated from further study, the modification of several draft alternatives, the addition of the "No Change" alternative and the formulation of a new alternative. The comparison of the alternatives almost exclusively concerns the issues, concerns, and opportunities (ICO's) and the indicators of responsiveness.

A more thorough discussion of the changes from the DEIS to this FEIS is presented in the Summary to this FEIS.

Alternatives

Forest management can vary by what is done, where it is done, and when it is done. These varying combinations of what (management activities), where (management areas), and when (activity schedules) result in different resource outputs and environmental conditions, while meeting the unique objectives of each alternative.

Each alternative is a unique combination of these three elements: management activities, management areas, and activity schedules. As a result, each alternative generates a different mix of goods and services for the public, and a different combination of resource outputs, land uses, and environmental effects.

The basis for alternatives are the public issues, management concerns, and resource use and development opportunities and the manner in which they respond to the ICO's. Laws and regulations also require that certain alternatives, which are based on national or regional issues and concerns, are included in the process. Given those alternatives required by law or regulation, and based on the issues,

concerns and opportunities identified in this planning process, an Interdisciplinary Team (IDT) formulated alternatives covering a broad range of possible actions. The alternatives represent a variety of ways to respond to the issues, concerns and opportunities.

This chapter also discusses "benchmarks." Benchmarks are calculations of the maximum potential output, production, or economic opportunities for the Forest. They are used to define the decision space and range of alternatives that can be developed for particular resources.

Eleven alternatives were developed for the DEIS based on the public involvement process described in Appendix A to this FEIS. Because of the appeals discussed later in this chapter (see pg. 2-21), an additional alternative, the No Change Alternative (Alternative NC) was developed in a Supplement to the DEIS, October 1988. This alternative represents management of the Forest according to the 1979 Timber Resource Plan and unit plans. This alternative used a different set of criteria for acres of land suitable for timber harvest.

An additional alternative was developed to reflect public comment and new information on the DEIS. This alternative is also a product of close coordination with the State of Oregon in the development of their proposed management strategy for the Forest and Grassland. Four of the alternatives in the DEIS were modified, updated and carried forward to this FEIS. Ten of the alternatives displayed in the DEIS were eliminated from further detailed analysis in this FEIS The disposition of the alternatives is also illustrated in Table 2-1. In addition, further discussion of required, departure, the "No Change,"and new alternatives, and also those alternatives eliminated from further discussion can be found on pages 2-18 through 2-21.

TABLE 2-1

DISPOSITION OF ALTERNATIVES CONSIDERED IN THE FINAL

	ALTERNATIVES															
TREATMENT	A	B	B Dep	B Mod 1/	C	C Mod	D	E	E Dep	F	G	H	H Dep	I Pre 2/	NC	CD BNCH 3/
Detailed Alts in DEIS	X	X	X		X		X	X	X	X	X	X	X		X	X
DEIS Alts Detailed in FEIS									X						X	X
DEIS Alts Eliminated in FEIS	X	X	X		X		X	X		X	X	X	X			
New Alts Detailed in FEIS				X		X								X		

/1 Alternative B-Mod represents evolution and change of Alternative B-plus proposed by timber industry Alternative B-Mod is a new industry alternative It is different than B-Departure in the Draft, the latter of which was much the same as Alternative B

/2 Preferred Alternative I

/3 Current Direction Benchmark with National Forest Management Act (NFMA), Alternative A in this FEIS

Formulation of Alternatives - The Process

Overview

The purpose of forest planning is to formulate and select an alternative that most nearly maximizes net public benefits. Net public benefits are defined as the "...overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not....consistent with the principles of multiple use and sustained yield" (36CFR 219.3).

Forest planning and the National Environmental Policy Act (NEPA) are both issue-driven processes. Maximization of net public benefits and responding to issues are, therefore, related. Net public benefit is not to be confused with present net value (PNV), which is the difference between discounted costs and discounted benefits. The Preferred Alternative may not have the highest PNV but should have the highest net public benefit in the judgement of the responsible official.

Both priced and non-priced outputs and effects must be considered when addressing net public benefits. Priced outputs are those for which there is an established value. It may be a market value such as that assigned to timber, developed recreation, minerals, and range, or a non-market value such as that assigned to dispersed recreation, wildlife, wildlife related recreation, and wilderness recreation. Non-priced outputs are those which have no established value, such as scenic quality, cultural resources, and water quality. The formulation of a range of alternatives involves, therefore, an economic evaluation of priced outputs, and a subjective evaluation of the amenities the Forest offers, such as scenery, water quality, and recreation opportunities.

The planning regulation (36 CFR 219 12(e) and (f)) requires an analytic process, which includes an inspection of various minimum and maximum production levels and economic factors. In addition, the range of alternatives must respond to management concerns and include alternatives which reflect current and national programs, such as RPA.

Some alternatives represent management of the National Forest or Grassland to maximize the production of priced commodities such as timber and forage, whereas other alternatives could emphasize non-priced amenities, such as dispersed recreation, wildlife, and scenic qualities. One alternative, the No Action Alternative, reflects the objectives of the Forest Service National program. Some alternatives, departure alternatives, have an altered timber harvesting schedule to meet specific needs.

Alternatives must be responsive to public issues, management concerns, and resource opportunities. Finally, the alternatives must reflect resource capabilities, in terms of both limitations and potentials, of the many different areas of the Forest. The potential of the Forest to produce goods and services is compared to projected demand and supply potentials for those same goods and services in Central Oregon. The ability of the forest to supply goods and services in response to society's demands was determined in the Analysis of the Management Situation (1984) and is reflected in the range of alternatives in this FEIS. In summary, the Interdisciplinary Team formulated the alternatives using the issues and concerns as the starting point, considering the Forest's capabilities, and addressing both priced and non-priced resource outputs to create a range of alternatives.

From this range of alternatives, a preferred alternative is selected. The preferred alternative is the alternative which, in the opinion of the Regional Forester, comes closest to maximizing net public benefit as defined above and is responsive to public issues.

The process and chronology for the preparation of the Forest and Grassland Plans follows:

Year	Process
1980	Notice of Intent Published in the Federal Register
1981	Preliminary Identification of Issues and Concerns
1982	Forest Inventory Completed
1984	Analysis of Management Situation
1985	Formulation and Analysis of Alternatives
	Evaluation of Alternatives
	Draft Preferred Alternative Selection
1986	Draft Environmental Statement Published
	Public Comment Period
1988	Supplement to DEIS Published
1989	Public Comment Period for SEIS
	Evaluation of Public Comment
	Formulation, Analysis and Modification of Final Alternative
	Final Plan Published
1990	Plan Implementation, Monitoring and Evaluation

Resource Inventories

The physical inventory of the forest resources and their productive potential is a major part of the analysis process. Resource information was collected on a common map base, with different layers developed for various resources and inventory components. Inventories of the character, potentials and limitations of the Forest and Grassland were conducted. Areas of the Forest and Grassland were with similar physical and biological characteristics were stratified into "capability areas." These homogeneous areas are expected to have a somewhat uniform response to any particular management prescription. The inventory and the development of capability areas and their function in the analysis process is further discussed in Appendix B of the this FEIS.

Public Issues, Management Concerns and Opportunities (ICO's)

Public issues, management concerns and opportunities are the beginning basis of forest planning. The ICO's drive the planning process. To develop alternative ways of managing the land and resources, it is necessary to determine what is important to the public who benefit from the Forest. In the Fall of 1980 the Forest began to identify the principal issues to be addressed in the draft Forest Plan. A decision was made to build on the previous issues identified for the existing unit plans. Interest groups were used as a starting point and were invited to identify preliminary issues that could be expanded or refined by a broader audience. These key interest groups met with the Forest Interdisciplinary Planning Team (IDT) at six meetings held during the fall, 1980. From the meetings, 125 preliminary issues, concerns, and opportunities (ICO'S) were identified. The IDT then consolidated these ICO's into 60 issues and submitted this list to the public along with a request for response. In addition, public involvement was requested through various news media. The interdisciplinary team also conducted six public meetings to gather additional public comment. The information that was gathered was used to consolidate the issues into resource and/or land use topics. Seventeen issues were developed from this exercise. Further consolidation resulted in twelve issues being displayed in the DEIS

Since those meetings, the Forest has used a variety of methods to keep its employees and the local communities informed of the planning process. We published periodic articles and special editions in our Forest and Grassland report (we prepared and distributed a Forest Plan Report). During the sum-

mer and fall of 1985 we had multi-resource media coverage, providing information and education on Forest Management. Through a networking process, each Management Team member has been contacting key individuals in our local communities, informally discussing Forest management and the planning effort and validating our course of action for the final Forest and Grassland Plans.

Eleven alternatives were drafted for public review in the DEIS in September 1986. Alternative E-Departure was selected as the preferred alternative. During the 90-day comment period, the Forest received over 2,150 responses, which included over 20,000 specific comments. The Forest considered this public input and modified the issues, modified some of the alternatives and created two new alternatives.

A Supplement to the DEIS was prepared in response to Forest Industry taking issue with some of the methods used in forest planning by National Forests in the Pacific Northwest. They were concerned with how the "No Action" Alternative was described, and the methods used to address Forest planning management requirements. The Supplement to the DEIS described a new alternative, Alternative NC, and analyzed alternative levels of management requirements. The Supplement was published in October 1988, and the 90-day public review period ended January 17, 1989. The Forest received nearly 200 letters in response to the Supplement. The results of the public response period for the Supplement are also discussed in Appendix I of this FEIS.

Significant steps were employed during the last 3 months of final document preparation to insure that direction in the Final Plan responded accurately to comments received on the Draft. Meetings were held, and contacts made with selected groups, individuals, agencies and political leaders in order to:

Validate public responses received during the process;

Insure that we correctly interpreted what was said;

Insure that we did not miss something or overlook stumbling blocks towards successful implementation; and

Set the stage for implementation of the Plan.

This networking followed our efforts in seeking broad public review of our draft documents. During this time, 39 meetings have been held with more than 289 citizens, and 69 interest groups or agencies. In response to this effort, when appropriate, adjustments were made to the final planning documents.

The details of the public involvement process and the development of the ICO's is further discussed in Appendix A. The changes between the DEIS and FEIS are highlighted in the Summary and in the Record of Decision.

Analysis of the Management Situation (AMS)

The document titled "Analysis of the Management Situation," Ochoco NF and Crooked River National Grasslands, Nov. 1984, provides a description of the Forest's environment and an analysis of the Forest's potential to provide both market and non-market resources and services (see Ochoco National Forest planning records).

Information from the AMS was used to further define the alternatives presented in the DEIS and this FEIS. Specifically, the AMS was used to:

Define the maximum potential of the Forest to produce resource outputs for selected market and non-market goods.

Evaluate the complementary and conflicting relationships between market and non-market goods the Forest could produce.

Analyze the efficiency and implications of constraints placed on the alternatives to meet legal, policy, or resource management requirements.

Identify the range within which alternatives could be developed.

Determine if current management direction is satisfactory or if there is a need to change.

TABLE 2-2
RESOURCE SUPPLY AND DEMAND PROJECTIONS FOR THE GRASSLAND

Resource/ Activity	Unit of Measure	Decade				
		1st Decade	2nd Decade	3rd Decade	4th Deacde	5th Decade
FORAGE	Thousand AUM's					
Supply						
Current Direction		21 3	21 3	21 3	21 3	21 3
Maximum Potential		29	29	29	29	29
Grassland Plan		18	19	19	19	19
Demand		22 5	22.5	22.5	22.5	22 5
FUELWOOD	Cords					
Supply						
Current Direction		300	300	300	300	300
Maximum Potential		12500	12500	12500	12500	12500
Grassland Plan		400	400	400	400	400
MINERALS						
Oil & Gas	Thousand Acres					
Supply						
Current Direction		7 2	17	17	17	17
Maximum Potential		7 2	93	93	93	93
Grassland Plan		7 2	17	17	17	17
Demand		7 2	17	17	17	17
Geothermal	Thousand Acres					
Supply						
Current Direction		0	0	0	0	0
Maximum Potential		174	174	174	174	174
Grassland Plan		0	0	0	0	0
Demand		0	0	0	0	0
Nonenergy Minerals	Thousand Acres					
Supply						
Current Direction		0	1	3	3	3
Maximum Potential		0	1	3	3	3
Grassland Plan		0	1	3	3	3
Demand		0	1	3	3	3
RECREATION						
Developed Recreation	MRVD s					
Supply						
Current Direction		28 8	28 8	28 8	28 8	28 8
Maximum Potential		28 8	28 8	28 8	28 8	28 8
Grassland Plan		28 8	28 8	28 8	28 8	28 8
Demand		13 7	15 4	16 7	18 3	19 9
Roaded Natural and Rural Supply	MRVD's					
Supply						
Current Direction		37 8	37 8	37 8	37 8	37 8
Maximum Potential		37 8	37 8	37 8	37 8	37 8
Grassland Plan		37 8	37 8	37 8	37 8	37 8
Demand		111 4	122 6	132 4	143 3	155 2
Semiprimitive Motorized	MRVD's					
Supply						
Current Direction		0	0	0	0	0
Maximum Potential		0	0	0	0	0
Grassland Plan		0	0	0	0	0
Demand		1 2	1 3	1 3	1 5	1 6
Semiprimitive Nonmotorized	MRVD's					
Supply						
Current Direction		2 6	2 6	2 6	2 6	2 6
Maximum Potential		3 2	3 2	3 2	3 2	3 2
Grassland Plan		3 2	3 2	3 2	3 2	3 2
Demand		2 0	2 1	3 0	4 0	6 0

Resource/ Activity	*Unit of* Measure	*1st* Decade	*2nd* Decade	*3rd* Decade	*4th* Deacde	*5th* Decade
Fishing	MRVD's					
Supply						
Current Direction		23 1	24 9	27 0	29 4	32 2
Maximum Potential		23 2	26 3	28 4	30 8	33 6
Grassland Plan		23 2	26 3	28 4	30 8	33 6
Demand		23 5	26 3	28 4	30 8	33 6
Hunting	MRVD's					
Supply						
Current Direction		5 7	5 6	5 2	5 3	5 3
Maximum Potential		5 7	5 6	6 2	6 2	6 2
Grassland Plan		5 7	5 6	5 4	5 4	5 4
Demand		Unknown	Unknown	Unknown	Unknown	Unknown
ECONOMIC AND SOCIAL	Change in Jobs from Current Situation					
Supply						
Current Direction		9	N/A	N/A	N/A	N/A
Maximum Potential		10	N/A	N/A	N/A	N/A
Grassland Plan		9	N/A	N/A	N/A	N/A
PAYMENT TO COUNTIES	MM$					
Supply						
Current Direction		03	03	03	03	03
Maximum Potential		03	03	03	03	03
Grassland Plan		03	03	03	03	03
WILDLIFE						
Deer Winter Range Carrying Capacity	Thousand of Wintering Animals					
Supply						
Current Direction		4 3	3 2	2 2	2 2	2 2
Maximum Potential		4 3	3 2	2 2	2 2	2 2
Grassland Plan		4 3	3 2	2 2	2 2	2 2
Antelope Winter Range Carrying Capacity	Hundreds of Wintering Animals					
Supply						
Current Direction		1 6	1 6	1 6	1 6	1 6
Maximum Potential		3 5	3 5	3 5	3 5	3 5
Grassland Plan		3 5	3 5	3 5	3 5	3 5

NOTE. Current Direction in this table is the No Action alternative which is Alternative A

MRVD - Thousand Recreation Visitor Days
MM$ - Million Dollars

TABLE 2-3
SUMMARY OF SUPPLY AND DEMAND PROJECTIONS FOR THE FOREST

	Average Annual for Decade					
Resources	1	2	3	4	5	Source of Information
ECONOMIC AND SOCIAL CHANGE IN JOBS FROM CURRENT SITUATION						
Supply						
Current Direction	48	N/A	N/A	N/A	N/A	Alternative A
Maximum Potential	224	N/A	N/A	N/A	N/A	Independent Estimates
Forest Plan	109	N/A	N/A	N/A	N/A	Alternative I
PAYMENT TO COUNTIES (MM $)						
Supply						
Current Direction	6 0	5 3	N/A	N/A	5 1	Alternative A
Maximum Potential	4 9	N/A	N/A	N/A	N/A	Maximum PNV Benchmark
Forest Plan	4 8	5 6	N/A	N/A	5 4	Alternative I
FIREWOOD (M CORDS)						
Supply						
Current Direction	14 0	12 4	12 0	12 0	11 6	Alternative A
Maximum Potential	15 0	14 0	13 0	13 0	13 0	Timber Benchmark
Forest Plan	13 0	12 0	11 0	11 0	11 0	Alternative I
Demand	18 0	18 0	18 0	18 0	18 0	Independent Estimate 1/
RANGE (MAUM)						
Supply						
Current Direction	57 8	57 6	63 7	64 9	65 2	Alternative A
Maximum Potential	68 0	65 7	75 6	75 9	76 3	Range Benchmark
Forest Plan	58 0	62 5	66 6	63 9	65 6	Alternative I
Demand	83 0	83 0	83 0	83 0	86 0	RPA 2/
RECREATION (MRVD)						
Developed Recreation						
Supply						
Current Direction	224 5	224 5	224 5	224 5	224.5	Alternative A
Maximum Potential	261 3	261 3	261 3	261 3	261 3	Recreation Benchmark
Forest Plan	261 3	261 3	261 3	261 3	261 3	Alternative I
Demand	116 1	130 5	145 0	156 6	172 0	Independent Estimate 3/
Roaded Natural and Rural Supply						
Supply						
Current Direction	1099 3	1099 3	1099 3	1099 3	1099 3	Alternative A
Maximum Potential	1139 4	1139 4	1139 4	1139 4	1139 4	Maximum PNV Benchmark
Forest Plan	1067 9	1067 9	1067 9	1067 9	1067 9	Alternative I
Demand	262 4	288 8	312 2	337 6	365 0	Independent Estimate 3/
SEMIPRIMITIVE MOTORIZED SUPPLY						
Supply						
Current Direction	0	0	0	0	0	Alternative A
Maximum Potential	25 9	25 9	25 9	25 9	25 9	Recreation Benchmark
Forest Plan	0	0	0	0	0	Alternative I
Demand	16 8	18 3	20 0	21 7	23 5	Independent Estimate 3/
SEMIPRIMITIVE NONMOTORIZED SUPPLY						
Supply						
Current Direction	22 5	22 5	22 5	22 5	22 5	Alternative A
Maximum Potential	65 1	65 1	65 1	65 1	65 1	Recreation Benchmark
Forest Plan	44 0	44 0	44.0	44 0	44 0	Alternative I
Demand	32 2	35 3	38 5	42 0	45 7	Independent Estimate 3/
FISHING						
Supply						
Current Direction	28 7	31 9	34 1	36 5	39 2	Alternative A
Maximum Potential	28 7	33 1	35 3	37 7	40 5	Wildlife Benchmark
Forest Plan	28 7	33 1	35 3	37 7	40 5	Alternative I
Demand	47 8	57 3	61 4	66 0	71 0	Maximum PNV Benchmark
HUNTING						
Supply						
Current Direction	82 5	80 6	75 1	77 0	76 2	Alternative A
Maximum Potential	79 8	79 8	89 1	87 3	88 8	Wildlife Benchmark
Forest Plan	79 1	77 9	78 4	77 7	75 5	Alternative I
Demand	89 9	98 1	108 8	108 8	108 8	ODFW

Resources	1	2	3	4	5	Source of Information
BIG GAME DEER (1000 DEER)						
Supply						
Current Direction	18 3	18 3	18 3	18 3	18 3	ODFW 4/
Maximum Potential	18 3	18 3	18 3	18 3	18 3	ODFW
Forest Plan	18 3	18 3	18 3	18 3	18 3	ODFW
ELK						
Supply						
Current Direction	3370	3160	2570	2775	2690	Alternative A
Maximum Potential	3075	3075	4070	3880	4040	Wildlife Benchmark
Forest Plan	3000	2900	2900	2800	2600	Alternative I
Demand	2560	2560	2560	2560	2560	ODFW 5/
TIMBER (MMCF)(ASQ + SALVAGE)						
Supply (All Species)						
Current Direction	21 2	20 6	20 6	20 5	20 5	Alternative A
Maximum Potential	23 7	22 8	22 1	22 0	21 9	Timber Benchmark
Forest Plan	19 8	19 5	19 2	19 2	19 2	Alternative I
Supply (Ponderosa Pine)						
Forest Plan						Alternative I
Demand						Maximum PNV Benchmark
State of Oregon	19 0	19 6	19 7	20 6	21 6	State of Oregon 6/
Forest Service	25 0	25 0	25 0	25 0	25 0	RPA 2/
WILDERNESS USE (MRVD)						
Supply						
Current Direction	25 7	25 7	25 7	25 7	25 7	Alternative A
Maximum Potential	25 7	25 7	25 7	25 7	25 7	Oregon Wilderness Bill
Forest Plan	25 7	25 7	25 7	25 7	25 7	Alternative I
Demand	16 3	17 8	19 2	21 0	22 9	Independant Estimate 3/
OLD GROWTH (M ACRES)						
Supply						
Current Direction	93 8	83 0	73 0	63 0	53 0	Alternative A
Maximum Potential	93 8	93 8	93 8	93 8	93 8	Benchmark
Forest Plan	93 8	83 9	74 2	64 5	55 1	Alternative I
Demand	N/A	N/A	N/A	N/A	N/A	
SNAGS (% OF POTENTIAL)						
Supply						
Current Direction	46 0	52 0	52 0	52 0	52 0	Alternative A
Maximum Potential	51 0	59 0	67 0	68 0	69 0	Benchmark
Forest Plan	47 0	49 0	51 0	55 0	54 0	Alternative I
Demand	N/A	N/A	N/A	N/A	N/A	
MINERALS - OIL (M ACRES LEASED)						
Supply						
Current Direction	808	808	808	808	808	Alternative A
Maximum Potential	808	808	808	808	808	
Forest Plan	808	808	808	808	808	Alternative I
Demand	140	670	400	270	140	

1/ Firewood estimate, based on past sales of permits
2/ Forest Service 1980 Resource Planning Act Program
3/ Estimate based on population growth See text.
4/ Management objective for deer established by Oregon Department of Fish and Wildlife
5/ The Forest Program for Oregon, 1980

NOTE Current Direction in this table is the No Action alternative which is Alternative A.

MM$ - Million Dollars
MAUM - Thousand Animal Unit Months
MRVD - Thousand Recreation Visitor Days
M Acres - Thousand Acres

Summary of Supply and Demand

Projected supply and demand for selected resources is discussed in Chapters 2 of the Forest and Grassland Plans. This information is repeated in this chapter of the FEIS to supplement the comparison of alternatives and is also discussed again in Chapter 3 in this FEIS

Identification of Alternative Themes and Objectives for the DEIS

Different "themes" and "objectives" were developed to help ensure a range of reasonable alternatives. Based on the minimum and maximum resource output levels (benchmarks) developed in the AMS, a number of output levels for each issue or concern were established. In some cases outputs represented production levels, such as volume of wood, and in other cases they represented conditions, such as acres of "old growth habitat." The alternative themes and objectives were created by grouping that, in the planning team's judgement, appeared to be compatible output levels for each issue or concern. Each output level for every issue or concern was incorporated into an alternative, in order to assure that the appropriate range of alternatives was considered.

In a second stage of alternative theme and objective evaluation every identified issue or concern was addressed to ensure that it was resolved in at least one alternative, and then tested to assure that the resulting alternative was significantly different from others. As a result of this step, some preliminary alternatives were consolidated and further refined, while others were eliminated.

The Regional Forester and his Directors reviewed the Ochoco AMS and proposed alternatives in December 1984. The alternative themes and objectives were approved with a few relatively minor refinements. It was decided that three of the eight alternatives should be evaluated and fully developed with timber harvest schedules that depart from nondeclining yield. Thus, a set of eleven alternatives were analyzed in the development of the Forest Plan DEIS.

Determination of Management Areas

Different ways of managing the Forest and Grassland were developed as "management prescriptions" during the AMS stage described earlier. "Management areas" are delineated by applying a management prescription to a particular piece of land. To a large degree it is the mix of management areas in an alternative that determines the levels of outputs and conditions that result.

Each potential management area was analyzed to develop trade-off information. The FORPLAN model was used to assist in this process. The next section in this chapter describes the Ochoco FORPLAN model in general, and Appendix B describes the model and analysis process in detail. Relative impacts on present net value (PNV), big game numbers, and timber outputs were assembled for each potential management area. Using this data and other information presented on the relative benefits of managing one area versus another under a given management prescription, an expanded Forest Management Team assigned priorities to management areas for each alternative. Using these priorities, and the alternative themes and objectives, final management area maps were developed for each alternative in the FEIS.

Management Activity Scheduling, Cost Efficiency and Feasibility Testing

After management areas were defined for each alternative, the Forest scheduled management activities over time with cost efficiency, using FORPLAN. Each alternative was "run" with all specified resource objectives being treated as constraints. This then led to a cost efficient schedule of activities by maximizing present net value.

A series of "feasibility screens" were performed on the scheduling results for each alternative. Criteria considered included: 1) timber volume available in the Burns-Hines area over time, 2) timber species mix, 3) logging systems, 4) reforestation methods, and 5) ability to meet watershed protection requirements. Adjustments needed to produce realistic alternatives were made, and the alternatives were adopted for additional analysis and evaluation in the DEIS.

Refinement of Alternatives from the DEIS to the FEIS

The public responses to the DEIS and the supplement to the DEIS have been used to refine the ICO's along with management concerns. The result has been the development of separate plans for the Forest and Grassland. The specific refinements of the alternatives carried forward in this FEIS are discussed for each alternative in the section on alternatives in this chapter (pp. 2-21 through 2-54). As has been noted, the changes from the Draft to the Final have also been discussed in the Summary to this FEIS.

Between the DEIS and the FEIS some data was changed, some processes were altered, and some additional analysis was performed Those changes are summarized as follows:

New Prescriptions and Yield Streams Applied in the FORPLAN Model

Uneven-aged timber management applied to ponderosa pine on general forest (20" target size).

Uneven-aged timber management applied to ponderosa pine in special areas with 30-inch DBH target size: Lookout Mountain, Stein's Pillar, Deep Creek, North Fork Crooked River.

Uneven-aged timber management (group selection) applied to mixed conifer in some areas.

Extended rotation ages and new thinning cycles for ponderosa pine in general forest.

More reliance on mixed conifer to produce cover.

Acres and Timber Yield Tables

Acres - Condition classes (i.e. the amount of pine sawlogs, saplings, etc.) have been updated from the 1983 information used in the DEIS. This was done to more accurately assess timber harvest scheduling and its associated outputs and effects.

Timber Yield Tables - Yield tables were updated to reflect the growth that has occurred in the last five years in order to more accurately determine outputs and effects.

Other

New elk coefficients.

New Habitat Effectiveness model for elk.

Standard view shed procedures eliminated in favor of set width (1200 ft.).

New riparian analysis and scheduling based on updated stream condition inventory.

Potential water developments for livestock and wildlife were re-evaluated. Existing old growth inventory was updated.

Anadromous fisheries were identified, the analysis included resource production relationships and economic parameters.

Potential for mineral exploration and leasing, and the economic value of mineral leases incorporated.

Potential for capital investments concerning developed and dispersed recreation, including trails, was re-evaluated.

Some changes were made to the cost and values data between the DEIS and the FEIS. These changes are detailed in Appendix B, Section IV, Economic Efficiency Analysis. Generally the number of changes were limited in scope. They included addition of data for mineral leases and anadromous fisheries which were ignored in the Draft. A review of the individual resources and their potential to significantly affect present net value and the comparison of alternatives, and potentially the decision, became the primary decision criteria for making any changes.

FORPLAN and the Analysis Process

Description of FORPLAN

Alternative development and evaluation for an entire National Forest has proven to be a complex process during which an enormous amount of information must be considered. Because of this complexity, several interrelated computer models and analytical tools were utilized to help develop alternatives and to evaluate their associated outputs and effects. The central model for this analysis process is called FORPLAN (FOResT PLANning Model). FORPLAN is a computerized linear programming model which allows a great deal of flexibility in formulating a mathematical representation of forest management interactions and activities. The major purpose of FORPLAN is to assist selection of the most efficient method of achieving goals and objectives, primarily timber management. Tens of thousands of management options, or combinations of options, can be considered simultaneously by FORPLAN. The FORPLAN model was designed and used to analyze the economic and output tradeoffs associated with the different emphases provided by the ICOs. A brief discussion of the Ochoco FORPLAN model is contained in the following paragraphs. A detailed description can be found in Appendix B.

The first key step in the development of the FORPLAN Model was to identify the "analysis areas" for the Forest and Grassland. Analysis areas are tracts of land with similar ecological characteristics that result in similar costs, outputs, and effects in terms of the model. These units have significant physical, biological, and economic differences in the way they respond to alternative management prescriptions. For example, an analysis area on the Forest may be two-storied ponderosa pine stands, on steep slopes, contained in roadless areas located on the Big Summit Ranger District.

In the FORPLAN model analysis areas were assigned to "management prescriptions" to achieve resource management objectives for particular benchmarks or alternatives. The prescriptions are associated with particular management areas and contain sets of standards and guidelines describing how forest resources in that area are to be managed. Development of prescriptions was a major step in the modeling. Forest interdisciplinary teams designed prescriptions to achieve a range of goals and objectives based on the ICO's. From six to ten different management prescriptions were prepared for each analysis area depending on its resource capabilities.

The management prescriptions and associated standards and guidelines were represented in FORPLAN as "coefficients." In other words, the costs, outputs, and effects of applying a prescription to an analysis area had numerical values in the model. Such things as the dollars required, forage produced, timber

harvested, and effects on elk habitat made up the core of the model. Different timing patterns were also allowed. These specific options concerning how to manage a particular piece of land over time, then, served as the basis for choice in FORPLAN.

The prescriptions FORPLAN selected depended on the "objective function" and the set of "constraints" used to represent a particular benchmark or land management plan alternative. The objective function served as the overall driving force for the model and usually maximized present net value. Constraints designed to meet all of the multiple resource goals and objectives for a particular benchmark or alternative had to be met first. Once the model had determined that a feasible solution existed by satisfying all of the constraints, it would then search for the set of prescriptions which permitted it to optimize the results according to the specified objective function.

The Analysis Process

Guidance for analysis of alternatives is found in the NFMA regulations (36 CFR 219.12 (f)(8)) as stated below:

> "Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

This requirement was met through design of the FORPLAN model, use of the model to select and schedule prescriptions for each alternative, use of the model in sequential analyses to help design alternatives, and by conducting supplemental analyses. The following paragraphs summarize the types of analyses performed.

The Forest performed several types of analyses in the process of designing and building the FORPLAN model. The purpose of these analyses was to provide a wide range of choice in order to evaluate the significant aspects of cost-efficient prescription assignment.

Major examples of this type of analysis follow:

1. Development of Analysis Areas - Testing different combinations of land classifications leading to use of the analysis area data that appeared to most efficiently reflect economic and environmental factors (Forest Planning Records, 1920 7/7/83).
2. Cost Efficiency Analysis - Specific modeling prescriptions were developed, tested, and selected based to a large degree on cost efficiency analysis (Forest Planning Records, 1920 9/10/84).
3. Specific modeling procedures themselves were also analyzed for cost efficiency. For example, the Forest elected to manage and model old growth habitat with a dedicated stand system based in part on economic efficiency considerations (Forest Planning Records, 1920 6/21/84). Also, procedures for dispersion of harvest units were adopted to minimize the impacts on present net value (PNV) while meeting dispersion objectives (Forest Planning Records, 1920 6/13/85).

The resulting Ochoco FORPLAN model was used to determine cost efficient prescription assignment and scheduling for each alternative and benchmark.

A number of other different types of analyses were performed in conjunction with FORPLAN runs, both to evaluate different mixes of goals and objectives, and to evaluate choices not explicitly analyzed in FORPLAN. For example, an analysis in the latter category examined the relative cost efficiencies of different management prescriptions and the timing of initial entry, as applied to individual roadless areas. The FORPLAN model was not able to validly analyze these choices with a single model run, so sequential analyses were performed to provide the economic efficiency trade-off data.

Another similar type of analysis examined relative cost efficiencies of different management area locations on the Forest and Grassland as described in Appendix B. The AMS also documented a series of analyses performed to provide a framework for alternative development. In the AMS, different mixes of goals and objectives were examined to provide cost efficiency information relative to the maximum

PNV obtainable, competition between market and assigned values, and current management direction. Opportunity costs of economic assumptions, management requirements, and timber harvest policies were also determined.

Between the DEIS and FEIS, Alternatives B-Modified, C-Modified and E-Departure were updated, and Alternative I was developed for the Forest and Grassland Plans. Alternative A in this FEIS is the "current direction" benchmark from the DEIS. See Appendix B for more detail.

The FORPLAN model, however, is not able to deal with all types of planning questions. Significant situations were analyzed "outside the model" through supplementary analyses. For example, early in the planning process an opportunity to increase domestic livestock forage availability by constructing additional water developments was recognized. An economic analysis of the proposed investments was conducted and the results used in the various benchmarks and alternatives. Another example is the elk habitat effectiveness index (HEI). The HEI is developed from a model outside FORPLAN, which uses cover quantity, cover quality and road density to evaluate the quality of elk habitat. Forage availability is not a factor in this model. An analysis of forage availability for livestock and wildlife on the Forest and Grassland showed that forage availability is not a limiting factor for elk habitat on the Forest (this analysis is available in the planning records located at the Ochoco National Forest headquarters in Prineville, OR.). Forage availability will, however, be looked at on a project basis during implementation of the plans and the resultant allotment management plan revisions.

Land Allocations

Management of certain areas of the Forest remain constant in all alternatives due to existing legislative or administrative requirements. The Forest does not have the authority to change the management of these areas. Such places include Wildernesses and Wild and Scenic Rivers. Areas of the Forest not held constant because of legislative or administrative requirements are assigned to management areas. There are 28 management areas on the National Forest and 16 on the National Grassland in Alternative I. These are not contiguous areas, but rather, each area represents a different management emphasis. For example, Management Area 20 emphasizes management of winter range for big game and is found in various places across the Forest, as may be other management areas. The maps accompanying this FEIS display management emphasis. The management areas are actually aggregates of those emphases.

Land use allocations (management areas) are not displayed for Alternative NC. A discussion of land classification can be found in the 1979 Timber Resource Plan.

During the planning process, the Interdisciplinary Team developed management strategies, called management prescriptions, for each management area. Each management strategy emphasizes a particular resource or use, or it incorporates legislated allocations such as wilderness. All management strategies meet all management requirements (see discussion that follows). Each of the management strategies was represented in alternatives where the area allocated was capable of attaining the desired future condition.

Management Requirements

Many laws and regulations guide Forest Service activities One law in particular, the National Forest Management Act of 1976 (NFMA), and its implementing regulations, provides direction for the forest planning process. The regulations for National Forest System Land and Resource Management Planning, in Section 36 of the Code of Federal Regulations, Part 219 (36 CFR 219) specify: 1) the minimum specific management requirements to be

met in accomplishing the goals and objectives of the National Forest System (36 CFR 219.27), and 2) the minimum requirements for integrating individual forest resource planning into the forest plan (36 CFR 219.14 through 219.26).

Some requirements are procedural and need not be addressed here. Some were analyzed and available for public review during the environmental analysis for the Regional Guide and are omitted as well. The management requirements treated in the supplement to the DEIS that required additional analysis were: size and dispersion of created openings, providing adequate habitat to maintain viable populations of existing native vertebrate species and water quality. A more thorough discussion of management requirements is presented in Appendix F.

The management requirements from the planning regulations (36 CFR 219.27) are legal requirements, and as such are ends that must be achieved on the ground when the forest plan is implemented For example, the NFMA implementing regulations require that fish and wildlife habitat be managed to maintain viable populations of existing native vertebrate species and desired nonnative vertebrate species in the planning area. Whatever implementation methods are chosen, this--and all other management requirements--must, by law, be met.

Specifications or standards for achievement for each management requirement are established at the national level or through analysis at the regional level for most of the management requirements. These are listed in the regulations or as standards and guidelines in the Regional Guide. Additional specifications identified on the Forest are listed as standards and guidelines in the Forest and Grassland Plans and in the FEIS Appendix D.

Often, the pool of scientific knowledge is insufficient to provide the entire basis for defining the specific conditions or standards that will satisfy or meet a management requirement. When this happens it is necessary to rely on field experience, to use professional judgement of knowledgeable professionals and to establish monitoring and research that will provide better information for future planning efforts.

Implementation methods are the means or ways of meeting the ends (management requirements). Using the pileated woodpecker as an example, the end is to provide adequate habitat to maintain a viable population of pileated woodpeckers into the foreseeable future. The means of providing this habitat involves designing and implementing a set of practices that will assure that nesting and feeding areas meeting the needs of pileated woodpeckers are available in the future. These habitats are to be located closely enough together to allow woodpeckers occupying adjacent habitat areas the opportunity to interact, thus maintaining genetic diversity and viability of the species.

Unfortunately, the distinction between ends and means is not always clear. For example, the requirement regarding viable populations of vertebrate species, stated above, is well defined. In contrast, the size and dispersion of created openings management requirement (end) is rather general: NFMA specifies that maximum size limits for areas to be cut in one harvest operation be established for areas to be clearcut (SEC.6(G)(3)(F)(IV)), but does not specifically state the objective (end) to be accomplished by doing so. Nonetheless, the implementing regulations and the Regional Guide have specified maximum unit sizes and dispersion requirements.

Often there is more than one way of achieving a management requirement. Considering and analyzing different means (or ways) of meeting a specific management requirement are particularly important if there are potentially large opportunity costs involved. The Forest and Grassland, through analysis, identified three management requirements that had opportunity costs greater than or equal to two percent. The methods of implementing these three management requirements were also analyzed. Appendix F to this FEIS provides a detailed discussion of the management requirements used in the planning process, their opportunity costs and the alternative methods of implementing each of them, for the Forest and Grassland. In addition, the BMP's for water quality (one of the MR's) are discussed in Appendix G.

Role and Use of Benchmarks

Benchmarks are calculations of the maximum output, production, or economic opportunities for a forest. They are similar to alternatives; they are a combination of management strategies, land capability, and activity schedules, the same "what, where, and when" considerations of alternatives discussed previously. Unlike alternatives, they are usually not capable of actually being implemented because they lack a consideration of specific geographic locations, environmental effects, compliance with management regulations, and generally do not respond to issues, concerns, and opportunities. They do provide significant information about the maximum biological and economic production potential. By showing potential, the benchmarks help to define the decision space within which alternatives could be developed.

Some benchmarks are economically based, while others indicate the maximum physical productivity of land for various resources. In benchmark analyses, each option must include meeting minimum management requirements of 36 CFR 219.27, such as protecting the productivity of the land and meeting minimum air and water quality standards. There are several benchmarks that are required by the regulations (36 CFR 219.12(e)) and National direction. They include:

Minimum Level: The minimum level benchmark displays outputs which would occur if management activities were reduced to levels necessary to keep the land in National Forest ownership, while meeting essential minimum environmental constraints and providing for the protection of life, health, and safety of incidental users. The Forest would be managed at a custodial level. Natural ecological succession would occur. Except for minimum administrative requirements and minerals and occupancy permits, there would be no man-made structures.

Maximum Present Net Value Based on Established Market Price: This benchmark specifies management of the Ochoco National Forest which would maximize the present net value of those outputs that have an established market price, such as timber and developed recreation. This benchmark manages timber subject to non-declining flow. Minimum timber rotations are based on utilization standards (7-inch diameter at breast height).

Maximum Present Net Value including Assigned Values: This benchmark specifies management which would maximize the present net value of priced outputs. Priced outputs include those that have a market price such as timber, and those that are non-market but have an "assigned" value based on what people would be willing to pay in the marketplace, such as dispersed recreation. This benchmark manages timber subject to non-declining even-flow and minimum timber rotations based on 95 percent of culmination of mean annual increment. Recreation and wildlife outputs are significant on the Forest. The difference in PNV between this benchmark and the previous one is primarily due to the added value of recreation and wildlife, with range having a smaller effect. Table 2-5 shows that timber, recreation, and wildlife are the major contributors to PNV on the Forest.

Current Level: This benchmark estimates the outputs and costs on the Forest subject to established management direction in current Multiple Use Plans, Land Management Plans, and specific resource plans. This benchmark was constrained to reflect existing budget levels. Timber is managed for at least 130-year rotations, and harvest is constrained to meet non-declining even-flow. Recreation and wildlife output values are low because low budgets preclude maintaining outputs at standard levels.

Maximum Timber Benchmark: This benchmark estimates the maximum capability of the Forest to produce timber in the first decade. This benchmark manages timber to meet non-declining even-flow. Minimum timber rotations are based on 95 percent of culmination of mean annual increment.

Maximum Unroaded Recreation Benchmark: This benchmark estimates the maximum potential for unroaded recreation on the Forest. All inventoried RARE II areas are allocated to roadless manage-

ment providing the largest possible unroaded acreage that is available on the Forest. Timber is managed on remaining lands for minimum timber rotations of 130 years to improve the quality of the recreation experience. Timber harvest is constrained to meet non-declining even-flow.

Other benchmark analyses were conducted to determine opportunity costs of management requirements, the affect of restricting timber harvest rotations to the culmination of mean annual increment (CMAI), and the effect of non-declining flow (NDF) of timber harvest. Table 2-4 displays the required benchmarks done prior to the DEIS along with the selected outputs for each. Table 2-5 shows information on maximum outputs from benchmark analysis by resource compared with outputs for the alternatives.

Range of Alternatives

Overview

A range of alternatives was formulated according the requirements of NEPA and NFMA. The alternatives were designed to address the issues from the public involvement process and validation phase between the DEIS and this FEIS. Decision space for alternatives was defined through the analysis of the management situation and the benchmark analysis and evaluation previously discussed. Additional discussion of the formulation of alternatives is provided in Appendix B to this FEIS.

Assumptions Common to All Alternatives

Some assumptions are common to all alternatives. Among them is requirement that the alternatives meet laws, regulations, and policies that are applicable to the management of the Forest and Grassland. Significant items are noted below.

The selection of harvest systems must conform with the criteria specified in the Regional Guide and the U.S. Department of Agriculture regulations. Additional discussion on the selection of harvest systems is presented in Appendix E to this FEIS.

The Region's recent direction on vegetation management, "Managing Competing and Unwanted Vegetation" FEIS, Nov. 1988, guides vegetation management activities for the Forest and Grassland and interprets application of the standards found in 36 CFR 219.27(b).

The management requirements, discussed earlier in this chapter, are incorporated into all alternatives except Alternative NC in the Supplement to the DEIS. Only the No Change alternative is carried forward without them. Forest-wide Standards and Guidelines are generally designed to meet resource protection or mitigation required by laws, regulations, or policies. They are common to all alternatives. Resources treated in this manner are: air quality, cultural resources, soil and water, threatened and endangered plant and animal habitat, Native American rights and claims, and human resource programs (see Chapter 4 of the Forest Plan and FEIS Appendix D).

Best Management Practices (BMP's) are specifically designed to protect water quality, as required by Section 208 of the Clean Water Act. General BMP's will be selected and tailored for site-specific conditions to arrive at project-level BMP's for the protection of water quality (see Appendix G).

Required Alternatives

Information generated by the benchmark analyses was used by the Interdisciplinary Team to construct alternatives. Among the alternatives formulated were several required by regulation, and National as well as Regional direction. These alternatives were reviewed against the public comments to the DEIS and carried forward intact or with modifications, or they were eliminated from further consideration as listed and briefly described below:

Current Direction (No Action, Alternative A): This is the "No Action" alternative required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14). This alternative continues management of the Ochoco National Forest and Crooked River National Grassland according to direction in existing management plans. It is a continuation of existing policies, standards, and guidelines with current budget updated for changing costs over time. It approximates production of current levels and mixes of resource outputs. Current management emphasis is on a mix of timber, big game, and roadless recreation. Alternative 'A' represents the "No-Action" alternative herein.

Emphasis on the Current RPA Program (Alternative B-Modified): This alternative determines how the Current (1980) RPA Program attributed to the Ochoco National Forest through the Regional Guide might best be implemented. In the DEIS, Alternative B emphasized RPA timber and range goals, and alternative B-DEPARTURE combined RPA timber, range, and wildlife goals. Alternative B is car-

TABLE 2-4
OUTPUTS AND EFFECTS OF REQUIRED BENCHMARKS

	Minimum Level	Max PNV	Max Timber	Max Range	Max Big Game	Max Unroaded Recreation
PNV (MM $)		512	480	424	429	454
Change in Jobs From Current Situation	-1,028	234	226	149	-93	-107
Payments to Counties (MM $)	0	6 0	5 6	4 7	4 2	4 0
1st Decade Average Annual ASQ MMCF MMBF	 0 0	 22 9 139	 23 4 142	 22 1 132	 17 1 102	 15 5 93
Elk (No of Elk 5th Decade)	7,950	1,510	1,270	1,350	4,270	4,040
Deer (No of Deer 5th Decade)	22,600	20,470	13,350	17,060	22,600	22,600
Forage Production (MAUM's/Yr)	0	82 0	80 8	105 3	71 0	71 0
Old Growth (M Acres 5th Decade)	94	39	39	39	40	75
Snag Habitat for Cavity Nesters (%of potential, 5th Decade)	70	30	30	30	60	45
Riparian Areas in Excellent Condition (M Acres 5th Decade)	17 5	17 5	1 9	1 9	17 5	17 5
Roadless - Allocated (M Acres)	59 9	0	0	0	0	59 9

ried forward in this FEIS with modifications to incorporate both forest industry and other public concerns and data updates. It will be called Alternative B-Modified.

Emphasis on Nonmarket Opportunities (Alternative C-Modified): This alternative puts emphasis on water, fish and wildlife, recreation, and other amenity values. Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on amenity values. In the DEIS, Alternative C emphasized amenity values. It is carried forward here with modifications to incorporate public comment and data updates and continues as Alternative C-Modified.

Emphasis on Nondevelopment and Intensified Management (DEIS Alternative F): This alternative retains all roadless areas in an unroaded condition while increasing commodity production on those areas already roaded. Its purpose is to strive for high commodity outputs and high roadless recreation management, and intensified management on areas already developed. This alternative was considered in the DEIS but is not carried forward in this FEIS.

Emphasis on Market Opportunities (DEIS Alternative H): This alternative emphasized outputs that have an established market price (timber, domestic livestock use, developed recreation opportunities, and minerals) in the DEIS. Management for other resources was at economically and environmentally feasible levels consistent with market-oriented outputs. In the DEIS, Alternative H emphasized market opportunities for the Forest and Grassland. This alternative was considered in the DEIS but is not be carried forward in this FEIS.

Emphasis on Economic Efficiency (DEIS Alternative H-Departure):

This alternative emphasized management of outputs with market or assigned values at their most economically efficient levels. In the DEIS, Alternative H-DEPARTURE met this emphasis. This alternative was considered in the DEIS but is not be carried forward in this FEIS.

Departure Alternatives

Three "Departure" Alternatives (B-DEPARTURE, E-DEPARTURE, and H-DEPARTURE) had the same emphasis and management areas as the alternatives they are based on (B, E, and H respectively) in the DEIS. Their timber harvest schedule was modified to "depart" from a nondeclining flow of timber. Management under the departure alternatives would result in higher volumes of timber harvested in the "near future," but have lower volumes of timber available for the "intermediate future." Alternative E-Departure, the Draft preferred alternative, is carried forward here as a reference point. The other departure alternatives are eliminated based on public comments.

No Change Alternative

The No Change Alternative, Alternative NC, was developed in response to decisions made regarding appeal number 1588, brought by the Northwest Forest Resources Council on May 19, 1986. The appeal questioned the decision by the Regional Forester to "require inclusion of minimum requirements (MR's) in the No Action Alternative for each forest plan." The substance of the appeal was that a "true no-action alternative representing current management plans" was not included in the Forest Plan DEIS's. The No Change alternative is designed to represent the existing 1979 Timber Resource Plan and unit plans, and consequently does not comply with all provisions of NFMA and regulations promulgated to implement NFMA.

TABLE 2-5
MAXIMUM RESOURCE OUTPUTS COMPARISON WITH ALTERNATIVE OUTPUTS

	Maximum Outputs	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
PNV (MM $)	512	380	452	471	475	421	395
Change in Jobs from Current Situation	234	Unknown	176	196	118	57	-101
Payments to Counties (MM $)	6 0	5 0	4 9	5 0	4 9	4 3	3 5
1st Decade Average Annual ASQ MMCF MMBF	 23 4 14 2	 N/A N/A	 21 8 130	 20 6 123	 19 0 115	 19 3 115	 15 6 94
Elk (No of Elk 5th Decade)	4040	Unknown	1700	2780	2620	2690	3700
Deer (No of Deer 5th Decade)	22,600	Unknown	17,210	22,600	22,600	22,600	22,600
Forage Production (1st Decade MAUM's/Yr)	105 3	77 5	75 0	79 0	75 0	77 5	73 1
Old Growth (M Acres 5th Decade)	94.0	40 0	42 4	55 0	55 1	53 0	78 2
Snag Habitat for Cavity Nesters (% of potential, 5th Decade)	70	52	33	55	54	52	69
Riparian Areas in Excellent Condition (M Acres 5th Decade)	5 4	5 4	17 5	9 4	17 5	5 4	17 5
Roadless - Allocated (M Acres) 1/	59 9	29 1	10 7	27 3	38 4	31 2	41 0
Scenic Corridors (M Acres) 2/	102 7	83 5	34 4	46 2	41 7	83 5	101 1

1/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F4, G8)

2/ Total acreage for lands allocated to managment areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

New Alternatives/ Preferred Alternative

A thorough review of the public comment and continuing validation and dialogue with key publics has resulted in the Forest developing a new alternative. The new alternative separates plans for the Forest and the Grassland. It was developed through a complex process of combining publicly supported parts of the other alternatives with Alternative E-Departure. It incorporates new information since the DEIS, such as the passage of the Oregon Omnibus Wild & Scenic Rivers Act. This new alternative, Alternative I, is the preferred alternative.

Alternatives Considered but Eliminated From Detailed Study

Eleven alternatives were developed to address the twelve ICOs identified for the DEIS. Analysis and evaluation of public comment and an administrative appeal resulted in the development of new alternatives (NC in the Supplement to the DEIS, and I in this FEIS), the modification of Alternatives B and C, the replacement of Alternative A to reflect the current situation benchmark, and E-Departure being carried forward as a reference point from the DEIS to the FEIS.

Alternative A in the DEIS has been replaced by the current direction benchmark which incorporates the NFMA requirements and makes the no action alternative one which could be implemented. Alternative A in this FEIS is the no action alternative.

Alternative B was modified by Timber Industry and provided as Alternative B+ between the DEIS and the FEIS. The Forest, in conjunction with Timber Industry representatives, refined B+ and refer to it as B-Modified to represent the Timber Industry proposal for the FEIS. With the exception of E-Departure, the other departure alternatives were eliminated based on the overwhelming public support for staying within sustained yield bounds for the Forest. Alternative C was modified to incorporate data updates and some management emphasis updates. Alternatives D, E, F, G, and H were not carried forward in this FEIS. Their further analysis was not considered necessary at this point, though they have contributed to the consideration of a reasonable range of alternatives in the development of the Forest and Grassland Plans. Based on a thorough review of the public comments and management concerns, it was determined that these alternatives could be eliminated at this point. The modified alternatives carried forward and the new alternatives respond to planning issues considered in the DEIS and offer a reasonable and appropriate range of choice for the decision on the Forest and Grassland Plans.

Alternatives Considered and Analyzed in Detail

Description of the Alternatives

Introduction

The alternatives treated, present a reasonable range of implementable approaches to managing the Forest and Grassland. Each is a combination of management activities, practices and schedules which results in a unique combination of resource outputs, land uses, and environmental conditions. They were formulated through an analysis process that explored a wide array of possibilities as shown by the benchmarks and alternatives discussion on pages 2-13 through 2-17.

Resource emphases by alternative are summarized in Table 2-6. Some of the management area allocations can be lumped into resource emphasis categories which summarize land allocations with very similar resource management emphasis.

Allocating lands on the Forest and Grassland into different management areas is a part of the alternative formulation process. For example, a given management area consists of the lands which emphasize a particular resource or combination of resources such as "old growth." Acreages allocated to different management areas vary from one alternative to another. Table 2-7 presents the actual acreage allocations by management area by alternative. Management area maps displaying the allocations are included with the Forest and Grassland Plans.

Management areas are managed according to specified standards and guidelines that provide direction on the types, amounts, and timing of activities. Resource coordination and mitigation are also provided for by the standards and guidelines. Some standards and guidelines were developed by the interdisciplinary team specifically for environmental conditions on this Forest and Grassland. Others were adopted from the Regional Guide. They are found in Chapter 4 of the respective Plans. For other alternatives, they are given in Appendix D of this FEIS.

Alternatives have different land uses being emphasized, different resource outputs, and as a result, different environmental effects. Some of the differences among the alternatives are a reflection of the specific objectives which are incorporated by design.

The land uses, environmental effects, and resource outputs by alternative are summarized in Table 2-8.

The interrelationships between resource outputs and environmental effects are discussed in Chapter 4 of this FEIS, Environmental Consequences. Table 2-8 is intended to facilitate comparison of the alternatives.

Mitigation Measures Common to All Alternatives

Mitigation measures are intended to minimize or eliminate potential conflicts or adverse effects of implementation. Mitigation measures have been developed through interdisciplinary efforts and are incorporated into the Plans at different levels in several different ways:

The standards and guidelines and management area prescriptions in Chapter 4 of the Plans are a fundamental and integral part of these measures, and as such they are a basic and essential part of the Plan.

Additional mitigation measures in the Forest-wide standards and guidelines and mitigation measures specific to individual management areas are also contained in Appendix D for all alternatives other than I.

The management area allocations play an important role in mitigation by the separation of incompatible uses, impacts, and conflicts.

National Forest Management Act (NFMA) requirements were incorporated into the planning process and are reflected in the allocations and standards and guidelines (FEIS Appendices B and D, Plans Chapters 4).

"General Water Quality Best Management Practices" (USDA Forest Service, Pacific Northwest Region, November 1988. 86p) are incorporated by reference under requirements of Section 319 of the Clean Water Act and are discussed in Appendix H.

The monitoring plan, which includes provisions for monitoring the effectiveness of mitigation measures, is contained in the Proposed Forest

TABLE 2-6
RESOURCE EMPHASIS ACREAGES BY ALTERNATIVE

	ALTERNATIVES				
Emphasis	B-Mod	E Dep	I Preferred	A	C-Mod
Wilderness	37,325	39,825	37,325	37,325	47,325
Research Natural Areas	2,145	4,800	4,510	2,230	4,860
Old Growth	18,740	26,340	19,990	36,970	45,030
Cultural	0	0	9,560	0	0
Unroaded Recreation	17,130	27,315	37,060	31,200	40,960
Eagle Roosting	570	570	570	570	570
Developed Recreation	4,650	750	4,650	750	750
Dispersed Recreation	2,060	0	2,060	0	0
Riparian Excellent	18,930	8,260	20,240	3,850	15,550
Riparian Acceptable	0	7,630	0	12,210	0
Special Recreation	3,420	1,580	11,530	0	1,580
Special Wildlife	430	0	2,990	0	0
Big Game Winter Range	35,440	72,310	99,570	32,100	308,150
Big Game Summer Range	0	154,100	0	61,830	378,775
Timber/Wildlife	171,490	0	107,360	0	0
Timber/Range	603,010	555,020	556,290	649,170	0
Wild & Scenic Rivers	5400	4030	5400	4030	4030
Visuals	34,410	46,160	41,670	83,450	101,110
Facilities	1,000	460	1,000	460	460

TABLE 2-6 CONTINUED, ACREAGE DOCUMENTATION

Emphasis	Applicable Management Areas
Wilderness	D8, F1, F2, F3, F4
RNA's 1/	D12, F5, G4
Old Growth	D4, F6, G5
Cultural	F7
Unroaded Recreation	D9, G8, F8, F10, F11
Eagle Roosting	F12
Developed Recreation	D11, F13, G11, G12
Dispersed Recreation	D9, D10, F14, G14
Riparian Excellent	D14, F15, G9
Riparian Acceptable	D13
Special Recreation	F11B, F16, F17, F19
Special Wildlife	G10, F18
Big Game Winter Range	D2, F20, G1, G2
Big Game Summer Range	D3
Timber/Wildlife	F21 (F20 for B-Mod)
Timber/Range	D1, F22, G3
Wild & Scenic Rivers 2/	F23, F24, G6, G7, G8 (that portion of Squaw Creek being recommended)
Visuals	D5, D6, D7, G13, F25, F26, F27
Facilities	F28, G15, G16

1/ RNA acreage totals are derived from the final management area mapping and R 2 data base acreage calculations RNA boundaries were slighty modified from the DEIS to the FEIS and consequently the total acreage for the final does not exactly track with that from the DEIS and the discussion of RNA s in Chapter 3 of the FEIS

2/ An eligibility and suitability evaluation has been made for Squaw Creek. A recommendation and interim management guidance for a Wild and Scenic River designation has been made in Alternative B-Modified and I For those alternatives, 1,370 of unroaded recreation emphasis has been deleted and added to the Wild and Scenic River emphasis

TABLE 2-7
ACREAGES IN MANAGEMENT AREAS BY ALTERNATIVE

MANAGEMENT AREAS	ALTERNATIVES				
	B-MOD	E DEP	I Preferred	A	C-MOD
MA-D1		555,020		649,170	0
MA-D2		72,310		32,100	308,150
MA-D3		154,100		61,830	378,775
MA-D4		26,340		36,970	45,030
MA-D5 4/		12,150		30,690	64,700
MA-D6 5/		28,690		52,760	36,410
MA-D7 8/	0	5,320	0	0	0
MA-D8 9/		2,500			9,350
MA-D9 6/		27,315		31,200	40,960
MA-D10 7/	0	7,000	0	0	7,000
MA-D11		750		750	750
MA-D12		4,800		2,230	4,860
MA-D13		7,630		12,210	0
MA-D14		8,260		3,850	15,550
MA-F1	13,400	13,400	13,400	13,400	13,400
MA-F2	5,400	5,400	5,400	5,400	5,400
MA-F3	17,400	17,400	17,400	17,400	17,400
MA-F4	1,125	1,125	1,125	1,125	1,125
MA-F5	2,035		4,400		
MA-F6	18,000		19,250		
MA-F7	0		9,560		
MA-F8	0		11,820		
MA-F9	0		2,480		
MA-F10	3,110		3,110		
MA-F11	7,550 2/		15,660		
MA-F12	570	570	570	570	570

MANAGEMENT AREAS	B-MOD	E DEP	I Preferred	A	C-MOD
MA-F13	1,810		1,810		
MA-F14	1,970		1,970		
MA-F15	16,820 3/		18,130		
MA-F16	1,580	1,580	1,580	0	1,580
MA-F17	1,070		1,070		
MA-F18	0		2,560		
MA-F19	770		770		
MA-F20	0		64,130		
MA-F21	171,490		107,360		
MA-F22	543,570		496,850		
MA-F23	1,830	1,830	1,830	1,830	1,830
MA-F24	830	830	830	830	830
MA-F25	6,850		6,850		
MA-F26	26,000 1/		33,260		
MA-F27	1,000		1,000		
MA-F28	460	460	460	460	460
MA-G1	22,700		22,700		
MA-G2	12,740		12,740		
MA-G3	59,440		59,440		
MA-G4	110		110		
MA-G5	740		740		
MA-G6	720	720	720	720	720
MA-G7	650	650	650	650	650
MA-G8 10/	7,840		7,840		
MA-G9	2,110		2,110		
MA-G10	430		430		
MA-G11	150		150		
MA-G12	2,690		2,690		

MANAGEMENT AREAS	B-MOD	E DEP	I Preferred	A	C-MOD
MA-G13	560		560		
MA-G14	90		90		
MA-G15	80		80		
MA-G16	460		460		
Forest & Grassland TOTAL	956,150	956,150	956,150	956,150	956,150

* As opposed to the DEIS, the above acres include roads and administrative sites

1/ Entire acreage goes to Partial Retention

2/ Prescription Area A (top) only, remainder to go to General Forest

3/ Does not include connective habitat as in Alternative I

4/ Reduced from that shown in Draft to reflect NFCR Scenic Corridor designation and Deschutes River Scenic Corridor

5/ Reduced from that shown in Draft to reflect NFCR Recreation Corridor designation and Crooked River Recreation Corridor

6/ Reduced from that shown in Draft to reflect NFCR Wilderness Study Area

7/ There are no acres allocated to Semiprimitive Motorized for Alternatives B-MOD, I or A

8/ There are no acres allocated to Partial Retention Middleground for Alternatives B-MOD, I, A, or C

9/ Deschutes Canyon/Steelhead Falls - portions allocated to wilderness for E-DEP All 10,000 acres allocated to wilderness - Alternative C None to other alternatives

10/ A portion of the Squaw Creek Management Area is being recommended for inclusion in the Wild and Scenic River System, a total of 1,370 acres for Alternatives B-Modified and I.

TABLE 2-8
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES, AND COSTS BY ALTERNATIVE
(AVERAGE PER YEAR UNLESS NOTED)

		ALTERNATIVES					
Resource/Activity/Effect	Unit of Measure	NC	B-MOD	E DEP	I Preferred	A	C-MOD
AIR QUALITY							
Total Suspended Particulates by Prescribed Fire	M Tons/Yr						
Decade 1		12 6	12 9	12 9	12 3	12 6	13 3
2		12 8	11 6	12 4	12 6	12 8	13 1
5		12 4	13 0	11 0	12 8	12 4	14 6
BIOLOGICAL DIVERSITY							
Riparian Areas in Excellent Condition	M Acres						
Decade 1			10 0		10 0		10 0
2			11 2		11 2		11 2
5		5 4	17 5	9 4	17 5	5 4	17 5
Riparian Areas Designated for Connective Habitat	M Acres						
Decade 1		0	0	0	1 0	0	0
2		0	0	0	1 0	0	0
5		0	0	0	1 0	0	0
Snag Habitat for Cavity Nesters (Average across the Forest) 1/	Percent of Potential						
Decade 1		Unknown	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69
Existing Old Growth	M Acres						
Decade 1		93 8	93 8	93 8	93 8	93 8	93 8
2		80 0	80 6	82 5	83 9	73 0	85 8
5		40 0	42 4	55 0	55 1	53 0	78 2
Acres of Forested Land by Successional Stage 2/							
Stage I and II	M Acres						
Decade 1		Unknown	9	9	9	9	9
2		Unknown	55	40	30	37	19
5		Unknown	45	41	34	43	21
Stage III	M Acres						
Decade 1		Unknown	146	172	151	170	138
2		Unknown	140	181	151	176	147
5		Unknown	69	88	63	106	42
Stage IV	M Acres						
Decade 1		Unknown	205	159	184	159	191
2		Unknown	167	127	192	123	158
5		Unknown	192	205	190	178	166
Stage V	M Acres						
Decade 1		Unknown	118	138	134	139	140
2		Unknown	129	142	115	151	162
5		Unknown	224	183	230	191	265
Stage VI	M Acres						
Decade 1		Unknown	94	94	94	94	94
2		Unknown	81	82	84	84	86
5		Unknown	42	55	55	53	78
Acres of Nonforest Land by Plant Community Type							
Timberline Meadows	M Acres	3450	3450	3450	3450	3450	3450
Meadows	M Acres	16,850	16,850	16,850	16,850	16,850	16,850
Juniper Dominant	M Acres	137,650	137,650	137,650	137,650	137,650	137,650
Grass Dominant	M Acres	50,900	50,900	50,900	50,900	50,900	50,900
Sagebrush Dominant	M Acres	80,100	80,100	80,100	80,100	80,100	80,100
Biscuit Root Scabland	M Acres	12,550	12,550	12,550	12,550	12,550	12,550

1/ Management indicator species (MIS) for snag dependent wildlife on the Forest and Grassland are the primary cavity excavators such as the Pileated woodpecker (also see Ch 3 pp 13-16)

2/ Acres are from the 1980 Timber Resource Plan and are adjusted for the Oregon Wilderness Act as per Timber Management Plan Ammendment No 1

TABLE 2-8 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B MOD	E DEP	I-Preferred	A	C-MOD
CULTURAL RESOURCES							
Sites Documented	Number/Yr						
Decade 1		Unknown	140	130	120	120	120
2		Unknown	120	110	100	100	100
5		Unknown	70	60	60	60	60
Sites Enhanced/Interpreted	Number/Yr						
Decade 1		Unknown	3	3	3	3	3
2		Unknown	3	3	3	3	3
5		Unknown	2	2	2	2	2
Nat'l Register Nomination	Number/Decade						
Decade 1		Unknown	2	2	2	2	2
2		Unknown	2	2	2	2	2
5		Unknown	2	2	2	2	2
FIRE							
Wildfire Effectiveness Index	$/1000 Ac Protected						
Decade 1		725	720	725	715	725	732
2		726	720	725	715	726	732
5		729	720	733	715	729	732
Precribed Burning	M Acres/Yr						
Natural Fuels							
Decade 1		12 3	9 8	11 7	10 4	12 3	13 2
2		12 3	9 8	11 7	10 4	12 3	13 2
5		12 3	9 8	11 7	10 4	12 3	13 2
Activity Fuels	M Acres/Yr						
Decade 1		12 9	15 9	14.1	14 2	12 9	13 5
2		13 3	13 3	13 2	14 8	13 3	13 1
5		12 6	16 1	10 4	15 2	12 6	16 1
FISH							
Anadromous Fish							
Steelhead	SHCI 4/ (M Smolt)						
Decade 1		121	121	121	121	121	121
2		136	136	136	136	136	136
5		220	220	220	220	220	220
Resident Fish (Rainbow and Brook Trout)	M Numbers						
Decade 1		656 1	816 6	712 8	816 6	656 1	816 6
2		749 25	1150 5	891 0	1150 5	749 25	1150 5
5		1215 0	2820 0	1782.0	2820 0	1215 0	2820 0
FORAGE							
Potential Forage Production 3/	M AUM s/Yr						
Decade 1		77 5	75 0	79 0	75 0	79 1	73 1
2		Unknown	82 0	78 9	81 5	78 9	73 3
5		Unknown	85 0	79 4	84 6	86 5	74 4
Structural Improvements	Number						
Decade 1		27	138	138	138	27	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Nonstructural Improvements	Acres						
Decade 1		N/A	13097	12477	12832	12530	8760
2		N/A	4337	3717	4072	3770	0
5		N/A	4337	3717	4072	3770	0
Wild Horses	Number						
Decade 1		60	60	60	60	60	60
2		60	60	60	60	60	60
5		60	60	60	60	60	60

3/ Forage production as displayed is the "potential," based on estimates by allotment, that could be achieved with the proposed schedule of range and riparian improvements by alternative These potentials may not be achieved and are at the minimum, directly dependent upon the implementation of the proposed improvements in the first decade It is reasonable to expect that some or all allotments may experience up to a 10% reduction in AUM s during the first decade to allow the accomplishment of riparian management objectives

4/ Steelhead Habitat Capability Index, thousands of smolt.

TABLE 2-8 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I Preferred	A	C-MOD
FOREST RESIDUES							
Existing Residues	*Million Tons*	*19 5*	*20 4*	*19 9*	*20 0*	*19 6*	*19 6*
Minimum Site Requirements	Million Tons	10 4	10 4	10 4	10 4	10 4	10 4
Residues Removed							
Activity	Million Tons						
Decade 1		3 7	4 7	4.2	4 3	3 9	4 1
2		3 7	3 7	3 7	4 1	3 7	3 7
5		2 7	3 5	2 3	3 3	2 8	3 5
Natural							
Decade 1		1 2	1 0	1 2	1 0	1 2	1 3
2		1 1	0 9	1 1	0 9	1 1	1 2
5		0 7	0 6	0 7	0 6	0 7	0 8
Total Residues Remaining							
Decade 1		14 5	14 6	14.5	14 7	14 5	14 2
2		13 6	14 0	13 7	13 8	13 6	13 4
5		13 0	13 1	13 3	13 1	13 0	12 7
FUELWOOD							
Fuelwood	M Cords/Yr						
Decade 1		14 0	15 0	13 1	13 0	14 0	12 0
2		*12 4*	*14 0*	*12 3*	*12 0*	*12 4*	*10 0*
5		11 6	13 0	10 0	11 0	11 6	9 0
LANDS							
Special Use Permits	Number	105	105	105	105	105	105
MINERALS AND ENERGY							
Oil and Gas	M Acres Leased						
Decade 1		147	140	140	140	140	140
2		687	670	670	670	670	167
5		157	140	140	140	140	140
Geothermal	Acres Leased						
Decade 1		0	0	0	0	0	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Minerals Access Restrictions	Percent						
Withdrawn		4	4	4	4	4	4
High		11	6	8	9	11	16
Moderate		11	27	14	28	11	39
Low		74	63	74	59	74	40
OLD GROWTH 5/							
Old Growth in wilderness and wilderness study (F1, F2, F3, F4, D8, D12)	M Acres						
Ponderosa Pine			2 3	2 3	2 3	2 3	2 3
Mixed conifer			18 2	18 2	18 2	18 2	18 2
Total			20 5	20 5	20 5	20 5	20 5
Allocated to Old Growth management area (F6, D4, G5)							
Existing Old Growth	M Acres						
Ponderosa Pine			7 0	N/A 6/	6 9	N/A 6/	14 0
Mixed conifer			10 8	N/A	11 1	N/A	25 0
Juniper		0 7	0 7	0 7	0 7	0 7	0 7
Capable Old Growth 7/			---	N/A	1 3	N/A	5 3
Total			18 7	26 3	20 0	37 0 8/	45 0

5/ Management Indicator Species (MIS) for Old Growth on the Forest is the Pileated woodpecker The common flicker is the MIS for old growth juniper on the Grassland

6/ NA - Data not available

7/ That which does not currently meet the characteristics described for "suitable", but exists on a site "capable" of producing it some time in the future

8/ This was based on managing these stands with timber harvest with long rotations

TABLE 2-8 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES											
		NC		B-MOD		E DEP		I Preferred		A		C-MOD	
Old Growth in roadless management areas with no programed harvest (F5, F8, F10, F11, D4, G5)	M Acres												
Ponderosa Pine				1 1		N/A		4 1		N/A		5 4	
Mixed Conifer				2 0		N/A		12 5		N/A		12 9	
Juniper				0 5		0 5		0 5		0 5		0 5	
Total				3 6		N/A		17 1		N/A		18 8	
Existing Old Growth areas in areas programmed for harvest (F7, F9, F11B, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28)	M Acres												
Ponderosa Pine				12 8		N/A		9 8		N/A		1 5	
Mixed conifer				39 6		N/A		28 8		N/A		14 5	
Total				52 4		N/A		38 8		N/A		16 0	
Total Existing Old Growth	M Acres												
Pondersoa Pine													
Decade 1		23 2		23 2		23 2		23 2		23 2		23 2	
2		18 0		16 2		18 5		18 2		20 0		19 2	
5		5 0		9 2		13 0		13 0		12.0		19 0	
Mixed Conifer													
Decade 1		70 6		70 6		70.8		70 6		70.8		70 6	
2		62 0		64 4		64 0		65 7		53 0		66 6	
5		35 0		33 2		42.0		42 1		41 0		59 2	
Total Existing Old Growth Forest	M Acres												
Decade 5		40 0		42 4		55 0		55 1		53 0		78 2	
Total Existing and Capable Old Growth													
Decade 1	M Acres	93 8		93 8		93 8		95 1		93 8		99 1	
RECREATION													
Developed Recreation	M RVD's	S	D	S	D	S	D	S	D	S	D	S	D
Supply/Demand													
Decade 1		141 0	129 8	159 4	129 8	149 0	129 8	159 4	129 8	141 0	129 8	159 4	129 8
2		141 0	145 9	159 4	145 9	149 0	145 9	159 4	145 9	141 0	145 9	159 4	145 9
5		141 0	191 9	159 4	191 9	149 0	191 9	159 4	191 9	141 0	191 9	159 4	191 9
Dispersed Recreation	M RVD s												
Roaded Natural													
Roaded Modified													
Supply/Demand													
Decade 1		1477 3	373 8	1230 3	373 8	1220 3	373 8	1204 1	373 8	1232 6	373 8	1125 3	373 0
2		1477 3	411 4	1230 3	411 8	1220 3	411 4	1204 1	411 4	1232.6	411 4	1125 3	411 4
5		1477 3	520 2	1230.3	520.2	1220 3	520 2	1204.1	520.2	1232 6	520 2	1125 3	520.2
Semiprimitive, Nonmotorized	M RVD s												
Supply/Demand													
Decade 1		11 1	34 2	11 4	34 2	35 2	34 2	47 2	34 2	11 1	34 2	55 4	34 2
2		11 1	37 4	11 4	37 4	35 2	37 4	47 2	37 4	11 1	37 4	55 4	37 4
5		11 1	48 1	11 4	48 1	35 2	48 1	47 2	48 1	11 1	48 1	55 4	48 1
Semiprimitive, Motorized	M RVD s												
Supply/Demand													
Decade 1		0	18 0	0	18 0	7 0	18 0	0	18 0	0	18 0	7 0	18 0
2		0	19 4	0	19 4	7 0	19 4	0	19 4	0	19 4	7 0	19 4
5		0	25 1	0	25 1	7 0	25 1	0	25 1	0	25 1	7 0	25 1

TABLE 2-8 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I-Preferred	A	C MOD
Hunting Use	WFUD's						
Decade 1		Unknown	173,200	172,500	169,100	176,400	170,600
2		Unknown	168,000	169,500	166,600	172,400	170,600
5		Unknown	143,200	164,600	161,400	163,000	189,900
Resident Fishing Use	WFUD's						
Decade 1		76,400	94,300	82,900	94,300	76,400	94,300
2		84,900	109,100	93,600	109,100	84,900	109,100
5		99,500	123,800	108,300	123,800	99,500	123,800
Anadromous Fishing Use	WFUD s						
Decade 1		5644	5644	5644	5644	5644	5644
2		10,968	10,968	10,968	10,968	10,968	10,968
5		27,158	27,158	27,158	27,158	27,158	27,158
Trails Summer Non-Motorized	Miles						
Construction							
Decade 1		0	109 6	132	186 9	0	186 9
2		0	182 4	0	184 9	0	184 9
5		0	0	0	0	0	0
Reconstruction							
Decade 1		9	20 5	29 3	13 0	9	13 0
2		9	20 5	15 0	25 0	9	25 0
5		9	38 8	15 0	25 0	9	25 0
Total Available							
Decade 1		96	206 4	228	283 7	96	283 7
2		96	388 8	228	468 6	96	468 6
5		96	388 8	228	468 6	96	468 6
Trails Summer ATV	Miles						
Construction							
Decade 1		0	95	0	95	0	95
2		0	95	0	95	0	95
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	0	0	0	0	0
2		0	15	0	15	0	15
5		0	15	0	15	0	15
Total Available							
Decade 1		0	90	0	90	0	90
2		0	190	0	190	0	190
5		0	190	0	190	0	190
Trails Winter X-Country	Miles						
Construction							
Decade 1		0	100	0	100	0	100
2		0	40	0	40	0	40
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	5	0	5	0	5
2		0	20	0	20	0	20
5		0	20	0	20	0	20
Total Available							
Decade 1		0	109	0	109	0	109
2		0	149	0	149	0	149
5		0	149	0	149	0	149
Trails Winter Snowmobile	Miles						
Construction							
Decade 1		0	210	0	210	0	210
2		0	40	0	40	0	40
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	10	0	10	0	10
2		0	40	0	40	0	40
5		0	40	0	40	0	40
Total Available							
Decade 1		0	285	0	285	0	285
2		0	325	0	325	0	325
5			325		325		325
Wild and Scenic Rivers	Acres						
Wild		0	0	0	0	0	0
Scenic		1480	2845	1480	2845	1480	1480
Recreation		2550	2550	2550	2550	2550	2550
Further Study							

TABLE 2-8 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B-MOD	E DEP	I-Preferred	A	C-MOD
RESEARCH NATURAL AREAS 9/							
Ochoco Divide	Acres	2035	2035	2035	2035	2035	2035
The Island	Acres	39	0	39	39	39	39
Haystack Butte	*Acres*	*0*	*0*	*58*	*58*	*0*	*58*
Dry Mountain	Acres	0	0	1187	1187	0	1187
Stinger Creek	Acres	0	0	453	453	0	453
Silver Creek	Acres	0	0	844	844	0	844
SCENIC							
Preservation	M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70 7	96 8	102 2	155 6
Partial Retention	M Acres	71 4	28 1	59 4	32 4	71 4	61 5
Modification and Maximum Modification	M Acres	743 2	827 8	781 6	784.9	743 2	687 1
SOCIAL AND ECONOMIC							
Social							
Change In Jobs 10/	Number	Unknown	176	196	118	57	-101
Change In Income	Million $	Unknown	2 9	3 0	1 6	0 9	-2 2
Economic							
Total National Forest Planned Budget	Million Dollars						
Decade 1		12 0	12 1	10 5	10 2	10 9	9 5
2		Unknown	10 7	9 2	9 3	10 3	8 8
5		Unknown	11 1	8 7	9 7	10 0	9 0
Returns to Government	Million $						
Decade 1		19 5	19 7	20 2	19 4	17 2	14 0
2		Unknown	23 1	22 7	22 3	21 1	16 5
5		Unknown	22 6	18 4	21 5	20 3	18 8
Present Net Value (PNV)	Million $	380	452	471	475	421	395
Payment to Counties	Million $	Unknown	4 9	5 1	4 9	4 3	3 5
SOIL							
Soil Loss (Erosion) By Major Activity	M Tons/Yr						
Timber Harvest & Roads							
Decade 1		1 9	1 7	1 8	1 7	1 5	1 7
2		1 5	2 2	1 3	2 1	1 8	1 9
5		1 3	2 1	1 2	1 9	1 5	1 9

9/ RNA = that would be recommended for inclusion in the National Forest System (FSM 4063)

10/ Change in jobs relative to the "current situation" discussed

TABLE 2-8 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
TIMBER							
Lands Tentatively Suitable for Timber Production	Thousand Acres	552 3 11/	533 2	533 2	533 2	533 2	533 2
Lands Suitable for Timber Production	Thousand Acres	534 0 11/	511 3	495 0	493 7	488 6	471 4
Lands with Timber Yield Reductions	Thousand Acres						
Full Yield		413 8 12/	484 5	0	0	0	0
50-99%		88 8 11/	26 8	495 0	491 9	488 6	471 4
1-49%		32 4 11/	0	0	1 8	0	0
Long-Term Sustained Yield Capacity	Million CF	31 1 11/	21 8	19 3	19 0	19 5	15 6
Allowable Sale Quantity	Million BF						
Decade 1		N/A	130	123	115	115	94
Total Pine	Million BF						
Decade 1			85	87	82	79	65
Allowable Sale Quantity	Million CF						
Decade 1		N/A	21 8	20 6	19 0	19 3	15 6
2		N/A	21 8	19 7	19 0	19 3	15 6
5		N/A	21 8	16 1	19 0	19 3	15 6
Potential Yield 13/	Million BF	136 5	N/A	N/A	N/A	N/A	N/A
Timber Sale Program Quantity	Million BF						
Decade 1		N/A	141 0	135 0	125 0	126 0	103 0
Timber Sale Program Quantity	Million CF						
Decade 1		N/A	23 8	22 9	20 9	21 4	17 1
2			23 3	21 4	20 5	21 4	16 6
5			23 1	17 1	20 1	20 4	16 5
Available Timber Harvest Prescriptions in First Decade	Thousand Acres 14/						
Even aged							
Clearcut		0	25 3	14 4	8 7	18 7	15 0
Shelterwood		118 6	49 8	25 4	21 1	18 2	3 6
Overstory Removal		63 5	21 2	113 2	53 1	105 6	31 6
Uneven-aged							
Selection		Unknown	67 5	4 0	62 2	0 9	96 4
Reforestation	Thousand Acres						
Decade 1		118 6	75 1	40 0	29 8	37 0	18 6
2		71 7	30 1	42 0	24 8	60 0	18 4
5		30 6	52 0	48 0	29 9	52 0	26 8
Timber Stand Improvement	Thousand Acres						
Decade 1		48 0	53 2	19 0	53 0	40 0	68 3
2		66 0	46 2	13 0	54 0	12 0	61 5

11/ For the NC alternative, these lands are the regulated commercial forest lands These lands were not classified using the suitability criteria, but were arrived at using the 1972 land classification system provided for by Amendment #1 of the 1985 Timber Plan These lands are the standard, special and marginal components of commercial forest lands

12/ For the NC alternative, these lands are the standard component of the regulated commercial forest base

13/ Potential yield applies only to the "No Change" alternative and comes from the Timber Resource Plan The potential yield for the next ten years is the maximum harvest that could be planned to achieve the optimum perpetual sustained yield harvesting level attainable with intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment.

14/ See Appendix E, Selection of Harvest Cutting Methods

TABLE 2-8 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I-Preferred	A	C-MOD
TRANSPORTATION SYSTEM							
Arterial and Collector Road Construction	Miles/Decade						
Decade 1		8	14	4	8	8	4
2		12	12	0	6	12	0
5		0	0	0	0	0	0
Arterial and Collector Road Reconstruction	Miles/Decade						
Decade 1		174	174	168	174	174	168
2		168	168	163	168	168	163
5		148	148	148	148	148	148
Forest Service Roads, Open and Maintained	Total Miles						
Decade 1		4774	4800	4776	4734	4774	4743
2		4992	5072	4962	4935	4992	4982
5		5326	5484	5253	5304	5326	5187
Passenger Car Use, Open and Maintained	Total Miles						
Decade 1		844	850	840	844	844	840
2		856	862	840	850	856	840
5		856	869	840	850	856	840
High Clearance Use, Open and Maintained	Total Miles						
Decade 1		3236	3037	3046	2332	3236	2384
2		3210	2993	2936	2210	3210	2099
5		2736	2492	2331	2269	2736	1123
Roads Closed, Seasonally or Yearlong	Total Miles						
Decade 1		694	913	890	1558	694	1520
2		926	1217	1186	1875	926	2043
5		1734	2123	2082	2185	1734	3224
UNROADED AREAS							
(Roadless Criteria Acres)							
Acres Remaining Unroaded	M Acres						
Lookout Mountain							
Decade 1		166	76	29	157	166	166
2		166	76	29	76	166	166
5		166	76	29	76	166	166
Rock Creek/Cottonwood Creek							
Decade 1		0	0	197	118	0	197
2		0	0	197	118	0	197
5		0	0	197	118	0	197
Deschutes Canyon/Steelhead Falls							
Decade 1		100	51	25	51	100	100
2		100	51	25	51	100	100
5		100	51	25	51	100	100
Silver Creek							
Decade 1		25	31	32	31	25	32
2		25	31	32	31	25	32
5		25	31	32	31	25	32
Green Mountain (SPM)							
Decade 1		0	0	70	0	0	70
2		0	0	70	0	0	70
5		0	0	70	0	0	70

TABLE 2-8 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES											
		NC		B-MOD		E DEP		I-Preferred		A		C-MOD	
WATER													
Water Quality													
Watershed Condition	% above Threshold												
Decade 1		21		0		0		0		0		0	
2		0		0		0		0		0		0	
5		0		0		0		0		0		0	
Watershed/Riparian Improvement	Acres/Yr												
Decade 1		360		890		740		890		360		890	
2		360		87		120		87		360		87	
5		32		32		32		32		32		32	
Total in Enhanced Condition	M Acres												
Decade 1				10 0				10 0				10 0	
2				11 2				11 2				11 2	
5		5 4		17 5		9 4		17 5		5 4		17 5	
Water Yield	M Acre Feet/Yr												
Decade 1		591		585		584		575		588		572	
2		575		574		572		563		580		560	
5		559		582		566		567		574		562	
Relative Risk of Affecting Watersheds	Ranking 1 - 6, 1 high est, 6 lowest												
Decade 1		1		2		2		3		2		3	
2		3		3		3		4		3		4	
5		2		2		4		4		3		4	
WILDERNESS													
Existing Wilderness	Acres												
Bridge Creek		5400		5400		5400		5400		5400		5400	
Black Canyon		13,400		13,400		13,400		13,400		13,400		13,400	
Mill Creek		17,400		17,400		17,400		17,400		17,400		17,400	
Recommended Wilderness	Acres												
Deschutes Canyon/Steelhead Falls		0		0		2500		0		0		10000	
Total Wilderness Capacity		36,200		36,200		38,700		36,200		36,200		46,200	
Wilderness Supply	MVRD s	25 7		25 7		26 6		25 7		25 7		28 3	
Wilderness Demand	M RVD's	S	D	S	D	S	D	S	D	S	D	S	D
Supply/Demand													
Semiprimitive													
Decade 1		25 7	16 5	25 7	16 5	26 6	16 5	25 7	16 5	25 7	16 5	28 3	16 5
2		25 7	19 2	25 7	19 2	26 6	19 2	25 7	19 2	25 7	19 2	28 3	19 2
5		25 7	27 5	25 7	27 5	26 6	27 5	25 7	27 5	25 7	27 5	28 3	27 5
Wilderness 15/	Acres												
Primitive Trailed													
Decade 1		0		3300		0		3300		0		3300	
2		0		3300		0		3300		0		3300	
5		0		3300		0		3300		0		3300	
Primitive Nontrailed													
Decade 1		0		3000		0		3000		0		3000	
2		0		3000		0		3000		0		3000	
5		0		3000		0		3000		0		3000	
Semiprimitive													
Decade 1		36,200		29,900		38,700		29,900		36,200		39,900	
2		36,200		29,900		38,700		29,900		36,200		39,900	
5		36,200		29,900		38,700		29,900		36,200		39,900	

15/ Black Canyon's WROS classification is presently incomplete and is presently displayed in total as semiprimitive

TABLE 2-8 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B MOD	E DEP	I-Preferred	A	C-MOD
WILDLIFE							
Deer Population	Number						
Decade 1		Unknown	22,600	22,600	22,600	22,600	22,600
2		Unknown	22,600	22,600	22,600	22,600	22,600
5		Unknown	17,206	22,600	22,600	22,600	22,600
Elk Population	Number						
Decade 1		Unknown	3210	3170	3000	3370	3740
2		Unknown	2950	3030	2870	3160	3660
5		Unknown	1700	2780	2620	2690	3700
Wildlife Habitat Improvement	Acres/Yr						
Decade 1		Unknown	768	302	768	132	468
2		Unknown	400	100	400	100	200
5		Unknown	100	100	100	100	150
Snag Habitat for Cavity Nesters (Average across Forest)	% of Potential						
Decade 1		Unknown	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69
Habitat for Old Growth Dependent Species							
Allocated Old Growth	Acres	32,860	18,740	26,340	19,990	36,970	45,030
Supplemental Feeding Areas			18,000	26,340	19,250	36,970	45030
Unallocated Old Growth 16/							
Decade 1		26,500	24,100	N/A	37,600	N/A	39,300
2		26,500	24,100	N/A	37,600	N/A	39,300
5		26,500	24,100	N/A	37,600	N/A	39,300
Total Habitat 17/							
Decade 1		59,360	60,840	N/A	76,840	N/A	129,360
2		59,360	60,840	N/A	76,840	N/A	129,360
5		59,360	60,840	N/A	76,840	N/A	129,360
Eagle Roosting Areas (Bald and Golden)	Acres	570	570	570	570	570	570

16/ Old Growth in management areas with no programmed timber harvest.

17/ Total Old Growth in management areas which is allocated, Old Growth in management areas not allocated but with no programmed timber harvest, and supplemental feeding areas

** The outputs, effects, activities, and costs included in this table are estimates and projections based on available inventory data, use of various modeling techniques and analyses, professional judgement and are subject to the annual budgetary process

and Grassland Plans (see Chapters 5).

Mitigation measures are developed at the site specific project level of planning, and projects are "tiered" to other planning level measures above.

Management requirements established in accordance with Regional direction (1920, 2/9/83) are a major part of mitigation found in all alternatives

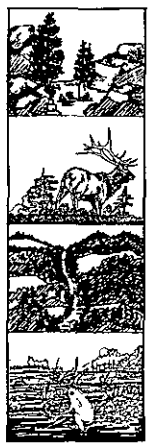
Requirements that may be termed mitigation having substantial influence on management are listed in Figure 2-1.

Research Natural Areas

The Ochoco National Forest presently has one established RNA, the Ochoco Divide Research Natural Area. In cooperation with the Federal Committee on Research Natural Areas, the Forest and Grassland has identified five additional areas that would meet the needs for RNA's representative of Central Oregon natural features. These areas have been identified for inclusion in the planning process for consideration in the final Forest and Grassland Plans. The direction for the identification and establishment of RNA's is specified in Forest Service Manual 4063 The RNA's acreages by management area are displayed in Tables 2-6 and 2-7. They are also discussed in Chapter 3, pp. 3-19 through 3-20.

Figure 2-1

MITIGATION MEASURES COMMON TO ALL ALTERNATIVES



No timber harvesting on unsuitable lands

Provide wildlife habitat sufficient to maintain viable populations of all vertebrate species

Timber harvests are to be dispersed according to watershed conditions to help meet state water quality standards and to avoid permanent impairment to the productivity of the land

Management practices in riparian areas must not allow detrimental changes to water conditions or fish habitat All streams must meet state water quality standards

Alternatives

This section describes the six alternatives analyzed in detail in this FEIS. For each alternative, the primary goals and objectives are presented along with a description of how the alternatives respond to the ICO's.

Alternative NC

Goal and Purpose

The "no change" alternative (Alternative NC), described below, was developed in response to the Northwest Forest Resource Council request that a "true" no action alternative representing current management plans be described and included in forest plans and environmental impact statements

Alternative NC is very similar to the no action alternative (Alternative A) described and analyzed in the Draft Environmental Impact Statement. Both do not include the National Forest Management Act (NFMA) requirements and were based on the 1979 Timber Resource Plan and the four unit plans: Ochoco-Crooked River (1979), Silvies-Malheur (1978), South Fork (1978) and Crooked River National Grassland (1980). The Timber Resource Plan and Unit Plans currently guide land and resource management on the Forest and Grassland.

Alternative NC presently differs from draft Alternative A in that it is based on a different computer model, timber inventory, and yield tables. Also, there are some differences in the way old growth and big game habitat are to be managed, resulting in potentially different environmental effects. A Current Direction--NFMA Benchmark, created originally by applying management requirements to Alternative A, is described in the DEIS. It allows outputs and costs attributable to NFMA requirements to be isolated and compared.

Since Alternative NC is based on the existing Timber Resource Plan, it does not incorporate requirements of the National Forest Management Act (NFMA), nor the implementing regulations (CFR 219 14-27, et al). For Alternative NC to be implemented, it would either have to be modified to meet NFMA requirements (as was done with Alternative A in this FEIS), or some NFMA requirements would have to be legislatively amended to allow current practices to be continued.

Management Direction

The following assumptions guided the development of the No Change Alternative:

1. Only NFMA requirements that are a part of current direction as established in current multiple use plans, unit plans, and timber resource plans will be followed.
2. Land allocations and management direction.

   Current plans will be used to fix the land allocation. An exception is where adjustments can be made to reflect updated, improved information on the suitability of land for timber production (this should include new inventory information, new land suitability classifications, etc.).

   Management direction in existing plans will be adhered to in setting the management strategy for management areas.

Yield Tables

Yield tables affect the calculation of long-term sustained yield. The yield tables used in the 1979 Timber Resource Plan (the basis for Alternative NC) were developed in 1975 for the entire Blue Mountain area without benefit of computer models. One set of yield tables was made for each timber type (Appendix D, Timber Resource Plan, 1979). While representing the state-of-the-art at the time they were developed, the predicted yields now appear to be overly optimistic when applied to the Ochoco National Forest because:

Productivity on the Ochoco National Forest is below the average for the Blue Mountains, and

Yields were based, in part, on the expectation that small material resulting from thinning would be merchantable, which, to date, has not happened.

The yield tables used for developing all alternatives except NC are based on prognosis models and adjusted to Ochoco National Forest conditions. Several different combinations of cultural treatments (e.g., planting, thinning, natural regeneration, extended rotation) were simulated and yields projected for each. Each alternative contains a combination of treatments that were selected by the FORPLAN model to best meet forest management objectives particular to each alternative.

Reconciling Unit Pans and the Timber Resource Plan with NFMA

The resource objectives of the unit plans and the Timber Resource Plan, the basis for Alternative NC, were not fully integrated and may not comply with current NFMA requirements. Taken a step further, the Current Direction with NFMA Benchmark, in the DEIS, shows the results of incorporating NFMA requirements into Alternative A. The result is Alternative A in this FEIS.

Modeling, Rotation Ages, and Timber Silvicultural Treatments

The amount of site preparation, planting, thinning, and other timber cultural work modeled in FORPLAN to achieve the resource objectives of Alternative A varies from that described for Alternative NC.

The Timber Resource Plan was modeled using Timber RAM (Resource Allocation Model), a linear program that is less sophisticated than the FORPLAN model used to develop the other alternatives. Timber RAM cannot consider economics or other resource constraints as FORPLAN does. For example, the potential yield in the Timber Resource Plan was based on the assumption that all available acres would be thinned. In reality, it is not economical to thin all stands, e.g , lodgepole stands on steep slopes. All calculations were based on application of shelterwood silvicultural system with planting, but the option of using other prescriptions was left open

(Timber Resource Plan, pp. 15-16) and in practice other methods were used on the Forest. In fact, overstory removal has been the most common silvicultural system applied on the Forest. Rotation age in the old model was fixed at 130 years, but the FORPLAN model can select a rotation age that best meets management objectives. This varies from 95 percent of culmination of mean annual increment (CMAI) to 150 years, resulting in 90 to 100 year rotations in many areas on this Forest.

Terminology

Some of the terms used in the Timber Resource Plan and units plans differ from those used in the DEIS, Supplement to the DEIS, FEIS and the proposed action. For example, "commercial forest," "standard component," "special component," "marginal component," "unregulated" and other old terms have either been redefined or replaced with new terms that have similar, but not identical, definitions. This makes comparing Alternative NC with the other alternatives difficult and confusing (see Glossary).

Timber Inventories

Alternative NC was based on the 1972 timber inventory. Alternative A (and all other alternatives,) were based on the 1982 timber inventory. Both inventories were based on photo-typing, that is, delineating timber stands on aerial photographs. The 1982 inventory was field checked to a greater extent than the 1972 inventory.

A difficulty inherent in developing a timber inventory on the Ochoco is that the distinction between forested and nonforested land is not clear. For example, on parts of the Snow Mountain Ranger District and in the Maury Mountains, forested areas grade into the desert with no definable line separating the two. While this could result in acreage differences between the two inventories, the impact on volume would be minimal because the forest-desert transition is low productivity land.

The inventories were also structured differently. The 1972 inventory model was based on percent volume by species, while the 1982 inventory model was based on productivity by community types.

Timber Land Suitability

The method for determining timber land suitability in Alternative NC was different from the NFMA-mandated methods used for Alternative A (and all other alternatives).

The suitable timber base in Alternative NC was taken from the Timber Resource Plan. Land allocations from the unit plans were deducted from the timber base in the reserved or deferred categories, or included as commercial forest land in one of four categories: standard component, special component, marginal component, or unregulated. The commercial forest land in the Timber Resource Plan (adjusted for the Oregon Wilderness Act) is 535,253 acres.

In developing Alternative A (and all other alternatives), tentative timber land suitability was developed according NFMA regulations. The lands identified as tentatively suitable for timber management total 533,177 acres. Final suitability varies by alternative. In Alternative A, 533,177 acres would be available for timber harvesting. The deductions from the tentatively suitable base are primarily the result of land allocations for wilderness, wilderness study areas, RNA's, roadless areas and old growth.

Potential Yield

The potential yield in Alternative NC, represented by the Timber Resource Plan adjusted to reflect the Oregon Wilderness Act, would be 133.8 MMBF. Because these yields include gains assumed but not realized from earned harvest effects (see discussion below), it is questionable whether they could be sustained in the long-run.

The allowable sale quantity (ASQ) under Alternative A would be 19.3MMCF, or 115 MMBF in the first decade. In addition, the Forest analyzed and displayed two alternatives in the DEIS (B and H) that would generate allowable sale quantities (ASQ) of 137 MMBF approximately the adjusted potential yield shown in the Timber Resource Plan. These alternatives were developed from the maximum timber benchmark and offered options for achieving

high timber harvest levels in the near decades while still meeting one alternative level of NFMA requirements. However, the harvest levels for the alternatives discussed above are sustainable in cubic feet as both models calculated yields and controlled flow in cubic feet but not board feet. Harvest volume in board feet would decrease because the smaller trees that will be harvested in the future will produce fewer board feet in proportion to cubic feet than the large trees being harvested at the present time.

Old Growth

The major difference in the acreage shown in the suitable timber land base between Alternatives A and NC (533,177 versus 552,300) results from the way old growth is proposed to be managed under each. In Alternative NC, the approximately 32,860 acres that would be managed for old growth dependent wildlife is included as commercial forest land in the special component, which means these lands could be harvested, but at 60 to 70 percent reductions in yields. Old growth stands would be about 300 acres each and uniformly distributed over the Forest. Stands would be managed on a long rotation to provide optimum habitat for non-adaptive species in at least one-third of the stands at any time. This would be accomplished by periodic harvesting on a group selection or larger area basis.

In Alternative A, approximately 36,970 acres (29,800 acres of suitable timber land) would be managed as "dedicated" old growth. Dedicated stands would not be harvested and are deducted from the suitable timber base. They would remain in old growth condition unless changed by fire or other natural disasters.

Earned Harvest Effect

In the 1979 Timber Resource Plan the potential yield was increased 7.3 MMBF based on the intent to plant genetically improved stock. This is called the earned harvest effect and it allows additional volume to be harvested today because of practices expected to increase forest growth and yields in the future. In the proposed programmed harvest level, only a 1.1 MMBF increase was claimed because only a small amount of genetically-improved stock was available for planting. Also, the primary silvicultural system used, overstory removal, has not required as much planting as was projected in the Timber Resource Plan.

In Alternative A, FORPLAN selected management practices that would maximize timber production, including thinning and planting genetically improved stock. Thus, the earned harvest effect influences Alternative A, but varies in amount and timing. This makes an exact comparison of the earned harvest effect between the NC Alternative and the other alternatives difficult.

Alternative A

Goal and Purpose

This alternative focuses on management under current direction. It is the "No Action" alternative required by NEPA, and can be used as a basis for comparison with other alternatives. The sources for present direction are:

1. Four "Unit Plans" (Ochoco - Crooked River, Silvies - Malheur, South Fork of the John Day, and the Crooked River National Grassland). These Plans contain specific land use allocations and provide management direction for those allocations.
2. The Timber Resource Plan that provides the basis for the timber management program and specifies allowable harvest levels.
3. Forest Service Manuals and policy memos.

Where these sources may conflict, priority was given to the Unit Plans (as per Regional Direction 1920, 11/10/83). Present budget or funding, a type of Congressional emphasis, was considered to continue at current levels under this alternative.

Alternative A is the "Current Direction Benchmark" from the DEIS and not "A" as presented in the DEIS. This alternative does incorporate National Forest Management Act requirements.

This alternative in the FEIS uses eleven of the original 14 management area allocations from the DEIS. In addition, four new management areas

have been added to incorporate the new wild and scenic river allocations. Management under existing plans results in a blend of resource emphases, but the resources (timber, range, big game, roadless, scenic, riparian, and recreation) are all managed at a sustained level substantially greater than minimum and less than maximum potential.

Management Direction

Timber Supply and Forest Management

Timber harvest is scheduled on a nondeclining yield basis. Current direction is to intensively manage timbered stands to the degree consistent with other resource requirements identified in the Unit Plans. This involves planting harvested units with genetically superior seedlings, planting at increased stocking levels, precommercial thinning to control the spacing of trees, one to three commercial thinnings both to harvest trees early and concentrate growth on the remaining trees, and managing for a rotation age close to the point in time where average annual growth is highest. This type of management is planned for the majority of the Forest's acres. Other resource requirements for some lands may either prohibit timber harvesting (old growth and roadless recreation management), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas) The allowable sale quantity (ASQ) in the first decade that results from this mix of practices is 115 million board feet (19.5 million cubic feet).

Social and Economic Wants and Needs of Local Communities

Alternative A ranks fourth amongst the alternatives with a PNV of $421 million. Jobs and payments to the counties would not change significantly with implementation of this alternative. This alternative provides next to the least recreational opportunities and wildlife emphasis and would influence local leisure time opportunities accordingly. Community cohesion would remain about the same as would community stability.

Livestock Grazing and Allotment Management

Current direction is to make forage available for livestock use at levels that do not cause conflicts with other resources. Restrictions on dollars available to the Forest and Grassland limit construction and reconstruction of structural improvements (e.g. water developments and fences), which limits forage availability. Management in riparian areas to meet State Water Quality Standards may also restrict forage availability, particularly when budgetary constraints reduce management options. The forage utilization would be in concert with management practices to rehabilitate riparian areas. There is some likelihood that AUM's on some or all allotments may have up to 10 percent reductions in the first decade to meet riparian area management objectives.

Riparian Management

Current direction for riparian areas entails meeting State Water Quality Standards. This would require improving riparian area conditions from "poor" to "fair" on approximately 7,000 riparian acres. Riparian areas tributary to streams with anadromous fisheries would be managed to provide "excellent" riparian conditions (approximately 5,400 acres).

Transportation System

Eight hundred forty-four miles of road would be maintained for passenger car travel in the first decade. This is estimated to remain relatively constant through the fifth decade. There would be 3,236 miles of road maintained for high clearance vehicles in the first decade, declining to 2,736 miles by the fifth decade.

Approximately 944 miles of road will be closed in the first decade, increasing to 1,734 miles in the fifth decade. Roads would be closed to protect the investment, to provide for public safety, to limit soil erosion and water quality degradation and to increase wildlife habitat effectiveness.

Big Game Habitat

Big game habitat receives primary management emphasis on 93,800 acres. On these areas, road use and thermal cover quantity, quality, and distribution would be controlled to provide high quality big game habitat. Three thousand three hundred-seventy elk could be supported through the first decade. This

number would decline steadily to 2,690 by the fifth decade. This alternative exceeds the ODFW management objective of 2,600 elk.

Roadless Areas and Wilderness Study Areas

Lookout Mountain, Deschutes Canyon-Steelhead Falls, and Silver Creek would be managed to maintain their roadless character. Green Mountain and the Rock Creek-Cottonwood Creek area would be managed as a general forest allocation. The North Fork of the Crooked River would be retained as a Wilderness Study Area, 1125 acres, until a decision is made on the pending BLM environmental analysis. The Deschutes Canyon-Steelhead Falls area would be recommended for wilderness in its entirety, 10,000 acres less the wild and scenic river allocation (MA-D8).

Segments of the North Fork Crooked River, Crooked River, and the Deschutes River were classified as Recreational or Scenic Rivers under the Oregon Omnibus Wild and Scenic Rivers Act. Four new management areas have been developed to incorporate these legislated areas into Alternative A equaling 4030 acres. These include MA-23 North Fork Crooked River Recreation Corridor, MA-24 North Fork Crooked River Scenic Corridor, MA-G6 Crooked River Recreation Corridor and MA-G7 Deschutes River Scenic Corridor.

A more detailed discussion of the existing roadless areas on the Forest and Grassland is presented in Appendix C.

Scenic or Visual Resources

Corridors along most of the principal roadways throughout the Forest and Grassland would be managed to attain or retain scenic qualities This amounts to 83,450 acres.

Old Growth

Old growth would receive a comparatively high emphasis, with 36,970 acres dedicated as a management area. This represents 39 percent of the 93,800 acres remaining on the Forest and Grassland.

Fuelwood Supply

Personal use of firewood is provided for on both the Forest and Grassland. Generally, most of the firewood comes from timber harvest residues; some juniper cutting also occurs. Firewood volumes available for use total approximately 14,000 cords annually.

Snag Dependent Wildlife

Alternative A would provide 46 percent to 52 percent of the potential snag habitat on an average from the first through the fifth decade across the Forest and Grassland.

Winter Sports

A majority of the Forest and Grassland, including Lookout Mountain and Bandit Springs, would be open to winter sports activities. A cross-country ski trail system is in place at the Bandit Springs area. Snowmobiles would be allowed to access all areas of the Forest except wilderness.

Anadromous Fish

Alternative A would provide for a gradual increase in the production of steelhead smolt over time (see Table 2-8). This increase would be primarily due to the improved riparian habitat gained through improved management practices and stream enhancement work.

Historic Trail Preservation

The Summit Historic Trail would be managed as specified in the Decision Notice issued for this trail in 1986. It would not be allocated as a management area but rather, the appropriate visual quality objectives (VQO's) would be applied and the integrity of the trail preserved.

Off-Road Vehicle (ORV) Use

No all-terrain vehicle (ATV) trail development would occur under this alternative.

Round Mountain

There would be no special management consideration for this area.

Alternative B-Modified (DEIS Alternative B modified to incorporate industry comments)

Goal and Purpose

The design of Alternative B in the DEIS was an attempt to meet the Regional Guide 1980 Renewable Resource Planning Act (RPA) timber and range program targets with a timber harvest schedule based on nondeclining yield. Some of the wildlife-related RPA goals conflicted with timber and range objectives and were not achievable under this alternative. Alternative B focused on intensive management to produce timber and range outputs.

Alternative B-Modified in the FEIS follows the basic philosophy of the original Alternative B but emphasizes other resource management where compatible with timber. For some resources (selected roadless areas, visual corridors, etc), timber volume was given up to provide for these resources. Also, Alternative B-Modified incorporates 39 of the management areas from Alternative I (23 from Forest Plan and 16 from Grassland Plan).

Management Direction

Timber Supply and Forest Management

Timber harvest is scheduled on a nondeclining yield basis. Many of the available timbered lands are managed intensively for timber production in this alternative. This involves planting harvested units with genetically superior seedlings, planting at increased stocking levels, precommercial thinning to control the spacing of trees, one to three commercial thinnings to harvest trees early and concentrate growth on the remaining trees, and managing for a rotation age close to the point in time where average annual growth is highest. The resulting allowable sale quantity is 21.8 million cubic feet (130 million board feet in the first decade). With additional volumes from anticipated salvage sales and firewood, the total cubic foot volume provides 88 percent of the RPA goal for the planning period through the fifth decade.

Approximately 120,000 acres of ponderosa pine stands with the appropriate characteristics would be managed under an uneven-aged management strategy.

Social and Economic Wants and Needs of Local Communities

Alternative B-Modified ranks third among the alternatives with a PNV of $455 million. Jobs and returns to the counties would be higher than the current situation. This alternative would increase logging and sawmill industry employment by about four percent (39 jobs) and remanufacturing industry employment by about three percent (35 jobs). The support sector would see a modest increase also.

This alternative provides the least opportunity for leisure activity as it has the lowest level of recreational and wildlife management emphasis.

This alternative provides for high commodity outputs at the expense of amenities, and community cohesion may be affected by the resultant polarization that would surface. Community stability could be a problem if the timber or forage supply was disrupted because of the local economic dependence on the timber and range industries. This alternative would not stimulate the local communities to diversify.

Livestock Grazing and Allotment Management

Potential forage production could build toward and exceed the 1980 RPA program level by the fifth decade, as projected in Table 2-8. This would require construction of 138 acres of structural and 13,100 acres of non-structural improvements in the first decade. The forage utilization would be in concert with management practices to rehabilitate riparian areas. There is some likelihood that the AUM's on some or all allotments may see up to 10 percent reductions in the first decade to meet riparian area management objectives.

Riparian Management

All riparian areas would be managed to meet State

Water Quality Standards. This would require improving riparian area conditions to "excellent" on 10,000 acres in the first decade, and on 17,500 acres by the fifth decade.

Transportation System

Eight hundred fifty miles of road will be maintained for passenger car travel in the first decade with an increase to 869 miles by the fifth decade. There would be 3,037 miles of road maintained for high clearance vehicles in the first decade, declining to 2,492 miles by the fifth decade.

There will be 913 miles of closed road in the first decade increasing to 2,123 miles in the fifth decade.

Big Game Habitat

Big game habitat would see some management emphasis on 171,490 acres of General Forest Winter Range on the Forest and an additional 35,440 acres on the Grassland. An average of 3,210 elk could be supported through the first decade. This number would decline steadily to 1,700 by the fifth decade. This alternative would fail to provide the ODFW planning benchmark of 2,600 elk in the fifth decade.

Roadless Areas and Wilderness Study Areas

Portions of Lookout Mountain, Deschutes Canyon-Steelhead Falls and Silver Creek would retain their roadless character with no scheduled timber harvest. A portion of the Deschutes Canyon-Steelhead Falls Wilderness Study Area (which was not made wilderness in the 1984 legislation), has been allocated to the Squaw Creek Management Area for unroaded recreation. The North Fork of the Crooked River Wilderness Study Area would be retained, 1,125 acres.

Segments of the North Fork Crooked River, Crooked River, and the Deschutes River were classified as Recreational or Scenic Rivers under the Oregon Omnibus Wild and Scenic Rivers Act. Four new management areas have been developed to incorporate these legislated areas into Alternative B-Modified (MA-F23 North Fork Crooked River Recreation Corridor, MA-F24 North Fork Crooked River Scenic Corridor, MA-G6 Crooked River Recreation Corridor and MA-G7 Deschutes River Scenic Corridor).

Eligibility and suitability determinations have been made for a portion of the Squaw Creek area. A 7.5 mile segment of the creek, 1,370 acres, from the Grassland boundary to the confluence with the Deschutes River would be managed as a "scenic river." In addition, it would be recommended for inclusion into the Wild and Scenic River System. This would be a preliminary recommendation that would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

A more detailed discussion of roadless areas on the Forest and Grassland is presented in Appendix C.

Scenic or Visual Resources

Corridors along most of the principal roadways throughout the Forest and Grassland would be managed to retain scenic values. Approximately 34,400 acres would be allocated to management areas with visual resource emphasis. This would include visual management zones along certain travel corridors such as Highway 26.

Old Growth

Old growth would receive low emphasis under this alternative, with 18,740 acres dedicated as a management area allocation. This represents 20 percent of the 93,800 acres remaining on the Forest and Grassland. The remaining old growth on the Forest outside the allocation by the fifth decade would be approximately 42,400 acres, 45 percent of the existing 93,800 acres.

Fuelwood Supply

Personal use of firewood would continue to be provided on the Forest and Grassland. Generally, most firewood would come from timber harvest residues. In the first decade, 15,000 cords would be provided annually. This figure would decrease to 13,000 cords by the fifth decade.

Snag Dependent Wildlife
Alternative B-Modified would provide 43 percent to 33 percent of the potential snag habitat from the first decade through the fifth across the Forest and the Grassland The decline over time would be the result of the intensive timber management.

Winter Sports
A majority of the Forest and Grassland would be open to all users including Lookout Mountain. The Bandit Springs Area would be managed for cross-country skiing. Snowmobilers may access all areas of the Forest except for Bandit Springs and wilderness.

Anadromous Fish
Alternative B-Modified would provide a steadily increasing production of steelhead smolt over time (see Table 2-8). The increase is generally representative of the improved riparian area conditions over time through management practices and enhancement projects.

Historic Trail Preservation
The Summit Historic Trail would be managed to protect its historic qualities. It would not be allocated as a management area, nor would there be any special provisions. The appropriate VQO's would be applied to protect its scenic qualities

Off-Road Vehicle (ORV) Use
Under this alternative, steps would be taken to construct, reconstruct and designate existing trails for ORV use. The schedule calls for 95 miles in the first decade, increasing to 190 miles by the third through fifth decade. Some area closures would also be implemented in conjunction with trail designations and the identification of resource impacts.

Round Mountain
The scenic qualities and recreational opportunities supplied by the Round Mountain Trail would be recognized under this alternative through the allocation of 1,000 acres as the Round Mountain Management Area

Alternative C-Modified

Goals and Purpose
Alternative C-Modified emphasizes resources associated with amenity values, for example, riparian areas, visual corridors, roadless areas, recreation, and forest management designed to provide big game habitat. Old growth and snags would also be provided at high levels. Timber and range resources would be managed at relatively low levels.

This alternative in the FEIS uses 11 of the original 14 management area allocations from the DEIS. In addition, four management areas have been added to incorporate the new wild and scenic river allocations.

Management Direction

Timber Supply and Forest Management
Timber harvest is scheduled on a nondeclining yield basis. Timber management activities which are most economically efficient would be used while meeting other resource objectives. Other resource requirements for this alternative would either prohibit timber harvesting (old growth and roadless recreation management), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas). Approximately 170,000 acres of ponderosa pine stands with the appropriate characteristics would be managed under an uneven-aged management strategy. The allowable sale quantity in the first decade that would result from this mix of practices is 94 MMBF (15.6 MMCF).

Socio-Economic Analysis
Alternative C-Modified ranks fifth amongst the alternatives with a PNV of $395 million. Jobs would see a significant drop under this alternative. Employment in the logging and sawmill industries would decrease by about two percent (21 jobs) and in the remanufacturing industry by about four percent (55 jobs). Other segments of the economy would see a slight gain in employment through the diversification of the local economy that this alternative would stimulate. This alternative could enhance community stability in the long run, but the short-term effect would be destabilizing.

Returns to the counties would be the lowest of the alternatives discussed.

This alternative would provide the highest level of recreational, scenic and wildlife emphasis, and therefore would provide increased opportunities for leisure time pursuits. This heavy emphasis on amenities would disrupt community cohesion in the short run.

Livestock Grazing and Allotment Management

In the first decade forage would be made available for livestock use at levels slightly lower than is currently provided. Heavy emphasis on the improvement of riparian conditions and timber management designed to maintain dense timber stands for big game cover, account for the diminished level of forage for livestock use. As riparian conditions improve in the future more forage would likely be available. AUM's are expected to increase only slightly from present levels (from 73,100 to 74,400 AUM's).

Riparian Management

All major streams with existing or potentially significant fisheries will be managed to achieve an "excellent" condition. This will require improving 10,000 acres by the end of the first decade and a total of 17,500 acres by the end of the fifth decade.

Transportation System

Eight hundred forty miles of road will be maintained for passenger car travel in the first through fifth decades. There would be 2,384 miles of road maintained for high clearance vehicles in the first decade, a decrease of 26 percent compared to the current situation. By the fifth decade, this would decrease to 1123 miles.

An estimated 1,520 miles of road would be closed in the first decade, increasing to 3,224 miles in the fifth decade.

Big Game Habitat

Big game habitat receives primary management emphasis on 732,530 acres. In these areas road use and cover quantity, quality, and distribution would be controlled to provide high quality big game habitat. A population of 3,740 elk could be supported through the first decade, decreasing to 3,700 by the fifth decade. This alternative would exceed the ODFW planning benchmark of 2,600 elk.

Roadless Areas and Wilderness Study Areas

The Silver Creek, Rock Creek/Cottonwood Creek, and Lookout Mountain roadless areas would be managed to maintain the present roadless character. Green Mountain would be partially developed to provide a semiprimitive setting with primitive roads for recreational use. All of Deschutes Canyon would be recommended for Wilderness in this alternative, 9,350 acres, except for that portion that has been incorporated into the Wild and Scenic River System. The North Fork of the Crooked River would be retained as a wilderness study area, 1125 acres.

Segments of the North Fork Crooked River, Crooked River, and the Deschutes River were classified as Recreational or Scenic Rivers under the Oregon Omnibus Wild and Scenic Rivers Act. Four new management areas have been developed to incorporate these legislated areas into Alternative A (MA-23 North Fork Crooked River Recreation Corridor, MA-24 North Fork Crooked River Scenic Corridor, MA-G6 Crooked River Recreation Corridor and MA-G7 Deschutes River Scenic Corridor).

A more detailed discussion of roadless areas on the Forest and Grassland is presented in Appendix C.

Scenic or Visual Resources

Corridors adjacent to all of the principal roadways throughout the Forest and Grassland would be managed for scenic qualities, totalling 101,100 acres.

Old Growth

Old growth would receive a high emphasis under this alternative, with 45,030 acres dedicated as a management area. This represents 48 percent of the 93,800 acres remaining on the Forest and Grassland.

Fuelwood Supply

Firewood for personal use would continue to be

provided on both the Forest and Grassland. Generally, most firewood comes from timber harvest residues. Some juniper cutting also occurs Road closures and the reduced timber harvest activity would limit access to firewood, supplying only 12,000 cords annually.

Snag Dependent Wildlife

Alternative C-Modified would provide 51 percent to 69 percent of the potential snag habitat on an average across the Forest and Grassland.

Winter Sports

The Bandit Springs area would be managed for cross-country skiers. Snowmobilers may access all areas of the Forest except for Bandit Springs, Lookout Mountain, and wilderness.

Anadromous Fish

Alternative C-Modified would provide for a gradual increase in the population of steelhead smolt over time (see Table 2-8). This increase would be primarily due to the improved riparian habitat gained through improved management practices and stream enhancement work.

Historic Trail Preservation

The Summit Historic Trail would be managed as specified in the Decision Notice issued for this trail in 1986. Rather then allocate this area as a management area, the appropriate VQOs would be applied and the integrity of the trail protected.

Off-Road Vehicle (ORV) Use

Under this alternative, steps would be taken to construct, reconstruct and designate existing trails for ORV use. The schedule calls for 95 miles in the first decade, increasing to 190 miles by the third through fifth decades. Some area closures would also be implemented in conjunction with trail designations and the identification of resource impacts.

Round Mountain

There would be no special provisions or allocations for Round Mountain under this alternative.

Alternative E-Departure - Preferred Alternative in DEIS

Goal and Purpose

Alternative E-Departure emphasizes a combination of timber production, roadless recreation, and big game habitat. Timber is scheduled as a departure from nondeclining yield. Timber harvests are scheduled so that first decade volumes remain close to current levels and then decline gradually over the next 50 years. The alternative is designed to maintain local jobs in the short term. All resources are managed or maintained at moderate levels.

This alternative in the FEIS has the same 14 management area allocations as the DEIS. In addition, four new management areas have been added to update the alternative with the new wild and scenic river designations.

Management Direction

Timber Supply and Forest Management

Timber harvest is scheduled as a departure from the nondeclining yield harvest levels set in Alternative E. The objective is to approximate current harvest levels for one decade and then decline to a sustainable level. The actual trend would be a decline followed by a slight rise and then a leveling off (see Figure IV-2 from the Draft Plan, p. 35). The allowable sale quantity for the first decade would be 20.6 MMCF (123 MMBF), declining to 19.7 MMCF in decade two, and 16.1 MMCF in decade five. All timber would be managed under even-aged management strategies.

Timber management activities which are most economically efficient would be used while meeting other resource objectives. Other resource requirements for this alternative may either prohibit timber harvesting (old growth and roadless areas), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas).

Social and Economic Wants and Needs of Local Communities

Alternative E-Departure ranks second among the

alternatives with a PNV of $471 million. Employment in the logging, sawmill, and remanufacturing industries would increase about three percent in the short run, followed by a significant decline. The support and other sectors of the local economy would experience a modest increase. Payments to the counties would increase four percent.

This alternative would not be expected to significantly alter leisure lifestyles or community cohesion. The departure from a nondeclining harvest would adversely affect community stability over time.

Livestock Grazing and Allotment Management

Potential forage production could build over time as projected in Table 2-8. This would require construction of 138 acres of structural and 13,100 acres of non-structural improvements in the first decade The forage utilization would be in concert with management practices to rehabilitate riparian areas There is some likelihood that the AUM's on some or all allotments may see up to 10 percent reductions in the first decade to meet riparian area management objectives. As riparian conditions improve in the future, additional forage could made available.

Riparian Management

Major streams containing anadromous fisheries, or with high-valued resident trout fisheries, would be managed to achieve an "excellent" condition (9,400 acres). The remaining would be divided equally between "good" and "fair" conditions

Transportation System

Eight hundred forty miles of road would be maintained for passenger car travel in the first decade, essentially no change from the current situation. This would be maintained out through the fifth decade. There would be approximately 3,050 miles of road maintained for high clearance vehicles in the first decade, only slightly lower than the current situation. Roads open to high clearance vehicles would decrease significantly through the fifth decade to 2330 miles.

A estimated 890 miles of road would be closed in the first decade, increasing to 2082 miles in the fifth decade. Roads would be closed to protect the investment, to protect public safety, to limit soil erosion and water quality degradation, and to increase wildlife habitat effectiveness.

Big Game Habitat

Big game habitat receives primary management emphasis on 253,320 acres of the Forest and Grassland. Most of this represents high priority winter range. In these areas, road use and cover quantity, quality, and distribution would be controlled to provide high quality big game habitat. A population of 3,170 elk could be supported in the first decade, declining to 2,780 in the fifth decade. This alternative would exceed the ODFW planning benchmark of 2,600 elk.

Roadless Areas and Wilderness Study Areas

The Rock Creek/Cottonwood Creek area, Silver Creek and the top of Lookout Mountain, would be managed to retain the present roadless character. The remainder of Lookout Mountain would be allocated to general forest. Green Mountain would be partially developed to provide a semiprimitive setting with primitive roads for recreational use. In the Deschutes canyon, an area of 2,500 acres would be recommended for wilderness. The remainder of the Deschutes canyon would be managed under a big game emphasis. The North Fork of the Crooked River would be retained as a wilderness study area, 1125 acres, until a decision is made on the BLM environmental analysis.

Segments of the North Fork Crooked River, Crooked River, and the Deschutes River were classified as Recreational or Scenic Rivers under the Oregon Omnibus Wild and Scenic Rivers Act. Four new management areas have been developed to incorporate these legislated areas into Alternative A (MA-23 North Fork Crooked River Recreation Corridor, MA-24 North Fork Crooked River Scenic Corridor, MA-G6 Crooked River Recreation Corridor and MA-G7 Deschutes River Scenic Corridor).

A more detailed discussion of the roadless areas on the Forest and Grassland is presented in Appendix C.

Scenic and Visual Resources
Forty-six thousand two hundred acres of travel corridors would be managed for scenic qualities. These include major roads, access roads to roadless management areas, and a special scenic recreation travel corridor on the Big Summit District.

Old Growth
Twenty-six thousand three-hundred and forty acres would be specifically allocated to old growth management. This represents 28 percent of the remaining old growth on the Forest and Grassland.

Fuelwood Supply
Personal firewood would continue to be provided for on both the Forest and Grassland. Generally, timber harvest residues provide the majority of wood gathered. This alternative would supply 13,100 cords annually in the first decade, declining to 10,000 cords annually by the fifth decade.

Snag Dependent Wildlife
This alternative would provide 46 percent to 50 percent of the potential snag habitat on an average across the Forest and Grassland, from the first through the fifth decade.

Winter Sports
A majority of the Forest and Grassland would be open for winter recreation. Bandit Springs would be managed for cross-country skiers Snowmobilers could access all areas of the Forest except for Bandit Springs, the top of Lookout Mountain, and Wilderness. A special recreation corridor from Bandit Springs east, and south to Lookout Mountain, would be managed to provide pleasing scenery. This corridor would include the Round Mountain Trail.

Anadromous Fish
Alternative E-Departure would provide for a gradual increase in the population of steelhead smolt over time (see Table 2-8). This increase would be primarily due to the improved riparian habitat gained through improved management practices and stream enhancement work.

Historic Trail Preservation
The Summit Historic Trail would be managed as specified in the Decision Notice issued for this trail in 1986. It would not be allocated as a management area, but rather the appropriate VQO's would be applied and the integrity of the trail protected.

Off-Road Vehicle (ORV) Use
No ATV trail development is planned under this alternative.

Round Mountain
The Round Mountain Trail would be managed as a part of the special recreation corridor from Bandit Springs to Lookout Mountain.

Alternative I (Preferred Alternative)

Goal and Purpose
Alternative I separates the plans for the Forest and Grassland. This is the result of public comment suggesting that the Grassland be handled in a separate plan to maintain its identity as a National Grassland. Alternative I is the final preferred alternative.

The Final Forest Plan expands the number of management areas from 14 in the Draft to 28. The expansion represents the Forest response to the public comments on the DEIS. Emphasis was increased in timber/forage production and recreation. A number of new management areas are designated to emphasize special features, including Stein's Pillar, Bandit Springs and Lookout Mountain.

The Final Grassland Plan expands the number of management areas from eight in the Draft to 16. As with the Forest Plan, the expansion is the result of public comment and new information. The change represents increases in management emphasis for wildlife, recreation, and riparian area management.

Management Direction

Timber Supply and Forest Management
A number of changes to the Draft Plan are incorporated into this alternative. Timber harvest would be scheduled on a nondeclining yield basis and there would be no scheduled harvest from the Grassland. The suitable land base for forest management activities within this planning period is 533,177 acres. Uneven-aged management would be applied to pon-

derosa pine stands with characteristics lending themselves to this type of management. The estimated scheduled timber volumes, harvest type, rotation age or size, and estimated potential contribution to ASQ by management area grouping are:

Group I

92,200 Acres - 11%
No scheduled treatment
1. Black Canyon Wilderness
2. Bridge Creek Wilderness
3. Mill Creek Wilderness
4. N.F.C.R. Wilderness Study
5. RNA's
6. Old Growth
7. Summit Trail (preservation)
8. Rock Creek/Cottonwood Creek Unroaded
10. Silver Creek Unroaded
11. Lookout Mountain
28. Facilities

Group II

18,130 Acres - 2%
Silviculture - Even- or uneven-aged
Rotation Age - 200 years
Diameter 20"+
Average annual cu ft. volume - 0.3 MMCF
15. Riparian

Group III

3,240 Acres - <1%
Silviculture - Even- or uneven-aged
Rotation age - 300 years
Diameter 30"
Average annual cu.ft. yield - <0.1 MMCF
12. Eagle Roosting
17. Stein's Pillar
19. Deep Creek
24. N.F.C.R. Scenic River

Group IV

28,110 Acres - 3%
Silviculture - Even- or uneven-aged
Rotation age - Pine 250 years, mixed conifer 200 years
Average annual cu.ft. yield - 0.4 MMCF
7. Summit Trail (retention)
13. Developed Recreation
14. Dispersed Recreation
16. Bandit Springs
25. Hwy 26 Corridor
26. Visual Management - (retention)
27. Round Mountain National Recreation Trail

Group V

32,140 Acres - 4%
Silviculture - Even- or uneven-aged
Rotation age - Pine 200 years, mixed conifer 150 years
Diameter - Pine 27", mixed conifer 22"
Average annual cu.ft. yield - 0.6 MMCF
7. Summit Trail (partial retention)
18. Hammer Creek
23. N.F.C.R. Recreation River
26. Visual Management (partial retention)

Group VI

64,130 Acres - 8%
Silviculture - Even-aged
Rotation age - Pine 125 years, mixed conifer 90 years
Diameter - Pine 16", mixed conifer 15"
Average annual cu.ft. yield - 0.9 MMCF
20. Winter Range

Group VII

606,690 Acres - 72%
Silviculture - Even- or uneven-aged
Rotation age - Pine 130 years, mixed conifer 90 years
Diameter - Pine 18", mixed conifer 16" (uneven-aged 20")
Average annual cu.ft. yield - 16.8 MMCF
9. Rock Creek/Cottonwood Creek Helicopter
21. General Forest Winter Range
22. General Forest

The ASQ would be 19.0 MMCF (115 MMBF) per year in the first decade. Of this, approximately 82 MMBF per year for the first decade would be in ponderosa pine. The desired ASQ would be attained through a planned harvest schedule to allow

FIGURE 2-2
Planned Harvest For 1990-1999
(Glide Path)
(MMBF not including salvage)

	YEAR				
	1990	1991	1992	1993	1994
ASQ	124	121	118	114	113
	YEAR				
	1995	1996	1997	1998	1999
ASQ	112	112	112	112	112

the reduction from the current situation to the 115 MMBF using a glide path shown in Figure 2-2.

Social and Economic Wants and Needs of Local Communities

Alternative I has the highest PNV of the alternatives, $501 million.

Employment in the logging and sawmill industries would increase about two percent (15 jobs). The commodity resource side of this alternative would provide a stable supply of timber and forage over time, providing community stability, baring any unforeseen disruptions in these supplies. Opportunities would also be created for diversification of the economy due to the increased emphasis on recreation, scenic and wildlife resources.

This alternative would have a positive effect on leisure lifestyles, providing a range of recreational needs and provisions for wildlife habitat. The balanced resource program would have a positive effect on community cohesion.

Livestock Grazing and Allotment Management

This alternative would incorporate new east-side forest utilization standards based on vegetation type, range condition and management strategies. Separate standards are provided for riparian areas and the remainder of the Forest and Grassland

Potential forage production could build as projected in Table 2-8. The emphasis on the improvement of all riparian areas to "excellent" condition, along with 138 acres of structural and 20,980 acres of non-structural range improvements, could provide for an additional capacity by the fifth decade of 84,000 AUM's. The forage utilization would be in concert with management practices to rehabilitate riparian areas. There is some likelihood that the AUM's on some or all allotments may see up to 10 percent reductions in the first decade to meet riparian area management objectives.

Riparian Management

All riparian areas would be managed as "excellent." Riparian corridors on 40 miles (1,000 acres) of high value streams would be emphasized to provide "connective habitat." Riparian area improvements and management practices would enhance 10,000 acres in the first decade and expand that to 17,500 acres by the fifth decade.

Transportation System

Eight hundred forty miles of road would be managed for passenger car travel in the first decade, remaining stable through the fifth decade, 850 miles. There would also be 2,330 miles of high clearance roads maintained in the first decade, slightly declining to 2,270 by the fifth decade.

There will be 1,560 miles of roads closed in the first decade, increasing to 2,190 miles by the fifth decade.

There would be additional emphasis on ORV management and control through the application of standards and guidelines and the Travel Plan. In addition, the need for additional planning to assess ORV management needs on open areas, such as General Forest (MA-F22) and General Forage (MA-G3), would occur as implementation actions.

Big Game Habitat

Big game habitat receives primary management emphasis on 230,480 acres. A major portion of this acreage recognizes winter range values, 206,930 acres on four management areas. The area receiving emphasis for winter range values in this alternative is an increase over the Draft. In this alternative

there is no specific allocation for big game summer range, however, road use and cover quantity, quality and distribution would be controlled to provide the desired habitat effectiveness. A population of 3,000 elk could be supported in the first decade, decreasing to 2,620 by the fifth decade. This alternative would exceed the ODFW planning benchmark of 2,600 elk.

Roadless Areas and Wilderness Study Areas

The Green Mountain proposal for semiprimitive motorized recreation (the area remaining roadless) was dropped for reasons of no apparent public interest or support. Also soil erodibility and slopes were found not to be suitable for that use.

A portion of the Rock Creek/Cottonwood Creek area would be managed for unroaded recreation. A portion of the area which was determined to be economical for timber management was allocated to general forest and unroaded helicopter management areas. Steeper areas were reserved for roadless area management, or helicopter logging to protect watershed, anadromous fisheries, recreation, and wildlife values.

The Silver Creek area would remain roadless and the boundary adjusted to a more manageable boundary along the canyon rim.

The Lookout Mountain area, allocated to unroaded recreation, increased from 2,950 acres to 15,660 acres in the first decade. The entire roadless area, plus road corridor, would be treated as a separate management unit. Planning for stand treatments would begin in the first decade. The lower portion of the management area would be managed for the enhancement of forest health, scenery, wildlife and recreation from the second through the fifth decades, leaving a 7,550- acre area unroaded.

A portion of the Deschutes River-Steelhead Falls Wilderness Study Area and a additional area outside the WSA in Squaw Creek are combined to form a 7,840-acre management area emphasizing semiprimitive, nonmotorized recreational opportunities and wildlife habitat management. The 5,200-acre draft wilderness proposal would be dropped. The majority of the remainder of the draft proposed wilderness was included in the Deschutes Scenic River Corridor classified by the Oregon Wild Rivers Act in 1988.

Eligibility and suitability determinations have been made for a portion of the Squaw Creek area. A 7.5 mile segment of the creek, 1,370 acres, from the Grassland boundary to the confluence with the Deshutes River would be managed as a "scenic river." In addition, it would be recommended for inclusion into the Wild and Scenic River System. This would be a preliminary recommendation that would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

A more detailed discussion of the roadless areas on the Forest and Grassland is presented in Appendix C.

Scenic or Visual Resources

The immediate foreground viewing area surrounding recreational developments (campgrounds) would be assigned a retention visual management objective. The miles of road with visual management objectives increased from the Draft to 384 miles in the Final. The width of the viewing corridor used in calculations was changed from more than 2,640 feet to 1,200 feet. The entire Summit National Historic Trail corridor was assigned a visual management objective relative to cultural aspects of the particular trail segment. Round Mountain National Recreation Trail management corridor reduced in width from >2,640 feet to 1,200 feet. Added were 560 acres of viewing area from Lake Billy Chinook reservoir on the National Grassland.

No middle ground viewing areas would be allocated as management areas.

Old Growth

Old growth would receive emphasis in this alternative with 19,990 acres dedicated in two management areas (MA-F6, MA-G5). Additional old growth would be retained in other management areas (wilderness,

the wilderness study area and RNA's), totalling 2,400 acres. That portion of the old growth on the Forest amounts to 23 percent of the 93,800 acres of old growth remaining. Alternative I also added 1,000 acres of connective habitat in the riparian management area allocation to link up old growth stands to enhance their effectiveness for old growth dependent species.

Fuelwood Supply

Personal use of firewood would continue to be provided for on both the Forest and Grassland. Generally, most firewood comes from timber harvest residues. In the first decade, 13,000 cords would be provided annually. This supply would decrease to 11,000 cords annually by the fifth decade.

Snag Dependent Wildlife

Alternative I would provide 47 percent to 54 percent of the potential snag habitat for the first through the fifth decades across the Forest and Grassland.

Winter Sports

The Bandit Springs Management Area, 1,580 acres, is allocated to provide winter recreational opportunities for cross-country skiing and other nonmotorized winter recreation activities. Most of the remaining Forest and Grassland would be open to snowmobile access, including Lookout Mountain. Exceptions would include such areas as winter range areas, wilderness and the wilderness study area.

Anadromous Fish

Alternative I would provide for a gradual increase in the population of steelhead smolt over time. This increase would be primarily due to the improved riparian habitat gained through improved management practices and stream enhancement work.

Historic Trail Preservation

The Summit Historic Trail would be treated as a management area allocation with emphasis on preserving the historic and scenic qualities of the trail, 9,560 acres.

Off-Road Vehicle (ORV) Use

Under this alternative, steps would be taken to construct, reconstruct and designate existing trails for ORV use. The schedule calls for 95 miles in the first decade, increasing to 190 miles by the third through fifth decade. Some area closures would also be implemented in conjunction with trail designations and the identification of resource impacts.

Round Mountain

The scenic qualities and recreational opportunities supplied by the Round Mountain Trail have been recognized in this alternative through the allocation of 1,000 acres as the Round Mountain Management Area.

Comparison of Alternatives

Overview

The purpose of Forest planning and the process of formulating alternatives has been discussed previously in this chapter. In this chapter, as part of the alternative selection and analysis phase, interalternative comparisons of alternatives have been made. The elements of alternatives that have been comparatively evaluated include:

-responsiveness to issues and concerns,

-management areas,

-resource outputs,

-environmental effects, and

-costs and benefits.

In addition to tables presenting information, there are narrative sections that qualitatively describe differences between the alternatives.

The following pages summarize in tables and narrative the outputs and effects that differ significantly among alternatives.

Summary of tables providing alternative comparisons:

Table 2-1	Disposition of Alternatives Considered in the Final
Table 2-2	Summary of Supply & Demand for Crooked River National Grassland
Table 2-3	Summary of Supply & Demand for Ochoco National Forest
Table 2-4	Outputs & Effects of Required Benchmarks
Table 2-5	Maximum Resource Outputs Comparison with Alternative Outputs
Table 2-6	Resource Emphasis Acreages by Alternative
Table 2-7	Acreages in Management Areas by Alternative
Table 2-8	Quantitative Resource Outputs, Environmental Effects, Activities and Costs By Alternative
Table 2-9	Indicators of Responsiveness of Alternatives to Issues, Concerns and Opportunities
Table 2-10	Comparison of Past, Present, and Alternative Timber Outputs
Table 2-11	Timber Resource Management Information by Benchmark and Alternative
Table 2-12	Present Net Value and Discounted Costs and Benefits of Alternatives
Table 2-13	Present Net Value and Discounted Costs and Benefits by Resource Group
Table 2-14	Annual Cash Flows and Non-cash Benefits in the First and Fifth Decades by Alternative
Table 2-15	Changes in Employment for Various Economic Sectors by Alternative

Issues, Concerns and Opportunities

Alternatives with different goals and resource objectives present ways of responding to issues and concerns. Table 2-9 (pp. 2-78 through 2-79) displays how each alternative responds to the Forest and Grassland's issues and concerns. Table 2-10 (pg. 2-88) compares alternative timber outputs to historical levels.

Management Areas

Management areas are defined by the area where particular management prescriptions apply. Management areas are treated in accordance with Forest-wide standards and guidelines and the individual management area's prescription in order to achieve a desired future condition. Standards and guidelines function to describe management practices, their intensity, and the timing to achieve intended goals and objectives for the management area

At the same time, standards and guidelines must provide for protection of resources, and contain mitigation measures which minimize any adverse environmental effects.

The standards and guidelines were developed by an Interdisciplinary Team specifically to respond to environmental conditions on the Forest and Grassland. Some of these were adopted from the Regional Guide. For a more complete description of standards and guidelines refer to Appendix D.

Each alternative is represented by different combinations of management areas. The acres by management area may vary by alternative also (Tables 2-6 & 2-7). The management area allocations for each alternative are shown on the maps included in the map packets for this FEIS.

Land and resource management goals for each management area are summarized below. Management area goals and desired conditions from the DEIS have also been carried forward and are represented in Alternatives A, C-Modified, and E-Departure.

Draft Management Areas

MA-D1. General Forest

Emphasis:

The primary management objective is to produce timber and livestock.

Desired Condition:

Timber management activities will include planting genetically improved stock, natural regeneration, precommercial thinning, commercial thinnings, and regeneration harvests generally at or near culmination of mean annual increment. Timber stands will generally be even-aged, 20 to 40 acres in size, with relatively uniform spacing. The largest trees in managed stands will be 16 to 18 inches DBH. Forage production for livestock will be enhanced by most timber harvesting activities and by range improvement activities, including the use of prescribed fire and the construction of additional water sources.

MA-D2. Big Game Winter Range

Emphasis:

The primary management objective is to produce winter range habitat of sufficient quality to ensure high big game survival potentials.

Desired Condition:

A quality big game winter range habitat will be brought about, over time, through vegetative treatment, including timber harvests and prescribed fire. These activities will be designed to create an optimal relationship between the size and spacing of thermal cover units for maximum deer and elk use. Open road densities will be kept low to limit the amount of disturbance to big game from vehicle traffic. Livestock grazing will be monitored and controlled to ensure sufficient forage for big game.

Uneven-aged management has been added to Alternative C-Modified, and it will have an effect on a portion of this management area. It is not known at this time how close those acres managed under this silvicultural system will be to the desired future condition specified for this management area.

MA-D3. Big Game Summer Range

Emphasis:

Management is directed towards ensuring big game habitat of sufficient quality for high production levels of deer and elk.

Desired Condition:

A quality big game habitat will be brought about, over time, through timber harvest and other vegetative treatments. These activities will create an optimum relationship between the size and spacing of cover units and forage areas for maximum deer and elk use. Open road density will be kept low to limit the amount of disturbance to big game from vehicle traffic.

Uneven-aged management has been added to Alternative C-Modified, and it will have an effect on a portion of this management area. It is not known at this time how close those acres managed under this silvicultural system will be to the desired future condition specified for this management area.

MA-D4. Old Growth

Emphasis:

The management emphasis on these lands is to provide habitat for wildlife species dependent on old growth habitat.

Desired Condition:

Timbered stands of 300 acres or greater in size will contain mature and overmature trees in a multilayered canopy. Standing dead and down material will also be a significant component of the stand. Stands managed for old growth will generally be distributed throughout the Forest. To create this pattern, existing old growth stands will be utilized where possible. If no suitable old growth exists, areas capable of becoming old growth will be managed to bring the stand to an old growth habitat condition as rapidly as possible.

MA-D5. Retention Foreground

Emphasis:

The primary management emphasis of these areas is to provide scenic views that retain or enhance natural beauty.

Desired Condition:

Lands in this management area are comprised of the seen area immediately adjacent to areas of very high recreational use. Management activities will only repeat form, line, color, or textures frequently found in a natural landscape. Changes to the scenery will not be visually apparent to the casual Forest user. Where possible, forested areas will contain a major component of large ponderosa pine in open, parklike stands.

MA-D6. Partial Retention Foreground

Emphasis:

Management in these areas is directed towards providing scenic views that partially retain natural beauty.

Desired Condition:

Lands in this management area are comprised of the seen area immediately adjacent to areas of high recreational use. Management activities may change form, line, color, or texture but should remain subordinate to natural patterns and not dominate the landscape. Where possible, forested areas will contain a major component of large ponderosa pine in open, parklike stands.

MA-D7. Partial Retention Middleground

Emphasis:

These areas provide scenic views that partially retain natural beauty, with man's activities remaining visually subordinate to the natural landscape.

Desired Condition:

Lands in this management area are located in the visual middleground adjacent to areas managed under a retention prescription (Management Area #D5). Management activities may change form, line, color, or texture but should remain subordinate to natural patterns and not dominate the landscape. When viewed from a highway, widely dispersed, small timber harvesting units will be visible, but will be shaped to the terrain.

MA-D8. Wilderness

Emphasis:

Protect the Wilderness ecosystems. Manage to maintain a natural setting and preserve solitude. (This management area has changed from the Draft and presently applies to the Deshutes Canyon-Steelhead Falls area for Alternatives C-Modified and E-Departure only.)

Desired Condition:

These areas are to be managed in a manner ". .where the earth and its community of life are untrammeled by man..." and where "...natural processes operate without interference by man..." Opportunities for solitude and challenge are offered away from the sights and sounds of motorized mechanical vehicles or equipment. Scientific information may be sought without the intrusion of permanent improvements or motorized equipment. Special exceptions provided in the Oregon Wilderness Act will be allowed.

MA-D9. Semiprimitive Nonmotorized

Emphasis:

The management goal for these areas is to administratively provide near-natural, unroaded, and undeveloped recreational opportunities.

Desired Condition:

Motorized vehicles are excluded except for oversnow vehicles, allowing for a semiprimitive nonmotorized recreational experience. Generally, interaction between users is low, but there is often evidence of other users. Natural processes will generally be operating without human interference, but management may occur to protect or enhance roadless qualities.

Motorized equipment such as chainsaws may be used in the management and maintenance of these areas. Nonmotorized mechanized equipment, such as "mountain bikes" and wheel-barrows, is acceptable. River corridors that are eligible for designation as Scenic Rivers under the Wild and Scenic Rivers Act are included in this management area.

MA-D10. Semiprimitive Motorized

Emphasis:

The management emphasis on these lands is to provide challenging motorized recreational opportunities in a natural appearing environment free from developed roads, highway vehicles, and concentrations of people.

Desired Condition:

This Management Area contains selected roadless areas that meet these goals. Management is directed towards maintaining a natural appearing setting for off-road vehicle use while maintaining other resource values.

MA-D11. Developed Recreation

Emphasis:
The management goal at these sites is to provide and maintain safe, healthful, and aesthetically pleasing recreational facilities.

Desired Condition:
This applies to sites currently developed or planned for parking, camping, picnicking, boating and other recreational activities.

MA-D12. Research Natural Areas

Emphasis:
The management goal of these areas is to preserve Research Natural Areas (RNA's) as scientific benchmarks.

Desired Condition:
This management area contains natural or nearly undisturbed areas which are representative of important forest and range land ecosystems. These areas fulfill identified needs for completion of the Regional RNA system. The RNA's will preserve natural ecosystems for research, education, and comparison with those affected by human activities

MA-D13. Riparian in Acceptable Condition

Emphasis:
The primary management emphasis of these areas is to improve poor riparian areas to a fair condition, and to maintain existing conditions in other riparian areas.

Desired Condition:
Streambank vegetation will be managed to maintain or improve streambank stability and fish habitat as needed to meet this objective. Water temperatures will generally not be increased in major streams. Temperatures in other streams will not deteriorate downstream fish habitat. Natural, large, woody material will be provided. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection needs.

MA-D14. Riparian in Excellent Condition

Emphasis:
Management in these areas will ensure that riparian areas are maintained or improved to provide excellent streambank stability and fish habitat in 15 years.

Desired Condition:
Streambank vegetation will be managed to provide the amount of cover and shade needed to meet this objective. Water temperatures will not be increased in major streams, and may need to be decreased in some areas. Temperatures in other streams will contribute to improved downstream fish habitat. Natural, large, woody material will be provided to help achieve high quality fish habitat. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection needs.

Forest Management Areas

The land and resource management emphasis and goals for the management areas for Alternative I are summarized on the following pages. The 28 management areas for the Forest and the 14 management areas for the Grassland are presented in narrative form to provide a picture of the physical description,

management emphasis, and desired future condition of each area. The standards and guidelines that apply to each of the Management Areas and the Forest-wide Standards and Guidelines are presented in Chapters 4 of the Forest and Grassland Plans.

MA-F1. Black Canyon Wilderness

Emphasis:

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

Desired Condition:

The Black Canyon Wilderness will be as natural as is possible, with little evidence of human activity. The area will be a place of natural settings with opportunities for solitude. Present road access and hunter caches and camps will be rehabilitated so their presence is no longer a dominant land feature. Recreational improvements, such as trailheads and access trails, will be evident where they are necessary to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

Old growth stands will be evident within the Management Area, along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning starts occur.

MA-F2. Bridge Creek Wilderness

Empasis:

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude. The area will be managed as a trailless wilderness where people can use their orientation skills.

Desired Condition:

The Bridge Creek Wilderness will be as natural as possible, with little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access will be rehabilitated so that its presence is no longer a dominant land feature. Recreational improvements, such as trailheads and access trails, will not be evident, but entry points will be signed where necessary to control use and to preserve wilderness qualities.

Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the Management Area, along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality, resulting from past Mountain Pine Beetle infestations and other endemic insects and pathogens will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning starts occur.

MA-F3. Mill Creek Wilderness

Emphasis:

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

Desired Condition:

The Mill Creek Wilderness area will be as natural as possible, with little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access will be rehabilitated so that its presence is no longer a dominant land feature. Recreational improvements, such as trail heads and access trails, will be evident where necessary to control use to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident. The stock driveway in the northeast portion of the Wilderness will be evident due to its routine use in association with the Mill Creek Allotment.

Old growth stands will be evident within the Management Area, along with those wildlife species dependent in old growth habitat on the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality, resulting from past Mountain Pine Beetle and other endemic insects and pathogens, will be evident along with associated changes in fuel loadings and plant succession. Fuel loadings will become very significant along the south side of Forest Road 27 and will pose a serious fire risk. Fire occurrence will be evident where lightning and human-caused starts occur. There may be planned ignitions to achieve wilderness objectives.

Minerals activities on valid mining claims will be evident along with authorized access under approved plans of operation.

MA-F4. North Fork Crooked River Wilderness Study Area

Emphasis:

Management will maintain the existing conditions of the area pending a decision by Congress on wilderness designation.

Desired Condition:

The wilderness study area will be as natural as possible with reduced evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access, and hunter caches and camps, will be rehabilitated. Recreation improvements, such as trail heads and access trails, will be evident where necessary to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the management area, along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

The Final Environmental Impact Statement for Wilderness by the BLM has not been published, but a decision on the status of this area along with the adjoining BLM lands is pending. If these areas are not designated wilderness, they will be managed under old growth, riparian, and general forest standards and guidelines.

MA-F5. Research Natural Areas

Emphasis:

These tracts of land are areas where natural processes are maintained for research and education purposes. They will provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species.

Desired Condition:

Natural conditions will be maintained. Any management activities within the RNA's will be directed at

maintaining the natural conditions of the area, and these human-caused changes to the ecosystem will not be readily evident. Continuing, nondestructive baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural lightning and human-caused fire starts occur.

MA-F6. Old Growth

Emphasis:

Provide habitat for wildlife species dependent on old growth stands.

Desired Condition:

Stands of old growth are not expected to change significantly over the next ten to fifty years, barring natural catastrophe. They will continue to provide habitat for a number of wildlife species, such as the pileated woodpecker and Rocky Mountain elk, and may become more extensively used by these species as the majority of the Forest moves towards a "managed condition." High levels of snag habitat will continue as individual trees within the stands die of old age, as well as from periodic infestations by insect and disease populations. Management activities and roads will generally not be evident Fire occurrence will be evident where lightning and human-caused starts occur. Prescribed fire may be evident if natural fuels accumulate to dangerous levels, threatening the existence of the old growth stand, or where vegetation manipulation is needed to maintain stand structure and species composition. Grazing by livestock, as well as by big game wildlife species may be evident.

MA-F7. Summit National Historic Trail

Emphasis:

Protect the existing integrity of the Summit Trail Enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities.

Desired Condition:

The Summit Trail will be a place where Forest visitors can enjoy the cultural and recreational resources offered in a visually pleasing environment. The majority of the trail route is along developed roads and will provide travel by highway vehicle, as well as by mountain bike and horseback. Vegetation may appear manipulated in widely dispersed areas in order to enhance cultural and recreational resources, but will generally not dominate the landscape. Interpretive facilities such as signs and landmarks may be visible in special, culturally significant areas.

The outer boundary of the management area will generally not exceed 600 feet on either side of the trail.

MA-F8. Rock Creek/ Cottonwood Creek Roadless Area

Emphasis:

Provide for protection of soil, water, and fisheries, and for opportunities for nonmotorized recreational use and enjoyment. Maintain vegetation on steep slopes to prevent erosion and to protect water quality and the anadromous fishery.

Desired Condition:

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will occur, but the area will appear natural. These activities, along with any desired recreational improvements, will be the only visible impacts of direct human activities.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area,

along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Structures may be constructed, or other work may be done to maintain or improve habitat for the anadromous fishery. The area will remain one where there are above average numbers of trophy-sized elk and deer. Tree mortality, resulting from past spruce budworm infestations and other endemic insects and pathogens, will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning and human-caused starts occur.

MA-F9. Rock Creek/ Cottonwood Creek Unroaded-Helicopter Area

Emphasis:

Allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes, and big game habitat.

Desired Condition:

The area will be unroaded. Timber harvest and associated activities will use helicopter systems. The area will remain unroaded with landings located outside the management area. Prescribed fire use will also be evident in some areas where its use is desirable to attain management objectives. Visible harvest impacts will generally be limited to vegetation modification with little soil or other surface disturbance.

Recreation improvements, such as trailheads and access trails, will be evident where necessary to enhance access. Livestock use may be evident, but the successful application of allotment management requirements will show acceptable grazing practices. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area, along with those wildlife species dependent on old growth habitat in the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from spruce budworm and other endemic insects and pathogens will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning and human-caused starts occur.

MA-F10. Silver Creek Roadless Area

Emphasis:

Protect and enhance the roadless qualities and provide nonmotorized recreational use.

Desired Condition:

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will be evident over time. These activities, along with any desired recreational improvements, will be the only visible impacts of human activities within the Management Area.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area, along with those wildlife species dependent on old growth habitat on the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning and human-caused starts occur.

MA-F11. Lookout Mountain Recreation Area

Emphasis:

Maintain a natural setting, providing continued opportunities for high quality, semiprimitive recreational activities and wildlife habitat, while maintaining healthy forests.

Desired Condition:

General

The Lookout Mountain Management Area will become a well-known area for year-round recreational activities and will provide excellent habitat for big game.

Prescription Area A:

This area will comprise approximately 7,550 acres of Forest land in a semiprimitive state with no vegetation manipulation planned. The recreational user will experience a highly diverse, natural landscape with interspersed stands of trees, openings, rock outcrops, and talus. A tree species mix including early successional species such as ponderosa pine, western larch and lodgepole pine will be seen across the lower elevations of the landscape. Lodgepole pine, sub-alpine fir, white fir and Douglas-fir will dominate at the higher elevations. Pockets of mixed conifer old growth will be an integral part of the vegetation mosaic. Natural tree mortality will be evident.

Big game habitat will be excellent due to the secluded nature of the area, high elevation moist meadows, and good year-round springs with heavy dense cover. Elk wallows will be numerous and big game use will be evident.

The area will be roadless, with currently existing roadbeds exhibiting evidence of rehabilitation activities and revegetation. Man-made improvements will be subordinate to the natural landscape and will be present to enhance recreational use of the area. Typical improvements apparent to the recreational user may include trails, trailheads, signing, trail shelters, livestock fencing, and possible wildlife habitat enhancement projects.

Prescription Area B:

This area will comprise about 8,110 acres in a relatively natural appearing condition.

A variety of trails, roads, trail shelters, signs and other improvements for the benefit of recreational users may exist, but will be designed and managed to be subordinate to the natural landscape. Several existing roads into the Management Area will remain open for motorized travel to dispersed campsites and mining activities.

Vegetation may appear manipulated in widely dispersed places in order to enhance recreational opportunities and wildlife habitat resources; vegetation manipulation will not dominate the landscape or generally be evident to the casual Forest visitor. Various vegetation manipulation techniques will be used to promote healthy forests which are more resistant to catastrophic events that may detract from big game habitat or a recreational experience. As a result of these limited entries, ponderosa pine and western larch, which are tree species valued for their appearance, will become more abundant over time. These species will be interspersed in a mosaic of other mixed conifer species of various size and age classes, including stands of old growth mixed conifer and ponderosa pine.

Minimum standard roads designed for specific projects will exist in low densities on the more gentle ground. Road use will be restricted to project activities and roads will be closed upon completion of each project. Roadbeds and banks will be seeded with mixtures of legumes and grasses to improve wildlife habitat. The amount of activity occurring at any one time will be limited.

MA-F12. Eagle Roosting Areas

Emphasis:

Provide winter roosting habitat for migrating bald eagles from December through April.

Desired Condition:

An uneven-aged stand will contain large trees which are at least 22 inches DBH, and a few trees which are

36-40 inches at DBH. Roost trees generally are at least 22 inches DBH and have an open structure which allows eagles to land easily. Those trees actively being used will be preserved along with replacement trees in the same vicinity.

The area will be free of potentially disturbing human activity during the period from December 1 to May 1. When actual or potential roosting areas overlap with areas which have more restrictive prescriptions, the area will be managed under the most restrictive prescription as long as roost trees are maintained.

MA-F13. Developed Recreation

Emphasis:

Provide safe, healthful, and aesthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.

Desired Condition:

This Management Area will consist of natural-appearing areas with obvious man-made controls and structures to direct users, provide for comfort and sanitation, and protect the natural resources. Developed sites will be provided for a broad range of recreational opportunities.

New and upgraded sites will incorporate a barrier-free design.

Management activities will not be visually evident. Scenic views may be enhanced through harvest or thinning but will appear natural.

Facilities, roads, and trails will have a well maintained appearance and provide a safe recreational environment. When vandalism is a problem, public use may be prohibited on a seasonal basis.

MA-F14. Dispersed Recreation

Emphasis:

Provide a near-natural setting for people to utilize while pursuing outdoor recreation experiences.

Desired Condition:

Within the immediate dispersed site, management activities will not be evident to the casual observer. Activities may be evident in areas adjacent to the site, depending on the management prescription applied to them. Primitive, user-constructed structures or facilities, consistent with a site's use, will be seen. Sites will be managed so that users tend to feel relatively isolated. A strategy will be developed that encourages individuals or groups to "find their own place."

Livestock grazing may be evident, but the successful application of allotment management requirements will also be evident.

MA-F15. Riparian

Emphasis:

Manage streamside vegetation and habitat in order to maintain or improve water quality and meet temperature and turbidity levels as required by state standards under the Clean Water Act (See Forest-wide Standards and Guidelines, Water; and Best Management Practices (BMP'S), Appendix G).

Desired Condition:

Riparian areas will exhibit a low but apparent level of management. Vegetation may or may not appear manipulated, depending on the condition of the stream. An abundance of wildlife species should be evident. Due to management restrictions and the low risk associated with these areas, the signs of natural or man-caused fire will be infrequent.

For management purposes, a special protection area (100 feet from the edges of perennial bodies of water) will be apparent. In addition, the streams listed below will receive extra protection to 200 feet

from the stream edge, in order to provide "connective habitat" for a variety of wildlife species on the Forest:

> Trout Creek, Bear Creek, Drake Creek, Pine Creek, Allen Creek, Indian Creek, West Fork Bridge Creek, Porter Creek, Howard Creek, Fox Creek, Cottonwood Creek, Baldy Creek, Little Windy and Windy Creek, and Nicoll Creek.

Roads not planned for future use will be obliterated and revegetated to a natural or near natural condition.

Within the limits of ecological potential, a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation will exist.

Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time. Sites unable to support a canopy of deciduous or evergreen species will be characterized by vigorous stands of forbs, grasses, and grass-like riparian species.

Bank slopes containing high plant densities, thick root masses, embedded angular boulders, and old logs will also characterize these areas. Extensive scouring of streambanks will be an uncommon occurrence, as will soil deposition outside the norm for the individual stream system. Streambeds will be commonly covered by native aquatic growth on assorted sizes of rocks and boulders.

Where cobble and gravel bars are prominent, they will become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are re-built and cutbanks stabilized, a narrower, deeper channel will gradually develop.

Springs and wet meadows are not specifically included in this management area prescription, but should receive appropriate protection as stated in Forest-wide Standards and Guidelines for Water, Chapters 4, Forest and Grassland Plans.

MA-F16. Bandit Springs Recreation Area

Emphasis:

Provide dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. Expand the recreational activities and opportunities beyond winter recreation to year-round activities.

Desired Condition:

The Bandit Springs Recreation Area is expected to become an important winter sports use area on the Forest, as well as a setting for other year-round recreational activities, including environmental education, mountain bike riding, day hiking, hunting, and horseback riding. Developments to accommodate a broad spectrum of nonmotorized recreationists' needs will be built. Emphasis will be on enjoying the natural scenery, with interpretation aiding the casual visitor. Developments may include trail shelters, maintained trails, horse unloading ramps, toilets, information areas, parking, picnic areas, and signs.

Periodic manipulation of vegetation to meet recreation and visual objectives for the area will be apparent to the user. Timber stands will be managed to develop and maintain resistance to catastrophic events that would detract from the recreational experience. Both uneven- and even-aged silvicultural practices will be used A road system will be visible, but secondary to the natural setting. Livestock use will also be evident.

MA-F17. Stein's Pillar Recreation Area

Emphasis:

Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Stein's Pillar. Provide roadless nonmotorized recreation with opportunities to enjoy nature.

Desired Condition:

The area will be a natural or natural-appearing place with a variety of volcanic plugs, topography, plant communities, and wildlife, where recreationists can enjoy nonmotorized recreation.

Ponderosa pine stands will have large, yellow-bark trees, particularly along the Stein's Pillar Trail. There will be a mosaic of these large-tree, open pine stands interspersed with juniper scab flats and fir stands. Created openings will blend with the natural appearance of the area. Scenic views will be created but management activities will not be evident to the casual observer.

The area will offer scenic views of Stein's Pillar and other volcanic plugs, as well as the Ochoco and Cascade Mountains. Recreationists will enjoy nonmotorized activities, including hiking, picnicking, rockclimbing, sightseeing, horseback riding, and group activities. These activities will mostly be day use.

Nonmotorized recreational opportunities and facilities will be provided. A rustic trail, designed and maintained for family day walks, will access Stein's Pillar. There will be an associated trailhead and access route. The trail system may be extended to the north to tie to the Benefield road. Also, a safe way to the base of the pillars will be constructed to allow easier access for climbers and others. Interpretive facilities will highlight geological, recreational, historical, old-growth, and wildlife features, and the nearby wilderness.

Streamsides will be extremely shady and brushy with an abundance of tall overstory conifer trees and/or shorter hardwoods of alder, willow, and aspen. Streamsides will meet the Riparian Management Area objectives.

Deer and elk may use the area for winter cover, feed, and security. Deer and elk may summer throughout the area. A 300-acre Old Growth Management Area will be available for wildlife, such as the goshawk and pileated woodpecker. Snags will occur naturally, providing habitat for woodpeckers, nuthatches, owls, and other cavity nesters

Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

MA-F18. Hammer Creek Wildlife/Recreation Area

Emphasis:

Provide and maintain habitat diversity for a variety of wildlife species where open road density is minimal. Provide a scenic, semi-natural or natural-appearing setting for nonmotorized recreational opportunities.

Desired Condition:

Forested areas of ponderosa pine will be seen as a wide variety of size/age classes with a major component of large, yellow-barked pine. Mixed conifer areas will be a mosaic of open and closed canopy stands of various size classes to provide an optimum forage and cover mix for big game. Nonforested areas will generally appear natural in character, but with periodic evidence of livestock grazing. Riparian areas will be shady and consist of a mixture of trees and shrubs. Management activities will remain visually subordinate to the characteristic landscape.

Developed facilities such as trailheads, picnic/camp areas, and associated access routes will be evident on the periphery of the unit. Interpretive facilities will be available to highlight historical, recreational, and wildlife features.

Access roads to trailheads will be open. All other roads will be closed to motorized use and rehabilitated after management projects are completed.

MA-F19. Deep Creek Recreation Area

Emphasis:

Provide a near natural setting for recreational pursuits within the area.

Desired Condition:

Forested areas will contain large larch and ponderosa pine. Nonforested areas will generally appear natural in character with little immediate evidence of management activities. The riparian area will

contain abundant alder and other riparian hardwood species.

Dispersed recreational areas will be protected. Opportunities for camping in developed sites will be provided at Deep Creek Campground.

Trails may be developed that provide day hiking or interpretive recreational opportunities.

Management activities, including timber harvest and prescribed burning, will not be evident to the casual observer. Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

MA-F20. Winter Range

Emphasis:

Manage for big game winter range habitat.

Desired Condition:

Big game use on winter range will be the primary activity, with other management activities and human intervention restricted from December 1 to May 1. Habitat effectiveness for big game will improve over time, due to increases in both quality and quantity of thermal cover, and to reductions in open road density. Road and trail use will be limited to one mile of open access per section, from December 1 to May 1, but up to three miles per section will be available during the remainder of the year.

Vegetation cover types, key species condition, big game use, and domestic livestock grazing will be inventoried and mapped. Treatment units will be identified and treatments prescribed on a scheduled basis to maintain key forage and browse species. Treatments will be monitored to assure appropriate forage and browse allocations for big game.

Management, including vegetation manipulation, structures, and prescribed fire to maintain or improve winter range, may be apparent. Livestock use of forage will be conducted in harmony with big game winter range habitat needs.

Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, may be evident along with associated changes in fuel loadings and plant succession, in areas reserved for big game cover.

MA-F21. General Forest Winter Range

Emphasis:

Manage for timber production, with measures taken to maintain habitat effectiveness for big game. Design and implement management activities to recognize big game habitat needs.

Desired Condition:

Big game use on winter range will be the primary activity, with other management activities and human intervention restricted from December 1 to May 1. Habitat effectiveness will slowly decrease in this area, mainly due to future reductions in quality and quantity of thermal cover. This decrease will not be as rapid as in MA-22 General Forest, due to specified road closures and other incidental wildlife improvements. Road and trail use will be limited to one mile of open access per section during December 1 to May 1, but up to three miles per section will be available during the remainder of the year.

Fire occurrence will be visible where lightning and human-caused starts occur and where prescribed fire is applied.

Management activities will take into account vegetation types and successional responses in order to apply prescriptions which have beneficial results for habitat. Areas of particular importance as big game habitat will be identified and management activities modified to complement, protect, or improve habitat. Livestock use of forage will be conducted in harmony with big game winter range habitat needs

Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, may be evident along with associated changes in fuel loadings and plant succession, in areas reserved for big game cover.

MA-F22. General Forest

Emphasis:

Produce timber and forage while meeting the Forest-wide standards and guidelines for all resources. In ponderosa pine stands, management will emphasize production of high-value (quality) timber.

Desired Condition:

Most ponderosa pine stands and some mixed conifer stands on slopes less than 30 percent will exhibit the application of uneven-aged management. Trees up to 20 inches DBH will be seen in these stands, and the evidence of trees managed for high quality lumber (where the first log is relatively free of limbs) will be noted.

Most mixed conifer timber stands, most stands on slopes greater than 30 percent, and some pine stands not suitable for uneven-aged management will be seen as even-aged, with trees uniformly spaced and fully occupying the site, except in seedling and sapling stages. Regenerated stands will generally be 20 to 40 acres in size. A mix of species, with emphasis on the seral species such as pine and larch, will be evident where conditions permit. The largest trees will generally be 18 to 22 inches DBH, but larger ones may be found where left for snag replacements or other resource reasons. Trees will have full crowns and be relatively free of defect. Snags will be apparent over the area with potential snag habitat managed at the 20 percent level for Alternative B-Modified, and at the 40 percent level for Alternative I.

A variety of native grasses, sedges and forbs will be available for grazing animals. Competition from nonforage species such as sagebrush and juniper will not be a major problem. Most of the forested range lands will be in fair and good forage condition class. Forage use will be apparent, and improvements installed to facilitate stock distribution and effective use of available forage will be evident.

Following use for timber haul, local access routes with planned future use will generally be open to high clearance access (maintenance level 2) for Forest visitor and administrative use, unless there are significant reasons to do otherwise. Access routes/trails will be developed to offer a variety of terrain and experience levels for ATV's, and users will be restricted to these areas. Recreational off-road motorized use will be allowed, but users will be encouraged to use designated routes in order to protect Forest resources such as soils and water quality.

Dispersed sites will be scattered throughout the area. These sites will be maintained in as natural a condition as possible.

Fire occurrence will be visible where natural lightning or human-caused starts occur, and where prescribed fire was applied.

MA-F23. North Fork Crooked River Recreation Corridor

Emphasis:

Maintain the appearance of a natural landscape in the foreground view from Road 42. Protect and enhance public use and enjoyment of the river segment.

Desired Condition:

This segment of the North Fork of the Crooked River will be a free-flowing river whose shorelines may be accessible by roads. The immediate river environment (up to one-quarter mile from the river) will appear natural, though there may be evidence of past and ongoing timber harvest and grazing. Developed and dispersed campsites and interpretive signing will be seen throughout the area. The use of prescribed fire may be evident where used to enhance the retention of featured tree species such as old growth ponderosa pine or western larch.

MA-F24. North Fork Crooked River Scenic Corridor

Emphasis:

Maintain and enhance a natural appearing landscape to protect the "scenic river" designation.

Desired Condition:

This segment of the North Fork of the Crooked River will be seen as a free-flowing river whose shoreline is accessed by a road. The immediate river environment (up to one-quarter mile from the river) will have an overall natural appearance, though there may be evidence of past timber harvest. Other management activities will be evident, including dispersed campsites and interpretive signing A low standard trail will be developed that will require wading or rock-to-rock natural crossings. Prescribed burning will be apparent where used to enhance the retention of featured tree species such as large old growth ponderosa pine and western larch.

Several stands have been designated for old growth within the scenic river corridor. Where old growth restrictions are more restrictive than scenic river restrictions, the old growth prescriptions will apply.

MA-F25. U.S. Highway 26 Visual Corridor

Emphasis:

Maintain and enhance the scenery along U.S. Highway 26.

Desired Condition:

The U.S. Highway 26 Corridor will be managed to maintain the big tree appearance; activities will not be evident to the casual Forest visitor. Vegetation will be manipulated in order to provide a variety of size and age classes of timbered stands, including open parklike stands of old growth ponderosa pine, dense shaded stands of mixed conifer, and small openings with planted and natural tree seedlings. Both uneven- and even-aged stand conditions will exist.

An established road system will be in place but will have been designed to minimize the visual effect on the landscape. Prescribed livestock grazing is planned. Pastoral scenes will add to visual variety. Prescriptive grazing will be designed to be in concert with the visual quality objectives of the area.

Wildlife may be viewed in the corridor. This might include big game and a variety of bird species. The effects of fire will be periodically evident, as a result of natural and prescribed burning.

Dispersed recreation sites will be abundant throughout the corridor. Camping will be encouraged, except where restricted for other resource reasons, such as streamside management areas along Mark's Creek. Snowparks for winter recreation will be constructed to blend into the surroundings.

MA-F26. Visual Management Corridors

(This includes all visual management areas outside of other special management areas, e.g. Highway 26, Summit Trail, etc.)

Emphasis:

Maintain the natural-appearing character of the Forest along major travel routes, where management activities are not evident, or are visually subordinate to the surrounding landscape.

Desired Condition:

Prescription Area A

This area will encompass about 86 miles of Forest roads and include approximately 9,300 acres of associated landscape. The outer boundary of the Management Area will generally not exceed 600 feet on each side the road. Retention will be the visual quality objective. Long-term management activities will not be visually evident to the casual observer.

Forest visitors will encounter a diverse landscape which reflects ecosystems where management activities appear as a natural condition.

Vegetation will be manipulated, but will reflect a natural forest setting. Stands of trees will exist in multiple age classes, from young seedlings to mature old growth in both uneven- and even-aged conditions. Unique characteristics of the landscape, such as rock bluffs and aspen clones, will be highlighted, where they are currently hidden from view due to existing vegetation.

Prescription Area B

This area will encompass about 174 miles of Forest roads and include approximately 23,960 acres of associated landscape. The outer boundary of the management area will generally not exceed 600 feet on each side the road. Partial retention will be the visual quality objective. Long-term management activities may be evident but will be visually subordinant to the characteristic landscape. Forest visitors will encounter a near-natural scenic view, with a diverse ecosystem reflecting a low level of management.

Vegetation will appear manipulated. Stands of trees, in multiple age classes in both uneven- and even-aged conditions, will occur in a background of rock outcrops, aspen clones and native grass communities.

Prescription Areas A and B

An established road system will be in place, but will have been designed to minimize the visual effect on the landscape. Grazing by livestock may or may not be visible immediately adjacent to these roads.

As a consequence of visual management, an abundance of wildlife may be viewed in the corridor. This might include big game, a variety of bird species, and fish. The affects of fire will be periodically evident as a result of natural and prescribed burning.

MA-F27. Round Mountain National Recreation Trail

Emphasis:

Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting. Rehabilitate trail sites where management activities conflict with National Recreation Trail objectives.

Desired Condition:

The visitor will note a naturally appearing forest along the majority of the trail route (visual quality objective of retention). The outer boundary of the management area will generally not exceed 600 feet on either side of the trail. The Round Mountain National Recreation Trail will be linked to trails on Lookout Mountain and the access road to the Summit of Round Mountain, as well as to Walton Lake Campground, through appropriate signing. Recreational improvements will be evident in those locations where necessary to protect the land, for public safety, and to enhance the public's enjoyment of the area.

Old growth stands will be seen within the management area. Fire occurrence will be evident where natural lightning and human-caused starts occur. Rehabilitation will be done in areas visually impacted by past management activity.

MA-F28. Facilities

Emphasis:

Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surroundings.

Desired Condition:

Sites will be efficiently designed work areas consistent with type and intensity of use. Employee wellness and public safety will be the primary design criteria. Color and design of structures and facilities will blend with the surrounding environment.

Traffic controls and signing will be designed to provide a safe driving environment. Roads and trails will be planned, designed, operated and maintained to levels sufficient to provide safe use for the intended traveler.

The historical significance of buildings and structures will be considered during any modifications to the site.

Employee residential areas will be designed to meet employee needs.

Management activities, such as timber harvest, thinnings, and fuel treatments for the protection of facilities from wildfire, may be apparent on a short-term basis.

Grassland Management Areas

MA-G1. Antelope Winter Range

Emphasis:
Manage for optimum winter range conditions for antelope.

Desired Condition:
This Management Area will consist of generally open grassland with shrub heights at or below 24 inches, but not over 30 inches in height. Range improvements that facilitate antelope migration will be constructed. Harassment and stress on wildlife caused by motorized vehicle traffic will be reduced.

Fall greenup will be reserved for use by antelope during winter.

MA-G2. Metolius Deer Winter

Emphasis:
Manage for big game winter range habitat.

Desired Condition:
Management in this area will support the Oregon Department of Fish and Wildlife management objectives for the wintering deer population. A 60/40 forage/cover ratio, and a vigorous shrub overstory will be maintained. Private land will be acquired when possible. The implementation of seasonal road closures will reduce harassment and stress on wildlife from motorized traffic. Early season livestock grazing will be used as a vegetative management tool to maintain forage in a palatable condition. Fall greenup will be reserved for deer forage. A management plan for the entire winter range area will be developed in coordination with Oregon Department of Fish and Wildlife.

MA-G3. General Forage

Emphasis:
Manage for forage production and utilization in a manner consistent with general standards and guidelines for other resources.

Desired Condition:
Structural and nonstructural range improvements, prescribed fire to increase the palatability of desirable species, and livestock management will be used to maintain or increase forage production. The natural composition and cover values of native grasses, sedges, forbs and palatable shrubs will be retained. Competition from undesirable forage plants, such as sagebrush and juniper, that decrease range productivity will be reduced. Proper stocking levels and distribution will be employed to effectively utilize forage production without adversely affecting plant communities. Areas planted in crested wheat grass will proceed through natural succession to reestablish native plant species, unless specific resource management objectives can be better met by maintaining certain pastures in crested wheat grass. Aspen clones will be allowed to regenerate. The occurrence and increase of noxious weeds will be prevented. A variety of native and introduced grasses, sedges, and forbs will be provided for grazing animals. Improvements that facilitate stock distribution and the effective use of available forage will be installed.

MA-G4. Research Natural Areas

Emphasis:

These tracts of land are areas where natural processes are maintained for research purposes and education. They will provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species.

Desired Condition:

Natural conditions will be maintained. Any management activities within the RNA's will be directed at maintaining the natural conditions of the area, and these human-caused changes to the ecosystem will not be readily evident. Continuing, nondestructive baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural lightning and human-caused fire starts occur.

If available, the private land on Haystack Butte RNA will be acquired.

MA-G5. Juniper Old Growth

Emphasis:

Provide habitat for wildlife species dependent on old growth stands.

Desired Condition:

The common flicker is the management indicator species. Stands at least 40 acres in size and not more than five miles apart will be maintained. Trees should be large with hollow centers and have broad, irregular-shaped crowns or spike tops. Most of the large trees, both live and dead, should support lichen growth. Cavities should be evident in the trees from either bole splits and/or limbs that have broken away from the tree bole. Some younger trees may be present along with various grasses, forbs, and shrubs. Management activities and roads will generally not be evident. Fire occurrence will be evident where lightning and human-caused starts occur. Grazing by livestock, as well as by big game wildlife species, may be evident.

MA-G6. Crooked River Recreation Area

Emphasis:

Maintain the appearance of a natural landscape to enhance and protect recreational values.

Desired Condition:

The natural and scenic qualities of the river corridor will be preserved, as required by the Wild and Scenic Rivers Act.

A trail system and dispersed campsites will be developed to assist in public enjoyment of the area.

MA-G7. Deschutes River Scenic Corridor

Emphasis:

Manage for scenic quality and natural appearance of the landscape.

Desired Condition:

The natural and scenic qualities of the river corridor will be preserved as required by the Wild and Scenic Rivers Act. A trail system will be developed to provide access to the area. Dispersed campsites will be designated to aid in management of the area.

MA-G8. Squaw Creek

Emphasis:

Provide opportunities for semiprimitive nonmotorized recreation in a pristine canyon setting while protecting and enhancing the deer winter range habitat

fisheries. A 1,370-acre corridor along the creek will be managed for its scenic quality as a "scenic river."

Desired Condition·

A travel management program will restrict vehicle access seasonally, except for administrative and special uses. Private inholdings which facilitate management of the area will be acquired when possible. Recreational use, livestock grazing, prescribed fire and wildfire will occur, but the area will appear natural. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Fire occurrence will be evident where lightning and human-caused starts occur.

A corridor along the creek from the Grassland boundary to the confluence with the Deshutes River has been determined to be suitable for designation as a scenic river under the Wild and Scenic Rivers Act.[1] This corridor will be managed to preserve and, or enhance its natural and scenic qualities.

MA-G9. Riparian

Emphasis:

Maintain riparian habitat, including streambank stability and fish habitat capability, at existing levels where the desired condition is met. On sites where the desired condition is not met, take steps necessary to bring riparian condition to its ecological potential. Allow no activities that will result in a deterioration of water quality in perennial and fish bearing streams.

Desired Condition:

General: On-the-ground work and management changes are needed to improve riparian conditions on approximately 1,250 acres of the Grassland, all but 400 acres have been completed. Remaining work will be completed in the first decade. However,) to 60 years for some of these nction fully as natural systems.

ities include fencing, seeding, tion of physical structures such ck dams, and log weirs. Changes in livestock management are an important part of this strategy. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection or enhancement needs.

Specific projects are shown in the Riparian Improvement Schedule in Appendix A.

Work to restore riparian areas will have been completed, but not all riparian areas will have had time to recover to full biological potential. Many streams that presently flow only seasonally will flow yearround. The potential for overland flows and delivery of sediment to streams from upland areas will have been reduced by construction of improvements such as fences, the development of dispersed water sources, and adjustments in grazing systems. Water quality will be maintained or improved to meet state standards for temperature and turbidity.

Stream Channels: Establish a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation. Sites unable to support a canopy of deciduous species will be characterized by vigorous stands of forbs, grasses, and grasslike riparian species. Although cobble and gravel are often prominent features during the development of riparian stream courses, they become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are rebuilt and stabilized, a narrower, deeper channel will gradually develop.

Springs: Manage springs to maximize water storage and support excellent condition riparian vegetation. These ecosystems should support deciduous vegetation where such vegetation was present in the past At spring sites not associated with deciduous vegetation manage the riparian area to support vegetation associated with excellent condition. These spring areas will not show signs of compaction, channeling, or head cuts.

Wet Meadows: Manage wet meadows to support vegetation associated with excellent conditions such as forbs, grasses, reeds, sedges, and rushes. These areas will not show signs of channeling or gully development of sufficient size to lower the seasonally saturated zone and change the plant community

istrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, the President of the United States Congress has reserved the authority to make final decisions on designation of rivers and Scenic Rivers System

type. These zones should be showing no signs of invasion from nonriparian species such as rabbitbrush, sagebrush, or juniper.

MA-G10. Rimrock Springs Wildlife Area

Emphasis:

Provide unique habitat (wetlands, ponds, springs) within the juniper-sagebrush steppe. Provide for nonconsumptive (viewing, photography) wildlife uses in a natural setting. Improve present habitat conditions and promote habitat diversity.

Desired Condition:

Increased opportunities for wildlife viewing and photography, including a barrier-free interpretive trail and a brochure will be provided Barrier-free toilet facilities will be available at the trailhead. Interpretation of unique cultural resources will preserve early history of the area. Prescribed fire will be used to improve habitat.

MA-G11. Haystack Reservoir

Emphasis:

Provide users with a system of quality facilities that are safe and environmentally sound. Continue to emphasize camping, picnicking, boating, fishing, and swimming.

Desired Condition:

The existing partnerships will be continued and new ones explored to provide for the needs of the recreational users. Bureau of Reclamation (BOR) lands around the reservoir will be acquired to simplify management of the area; BOR would retain ownership and management of the dam. New and upgraded facilities will provide for barrier-free opportunities.

MA-G12. Cove Palisades State Park

Emphasis:

Manage for developed campgrounds and water related recreational activities.

Desired Condition:

The landbase needed by the State to operate a high-quality developed recreational facility on the shores of Lake Billy Chinook will be provided. Other resources within the park boundary will be managed to support this goal.

MA-G13. Lake Billy Chinook View Area

Emphasis:

Maintain the natural appearing character of the viewshed from Lake Billy Chinook, where management activities are not evident or are visually subordinated to the surrounding landscape.

Desired Condition:

The natural and scenic qualities of the management area will be preserved.

MA-G14. Dispersed Recreation

Emphasis:

Provide and maintain a near-natural setting for outdoor recreational experiences.

Desired Condition:

Within the immediate dispersed site, management activities will not be evident to the casual observer. Activities may be evident in areas adjacent to the site, depending on the management prescription applied to them. Primitive, user-constructed structures or facilities, consistent with the sites' use, will be seen. Sites will be managed so that users tend to

feel relatively isolated. A strategy will be developed that encourages individuals or groups to "find their own place." Livestock grazing may be evident, but the successful application of allotment management requirements will also be evident.

MA-G15. Gray Butte Electronic Site

Emphasis:

Manage the site to provide low power output electronic equipment. Limit transmitters to a maximum of 150 watts.

Desired Condition:

All development should meet partial retention from important viewpoints. Minimize interference potential through facility design, location, spacing, capacity and establishment of site-noise floor limits. Meet user needs, and maximize utilization of the site. Three buildings and three towers will be allowed at the site.

MA-G16. Utility Corridors

Emphasis:

Accommodate energy-transmission facilities.

Desired Condition:

Future development will be confined to existing corridors. No windows for future development will be designated Identify exclusion and avoidance areas. Through design and management, the use of lands allocated to power facilities will be optimized. The proliferation of separate rights-of-way will be discouraged to reduce the cumulative environmental impact of linear facilities. The creation of corridors in addition to those currently designated will be discouraged.

Interalternative Comparison of Resource Outputs, Environmental Effects, Activities, and Costs

By comparing the alternatives' response to issues and concerns (Table 2-9), and to outputs and effects (Table 2-8), a relationship between issues and environmental effects may be seen.

Many outputs and effects have been derived from the FORPLAN model described in Appendix B. Other environmental effects are discussed in Chapter 4. The glossary provides definitions and explanations of abbreviations and units of measure.

Economic Values and Responses to Major Issues, Concerns, and Resource Use and Development Opportunities

This section defines indicators that are used to show differences in how alternatives respond to the Issues, Concerns and Opportunities (ICO's). It also discusses indicators that are of central concern to the nation as a whole. Appendix A fully discusses each of these ICO's and the relevance of the re-

sponse indicators. The ICO's with the greatest influence on the alternatives and their associated response indicators follow.

1. **Timber Supply and Forest Management:**

   allowable sale quantity in cubic feet, first and fifth decade;

   allowable sale quantity in board feet, first decade;

   average annual salvage;

   unevenage management acres.

2. **Social and Economic Wants and Needs of Local Communities:**

   Present Net Value (PNV);

   number of Forest-dependent jobs,

   payments to counties.

3. **Livestock Grazing and Allotment Management:**

   Permitted Livestock Use in AUM's, first and fifth decades.

4. **Riparian Area Management:**

   acres of riparian area in excellent condition, first and fifth decades.

5. **Transportation System:**

   miles of primary road, end of first decade.

6. **Big Game Habitat:**

   potential deer population, fifth decade;

   potential elk population, first and fifth decades.

7. **Roadless Areas and Wilderness Study Areas:**

   acres allocated to roadless recreation.

8. **Scenic or Visual Resources:**

   acres allocated with scenic resource emphasis.

9. **Old Growth:**

   acres allocated/dedicated to old growth emphasis.

10. **Fuelwood Supply:**

    annual firewood supply in M acres, first and fifth decades.

11. **Snag Dependent Wildlife:**

    average percent of potential cavity nester habitat, first and fifth decades.

12. **Winter Sports:**

    areas available for winter recreation pursuits.

13. **Anadromous Fish:**

    production of Steelhead smolt (smolt /meter sq.), first and fifth decade.

14. **Historic Trail Preservation:**

    acres allocated for Summit Historic Trail.

15. **Off Road Vehicle (ORV) Use:**

    miles of ATV trail, first and fifth decades.

16. **Round Mountain:**

    area with recreation and scenic resource emphasis, planning period.

Interalternative Comparisons and Major Trade-offs

Introduction

This section summarizes relationships between economic values and the responses of the alternatives to the issues, concerns, and opportunities (ICO's). The purpose is to identify economic and noneconomic comparisons and trade-offs that can be quantified as ICO response indicators. To provide a partial framework for assessing comparisons and trade-offs, the long-term resource demands of the national, regional, and local communities have been

TABLE 2-9
INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO ISSUES, CONCERNS, AND OPPORTUNITIES

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Allowable Sale Quantity (ASQ)							
1st Decade	MMCF	N/A	21 8	20 6	19 0	19 3	15 6
5th Decade	MMCF	N/A	21 8	16 1	19 0	19 3	15 6
1st Decade	MMBF	N/A	130 0	123 0	115 0	115 0	94 0
Average Annual Salvage	MMBF		8	1 5	7	1 4	6
Uneven-Age Mgmt	M Acres	0	120	0	100	0	170
PNV	Million $	380	452	471	475	421	395
Estimated County Receipts	M $'s	Un-known	4 5	5 1	4 9	4 3	3 5
Estimated Change in Jobs	#	Un-known	176	196	118	57	-101
Livestock Use	M AUM's/Yr						
1st Decade		77 5	70 0	79 0	70 0	77 5	73 1
5th Decade		77 5	80 0	79 4	80 0	79 1	74 4
Riparian Areas in Excellent Condition							
1st Decade	M Acres	—	10 0	—	10 0	—	10 0
5th Decade	M Acres	5 4	17 5	9 4	17 5	5 4	17 5
Miles of Primary Road Open and Maintained -End of Planning Period	#Miles	4774	4800	4776	4734	4774	4743
Miles of Roads Closed	#Miles						
1st Decade		694	913	890	1558	694	1520
5th Decade		1734	2123	2082	2185	1734	3224
Deer Population							
5th Decade	#	Un-known	17,210	22,600	22,600	22,600	22,600
Elk Population	#						
1st Decade			3210	3170	3000	3370	3740
5th Decade		Un-known	1700	2780	2620	2690	3700
Acres Allocated-Unroaded 1/	M Acres	29 1	10 7	27 3	38 4	31 2	41 0

Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Scenic Resources							
Preservation	M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70 7	96 8	102 2	155 6
Partial Retention	M Acres						
	71 4	28 1	59 4	32 4	71 4	61 5	
Allocated 2/	M Acres		34 4	46 2	41 7	83 5	101 1
Old Growth (Allocated) 3/	M Acres 32,860		18,740	26,340	19,996	36,970	45,030
Fuelwood Supply	M Cords						
1st Decade		14 0	15 0	13 1	13 0	14 0	12 0
Snag Habitat for Cavity Nesters	% of Potential						
1st Decade		Unknown	43	46	47	46	51
5th Decade		Unknown	33	55	54	52	69
Area Allocated To Recreation Emphasis 4/	Acres		28,630	35,065	58,120	31,950	48,710
Anadromous Steelhead	SHCI 5/ (M Smolt)						
1st Decade		121	121	121	121	121	121
5th Decade		220	220	220	220	220	220
Total Miles of ATV Trails	#Miles						
1st Decade		None	95	0	95	0	95
5th Decade		None	190	0	190	0	190
Round Mountain Recreation Emphasis 6/	Acres	N/A	1,000	0	1,000	0	0

1/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F11, G8)

2/ Total acreage for lands allocated to management areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

3/ Total acreage for lands allocated to management areas with old growth emphasis (D4, F6, G5)

4/ Total acreage for lands allocated to management areas with recreation emphasis (D9, D10, D11, F7, F8, F10, F11, F13, F14, F16, F17, F19, G8, G11, G12, G14)

5/ SHCI: Steelhead Habitat Capability Index, thousands of smolt

6/ Acres on Round Mountain with recreation emphasis (applies to Round Mountain National Recreation Trail)

summarized. Selected economic values and quantified indicators of responsiveness to ICO's are tabulated (Table 2-9). Finally, differences and similarities among individual alternatives are summarized in terms of major trade-offs among competing objectives or responses to expressed issues, management concerns, or resource use and development opportunities. A complete understanding of differences among alternatives requires reading all of Chapters 2 and 4.

National, Regional, and Local Overview

National projections predict demands will rise for all outputs from National Forests (RPA). At the same time, there is also strong demand to protect and enhance environmental quality. Demands and prices for commodity production are generally determined in national and regional markets. Demand for timber from this Forest is high. Most timber sales are competitively bid to prices significantly higher than appraised prices. When national and regional markets are strong, prices are frequently bid upwards of $200 per thousand board feet for ponderosa pine. Demand for livestock forage is also high since the Forest and Grassland are the primary sources of summer forage in this area. All allotments are currently grazed, and the desire to utilize additional forage, or take over any unused allotments, is always high.

Demands for outdoor recreation uses are essentially local or regional. Recreationists on this Forest are predominantly local. The main exceptions are the fall hunting seasons which draw hunters from more populated areas of the state. Total recreational use of the Forest is predicted to rise about 59 percent in the next 50 years (see Tables 3-14 & 3-15, FEIS, Chapter 3).

Forestry Program for Oregon (FPFO)

The Oregon Department of Forestry has developed, in conjunction with the State Board of Forestry, the "Forestry Program for Oregon." The objectives for this program as they relate to the Ochoco National Forest are discussed in detail in Chapter 4 of this FEIS. The preferred alternative (Alternative I) and Alternatives B-Modified, A and E-Departure would all meet the FPFO objectives for the planning period. Chapter 4 of this FEIS discusses the FPFO in more detail.

Summary of Environmental Consequences

Effects on Resources that Vary by Alternative

Oregon State Air Quality Implemtentation Plan

The current Forest and Grassland prescribed fire program is producing 10 to 20 tons/year of total suspended particulates (TSP). This amount varies by alternative. Fugitive dust from construction activities and traffic also occurs.

Cultural Resources

Cultural and archaeological sites will be protected in all alternatives. However, the possibility of damage, vandalism, and discovery of sites will be greater in alternatives that emphasize commodity resources.

Developed Recreation

The Forest maintains 30 developed recreation sites; 96 miles of trail, 15.8 miles of which are designated "National Recreation Trail"; and seven small reservoirs. Alternatives consider the development of additional recreational facilities, including trails, campgrounds and impoundments. The associated recreational activities can result in environmental effects of a local nature, such as vegetation loss, soil compaction, erosion, and conflicts with other resources, such as wildlife, timber harvest activities and grazing of livestock.

Dispersed Recreation

Over 445,000 visitor days of use are received annually, and recreational use continues to increase. This

amount of dispersed recreational use calls for controls on off-road vehicle use to prevent noise pollution, and damage to soil, vegetation, and aesthetics. It also calls for road closures to maintain habitat security for wildlife, to prevent damage to road surfaces, and to prevent conflicts with other resource management activities such as log hauling. The alternatives affect the amount of unroaded area available for semiprimitive and other dispersed recreational activities.

Energy Conservation

Activities on the Forest and Grassland which generally have a positive net energy balance are firewood harvesting and forage production. Generally, all other activities consume more energy than they produce. The average range that energy consumption from planned National Forest activities exceeds energy yields has been estimated to be in the magnitude of three to five billion BTU's per decade.

Fire and Fuels

There are an average 108 wildfire ignitions per year. Prescribed fire is being increasingly used as a management tool. Approximately 15 to 20 thousand acres of slash are treated with prescribed fire annually. Use of fire in management can have effects on soil erosion, short-term appearances, air quality, vegetation productivity, plant community, species composition, and fuels.

Floodplains and Wetlands

Considerations for floodplain management as required by EO 11988, and protection of wetlands, EO 11990, are incorporated into all alternatives.

Human Resource Programs and Civil Rights

The Forest and Grassland will continue to participate in these programs in accordance with laws, administrative opportunities, and economic availability of programs. Minorities and economically disadvantaged groups will not be adversely affected by any of the alternatives.

Landscape Appearance

Emphasis on maintaining scenic quality within road corridors varies by alternative. Significant effects on landscape appearance are related to timber harvest practices; dispersion of cutting units; protection and management of riparian areas; and road location, design, and densities, all of which are related to direction in the management prescriptions in Chapters 4 of the Plans.

Livestock Grazing

Livestock grazing is maintained at nearly current levels for most alternatives considered. Livestock grazing activities, if not carefully managed, can cause soil compaction, impact streamside vegetation, affect water quality of stream habitat for fisheries, compete with wildlife, affect plant community composition and productivity over time, and alter the appearance of natural settings. Water developments and salt intended for livestock also benefit wildlife.

Minerals

There is little real difference in the effects on mineral production or mineral leasing between alternatives. The effects on mining operations and minerals leasing would be reflected in operation plans and lease stipulations, for example, alternatives proposing unroaded area management and research natural areas could result in attachment of no occupancy stipulations to specific leases. Mineral leasing provides returns to local governments in terms of receipts.

Old Growth Habitat

Old growth habitat is identified for protection and management for purposes of wildlife habitat and genetic diversity. The amount and dispersion varies by alternative. Protection of old growth habitat results in reduced timber harvest levels.

Prime Farmlands, Forestlands, and Rangelands

All the alternatives propose actions which are consistent with the intent of the Secretary of Agriculture direction for protecting and managing prime lands.

Research Natural Areas

Research Natural Areas (RNA's) preserve places

for the purpose of research and maintaining genetic diversity. The maximum increase in area proposed for RNA's is 2,630 acres. The designation and protection of RNA's can affect timber harvest level, mineral leasing, road system development and grazing activities. Because of the small acreage involved, these consequences are minimal regardless of alternative.

Riparian

Approximately 800 miles of streamside area, plus wet meadows and lake shores, have been identified on the Forest as riparian area. While only an estimated two percent of the total Forest and Grassland area is considered riparian it receives the most intensive and concentrated use of any land area More than 50 percent of the recreational use occurs there; transportation corridors are located along stream bottoms, grazing in the past has been intense; important wildlife habitats are found there, streamside areas provide productive timber sites; and fisheries habitat is dependent, in part, on the condition of streamside vegetation. Nearly all Forest activities have either direct or indirect effects on riparian areas and water quality. Protection and restoration of riparian areas can impact other activities over the short term.

Roads and Off-Road Vehicles

Over 4,550 miles of roads have been constructed on the Forest and Grassland. Management and maintenance of this transportation system requires closures and restrictions at times to protect road surfaces, other resources, and public safety. Travel planning for on-road and off-road vehicle use has placed more restrictions on vehicles and motorized use of the Forest and Grassland in order to protect resources.

Social and Economic

The Forest and Grassland directly influences a six county area which contains a population of about 110,000. Socio-economic consequences are related to economic stability of communities, livelihoods in terms of numbers and types of jobs, local government revenues, lifestyles, and community cohesion. Alternatives favoring timber and other commodity uses tend to impact livelihoods and lifestyles dependent on amenity values, and vice versa. On this Forest, the production of net cash returns to the U.S. Treasury, levels of employment, and payments to counties are directly dependent upon the level of timber production. These benefits are less under alternatives that place more emphasis on nontimber issues, such as those associated with wilderness and roadless areas, high levels of scenic quality, and vegetative diversity. The benefits associated with minerals are similar for all alternatives.

Threatened and Endangered Species

The only Federally listed species observed on the Forest and Grassland are the peregrine falcon and bald eagle. Neither is a known permanent resident. All Federal and State listed species are protected in all alternatives as provided for in the standards and guidelines in Chapters 4 of the Forest and Grassland Plans or Appendix D of this FEIS.

Formal consultation with the Fish and Wildlife Service (FWS) was initiated through request by the Forest Service in October 1986. The resultant FWS consultation addressed the possible effects of selecting Alternative E-Departure in the DEIS. The consultation was limited to the bald eagle and the peregrine falcon, both federally classified as endangered. The biological opinion of the FWS is that the implementation of Alternative E-Departure in the DEIS would not likely jeopardize the continued existence of the bald eagle and peregrine falcon.

There has been continued informal consultation between the Ochoco National Forest and the FWS since the DEIS. The FEIS incorporates a number of changes that have resulted from both the formal and informal consultation. Among them are the allocation of 570 acres to an Eagle Roosting Management Area (MA-F12) for all the alternatives, specific monitoring requirements for threatened and endangered species and direction to develop site specific management plans for the roosting sites during implementation of the Forest and Grassland Plans.

Timber Management

Timber production and associated management and cultural activities has the greatest influence locally

on jobs and economics of any resource on the Forest. An array of alternatives ranging from 15.6 million cubic feet production per year to 21 8 million cubic feet is examined in the environmental impact statement. The alternatives considered emphasize utilization of appropriate silvicultural systems which may be either even- or uneven-aged depending on field conditions and objectives. Timber management and associated activities such as road construction, reforestation,thinning, harvest, slash disposal, and various site treatments have a wide variety of effects on other resources, particularly soil, water, air, wildlife, fisheries, landscape, recreational experiences, and socio-economics. Practices and management requirements are applied that minimize adverse effects.

Toxic and Hazardous Materials

Activities that may occur on the Forest and Grassland involving the use or disposal of hazardous or toxic materials are required to meet all State and Federal laws and provisions. Therefore, provisions and procedures for dealing with any of these materials are the same for all alternatives.

Unroaded Areas

The areas remaining that have not been designated as wilderness or Wild and Scenic Rivers, totaling 52,880 acres, are treated in the alternatives. The range of alternatives provides for varying degrees of development, or retention of roadless characteristics for semiprimitive recreation.

The most significant conflict of maintaining unroaded areas is with timber production. Approximately 38,430 acres will be managed in an unroaded condition for semiprimitive recreation under the preferred alternative.

Utility and Transportation Corridors

All alternatives recognize State and County road corridors. Utility corridors are also recognized and no alternatives result in any conflict with movement of power or energy throughout the area.

Wild and Scenic Rivers

An inventory conducted by the National Park Service under Public Law 88-29 and Public Law 90-252 identified segments of the Deschutes, Crooked River, and North Fork Crooked River for study and potential classification under the Wild and Scenic Rivers Act. The Oregon Rivers Act of 1988 classified segments of these rivers. All alternatives provide for the protection of the rivers until required planning for their management is complete.

Eligibility and suitability determinations have been made for a portion of the Squaw Creek area. A 7.5 mile segment of the creek, 1,370 acres, from the Grassland boundary to the confluence with the Deschutes River would be managed as a "scenic river." In addition, it would be recommended for inclusion into the Wild and Scenic Rivers System. This would be a preliminary recommendation that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designations of rivers as part of the National Wild and Scenic Rivers System.

Wilderness Establishment

Three wilderness areas totaling 36,200 acres were established under the Oregon Wilderness Act of 1984 on the Ochoco National Forest. A range of options was considered for the Deschutes-Steelhead Falls area which the Oregon Wilderness Act identified for further study. No wilderness is being recommended. A 7840 acre semiprimitive nonmotorized management area is being established which involves part of the WSA, some of the remaining portion is included in the classified Deschutes Scenic River. North Fork Crooked River area is addressed in a separate study by the BLM. The BLM recommended no wilderness in their draft EIS for this area.

Wildlife

Important game species habitat, namely deer and elk, is afforded some degree of protection in all alternatives, but its management is emphasized in certain ones. Snag and old growth forest habitat is provided at varying levels throughout a range of alternatives. Fish habitat protection is related to those alternatives emphasizing management of riparian areas. Management activities and uses on the

Forest and Grassland directly and indirectly affect wildlife and fisheries habitat. Road construction, timber harvest, timber cultural practices, livestock grazing, recreational uses, prescribed fire, and firewood cutting are common activities on the Forest and Grassland which can affect wildlife and fisheries habitat. Alternatives, management requirements, standards and guidelines, and project design all incorporate means to minimize impacts on wildlife and their habitat.

Probable Adverse Environmental Effects that Cannot be Avoided

1. Soil displacement or erosion can be expected to result from planned management activities, such as vegetation removal, slash disposal, log skidding, prescribed fire, construction and maintenance of roads, trails, transmission facilities, recreation sites and others. Soil productivity would be maintained except for sites dedicated to roads, skid trails, log landings, recreation sites, and other facilities or uses that may compact the soil, alter the soil profile, or deplete nutrients. An estimated one percent of the Forest and Grassland area would be occupied by roads or facilities. Experience has shown that temporary road surfaces can be re-vegetated, but the productivity is reduced. Forest-wide, an estimated 10 percent of cable-logged areas and 30 percent of tractor logged areas would experience increases in soil bulk densities or compaction. These factors, in turn, have indirect effects relating to reduced wildlife habitat, vegetation productivity, occurrence and spread of noxious weeds, and increases in stream sedimentation.

2. Prescribed fire use may be expected to contribute to total suspended particulates (TSP) in the atmosphere, to periodic increases in haze, and reduced visibility.

3. The natural appearance of the landscape and forest would change over time, with the natural and characteristic features as they exist today giving way to more domination in places by management activities and results of management.

4. Forest vegetation would be altered in respect to species composition, stand structure, and age. Existing mature forest "suitable" lands would be subject to management treatments. Where feasible, mixed conifer stands would be replaced with currently more economically or silviculturally desirable species (primarily ponderosa pine). Other management treatments include overstory removal of old growth ponderosa pine from multistoried stands, resulting in a reduction in basal area, and removal of less desirable species within densely forested areas by thinnings. Intensively managed or regulated forests may provide less habitat for species dependent on old growth forest, snags and down material, and provide less scenic settings, species diversity, and habitat diversity.

5. Average size of trees that are harvested would change over time to smaller material as old growth and existing mature forest is converted to younger stands. This would have an affect on types of harvest equipment and wood processing, and machinery and manufacturing requirements; and likely will bring a shift towards cubic feet management rather than board feet.

6. Approximately 93,110 acres on the Forest and Grassland remain roadless. With the exception of 36,200 acres designated as wilderness, 4,030 acres designated as wild and scenic rivers, and 52,880 acres remaining available, opportunities for semiprimitive recreation may decrease over time.

7. Increased road densities, improvement in access, subsequent increases in human presence, and continuing expansion of management activities can result in reduction of wildlife habitat security, harassment of wildlife, increased road kills, physiological stress in wildlife species resulting in altered behavior and productivity, and changes in hunter attitudes and experiences over time. The preferred alternative provides for road management closures and restrictions which would reduce open road density over the next five decades.

8. Actions to improve riparian conditions may result in increased costs to grazing management, e.g., installation of improvements (fencing and water developments), herding, transport to control stock distribution and use, and possible temporary reductions in animal unit months.

9. Current procedures cannot insure that all cultural resource sites will be located. Some sites could be inadvertently destroyed or damaged. Such impacts are unavoidable pending advances in inventory techniques

10. Forest users could encounter more controls and restrictions over time as management intensity, resource competition, and human populations increase.

Short-term Uses of the Environment and Maintenance of Long-term Productivity

From a perspective that each generation is trustee of the environment for succeeding generations, an objective of the Plans is to provide for the proper and continued development of resources in a manner that maintains economic viability, yet maintains local natural heritages, such as, wildlife habitat, outdoor recreation opportunities, water quality, scenic qualities, and livestock grazing. The preferred alternative emphasizes a balanced mix of uses and intensive commodity (timber, range) production on suitable places in order to help provide economic stability, but also attempts to provide for the protection of other resources (soil, water, wildlife habitat, aesthetics).

While the Plans involve harvest of mature timber, sustaining or improving long-term productivity is planned for through intensive forest management practices (e.g. reforestation and thinnings). This may result in future utilization of smaller trees to maintain harvest levels over time. Lands were identified as "unsuitable" for sustained yield timber management due to regeneration difficulties. Dispersion of timber harvest activity, retention of old growth, and protection of riparian areas and big game habitat have all been planned to prevent impairment of long-term land and resource productivity.

Construction of roads, mechanical slash piling, and log skidding are short-term uses that can reduce long-term vegetation productivity.

Increases in road densities, improvement in access, subsequent increases in human presence, and continuing management activities have the potential in the near future to create effects that will affect long-term productivity of wildlife habitats, aquatic systems, and local socio-economic aspects.

Irreversible or Irretrievable Commitment of Resources

This plan deals with both developed and undeveloped or roadless lands. Lands where road systems, plantations, thinnings, and structures are established represent a type of economic commitment that commits the land to those activities. These investments represent "sunk funds" from an economic standpoint and are not retrievable, nor do they necessarily have any "liquidity," over the planning period.

The specific acres, estimated to be one percent of the total Forest and Grassland area, upon which roads and facilities are constructed represent a loss of soil/vegetation productivity and unaltered landscape.

Use of rock for road surfacing and construction purposes, estimated to be 200,000 tons annually on the Forest and Grassland, is an irreversible and irretrievable commitment of a resource, but is not considered critical because of the abundance of good quality rock in this locale.

Undeveloped and roadless areas once allocated for development will, within a relatively short time, become irretrievably unsuited for wilderness classification. In the case of lands already intensively developed by roading, a high degree of irreversibility exists; whereas, in the case of undeveloped lands, frequently a wide range of management options exists.

Dasmann, et. al., in *Ecological Principles for Economic Development,* 1973 (pp 22-23), recognized six

broad development levels for lands, each representing progressively greater commitment of resources. The development levels are:

1. The land can be left in a completely natural state and reserved for scientific study, educational use, wilderness, watershed protection, and its contribution to landscape stability.
2. It can be used as a park, refuge, or reserve with the natural scene remaining largely undisturbed to serve as a setting for outdoor recreation and an attraction to tourism.
3. It can be used for limited harvest of its wild vegetation or animal life, but maintained for the most part in a wild state - serving to maintain landscape stability, support certain kinds of scientific or educational uses, provide for some recreation and tourism, and yield certain commodities from its wild populations.
4. It can be used for more intensive utilization of its wild products as in forest production, pasture for domestic stock (recreation), or intensive wildlife production. In this case, its value as a "wild" area for scientific study diminishes, but it gains usefulness for other kinds of scientific and educational uses. Its value for (some) tourism and outdoor recreation diminishes, but is not necessarily lost. Its role in landscape and watershed stability is changed, but may be maintained at a relatively high level.
5. The wild vegetation and animal life having been removed in part, it can be intensively utilized for the cultivation of planted tree crops, pastures, or farming crops.
6. The wild vegetation and animal life having been almost completely removed, it can be used for intensive urban, industrial, or transportation purposes.

So long as any of the first three choices are taken, the option remains open to change to any of the others. In the fourth choice, the options for restoring the land to any of the first three levels are reduced, but not eliminated. Lands allocated to development are likely to approach the fifth and sixth level over time. This would largely prohibit any shift to other alternatives on those acres.

For Alternative I, with the resource allocations proposed herein, 19 percent of the lands are committed to categories of "low" or "moderate" irreversibility; about 80 percent of the land that is proposed for intensive timber culture, transportation systems, special uses, and rangeland management can be categorized as "moderately high." Another one percent would be considered "high" irreversibility of irretrievability for commitment of resources (Table S-10, FEIS Summary).

Timber Supply and Forest Management

Comparison of Past, Present and Alternative Timber Harvest Levels

The potential yield (PY) under the current timber management plan is the total harvest level that could be sustained assuming intensive forestry practices on all available acres. This includes adjustments to meet multiple resource objectives. This was calculated to be 20.86 MMCF (139.5 MMBF) and adjusted to 20.4 MMCF (136.5 MMBF) in 1984, as a result of the Oregon Wilderness Bill. A similar value was not calculated for the alternatives. It would be equivalent to a maximum timber FORPLAN run for each alternative if unsuitable [1/] acres were included in the available acreage base.

The programmed allowable harvest under the current timber management plan is that part of the potential yield scheduled for harvest in a specific year (see Table 2-10). It was calculated for the current plan by: (1) reducing the acreage base by the acres of marginal land [1/] that we did not plan to treat, and (2) by reducing yields based on difference in acres of intensive management (planting of genetically improved stock and precommercial thinning) predicted under the potential yield and what was actually planned to be accomplished. (This process was known as the "earned harvest effect" (EHE)). This could be adjusted annually if there was signifi-

[1/] The current plan did not have a category called "unsuitable" so there was no reduction in available land base for lands that could not be reforested It did have a category called "marginal" which included steep slopes and critical soils, and stagnated submerchantable lodgepole Some harvesting was programmed from these lands but it was a separate component and could not be substituted for "standard" volume or vice versa

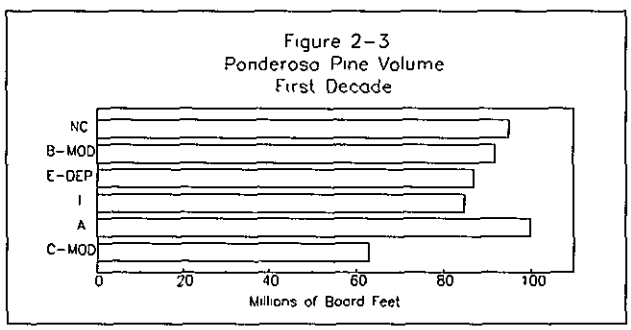
cant change in acres of intensive management practices or in marginal land treated from what was programmed. This was originally calculated to be 19.86 MMCF (132.7 MMBF) and was adjusted in 1984 to 19.46 MMCF (129.8 MMBF). This is equivalent to the Allowable Sale Quantity (ASQ) plus the salvage volume.

Table 2-10 displays the past actual sold and cut volume, planned harvest level from the existing plan, and range of harvest levels for each alternative. The range of harvest levels shown shows the highest and lowest predicted harvest level in board feet for the first decade. All volumes are average annual figures for a particular decade. This table also displays the estimated volume of ponderosa pine for this same period. Additional timber resource information by alternative and benchmark is also presented in Table 2-11.

The local industry is most interested in the ponderosa pine volume, and it has the greatest impact on the local economy, since much of the pine lumber is remanufactured to molding and other products locally. It is estimated that the sell volume has included 90 to 100 MMBF of pine in recent years. The current inventory shows 67 percent of the total volume is in ponderosa pine (see Appendix E). So the pine harvest in all alternatives will be 67 plus or minus five percent of the total harvest volume. However, the actual pine volume scheduled for harvest will vary considerably by alternative during the next five decades.

Effects of the Alternatives on the Ponderosa Pine Harvest

The range of ponderosa pine volume by alternative is displayed in Figure 2-3.



Alternative A has the highest volume of pine during the first decade due to the large proportion of harvesting in the first decade in two-story pine types. The volume decreases by about 30 MMBF after the first decade and remains at a relatively low level for the next four decades.

Alternative B-Modified would provide about 85 MMBF of pine during the first decade. Alternative B-Modified would maintain the highest level of pine during the first five decades of all the alternatives.

Alternative E-Departure has a first decade volume of 87 MMBF and declines to an estimated 52 MMBF in the fourth decade.

Alternative C-Modified would provide about 63 MMBF in the first decade, remaining constant through the fifth decade.

The pine volume in the long term (decades six and beyond) depends on harvest level and intensity of management. Alternative I provides for a stabilization of the ponderosa pine harvest over time, as does the other alternatives.

Uneven-aged Management

Uneven-aged management has been included in Alternatives B-Modified, C-Modified and I. This silvicultural system was included in these alternatives in response to public interest in its application as an alternative to clearcutting. Expectations would be increased size of ponderosa pine crop trees (20 inch DBH), improved conditions of forested habitat for wildlife and more desirable scenic qualities.

The range of acreage of ponderosa pine which would be managed with uneven-aged silvicultural systems is shown in Table 2-9 and Figure 2-4.

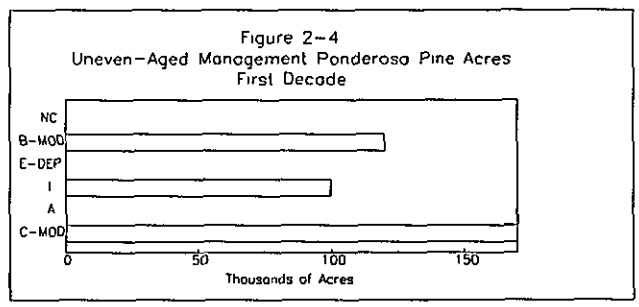


TABLE 2-10
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS 1/
(First Decade Volumes in MMBF)

TIMBER OUTPUT *COMPONENT*	ACTUAL *1979-88 Annual Ave.*		EXISTING *1990 TM Plan*	ALTERNATIVES PLANNED VOLUME BY ALTERNATIVE FOR FIRST DECADE					
	Sold	Cut	P.A.H 2/	NC	B MOD	E DEP	I	A	C-MOD
SAWTIMBER (Chargeable)									
Green sales (ASQ)3/	136 9	111 6	127 1	127 1	130	123	115	115	94
Est. pine volume 4/	109 1	87 5	95	95	85	87	85	79	65
Salvage sales	include	above	2 7	2 7	4	5	4	4	3
SALVAGE SALES & SAWTIMBER (Est. percent change in next five decades) 6/	136 9 5/	111 6	129 8	129 8	134 (-7)	128 (-30)	119 (-10)	119 (-10)	97 (-10)
SAWTIMBER (Nonchargeable) negligable in existing or planned program	0	0	0	0	0	0	0	0	0
SUBMERCHANTABLE (Post, poles, cull)	1 3	1 3	Unestimated in existing or planned progam						
CONVERTIBLE PRODUCTS Firewood 7/	2 7	2.7	unestimated	unesti-mated	7	7	6	7	6
TOTAL (TSPQ)	138 2	110 1			141	135	125	126	103

1/ Note that due to different bases for calculation, these figures may not be directly comparable However, they may be used to show changes in specific comonents for calculations, over time All calculations were done in cubic feet. The volumes in this table are estimates based on board foot/cubic foot ratio

2/ Yield of timber projected for the period of 1980 to 1989, as calculated for the 1980 Timber Management Plan and adjusted for 1984 Oregon Wilderness Bill The Programmed Allowable Harvest (P.A.H.) is the sawtimber from green and salvage sales scheduled for harvest.

3/ Allowable sale quantity calculated for the current land and resource management plan direction, projected into the future using new scientific information, such as yield tables and suitability for timber harvest, and using FORPLAN analysis model

4/ Estimated volume of ponderosa pine that is included in green sale volume

5/ Average volume sold was not adjusted for "buy-back" volume

6/ Reduction in all but E DEP is due to change in BF/CF ratio and estimated reduction in salvage volume as more stands become managed Change in E DEP is mostly due to *the planned departure from even-flow*

7/ Actual firewood volume is based on years 1985 to 1988 Essentially all of this was sold as personal use Planned volume is the estimated amount if firewood available Typically less than half of this will be utilized

TABLE 2-11
Timber Resource Management Information by Benchmark and Alternative

		Inventory			First Decade Average Annual ASQ			LTSYC			Average Annual Net Growth		
Benchmark or Alternative 1/	Selected Suitable Lands (M Acres)	Begin (MMCF)	Begin/Acre (CF)	End (MMCF)	(MMCF)	% of Col (2)	(MMBF)	(MMCF)	% of Decade Col (4)	Met	CF/Acre Present	CF/Acre 2030	2030 MMCF
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Benchmark													
Max Timber	518	1152	2 2	730	23 4	2 0	142	23 4	3 2	2	27	43	22 3
Max PNV	518	1147	2 2	762	22 7	2 0	139	22 7	3 0	1	30	39	20 1
Alternative													
NC	534 2/	N/A	N/A	N/A	N/A	N/A	N/A	31 1	N/A	N/A	25	N/A	N/A
B-MOD	511	1115	2.2	799	21 8	2 0	130	21 8	2 7	1	22	41	20 9
E-DEP	495	984	2 0	760	20 6	2 1	123	19 3	2 5	1	26	35	17 4
I-Preferred	494	990	1 9	782	19 0	1 9	115	19 0	2 4	1	28	37	18 2
A	489	970	2 0	740	19 3	2.0	115	19 5	2 6	2	24	39	19 2
C MOD	459	895	1 9	751	15 6	1 7	94	15 6	2 1	1	30	28	13 4

	Area and % of Suitable Land by Yield Level						First Decade				
	Full Yield		50-90% Yield		Under 50% Yield						
Benchmark or Alternative 1/	M Acres	% Col (1)	M Acres	% Col (1)	M Acres	% Col (1)	Clearcut M Acres	Shelter-woodM Acres	Overstory Removal M Acres	Selection M Acres	Harvest Total % Col (1)
Column	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Benchmark											
Max Timber	506	98	12	2	0	0	22	45	64	3	26
Max PNV	506	98	12	2	0	0	13	17	88	25	28
Alternative											
NC	413	77	89	17	32	6	0	119	64	0	34
B-MOD	484	95	27	5	0	0	25	50	21	68	32
E-DEP	0	0	495	100	0	0	14	26	113	4	32
I Preferred	0	0	492	99	2	1	9	21	53	62	29
A	0	0	489	100	0	0	19	18	106	1	29
C MOD	0	0	459	100	0	0	15	4	32	96	32

1/ Tentatively suitable land for all alternatives is 533 M Acres

2/ This is based on 1972 land classification system and adjusted for Amendment #1 of the Timber Plan

Social and Economic Wants and Needs of Local Communities

This section compares and discusses the economic consequences of the alternatives. The comparisons focus on present net value (PNV), market and nonmarket values, costs, net receipts, returns to treasury, and non-cash benefits. Each alternative has non-quantifiable benefits and costs which should also be considered when attempting to rank the alternatives in terms of net public benefits. This section also discusses the social effects of the alternatives. Appendix B provides additional discussion on social and economic evaluations of the alternatives.

Differences in Present Net Values

Present net value (PNV) is the primary quantitative measure of economic efficiency used for all benchmarks and alternatives. It is also an important measure of the dollar value of the alternatives. PNV has been calculated to be the sum of all market and nonmarket priced values, less all management costs for the 50-year planning horizon, discounted to present values using a four percent interest rate. The relationship between PNV and net public benefits is discussed on pages 2-3 through 2-4 in this chapter.

The Max PNV benchmark and six alternatives are ranked by decreasing PNV in Table 2-12. Table 2-14 provides further detail on discounted costs and benefits by resource group. The Max PNV benchmark is provided as a reference point only. It is an estimate of the discounted net economic returns the Forest could receive for its priced resources if they were managed solely to maximize present net value.

The main factor influencing patterns in PNV, benefits, and costs is timber management. Timber values represent from 53 percent to 65 percent of the total dollar values in the alternatives. Values produced from selling timber are, in general, far in excess of related costs As timber harvest levels decrease across alternatives, discounted costs and benefits, PNV usually decrease as well. This pattern is due mainly to non-timber resource objectives restricting timber practices and harvests. Although recreation related benefits (including hunting and fishing) do make up a significant portion of the total dollar benefits (28% to 41%), increases in these dollar benefits do not make up for the PNV lost from timber. Therefore, the greater the non-timber resource objectives, the lower the timber discounted benefits and costs, and PNV.

This general pattern is modified by the intensity of the timber management activities employed. Some alternatives schedule timber practices and harvests at the most economically efficient level, given other resource objectives (Alternatives C-Modified, I, and E-Departure). Other alternatives apply more intensive timber practices to achieve the highest timber volumes possible, given other resource objectives (Alternatives A, B-Modified, and NC). This results in higher timber benefits, but also higher costs and lowered PNV. In each of these two groups of alternatives the general pattern discussed above holds. The exact combination of non-timber resource objectives and timber management intensity determines the ranking in PNV of these two groups together.

The PNV of the NC Alternative is an estimate. It is also based on a programmed harvest level of 129 MMBF. If the estimate was based on the potential yield of 136.5 MMBF, the PNV would be significantly higher.

The Forest and Grassland are considered to have potential energy resources. However, very little testing and development has taken place to date. No estimates have been made of future extractions, so energy values were not included in the economic analysis. However, oil and gas leasing provides significant returns to the Treasury and to counties. The alternatives have little effect on mineral activities.

Differences in Costs

Capital investment costs include trails, roads, reforestation, timber stand improvement, prescribed burning, and physical structures for range, recreation, fish, and wildlife. Other costs include operating and maintaining facilities, program management, and support costs associated with management of

other resources. Capital investment costs pertain mostly to roads and timber stand management. For example, 76 percent (Alternative C-Mod) to 95 percent (Alternative A) of capital investment costs are associated with road construction and timber management. The majority of operation and maintenance costs are program management, followed by support funds necessary to carry out timber programs.

Because most costs are associated with timber management, the higher the timber output, the higher the costs. Generally, capital investment costs decrease significantly over time due to declining road construction and timber stand improvement practices. Operation and maintenance costs remain fairly constant over time except for alternative E-departure's where timber volume declines over time.

Fixed costs represent a relatively small portion of the total costs (20% to 30%). The remainder of the cost for each alternative varies with the objectives of the alternative.

Costs associated with timber practices and harvests constitute a large portion of the total costs. Alternative B-Modified has the highest cost of any alternative and only 29 percent of the discounted cost is directly attributed to resources other than timber and roads. Road construction and reconstruction is almost entirely tied to timber harvests on this Forest. Alternative C-Modified has the lowest cost of any alternative and the highest benefits associated with amenity outputs, yet only 35 percent of the costs can be attributed to resources other than timber.

Differences in Economic Benefits and Cash Flows

The total economic benefits of the alternatives come from priced resources which include both "market" outputs, and those with "assigned" values. Market values represent the unit price of an output that is normally exchanged in a market. On this Forest, timber is the primary market output, accounting for over 90 percent of the market outputs and 50 percent to 65 percent of the total economic benefits of the alternatives. Other market outputs include livestock grazing, campground use, special use permits, and minerals leasing. Assigned values represent the unit price of an output not normally exchanged in a market. Various analytical techniques were used to estimate values that people would be willing to pay for these benefits. Outputs with assigned values include dispersed recreation, wilderness use, hunting, fishing, and water quality improvement. Hunting and fishing are the major assigned values, comprising from 16 to 26 percent of the total economic benefits. The remaining 18 to 24 percent is split in different proportions, depending on the alternative, among livestock grazing, developed recreational use, dispersed roaded recreational use, and dispersed non-roaded recreational use.

Total market values range from 62 percent (Alternative C-Modified) to 70 percent (Alternative B-Modified) of the total economic benefits. Alternatives in the high end of this fairly narrow range have relatively high timber benefits and/or relatively lower fish, wildlife, or recreational values. The opposite is true for alternatives in the low end of the range.

Cash receipts are revenues returned to the Forest and Grassland for stumpage, grazing permits, campground fees, leasable minerals, and special use permits. However, the Forest generates economic benefits to users which are not realized in terms of cash flows. These are referred to as "noncash benefits." They refer to the benefits individual resource users receive when they are charged less for the resource than they would be willing to pay, or current market prices indicate they should pay. Noncash benefits are the difference between the full economic value of the resource and the fees actually paid to use that resource. Table 2-13 displays the relationships between total receipts, total budget costs, net receipts, and noncash benefits for each alternative in order of decreasing net receipts. All alternatives receive more money than they spend (net receipts are positive). Fish and wildlife provide the most noncash benefits in all alternatives, followed by recreation, then range. Timber provides nearly all of the cash receipts.

Generally the proportion noncash benefits contribute to total economic benefits increases as net receipts decrease. The decrease in net receipts as

TABLE 2-12

PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES

(Million Dollars)

(Ranked by Decreasing PNV)

Alternative/ Benchmark	Present Net Value	Change	Discounted Costs	Change	Discounted Benefits	Change
Max PNV *Benchmark 7*	512		241		754	
Alternative I	475	-37	227	-14	701	-53
Alternative E-Dep	471	-4	221	-6	693	-8
Alternative B-Mod	452	-19	262	+41	714	+21
Alternative A	421	-31	236	-26	657	-57
Alternative C-MOD	395	-26	213	-23	608	-49
No Change	380	-15	245	+32	653	+45

TABLE 2-13

FIRST AND FIFTH DECADE AVERAGE ANNUAL CASH FLOWS 1/ AND NONCASH BENEFITS BY ALTERNATIVE

(Million Dollars)

(Alternatives Are Ranked in Order of Decreasing Net Receipts)

	ALTERNATIVES					
	I	E-Dep	NC	B-Mod	A	C-MOD
DECADE 1 Total Receipts	19 4	20 2	20 2	17 9	17 2	14 0
Total Costs	12 0	12 8	13 1	14.5	13 0	11 4
Net Receipts	7 4	7 4	7 1	3 5	4 2	2 6
Non-cash Benefits to Users	10 8	10 9	10 3	10 7	10 5	11 0
DECADE 5 Total Receipts	21 5	18 4	18 7	25 3	20 2	18 7
Total Costs	10 9	9 5	10 9	12 4	10 7	10 0
Net Receipts	10 5	8 9	7 8	12 8	9 5	8 7
Non-cash Benefits to Users	13 6	13 2	11 6	12 5	12 5	14 3

1/ Payments to counties and expenditures by cooperators are excluded

TABLE 2-14
DISCOUNTED BENEFITS AND COSTS BY RESOURCE GROUPS
(Millions of Dollars) 1/

	ALTERNATIVES (Ranked by Decreasing PNV)					
	I	E Dep	B-Mod	A	C-MOD	NC
PNV	475	471	452	421	385	380
DISCOUNTED PRICED BENEFITS BY RESOURCE						
Timber	422.6	415.9	446 1	392.4	322.4	413
Developed & Dispersed Recreation	84 8	85 1	76 7	75 7	86 4	72 3
Fish & Wildlife	154 8	152 1	151 0	149 7	161 5	103
Range	20 5	20 5	20 8	20 2	19 1	18 6
Minerals	19 0	19 0	19 0	19 0	19 0	18 2
DISCOUNTED COSTS BY MAJOR CATEGORIES						
Timber	49 6	50 7	70 1	64 8	41 1	69
Roads	86 2	82 8	95 7	84 0	80 5	87
Developed & Dispersed Recreation	11 7	8 2	11 3	5 2	12.7	5 1
Fish & Wildlife	6 9	6 9	7 4	5 7	9 4	6
Range	8 1	8 3	8 3	7 9	7 5	9
Other 2/	59 4	59 9	63 5	63 7	57 7	55
Soil & Water	4 8	4 7	5 1	4 6	4 4	4

1/ Direct comparisons of benefits and costs by individual resource provide broad indications of specific relationships, but they may be misleading because many costs are nonseparable under multiple-use management

2/ These costs include general administration, cultural resources, lands and minerals, human resources, and protection

noncash benefits increase is a result of more land and resources being allocated to producing noncash benefits, thus lessening the resources available to produce cash receipts.

Table 2-13 (decade one) as compared to Table 2-12 shows that alternatives with higher net receipts in decade one generally have higher PNV's. This trend holds true in all but one case.

This case involves Alternative NC In Table 2-12, Alternative NC has the lowest PNV, but in Table 2-13 it has the third highest net receipts. The cause of this is two-fold: first, it has the lowest non-cash benefits of all the alternatives, and secondly, Alternative NC is different from the other alternatives in that it does not ensure meeting all management requirements. This allows more of the higher value ponderosa pine stands to be harvested in decade one. However, to satisfy particular harvest scheduling requirements, cash receipts drop off dramatically after the first decade. Table 2-13 shows that the net receipts for Alternative NC drop in rank from third in the first decade, to last in the fifth decade. Alternative NC also harvests timber at levels beyond that which is efficient in order to meet current sale levels. This results in higher total receipts, but also higher costs resulting in lower PNV's. As a result, Alternative NC has relatively high net receipts in decade one, but a relatively low PNV.

When decade five from Table 2-13 is compared with Table 2-12, the relationship between net receipts and PNV's is not as strong as it was for the first decade. The ranking of alternatives from highest net receipts to lowest net receipts shows the same changes from decade one to decade five. Alternatives E-Departure and NC have higher net receipts in the first decade than in later decades, while Alternative B is ranked higher by net receipts in decade five than in decade one. Because of the PNV discounting computations, high returns in early decades will affect the PNV more than high returns in later decades. The exception is NC, because the drop in net receipts is so sharp the net receipts in decades two to five outweigh the high first decade receipts, thus lowering the PNV.

Comparing the first and the fifth decades in Table 2-13, all alternatives show an increase in net receipts. The major factor is a decrease in costs because much less road building is necessary in the fifth decade. Also, real stumpage prices increase over time.

Noncash benefits for all alternatives increase from decade one to decade five. Part of this increase is a result of a projected increase in recreation demand. The rest of the increase can be attributed to habitat management for big game and fish. The time lag between habitat improvement and an increase in hunting and fishing causes benefits to show up most dramatically in future decades. The percent increase between decades one and five in noncash benefits ranges from 13 percent in the high commodity alternatives, to 28 percent in Alternative C, an amenity oriented alternative.

Social Effects

Direct Effects

The direct effects of the alternatives include the following:

Employment levels produced by the alternative's mix of outputs (see Table 2-15);

The amount of the Forest budget;

The amount of 25 percent monies paid to the counties.

Indirect Effects

The previously mentioned effects of the various alternatives would produce effects on the social fabric of the area as follows.

Effects on Occupational Lifestyles

For loggers and sawmill workers, Alternative B-Modified would increase employment by 44 jobs, which is around four percent of total logging and sawmill employment. Alternatives A, I, and E-Departure would produce increase of 14, 15, and 28 jobs respectively.

For workers in remanufacturing operations, the changes range from a three percent employment

TABLE 2-15
CHANGES IN EMPLOYMENT FOR VARIOUS ECONOMIC SECTORS BY ALTERNATIVE
(# of Jobs - First Decade)

	ALTERNATIVES				
Economic Sector	B-MOD	E-DEP	I Preferred	A	C-MOD
Logging	14	10	5	5	-7
Sawmills	25	18	10	9	-14
Remanufacturing	35	30	8	3	-55
Range-fed Livestock	1	1	1	1	0
Retail Trade Produced by Wood Products Industries and 25% Monies	31	16	6	3	-22
Produced by Recreation	21	49	45	18	51
Other Sectors	64	73	43	19	-53
Total All Sectors	176	196	118	57	-101

gain (Alternative B-Modified) to a three percent loss (Alternative C-Modified). None of these changes is considered to be significant. However, the remanufacturing industry will be affected by the Forest Plans of several Forests. This matter is discussed in the Cumulative Effects section in Chapter 4 of this FEIS.

Merchants benefit from any alternative. The smallest gain, 21 jobs, is in Alternative A; the largest gain, 65 jobs, occurs in Alternative E-Departure. Small town merchants hire a smaller proportion of employees than do other business. Therefore, these figures are considered to understate the gains to the merchants. When these merchants do hire employees, they often work part time and for low wages. These jobs are often taken by women. Often these jobs provide a secondary income for a family.

Effects on Leisure Lifestyles

Alternative C-Modified would provide for the most recreational activities. Elk and fish are at the highest levels of any of the alternatives, as are opportunities for roadless recreation. Landscapes appear most natural to the driver or hiker. Fuelwood gathering is the one activity which is at its lowest.

At the other end of the scale, Alternative A provides, in general, the least recreational opportunities. Roadless areas and fish are at the lowest levels. Unlike the other alternatives, there is no construction of trails for hiking, ATV's, cross-country skiing, or snowmobiling.

Generally speaking, Alternative B-Modified provides the next lowest level of recreational opportunities. Roadless areas and elk are low. The scenery is the lowest of all the alternatives. However, fuelwood is at its highest; and trail construction and increased numbers of fish improve the picture.

Alternatives E-Departure and I provide an intermediate situation. Alternative I provides more roadless areas, trails, and fish; while Alternative E-Departure offers slightly more elk plus a provision for a semiprimitive motorized area.

Effects on Social Structure· Community Cohesion and Stability

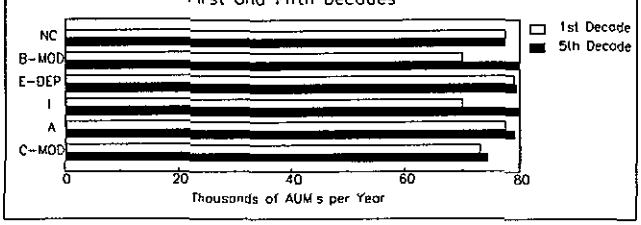
"Community Cohesion" is an estimation of whether a given alternative will tend to unify or polarize a community. While a diversity of opinions in a community is generally desirable, it is assumed that polarization of the community is harmful and that cohesion is beneficial. It is further assumed that polarization will be caused by the adoption of an alternative which greatly favors one point of view over others. In contrast, the selection of an alternative that meets to some extent the desires of diverse participants is assumed to produce cohesion.

Judging by this criterion, Alternatives B-Modified and C-Modified would produce polarization. The public response to E-Departure, the Draft Preferred Alternative, included many negative comments about its "departure" harvest schedule Under Alternative A, existing polarization would not diminish. Alternative I is the one alternative judged likely to promote some degree of community cohesion.

Livestock Grazing and Allotment Management

Alternatives E-Departure, I and B-Modified all seek to increase the forage available over time. Alternative B-Modified is the most aggressive of the three in its emphasis on forage production. Alternative C-Modified emphasizes amenities over commodity resource use and accordingly shows the lowest forage production for livestock. Alternatives NC and A maintain about the current level of forage production over time.

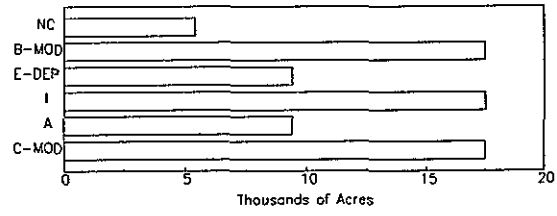
Figure 2–5
Livestock Use
First and Fifth Decades



Riparian Area Management

All alternatives show some progress toward meeting the public and management concerns over livestock impacts to riparian areas. Alternatives NC and A would improve the least amount of riparian area over time, generally limiting the rehabilitation and enhancement to anadromous fisheries. Alternative E-Departure would improve more acreage by adding additional enhancement work on key trout fisheries, as well as to anadromous fisheries. Alternatives B-Modified, I and C-Modified would include rehabilitation and enhancement to bring 17,500 acres to "excellent" condition by the fifth decade. The desired future condition for these three alternatives would be "excellent for all of the 20,240 acres of riparian area on the Forest and Grassland.

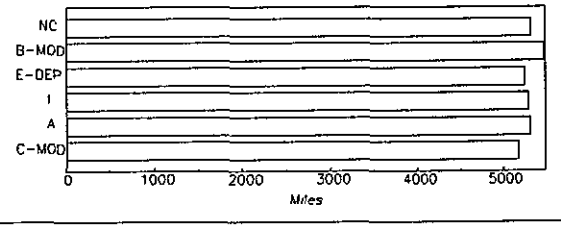
Figure 2–6
Riparian Area in Excellent Condition
By the Fifth Decade



Transportation System

The primary difference between the alternatives is in the management strategy for the miles of road maintained open for public travel. All alternatives close and or restrict use on some roads to protect the investment, to provide for public safety, to reduce soil erosion and degradation of water quality, and to

Figure 2–7
Miles of Road Maintained for Public Travel
By the Fifth Decade



increase the wildlife habitat effective in key areas on the Forest and Grassland.

Big Game Habitat

A number of the alternatives provide for big game habitat through the dedication of or emphasis on management for winter range characteristics. The indicator for the responsiveness of the alternatives to this issue is the potential population levels of elk and deer that could be maintained. Table 2-9 and Figure 2-8 illustrate the responsiveness of each of the alternatives.

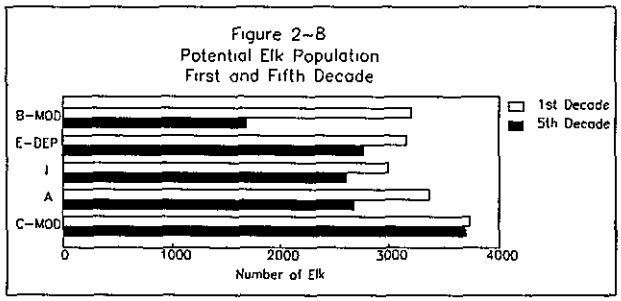
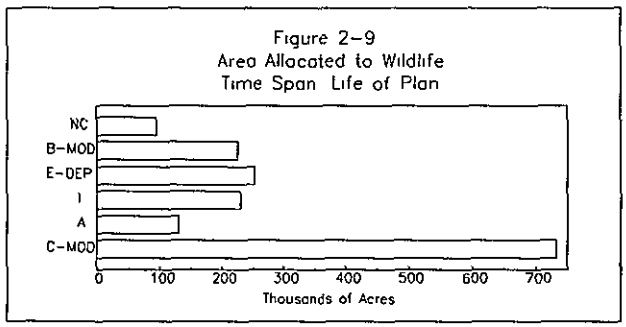


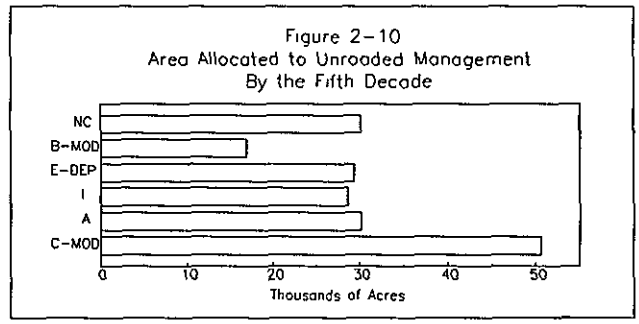
Table 2-9 and Figure 2-9 illustrate the areas allocated or dedicated to a wildlife management strategy (includes old growth and eagle roosting areas but is reflective of emphasis for big game).



Roadless Areas and Wilderness Study Areas

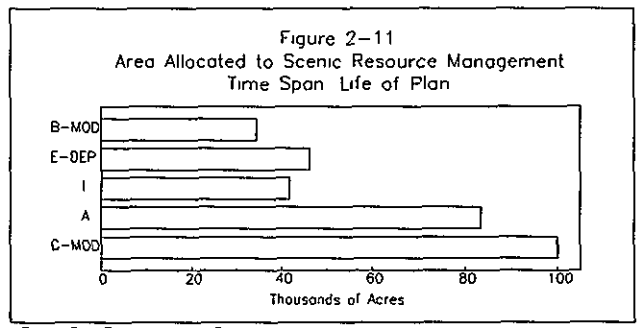
A number of the alternatives allocate or manage areas for unroaded recreation (nonmotorized and without roads). Table 2-10 and Figure 2-10 illustrate the area that will be maintained in an unroaded condition for the life of the planning period.

The North Fork of the Crooked River Wilderness Study Area, 1,125 acres, is incorporated in all the alternatives.



Scenic or Visual Resources

Public and management concerns for the maintenance of the scenic qualities on the Forest and Grassland resulted in provisions for scenic resource emphasis along key travel corridors for a number of the alternatives. This is in addition to the visual quality objectives assigned to all alternatives. Table 2-9 and Figure 2-11 illustrate the area allocated or dedicated to a visual resource management emphasis.



Old Growth

Old Growth areas have been designated according the Regional definition for all all the alternatives considered in this FEIS. The range of acreage allocated is presented in Table 2-9 and Figure 2-12. Those alternatives with higher emphasis on commodity outputs, such as Alternative B-Modified,

have lower allocations with total existing old growth rapidly depleting over time. On the other end of the spectrum, alternatives such as C-Modified with amenity value emphasis, allocate larger areas to old growth and will retain larger acreages over time

Figure 2-12
Area Allocated to Old Growth Management
Time Span Life of Plan

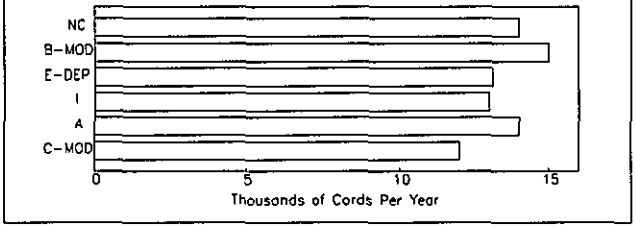


Fuelwood Supply

All the alternatives would supply a portion of the fuelwood demand on the Forest and Grassland. Those alternatives that have higher levels of timber harvest activity would supply a higher percentage of the demand. The amenity alternative, C-Modified, would provide the least amount of fuelwood Those alternatives such as I, which would stabilize the timber supply over time, would provide a more consistent supply than alternatives which depart from an even flow of timber harvest and experience a long-term reduction in harvest. A similar reduction in available fuelwood would shadow the decline in timber harvest.

The fuelwood supply for each alternative for decades one and five is presented in Table 2-9 and is illustrated in Figure 2-13.

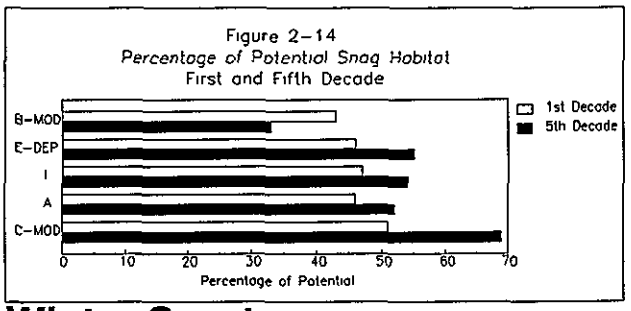
Figure 2-13
Fuelwood Supply
First Decade



Snag Dependent Wildlife

All the alternatives provide for the maintenance of a portion of the potential snag dependent species habitat. The ability of any alternative to provide snag habitat is directly related to its timber harvest strategy. Those alternatives with the higher timber harvest levels over time will have less ability to provide a portion of the potential habitat. The percentage of potential snag habitat is presented by alternative in Table 2-9 and is illustrated in Figure 2-14.

Figure 2-14
Percentage of Potential Snag Habitat
First and Fifth Decade



Winter Sports

All the alternatives are responsive, to a degree, to the public interest in having areas available for winter recreation. All the alternatives except for NC and A would provide for winter recreation at Bandit Springs through a 1,580-acre management area allocation. This area is presently closed to snowmobilers to allow for cross-country skiing and similar nonmotorized winter recreation pursuits.

The top of Lookout Mountain would be open to snowmobile use on all the alternatives except for C-Modified and E-Departure.

Anadromous Fish

All the alternatives provide for the rehabilitation of key riparian areas along all anadromous fisheries, and schedule enhancement activities to provide for maintenance or enhancement of steelhead production. Estimated smolt production over time is displayed in Table 2-9. It is planned to be the same for all the alternatives, that is anadromous fish production is assured at this level for all alternatives.

Historic Trail Preservation

The Summit Historic Trail is presently designated as a National Historic Trail and would retain that status for all the alternatives. Alternative I allocates 9,560 acres to protect the existing integrity of the trail and to preserve its historic and related scenic qualities.

Off-Road Vehicle (ORV) Use

The off-road vehicle use issue is an administrative problem for all the alternatives. At this point in time it is more of a social issue than one of resource impacts. All the alternatives would have adequate regulations in place to deal with resource impacts. Off-road use by ATV's, snowmobiles and motorbikes is seen as not being compatible with some resource emphases. Off-road use would be prohibited on all the alternatives for areas allocated as wilderness, wilderness study areas, and wild and scenic rivers - a total of 41,355 acres amounting to four percent of the Forest and Grassland.

Off-road use would be restricted to designated routes and prohibited from December 1 to May 1 for eagle roosting management areas (570 acres) for all alternatives.

The Bandit Springs area, in Alternatives B-Modified, E-Departure, I and C-Modified, would prohibit snowmobile use on 1,580 acres.

Alternative I would include a number of additional off-road vehicle use closures and restrictions. Motorized use would be prohibited on an additional eight management areas, a total of 35,580 acres amounting to four percent of the Forest and Grassland. Off-road use would be restricted to the summer months (closed December through April) to protect such resources as big game winter range on 186,790 acres amounting to 20 percent of the Forest and Grassland.

Alternatives B-Modified, C-Modified and I would begin to develop an ATV trail system to manage off-road use. The Forest and Grassland program for ATV trails is illustrated in Tables 2-8 and 2-9. The intent would be to move towards designating off-road use on specified trail networks and special areas over time. Alternatives NC, A and E-Departure would control ORV use through existing regulations with no special programs planned.

Round Mountain

None of the alternatives provide for any special resource allocations for the Round Mountain area, except for Alternatives B-Modified and I which allocate 1,000 acres along the Round Mountain National Recreation Trail corridor to provide for management of its scenic and recreational values. Activities and uses which take place on Round Mountain are considered to be part of the multiple uses which occur in the general forest.

Chapter 3

Affected Environment

CHAPTER 3
AFFECTED ENVIRONMENT

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Chapter 3

Affected Environment

Introduction

This chapter presents an overview of conditions, land uses, and resources as a foundation for understanding the changes that would take place in response to the alternatives discussed in Chapter 2. It describes the physical, biological, social, and economic environments of the Ochoco National Forest and Crooked River National Grassland. The following is a list of the resources that will be discussed.

AIR QUALITY
BIOLOGICAL DIVERSITY
CULTURAL RESOURCES
FACILITIES
FIRE
FORAGE
FOREST HEALTH
FOREST RESIDUES
FUELWOOD
LANDS
MINERALS AND ENERGY
OLD GROWTH:
RECREATION
SCENIC RESOURCES
SOCIAL AND ECONOMIC
SOIL
TIMBER
TRANSPORTATION SYSTEM
UNROADED
WATER
WILD AND SCENIC
WILDERNESS
WILDLIFE AND FISH

Changes between Draft and Final

As a result of public comments, Forest management activity, and Congressional action, Chapter 3 of the DEIS has been updated to accurately reflect the significant environmental changes. Data included on population, incomes, harvest volumes, operating costs, and revenues have been updated to the most current figures available. In addition, portions of the text have been reorganized and rewritten to improve clarity and readability. Significant additions are:

A discussion in the Recreation Section of the Oregon Omnibus Wild and Scenic Rivers Act, and the eligibility and suitability of a 1,370 acre segment of Squaw Creek for possible designation to the Wild and Scenic River System;

A major section on Biological Diversity;

A major section on Old Growth with updated inventory figures;

A section on Forest Health which places the former Forest Pest: : discussion in an ecological context;

A section on Forage which mentions uses of the resource other than for livestock grazing;

A discussion of the Cultural Resource Inventory Plan in the Cultural Resource Section,

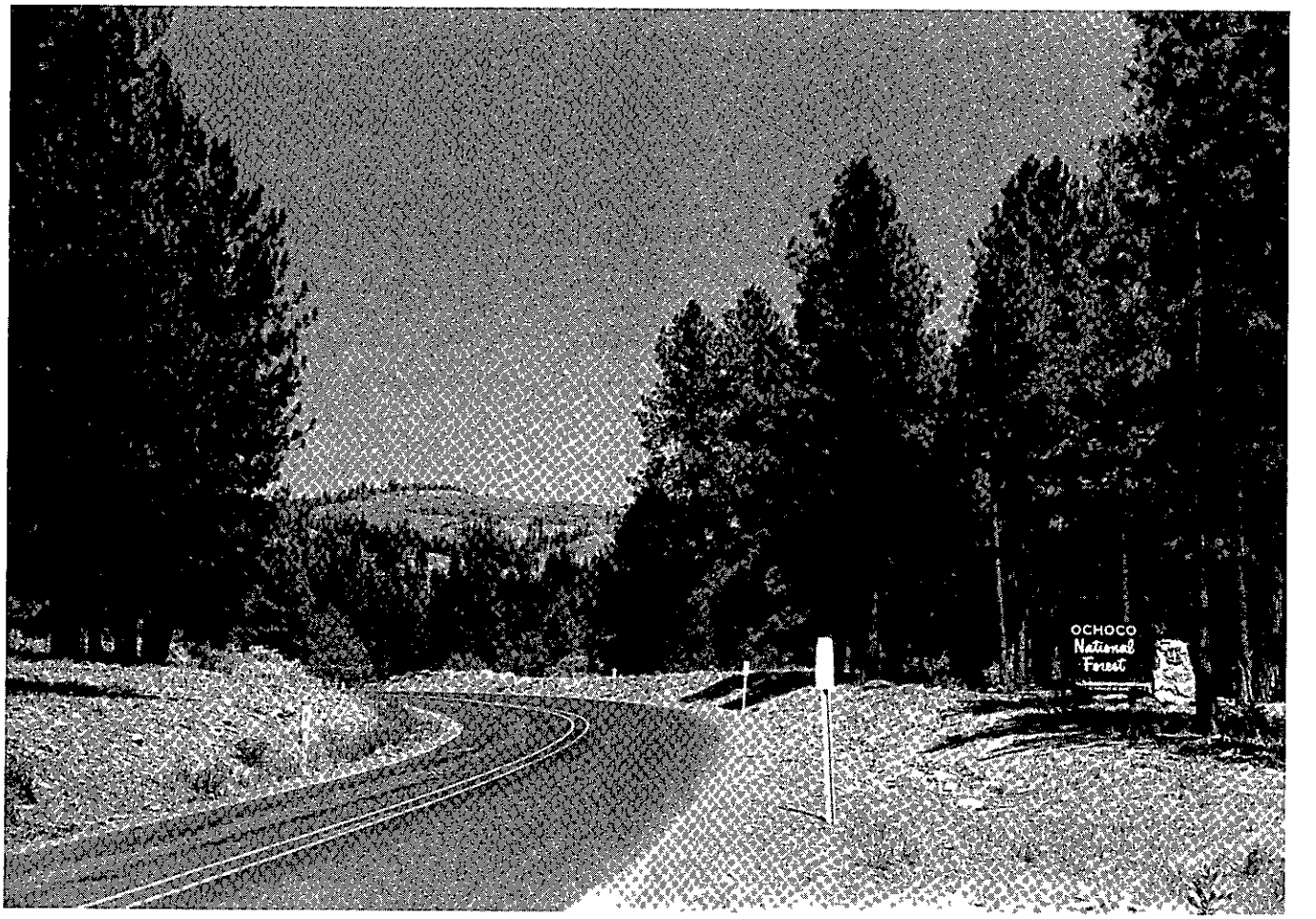
A discussion of the Ochoco National Forest and Crooked River National Grassland's unique contributions to the State's economy in the Social and Economic section; and

A discussion of the supply and demand for timber at the national, regional, and local levels in the Timber Section.

Location

The Ochoco National Forest and Crooked River National Grassland are located near the geographic center of Oregon (Figure 1-1). Combined, they occupy approximately 956,877 acres in the southern part of the Blue Mountain Physiographic Province, which includes the Blue, Ochoco, and Maury Mountains.

Being too large to effectively administer as one unit, the Blue Mountain Reserve was split, by Executive Order, into four National Forests on July 1, 1908, thus forming the Deschutes, Malheur, Whitman, and Umatilla National Forests. The Ochoco National Forest was created in 1911, by combining parts of the Deschutes and Malheur National Forests.



Headquartered in Prineville, the Ochoco National Forest is part of the former Blue Mountain Reserve. The reserve, established in 1906 by President Theodore Roosevelt, was divided into east and west units

In 1960, the 111,379-acre Crooked River National Grassland came under the administration of the Ochoco National Forest. The land was returned to government ownership in the late 1930's, with the purchase of submarginal and drought-stricken homesteaded lands under the Resettlement Administration and the Bankhead-Jones Act.

Land Ownership

Land Ownership in the Ochoco National Forest and Crooked River National Grassland is fairly well consolidated in four parcels of land in five counties. Crook, Harney, Jefferson, Wheeler, and Grant Counties are home to the Ochoco National Forest and Crooked River National Grassland.

Parcels of land belonging to the Bureau of Land Management, State of Oregon, and private parties are intermingled and border the Ochoco National Forest. Management of these lands within the boundaries of the Ochoco National Forest can, and may continue to, conflict with the management of the Ochoco National Forest. Adverse impacts on resources may result, and the potential for trespass is also a possibility.

Climate

The climate of the Ochoco National Forest and Crooked River National Grassland is relatively arid. Annual precipitation ranges from less than 10 inches to over 30 inches at higher elevations. The Cascade Mountain Range intercepts much of the moisture-laden air coming from the Pacific Ocean. Areas to the east of the Cascades are in a "rain shadow.": The climatic effects of the rain shadow and central Oregon's elevation are low relative humidity, low rainfall, large daily temperature fluctuations, and cool average temperatures. The central Oregon area is often referred to as a "high desert."

Geology and Topography

The Ochoco National Forest includes moderate to gentle slopes with elevations ranging from 2,200 to 7,000 feet. The Crooked River National Grassland consists of rolling range interspersed with deep canyons and volcanic buttes.

The physiographic province of the Blue Mountains provides the diverse topography of the Ochoco National Forest. Mountain ranges, faulted valleys, and synclinal basins formed through time by volcanic activity have left some of the oldest rocks in Oregon in the Ochoco National Forest. Around the Forest's periphery are some very rugged canyons and buttes with steep slopes and rock outcrops.

The Crooked River National Grassland is located in four major physiographic provinces:: the Rolling Hills, the Mid-basin Plains, the Mid-basin Lava Buttes, and the East Cascade Plateau. The Crooked River National Grassland consists of rolling range country interspersed with deep canyons and volcanic buttes. The buttes are found mostly in the southern portion of the Crooked River National Grassland. The canyons generally run south to north and were formed by the Crooked and Deschutes Rivers.

Resources

Timber harvest has a large economic influence in the five counties in which the Ochoco National Forest is located. The revenues generated from timber harvest not only provide income for the timber industry, but also to the economy of the counties as a whole.

Summer forage is an important part of the Ochoco National Forest and Crooked River National Grassland. Cattle and sheep belonging to 115 permittees graze annually. This amounts to 75,000 animal unit months (AUM's).

The Forest and Grassland provide a variety of habitat for an estimated 350 to 400 wildlife species. Hunting and viewing big game are major recreational attractions. The Oregon Department of Fish and Wildlife coordinates management activities with the habitat provided by the Forest and Grassland: producing an estimated 22,600 mule deer, 2,300 elk, and 750 antelope. Other significant habitats provided by the Ochoco National Forest and Crooked

River National Grassland include old growth, snags, and riparian areas.

More than 500 miles of streams support cold water fisheries. Approximately 200 additional miles of streams have the potential to support cold water fisheries, however, due to low flows, high water temperatures, and lack of pools, fish habitat is sometimes greatly reduced in the summer. A few streams on the Ochoco National Forest that are part of the John Day and Deschutes River drainages provide conditions for limited anadromous fish spawning. Average annual runoff from the Ochoco National Forest is estimated to be 574,000 acre feet.

Recreational opportunities vary from rockhounding to snowmobiling, and include horseback riding, driving for pleasure, camping, hunting, fishing, and cross country skiing. Various boating, camping, and picnicking sites exist throughout the Ochoco National Forest and Crooked River National Grassland.

Camping is a major recreational use. Water-related sites, and those along main transportation routes, are heavily used. Use on weekends and holidays varies from 80 to 130 percent of developed capacity. The more remote sites are, in general, lightly used except during holidays and hunting season. Total recreation visitor days are estimated to be 430,000 annually.



Three classified wilderness areas, and one "further study" area lie within the Ochoco National Forest and Crooked River National Grassland. One Research Natural Area has been designated, and five others have been proposed. Over 1700 cultural resource sites have been documented, with about 1000 of these being prehistoric sites.

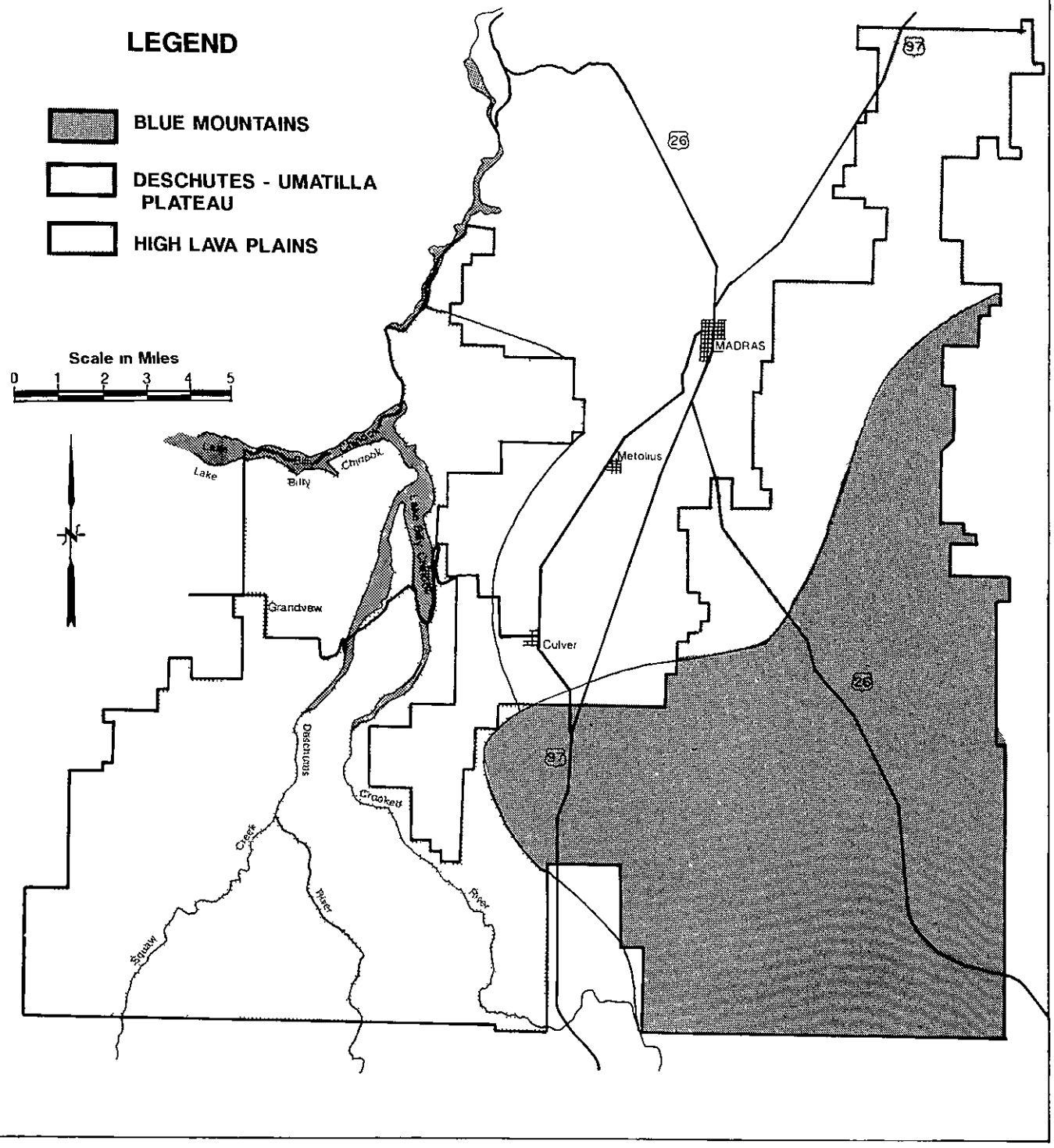
Mineral activities and mining claims, though generally not commercially productive, exist on the Ochoco National Forest. Some minor prospecting for cinnabar and gold occurs. A major activity is hunting for semiprecious stones. About 800,000 acres have been identified as having significant oil and gas potential, and over 20 percent of the Ochoco National Forest and Crooked River National Grassland is leased for possible oil and gas exploration and development.

The area's vegetation has been described in detail by Hopkins and Kovalchik in "Plant Associations of the Crooked River National Crooked River National Grassland" (1983), by Hall in "Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington" (1973), and by Kovalchik in "Riparian Zone Associations, Deschutes, Ochoco, Fremont, and Winema National Forests" (1987).

Soils on the Ochoco National Forest and Crooked River National Grassland have developed under the influence of a semi-arid climate from parent material of principally volcanic origin. North slope surface soils are primarily recent ash deposits. Good water permeability is associated with deeper soils. Lower elevation soils range from silt loam to sandy loams. Rocky areas of very thin soil and low productivity, called "scablands," occur in places.

Figure 3-1

PHYSIOGRAPHIC PROVINCES



Air Quality

National Ambient Air Quality Standards have been developed by the Environmental Protection Agency under authority of the Clean Air Act Amendments (PL 91-604). The standards establish acceptable levels for certain pollutants including total suspended particulates (TSP). Although air quality surfaced as an issue during scoping for the Regional Guide, it is closely tied to Forest issues relating to residue management, visuals, and any other use of fire to protect and enhance Forest resources.

A potential for short-term air quality impairment from dust is created by a variety of management practices. Machinery operations related to timber harvest often raise clouds of dust. Log hauling on roads is another source of dust as is prescribed burned areas on windy days. Road construction and maintenance machinery operations are also dust contributors, both in the actual road work and in the rock crushing operations. The impacts are usually of a local nature and of short duration.

Visibility on and adjacent to the Ochoco National Forest and Crooked River National Grassland is affected by the emission of suspended particulates from fire. The Bend-Redmond-Madras-Prineville area experiences regional haze problems several times each year due to an accumulation of smoke from numerous agricultural and wildland burns, from local fires and from fires west of the Cascades. The contribution of smoke from west of the Cascades is occasionally great enough to cause voluntary curtailment of local burning to avoid further degradation. Regional data, presented in the Final Environmental Impact Statement for the Pacific Northwest Regional Guide (May 1984), indicates that the Ochoco National Forest contributes approximately 30 percent of the emissions generated in the Bend-Redmond-Madras-Prineville area. These emissions come almost entirely from prescribed fire.

Fire has been used on the Ochoco National Forest and Crooked River National Grassland to treat slash, to manage wildlife habitat, and to improve forage for livestock. Records show a steady increase in the use of prescribed fires over the past two decades. As a result, the number of days per year with reduced visibility have also increased.

The primary use of fire has been to treat timber harvest residues (slash). Currently, prescribed fire is used to treat 15-20 thousand acres of slash annually from past and current timber sales. This activity produces 8 to 14 thousand tons of total suspended particulates (TSP) in smoke emissions. Most of this activity occurs in spring and fall. The TSP production for wildfires is highly variable. Estimates range from 25 tons in years of infrequent wildfires to 4000 tons in years of numerous wildfires.

Biological Diversity

Biological diversity refers to the distribution and abundance of plant and animal species and communities on the Ochoco National Forest. Elements of biological diversity include, but are not limited to:

Viability, distribution and abundance of wildlife and plant populations;

Structure and composition of forests;

The role of agents such as fire and insects;

Long-term productivity, and

Fragmentation of scarce community types.

The law (36 CFR 219.27) requires that management prescriptions, where appropriate and to the extent practical, preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species. These communities should be at least as great as those expected in a "natural" Forest, and the diversity of tree species should be similar to that existing in the planning area. Reduction in diversity may be prescribed only where needed to meet overall multiple-use objectives. A discussion of the biological processes occurring on the Ochoco National Forest is basic to an understanding of whether or not management practices have the potential for adversely altering diversity.

Detailed discussions of individual elements that comprise biological diversity are included in other sections of this chapter, e.g. Soils, Wildlife and Fish. To avoid repetition, discussions of biological diversity elements presented here have been summarized or cross-referenced, where appropriate.

Biological Processes and Long-Term Productivity

Soil

Soil, a basic nonrenewable resource, is the foundation on which biological diversity is maintained. All plant and animal life on the Forest and Grassland is either directly or indirectly dependent on maintenance of long-term productivity of our soils. By definition, the components of long-term soil productivity include:

Surface litter and topsoil layers;

Soil organic matter and it's replacement,

Soil organisms and biological systems; and

Soil porosity, structure, drainage and aeration.

Three general soil types occur on the Ochoco National Forest. Each of these types reacts somewhat differently to management activities and possibly to other outside influences such as pollutants and atmospheric depositions.

TABLE 3-1
Diversity of Soil Types

SOIL TYPE	PERCENT OF FOREST AND GRASSLAND	MANAGEMENT HAZARDS/LIMITATIONS
Volcanic Ash	30	High compaction and displacement hazard under a wide range of soil moistures
Residual (mixed with loess and ash)	30	Low timber production High surface erosion hazard and muddiness potential in wet season Dry site
Nonforest	40	Droughty, low vegetative capacity High erosion hazards and muddiness potential from roads Low water holding capacity

Natural and Human Influences

In addition to soils, long-term productivity can be described as the ability of the forest to withstand impacts from both biotic and abiotic influences. Insects, diseases, wildfire, atmospheric deposition, silvicultural treatments, and harvesting practices are primary examples of influences that can have both positive and negative affects on the "health of the forest," and therefore, long-term productivity of the resources therein (See Forest Health, this chapter for a more detailed discussion). It is believed that the presettlement forest was maintained in a relatively healthy condition with frequent natural fire (Hall, 1976; Volland and Dell, 1981). These low intensity fires had a significant affect on soil development, as well as vegetative species composition, distribution and density. The elimination of wildfire, introduction of intensive livestock grazing, and harvest of timber have had a profound effect on the ecological processes throughout the forest (See Fire, this chapter, for a more detailed discussion). Many believe that significant increases in forest pest outbreaks, such as spruce budworm, are a direct result of fire control (Schmidt, 1983). The affects of fire elimination on soils are less understood, but there is some indication that long-term soil productivity may actually be enhanced (on some soil types) as a result of increased organic materials which were historically eliminated by fire (Harvey, Jurgensen, Larsen and Graham, 1987).

Vegetation and Biological Diversity

The vegetation of the Ochoco National Forest and Crooked River National Grassland can be described by using "plant associations" and "vegetation types.": Each plant association indicates the presence of a specific type of environment.

Plant Associations

The vegetation of the Ochoco National Forest consists of forested and nonforested plant associations. These plant associations are distributed according to elevation, soil type, topography, and precipitation. Ecologists use the presence and abundance of indicator plants to classify certain types of environments. This reduces the numerous combinations of vegetation into classes called plant associations.



Forested plant associations are grouped according to climax tree or shrub species (series). The series is then subdivided using shrubs and herbs to form an association classification reflecting both the macroclimate and the microclimate. Trees tend to reflect relatively broad patterns of climate: while shrubs and herbs reflect more complex patterns of microenvironment. Each plant association is recognized by a distinctive combination of overstory and understory plants at maturity. Hall (1973) has identified 44 plant associations for the Blue Mountains in Eastern Oregon and Southeastern Washington. Hopkins and Kovalchik (1983) have identified 16 plant associations for the Crooked River National Grassland. In separate work, Kovalchik (1987) has described the riparian associations found on the Ochoco National Forest and Crooked River National Grassland.

TABLE 3-2
PLANT ASSOCIATIONS

Vegetation Type	Name	Code
Mixed Conifer (206,020 acres)	Ponderosa Pine - Douglas-Fir - Snoberry Oceanspray	CD-S6-11
	Mixed Conifer - Pinegrass, Residual Soil	CW-G1-11
	Mixed Conifer - Pinegrass, Ash Soil	CW-G1-12
	Lodgepole - Pinegrass - Grouse Huckleberry	CL-G2-11
	Lodgepole - Grouse Huckleberry	CL-S4-11
	White Fir - Twinflower - Forb	CW-F3-11
	White Fir - Huckleberry	CW-S2-11
	White Fir - Grouse Huckleberry	CW-S8-11
	Sub-Alpine Fir - Big Huckleberry	CE-S3-11
	Sub-Alpine Fir - Grouse Huckleberry	CE-S4-11
Ponderosa Pine (340,440 acres)	Ponderosa Pine - Douglas-fir - Elk Sedge	CD-G1-11
	Ponderosa Pine - Wheatgrass	CP-G1-11
	Ponderosa Pine - Fescue	CP-G1-12
	Ponderosa Pine - Blue Wildrye	CP-M1-11
	Ponderosa Pine - Bitterbrush - Ross Sedge	CP-S2-21
Low Site Ponderosa Pine (13,240 acres)	Ponderosa Pine - Wheatgrass	CP-G1-11
	Ponderosa Pine - Fescue	CP-G1-12
	Ponderosa Pine - Bitterbrush - Ross Sedge	CP-S2-21
Pine-Juniper-Shrub Transition (116,400 acres)	Ponderosa Pine - Wheatgrass	CP-G1-11
	Ponderosa Pine - Fescue	CP-G1-12
	Ponderosa Pine/Bitterbrush/Idaho Fescue	CP-S2-11
Juniper-Shrub (171,830 acres)	Juniper - Bunchgrass	CJ-G1-11
	Juniper - Stiff Sage Scabland	CJ-S8-11
	Juniper - Low Sagebrush	CJ-S1-11
	Juniper - Big Sagebrush	CJ-S2-11
	Juniper/Gray Rabbitbrush - Big Sagebrush/ Crested Wheatgrass	CJ-S2-91
	Juniper/Gray Rabbitbrush - Big Sagebrush/ Beardless Wheatgrass	CJ-S2-92
	Juniper/Big Sagebrush/Bluebunch Wheatgrass Idaho Fescue, Mound, and Sandberg Bluegrass, Swale	CJ-SB-11
	Juniper/Big Sagebrush/Bluebunch Wheatgrass Idaho Fescue, Flat	CJ-S2-26
	Juniper/Big Sagebrush - Rock Spirea/ Bluebunch Wheatgrass - Arrowleaf Balsamroot, Steep N Canyon	CJ-S2-31
	Juniper/Big Sagebrush - Green Rabbitbrush/ Idaho Fescue - Arrowleaf Balsamroot, Steep N Canyon	CJ-S2-32
	Juniper/Big Sagebrush/Bluebunch Wheatgrass - Sandberg Bluegrass, S Slope	CJ-S2-13
	Juniper/Big Sagebrush/Idaho Fescue - Bluebunch Wheatgrass, N Slope	CJ-S2-12
Shrub-Grassland (9,130 acres)	Low Sagebrush - Bunchgrass	SD-19-11
	Big Sagebrush - Bunchgrass	SD-29-11
	Alpine Sagebrush	SS-49-11
	Bitterbrush - Bunchgrass	SD-39
	Curlleaf - Mountain Mahagony - Grass	SD-49
	Snowberry Shrubland	SM-31

Vegetation Type	Name	Code
Grassland (50,330 acres	Bunchgrass on Shallow Soil, Gentle Slope	GB-49-11
	Bunchgrass on Deep Soil, Gentle Slope	GB-49-12
	Bunchgrass on Shallow Soil, Steep Slope	GB-49-13
	Bunchgrass on Deep Soil, Steep Slope	GB-49-14
	Alpine Sedge	GS-39-11
Meadow (5,520 acres)	Dry Meadow	MD
	Moist Meadow	MM
	Wet Meadow	MW
	Quaking Aspen Meadow	HQ-M1
Scabland (43,970 acres)	Bluegrass Scabland	GB-91-11
	Stiff Sage Scabland	SD-91-11
	Shrub Dominant	SD-B9
	Grass Dominant	GB-B9
	Stiff Sagebrush/Sandberg Bluegrass - Bigseed Lomatium, Scabland	SD-91-31

* Information from District mapping projects, TRI orthophotos, field checks, and Hall's *Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington*, (1973)

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Vegetation Types

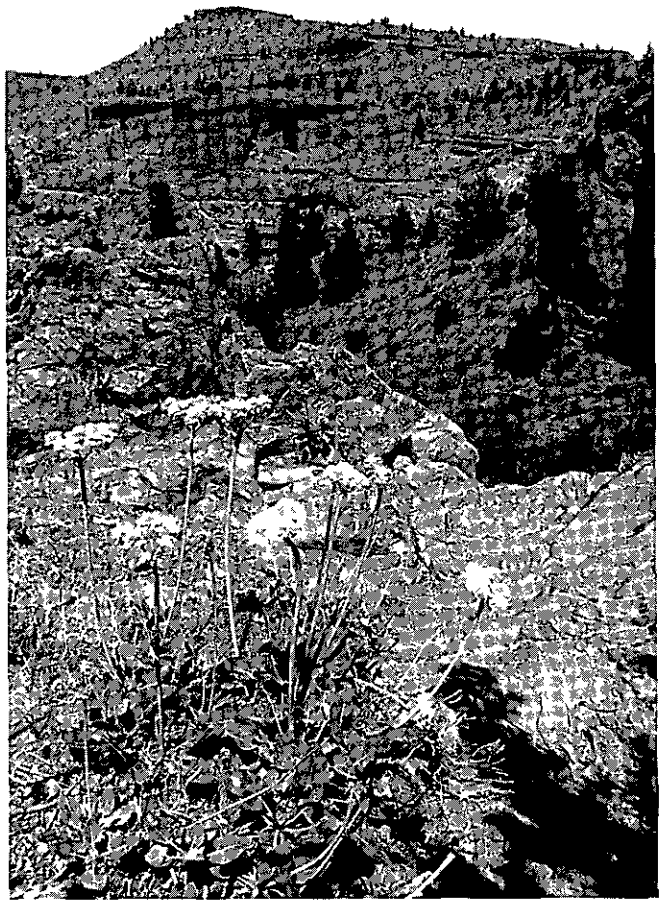
For administrative planning and analysis purposes, the plant associations identified by Hall (1973), and Hopkins and Kovalchik (1983) have been combined into nine vegetation types as follows: mixed conifer, ponderosa pine, low site ponderosa pine, pine-shrub transition, juniper-shrub, shrub-grassland, grassland, meadow, and scabland. The first three are considered forested vegetation types and the last six are nonforested types.

Forested Vegetation Types

The mixed conifer type occurs on portions of the Ochoco National Forest with the most precipitation (25 inches or more) and/or on northern and eastern aspects where evaporative losses from solar radiation are minimal. Approximately 95 percent of the Forest's mixed conifer stands are mature (over 100 years old) and single or multi-story in structure. This type is dominated by stands of ponderosa pine, Douglas-fir, white fir, western larch, and lodgepole pine. Understory vegetation is comprised primarily of pinegrass, elksedge, and heartleaf arnica. Silviculturally, these stands are often treated in a similar manner since it is frequently not feasible to manage the understory due to disease, insect, and physical damage interactions. Treatments most often involve a regeneration cut (clearcut, shelterwood, or some modification of either) and subsequent reforestation, either naturally or artificially.

At mid to lower elevations, the ponderosa pine vegetation types receive less precipitation. Their occurrence is also associated with southern and western aspects. About two-thirds of the ponderosa pine stands are two-storied or multi-storied in structure, and contain small amounts of Douglas-fir. Ground vegetation is comprised of elk sedge, bluebunch wheatgrass, fescue, and bitterbrush. These stands have varying amounts of large old growth ponderosa pine (overstory trees) with younger trees of pine or other species below (understory). The understory is also variable in terms of the number and size of the trees, but can usually be managed silviculturally after the overstory removal without additional reforestation.

Low site ponderosa pine types generally occupy a transition area between the predominant, higher elevation pine type and nonforested areas. This type is dominated by ponderosa pine and juniper. Ground vegetation is comprised of fescue, bluebunch wheatgrass, bitterbrush, Sandberg bluegrass, and mountain mahogany. Individual tree harvest occurs on these types, when sufficient advance reproduction of commercial species already exists.



Nonforested Vegetation Types

Below the forested types, tree-shrub (pine-shrub transition and juniper-shrub) vegetative types occur. Precipitation and evaporative losses are limiting to most trees on these sites, except juniper and an occasional ponderosa pine. The grassland vegetation type receives the least precipitation of the vegetation types discussed, less than 10 inches annually, and generally occupies the lowest elevations. Dry, moist, or wet meadows occur locally, depending on the availability of water throughout the summer and fall. Scablands have relatively less vegetation cover than the other vegetation types due to their rocky and shallow soils. A discussion on the major plant species that occur in each of these vegetation types follows.

Pine-Shrub Transition - This type is dominated by juniper and ponderosa pine. Understory vegetation includes sagebrush, bitterbrush, and wheatgrass.

Juniper-Shrub - This type is dominated by juniper and sagebrush. Understory vegetation consists of wheatgrass and fescue.

Shrub-Grassland - This type is dominated by sagebrush, bitterbrush and rabbitbrush. Herbaceous vegetation consists of fescues and wheatgrass.

Grassland - This type is dominated by bunchgrass, wheatgrass, and sagebrush. Juniper may also occur in significant amounts on this vegetative type.

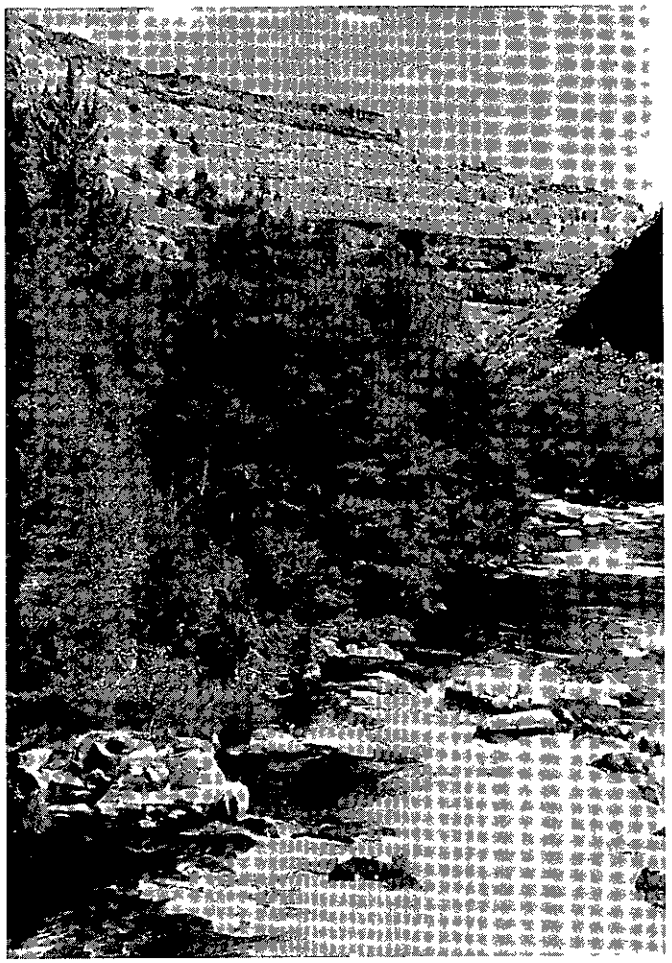
Meadow - This type is dominated by tufted hairgrass, oval-head sedge, and Nebraska sedge. The ratio of sedges to grasses increases in moist meadows.

Scabland - This type is dominated by bluegrass, oatgrass, and rigid sage.

Riparian Areas

Riparian areas are adjacent to water. They are where plants occur that are dependent on a perpetual source of water, and that are a significant component of the diverse ecosystem. Riparian sites include stream banks, active channel shelves (e. g. gravel bars), active flood plains, and overflow channels (Kovalchik, 1987).

The Ochoco National Forest has approximately 19,000 acres of riparian areas that are associated with about 800 miles of streams. The Crooked River National Grassland has about 2,090 acres of riparian acres along approximately 30 miles of streams. These riparian areas amount to 2 percent of the land base.



Abundance and Distribution of Different Plant Successional Stages

Forested Areas

The abundance and distribution of various timbered successional stages has possibly the greatest affect on the overall biological diversity of plants and animals on the Ochoco National Forest. A "managed" forest, represented by a wide variety and distribution of successional stages, is likely to maintain more resistance to insect and disease outbreaks, wildfire, and other potentially destructive forces. Variety also increases both the vertical and horizontal diversity, which increases habitat for wildlife species. Historically, diversity was much lower because large acreages of the Ochoco National Forest were maintained as large open ponderosa pine stands by frequent, low intensity fires.

Table 3-3 shows existing acres of different forested successional stages (Stages 1-6) on the Ochoco National Forest.

TABLE 3-3

	Stage 1 & Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
AGE –>	Grass-forb & Shrub seedling (0-10)	Pole-sapling (11-39)	Young (40-79)	Mature (80-159)	Old Growth (160+)
Total = 571 M Acres	9	170	159	139	94

Old Growth

Old growth (Stage 6 vegetation) has been recently inventoried for the ponderosa pine and mixed conifers vegetation types. This successional stage is of importance because of its diverse stand structure and because of its ability to provide cavity nesting habitat. A total of 93,800 acres have been identified and mapped. Of these, 30,300 lie within Wilderness and Research Natural Areas.

Old growth in the juniper-shrub type has yet to be mapped; however, 740 acres have been reserved on the Crooked River National Grassland.

For a further discussion of the old growth resource, refer to the Old Growth section of this chapter.

Nonforested Areas

Nonforested plant associations on the Forest and Grassland include: 1) dry and wet meadows which are found throughout the Forest, generally at higher elevations; 2) sagebrush/bunchgrass and sagebrush/bunchgrass/juniper sites which are found at lower elevations of the Forest, and over much of the Grassland; and 3) the various scabland community types which are found throughout the Forest, except on north aspects.

Successionally, the nonforested types are not changing since the majority are at or near climax. A shift, however, has been noted from a historical fire climax to the more recent nonfire climax type. Trees are encroaching on many meadows and juniper is invading many of the lower elevation sites due to lack of fire.

Distribution of Forested and Nonforested Vegetation as an Element of Diversity and Habitat

Forested and nonforested areas are distributed in a random, mosaic fashion across the Ochoco National Forest Compared to the surrounding "high desert," the Forest offers a greater diversity of habitats, and this is not duplicated in the immediate central Oregon area. The Forest is relatively isolated from its neighboring national forests, and adjacent forest lands of other ownership are not extensive.

It is this great variety of vegetative diversity that provides habitat for over 378 terrestrial wildlife species (See Wildlife and Fish Elements and Biological Diversity). Food, cover, and water (essential wildlife habitat) exist across the Forest and Grassland in quantities capable of supporting large numbers of both game and nongame species. Riparian areas and their associated water resource are the most critical wildlife habitats, supporting possibly as much as 75% of all terrestrial wildlife species on the Forest and Grassland. Perennial streams usually support trout and other species of fish. The riparian vegetation is of critical importance for escape cover, stream shade, and streambank stability as it maintains water quality and aquatic habitat. Riparian areas can also serve as forested connectors (connective habitat) between original or primary habitats for many species. Pileated woodpeckers, a management indicator species, are likely to use these travel lanes to move between primary reproductive and feeding areas (Bull, 1989).

Figure 3-2

CONNECTIVE HABITAT

PRINEVILLE

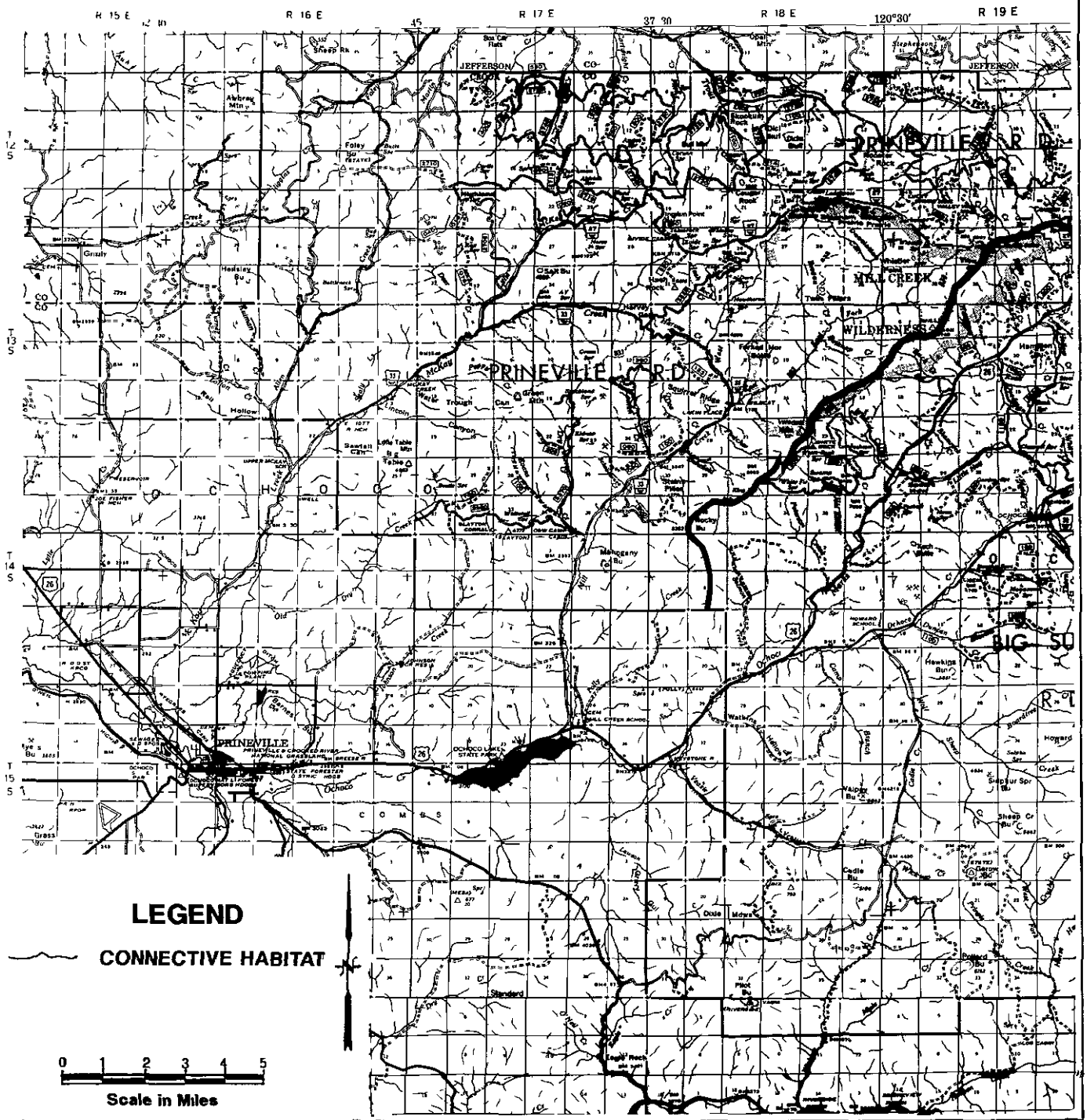


Figure 3-3

CONNECTIVE HABITAT

PRINEVILLE (MAURYS)

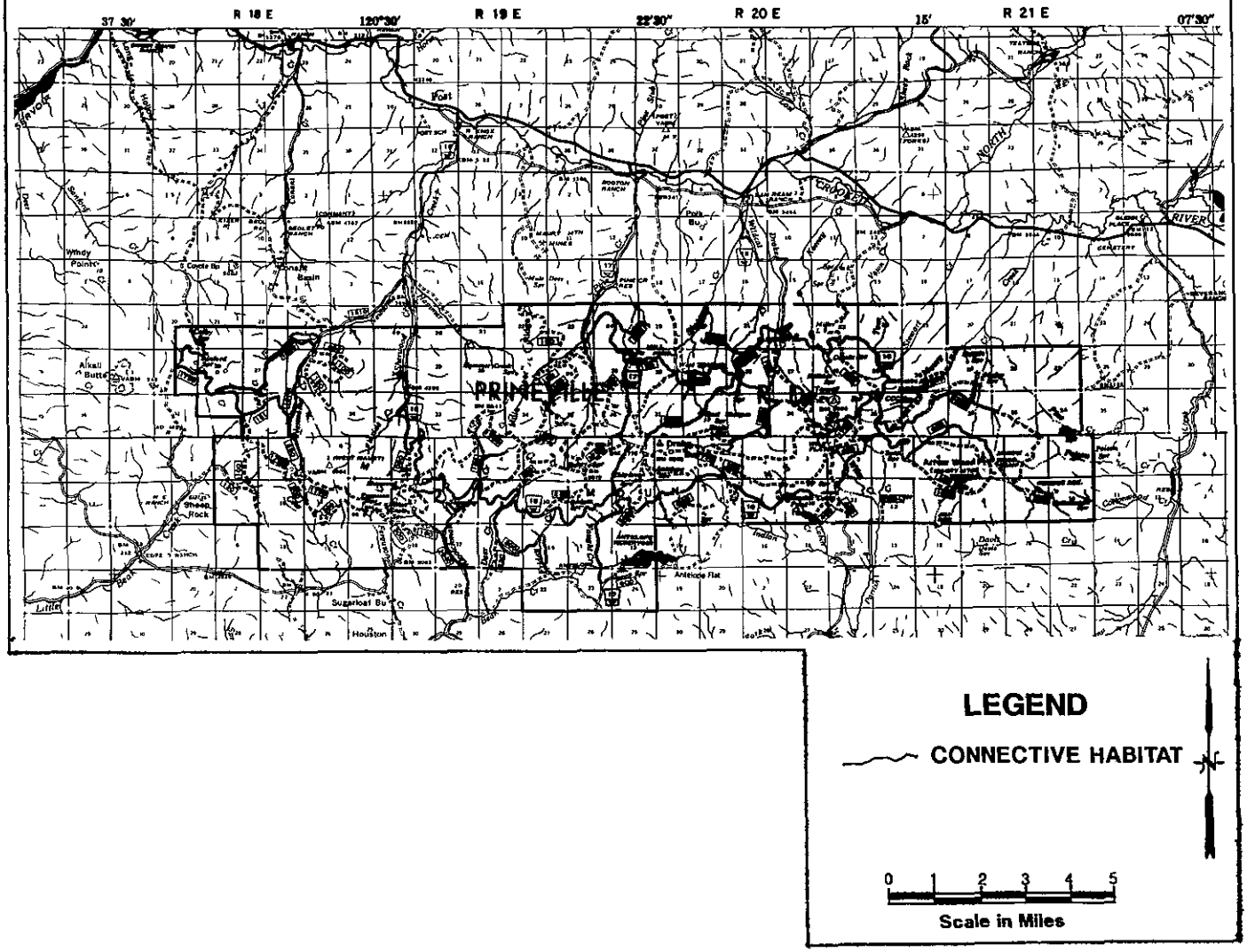


Figure 3-4

CONNECTIVE HABITAT

BIG SUMMIT

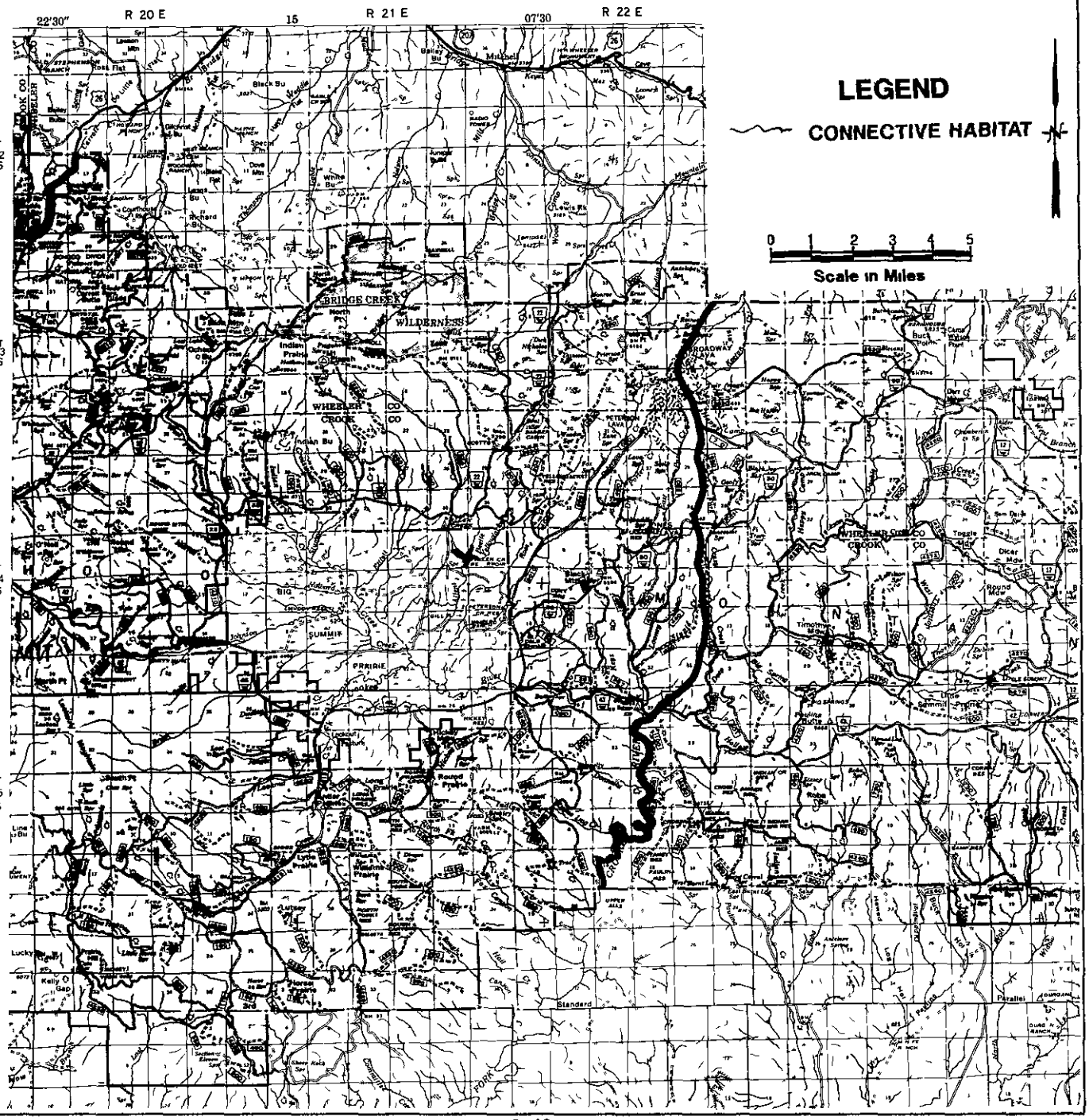


Figure 3-5

CONNECTIVE HABITAT

PAULINA

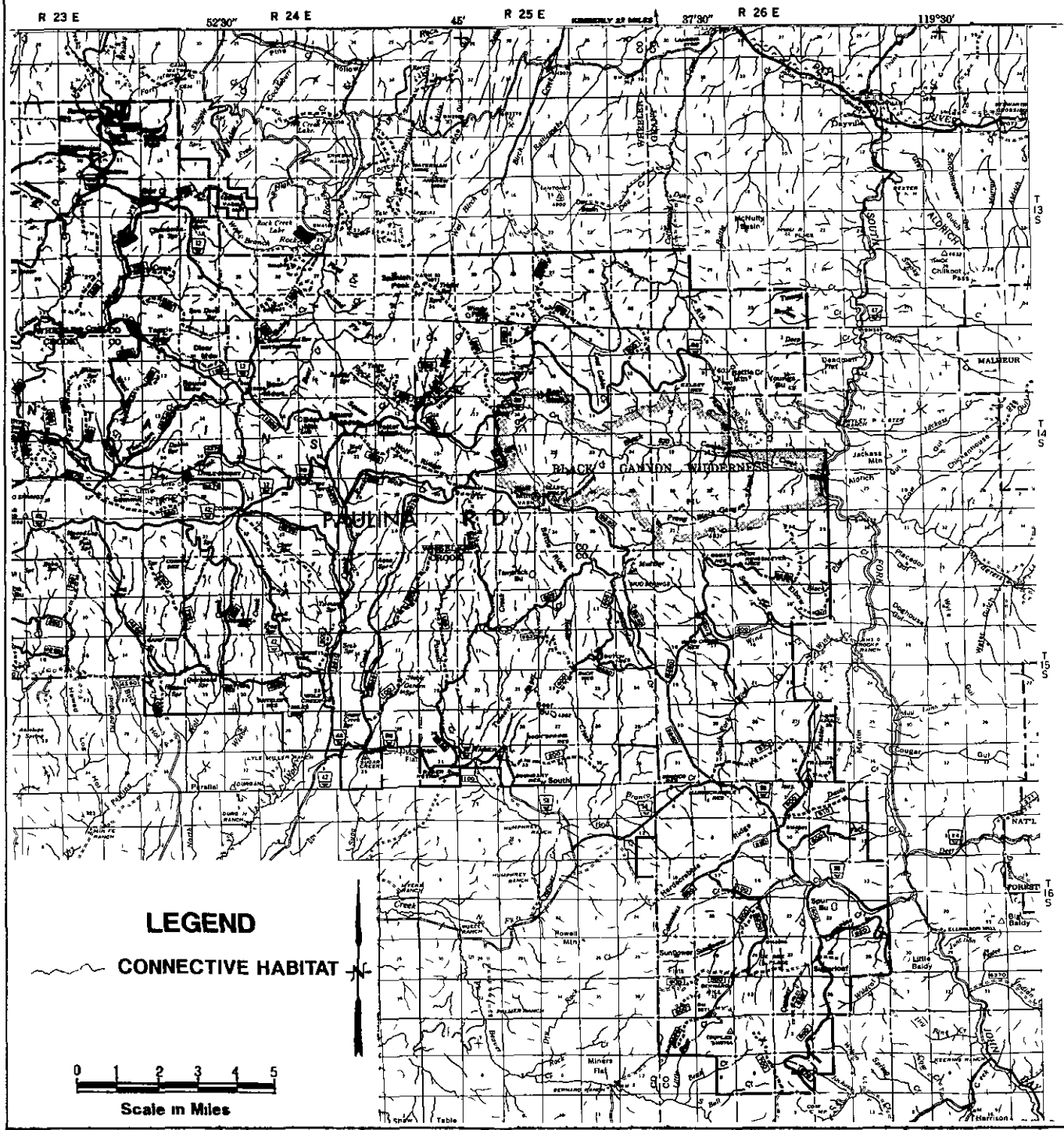
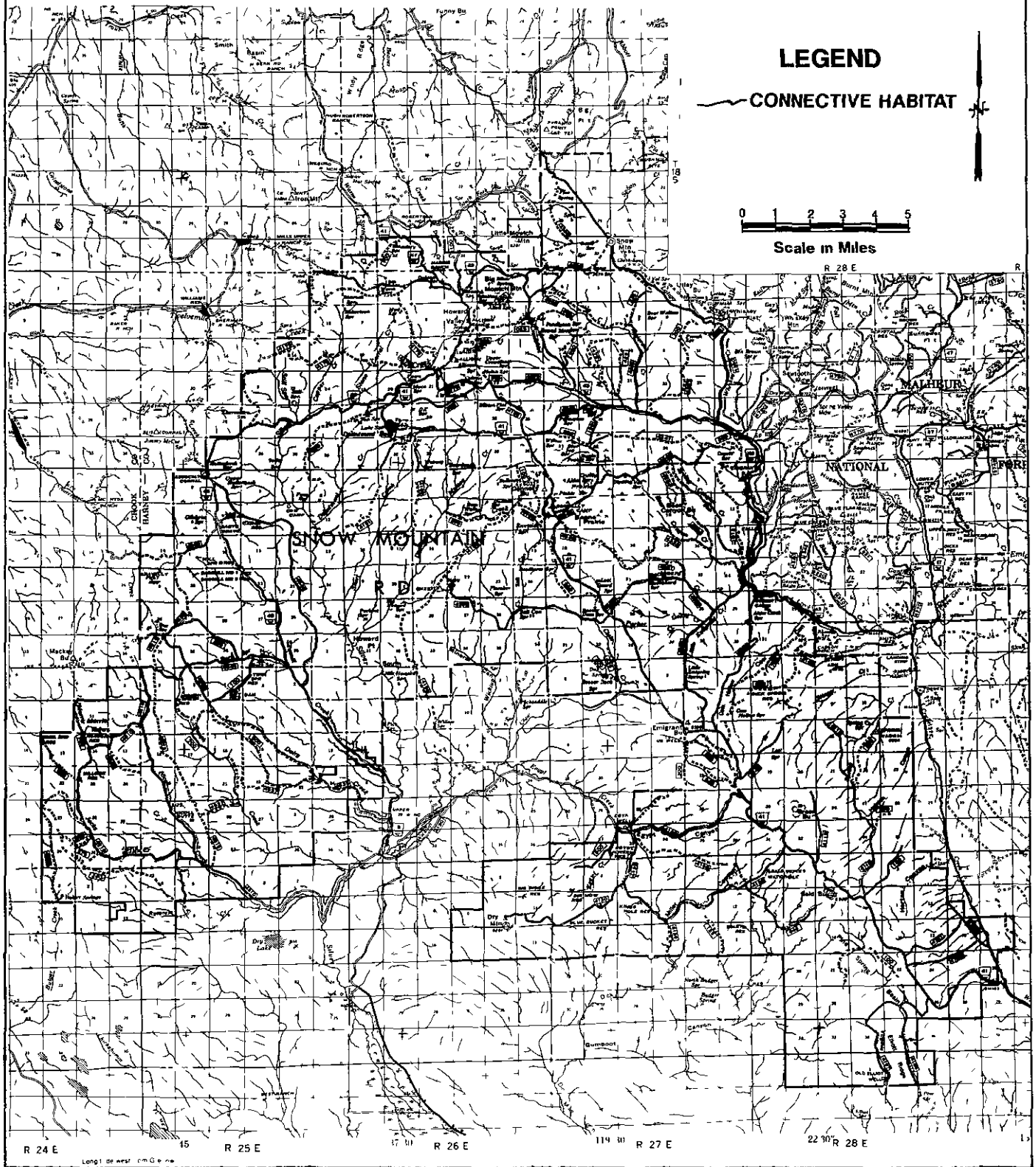


Figure 3-6

CONNECTIVE HABITAT

SNOW MOUNTAIN



Undisturbed Ecosystems and the Role of RNA's

Ecosystems that are substantially undisturbed represent rare conditions on the Ochoco National Forest and Crooked River National Grassland. Preservation of this element of biological diversity is one of the objectives of the Research Natural Area program.

Research Natural Areas (RNA's) are tracts of land where specific natural features are preserved and natural processes are allowed to occur for research, education, and conservation purposes. The primary reasons for preserving these tracts are to provide:

1. Baseline areas against which the effects of human activities in similar environments can be measured;
2. Sites for study of natural processes in undisturbed ecosystems, and
3. Gene pool preserves (gene pool conservation) for plant and animal species, particularly rare and endangered types.

RNA's offer biologists and other natural resource scientists opportunities to study biota, environments, and ecological processes with a minimum of disturbance to installed studies.

The Ochoco National Forest has one established RNA, the Ochoco Divide Research Natural Area (2,035 acres) on the Big Summit Ranger District. The Crooked River National Grassland does not have any established RNA's.

Central and eastern Oregon currently lack adequate representation of natural features in the RNA system. In a cooperative effort with other Federal agencies, as supported by the Federal Committee on Research Natural Areas, the Ochoco National Forest and Crooked River National Grassland were reviewed to determine if areas existed that met RNA needs as identified in "Research Natural Area Needs in the Pacific Northwest" (Dryness et al., 1975). Coordination with the Bureau of Land Management by Forest Service ecologists led to the identification and proposal of five additional RNA's on the Ochoco National Forest and Crooked River National Grassland.

TABLE 3-4
PROPOSED RESEARCH NATURAL AREAS

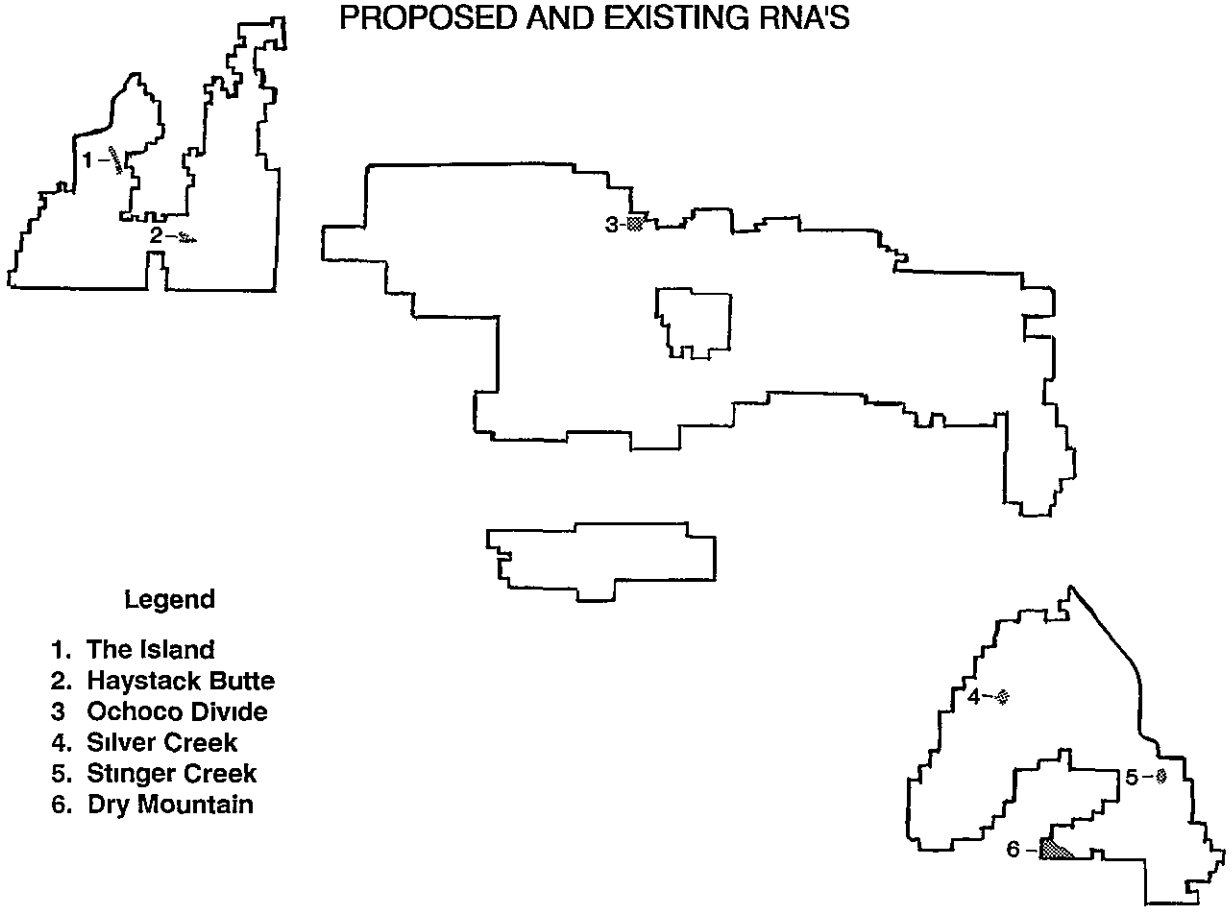
		Acreage		
Proposed Area	Location	National Forest System Lands	Total (All Ownership)	Major Characteristics
Dry Mountain	Snow Mtn Ranger District	1,187	1,187	Ponderosa pine/pinegrass ecosystems
Silver Creek	Snow Mtn Ranger District	844	844	Riparian setting and associated uplands
Stinger Creek	Snow Mtn Ranger District	453	453	Ponderosa pine/bitterbrush and scabland ecosystems
The Island	Crooked River National Grassland	39	199	Juniper/shrub/steppe ecosystems (discontinuous)
Haystack Butte	Crooked River National Grassland Option A Option B	 100 58	 146 84	Juniper/shrub/steppe ecosystems (continuous)

A comprehensive Establishment Report must be prepared for each RNA proposed on National Forest system lands. Prior to the establishment of a proposed RNA, the Establishment Report is submitted to the Chief of the Forest Service for approval.

A complete description of the existing and proposed research natural areas can be found in Appendix E. Figure 3-7 shows the approximate locations of the established and proposed RNA's. Table 3-4 displays the acreage, location: and major characteristics of the proposed RNA's.

A proposed RNA on the Crooked River National Grassland called "The Island" has also been identified as a potential National Natural Landmark by the National Park Service. National Natural Landmarks are areas representing the best examples of the ecological and geological features composing our Nation's natural history. The National Park Service has identified The Island area as 1) the largest and most pristine example of western juniper/big sagebrush/bluebunch wheatgrass community in the Columbia Plateau, and 2) the best example of the pumice western juniper steppe community.

Figure 3-7
PROPOSED AND EXISTING RNA'S



Wildlife and Fish Elements and Biological Diversity

The abundance and distribution of animal species is a key element of biological diversity. Typically, animals are dependent upon or frequently use certain vegetation types or successional stages that have been previously discussed. Consequently, managing for the maintenance of diversity of vegetation ensures a diversity of wildlife habitats and continued existence of healthy populations. This contention will be tested through the monitoring of management indicator species.

Management Indicator Species

To help determine the effects of management activities on wildlife and fish habitat, several species and groups of species were chosen as management indicators. The habitat requirements of management indicator species are assumed to be similar for other wildlife and fish species. If a selected species and its habitat are influenced significantly by management activities, like effects can be expected on other fish and wildlife species with similar habitat requirements. The indicator species were selected in conjunction with the Oregon Department of Fish and Wildlife (ODFW). The selected species are listed in Table 3-5 along with their respective types of habitat.

TABLE 3-5
MANAGEMENT INDICATOR SPECIES AND RESPECTIVE HABITAT

Indicator Species	Habitat provided by the Forest and Grassland
Brook and Rainbow Trout	Riparian
Pileated Woodpecker	Old Growth
Primary Cavity Excavators 1/	Snag
Common Flicker	Old Growth Juniper
Rocky Mountain Elk	Big Game

1/ Wildlife species that excavate cavities in snags

Brook and Rainbow Trout were picked as a indicator group. The Salmonids have a broad distribution across the Forest and are of economic importance resulting from commercial and recreational harvest. The group generally has similar habitat requirements which are narrow enough to ensure viability of most other game fish. The habitat requirements make the group a good indicator of **riparian habitat** and aquatic habitat condition for the Ochoco National Forest and Crooked River National Grassland.

Pileated Woodpeckers serve as an indicator for other species that require large snags, large amounts of down-dead wood, and large trees with defect. The pileated woodpecker represents the presence of favorable habitat for species that require mature forest and **old growth habitat.** It may also indicate the presence of favorable habitat for secondary cavity nesters, such as Northern flying squirrel, pygmy owl, saw whet owl, and flammulated owl.

We have incomplete knowledge of current pileated woodpecker populations and habitat requirements, but 93,800 acres on the Forest are currently suitable old growth habitat. The majority of existing old growth habitat occurs as mixed conifer stands on the north part of the Ochoco National Forest. This results in an uneven distribution of old growth across the Forest Current direction calls for maintenance of 36,975 acres of old growth over time. Currently, 28,000 acres are dedicated for pileated habitat, while the remainder is recruited through long rotation management.

Primary Cavity Excavators and the Common Flicker were selected to represent the species that utilize snags and **old growth juniper habitat** respectively. The common flicker is probably the only primary cavity excavator that is capable of creating cavities in juniper (Thomas, 1979). The Forest and Grassland do not have population estimates for primary cavity excavators or flickers at this time.



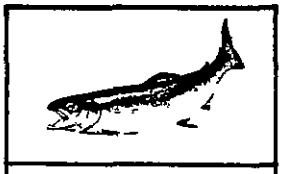
Primary Cavity Excavators were selected to represent the species that require **snag** habitat that is often reduced by forest management activities. Also, this group of species has high public interest and serve a predators of forest insect pests. The primary cavity nesters serve as ecological indicators for a large number of species and for secondary cavity users, like swallows, blue birds and bats.

Present snag densities are relatively high (80-100 percent of potential populations) in most mixed conifer stands. However, due to past entries for salvage logging and firewood gathering, snag densities are relatively low in ponderosa pine stands (20-60 percent of potential populations). Current direction is to manage for 40 percent of potential populations as stands are entered for timber harvest. Only lodgepole pine snags are currently available for firewood gathering.

Rocky Mountain Elk were selected as an indicator species to reveal changes in **big game habitat**. The elk was selected because of public interest and the recreational value of big game.

Figure 3-8

MANAGEMENT INDICATOR SPECIES AND RESPECTIVE HABITAT

Indicator Species		Habitat Provided by the Forest and Grassland
Brook Trout/Rainbow Trout		Riparian habitat
Pileated Woodpecker		Old Growth habitat
Primary Cavity Excavators[1]		Snag habitat
Common Flicker		Old Growth Juniper habitat
Rocky Mountain Elk		Big Game habitat

[1] Wildlife species that excavate cavities in snags

Cultural Resources

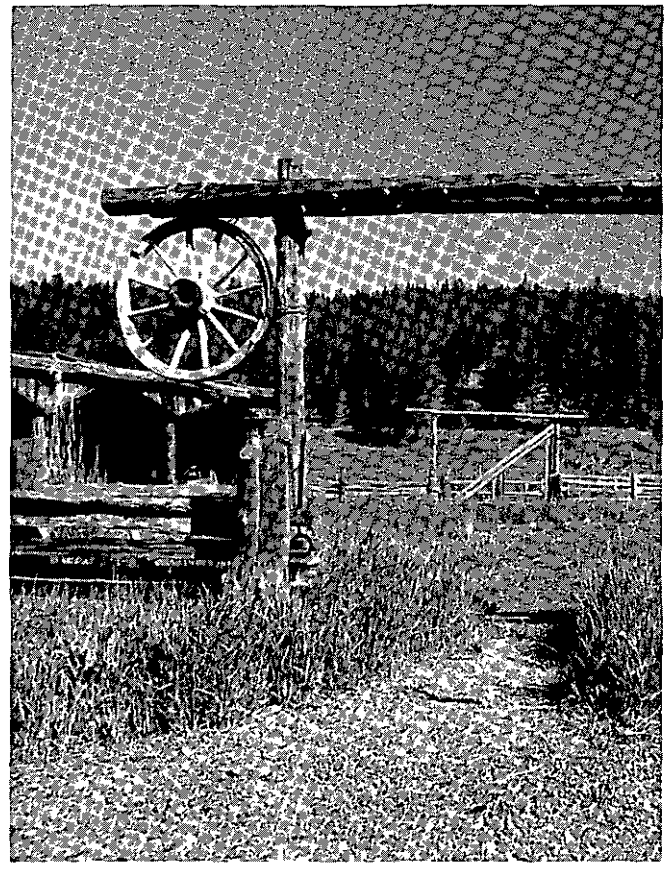
The cultural resources of the Ochoco National Forest and Crooked River National Grassland include a variety of prehistoric and historic sites which represent perhaps 10,000 years of human use and settlement. Presently, over 1,700 cultural resource sites have been documented on the Ochoco National Forest and Crooked River National Grassland. Approximately 1,000 of these sites are prehistoric, providing evidence of the occupation and land use patterns of Native Americans. The remaining 700 sites document Euro-American activities over the past 150 years.

Prehistory

Most of the prehistoric sites on the Ochoco National Forest and Crooked River National Grassland are called lithic scatters, i.e. they consist of chipped stone tools and the by-products of tool manufacture. Native Americans used a wide variety of materials in adapting to their environment, but artifacts fashioned from wood, natural fibers, bone, and hide usually decay when subjected to harsh weather, moisture, and/or acidic soil conditions. Chipped stone tools and flakes are often all that remain at a site after centuries of occupation. As a group, the prehistoric lithic scatters have been determined eligible for the National Register of Historic Places.

History

Historic sites on the Ochoco National Forest and Crooked River National Grassland provide direct evidence of how settlers lived and how their actions affected the land. For instance, remnants of the Paulina Deadline (circa 1900), which marked the boundary between lands allocated for cattle grazing and those allocated for sheep grazing, are still present on parts of the Ochoco National Forest. While the conflict between cattle ranchers and sheep herders is widely known, such material evidence of this conflict is rare. Similarly, early mining activity on the Big Summit Ranger District is documented by abandoned mines at Scissorsville and at the Amity, Blue Ridge, and Independent mines. The Crooked River National Grassland contains vestiges of extensive homesteading during the early twentieth century. While successful homesteads have generally remained in private ownership, these latter public lands contain evidence of the more typical and often anonymous homesteaders.



A few historic sites have been listed, or have been determined eligible for the National Register of Historic Places. These sites are representative of the early administration of the Forest Service, and include the original Allison Ranger Station on the Snow Mountain Ranger District (circa, 1910), and the depression-era compounds built by the Civilian Conservation Corps (Lamonta, Rager, Big Summit, and Allison). These historic sites will be maintained with the goal of retaining their historic values.

Inventory Status

The Cultural Resource Overview for the Ochoco National Forest and Crooked River National Grassland was completed in 1987 under contract with Heritage Research Associates (Minor, Beckham, Toepel, and Greenspan, 1987). This document summarizes data for all historic and prehistoric sites; a synopsis of the cultural resource inventory is provided in the Overview (Ibid.: pp. 193-199). This document is used to provide contexts for the assessment of cultural resource significance, assist in cultural interpretation, develop a Cultural Resource Inventory Design, and provide basic background and reference material.

The Ochoco National Forest and Crooked River National Grassland are still in the process of gathering basic information about the location and nature of their cultural resources. By October 1, 1988, approximately 30 percent of the Ochoco National Forest the Crooked River National Grassland had been inventoried at varying degrees of intensity. The Ochoco National Forest and Crooked River National Grassland will not attain a complete inventory of its acreage by 1990, as directed by Executive Order 11593. Given recent levels of support and activity (5 year average = 26,000 acres/year) it would take approximately 25 years to inventory the remaining acreage. The current inventory of cultural resource sites is summarized in Table 3-6.

TABLE 3-6
CULTURAL SITE INVENTORY
(as of 1988)

Cultural Resource	Sites	Acres
Historic	715	1,020
Prehistoric	1,350	5,130
Total	2,065	6,150

Source Ochoco Cultural Resource Management Files

The Interim Cultural Resource Inventory Design is currently under review by the Oregon State Historic Preservation Office. This design, as required by the 1987 Lithic Scatter Programmatic Memorandum of Agreement, serves to incorporate current inventory data and regional research questions regarding area prehistory and history with a comprehensive means for locating cultural resources in broad areas proposed for treatment under the schedule of proposed land and resource management activities.

The design provides guidance in the development of Ranger District-project survey designs. It outlines two basic types of inventory; initial and secondary (re-survey). Initial surveys will be conducted in areas previously unsurveyed. Secondary surveys are conducted in areas inventoried where previous surveys were not adequate, where ground conditions have changed since initial entry, and where information on site frequency indicates new levels of cultural resource predictability.

The design keys the predictability of cultural resource site location to environmental variables. It recognizes three levels of site frequency: high, normal, and low. These variables are then employed to predict site frequency and selectively survey large, topographically diverse project areas such as timber sales.

A complete inventory (100% survey) is undertaken for known, reported and suspected cultural resource sites and areas. Pedestrian transect surveys (transect interval less than 50 M) are conducted in areas identified as containing one or more variables indicating a predicted high or normal site frequency. On project areas indicating low site frequency, a 20% sample will be obtained via additional pedestrian transect surveys through random and convenience sampling. For projects less than 100 acres (e.g. spring developments, recreation sites, pipelines and road corridors) a complete 100% survey will be undertaken.

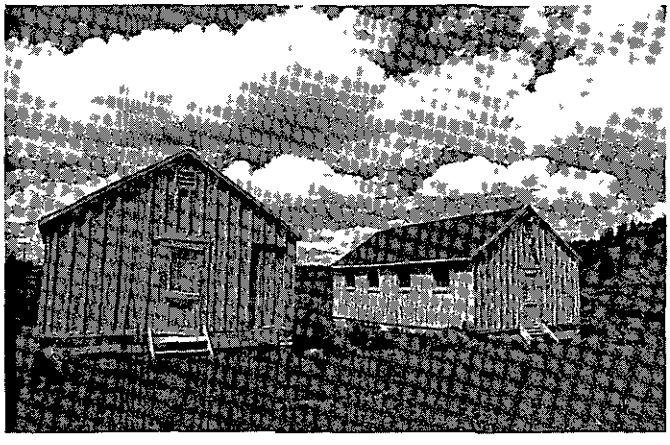
The Ochoco National Forest and Crooked River National Grassland is investigating ways to increase the reliability of its inventory efforts. The current inventory design was created as a fluid plan to be constantly improved upon during its implementation, and as the result of new data and interpretations of existing data.

Facilities

The Ochoco National Forest and Crooked River National Grassland have 103 buildings, 36 potable water sources and nine dams.

The buildings are located at five administrative sites and six fire lookout sites. The buildings include offices, residences, crew quarters, shops, warehouses, storage buildings, lookouts, and tree coolers. Several buildings built before 1937 have National historic significance. Maintenance has been adequate to keep the buildings serviceable and structurally sound. Changes in forest management and methods of work have caused some structures to be extensively remodeled to retain their usefulness.

Efficient management of the Forest will continue to require administrative sites based on resource needs, budget, and personnel needs. A Facilities Master Plan for buildings will be prepared as part of the implementation of the Forest Plan. It will guide the acquisition, continued use, and disposal of forest buildings.



The water systems serve administrative sites, developed and dispersed recreation sites. Most of the recreation water systems need to be reconstructed to meet current State standards for construction. This work is scheduled to be completed in the next three years.

There are nine dams on the Forest over 10 feet in height. Four of the dams are Forest owned and operated, four are operated under special use permits, and one by a public utility company. The Forest-operated dams store water for irrigation. The Forest also has dozens of small dams which impound seasonal water for wildlife and livestock.

The Forest plans to improve existing dams where appropriate. No new dams are foreseen at this time.

Fire

Natural Fire and Ecological Effects

Ponderosa pine types have experienced a natural fire frequency of 5 to 15 years (Hall, 1976; Volland and Dell, 1981). Fires burning in these stands can be of low intensity due to light fuel accumulations maintained by frequent underburning. This vegetative type covers the largest portion of the Ochoco National Forest. Ponderosa pine's thick bark, high crown, and specialized water conducting system make it well adapted to resist damage by fire (Hall, 1976). Fire prepares mineral seed beds for seedling establishment, thins reproduction, prunes lower tree branches, stimulates grass and forb growth, maintains open park-like stands (Hall, 1976; Volland and Dell, 1981), and recycles nutrients from dead organic material.

The natural fire frequency in the mixed conifer type is thought to be 25 to 70 years (Martin, 1982). This forest type exists in moist drainage bottoms and on north aspects, which accounts for a longer fire frequency. Tree species common to this timber type are

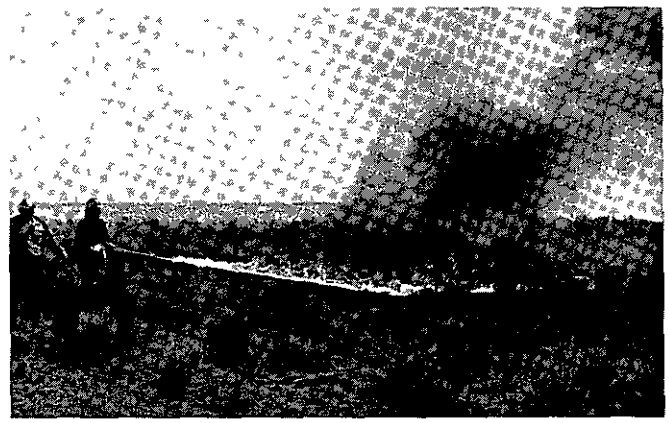
Douglas-fir, ponderosa pine, white fir, western larch, and lodgepole pine. Moderate to high-intensity surface fires, with occasional torching or crowning of trees, occurred in these stands. Heavier fuel accumulations in this type account for the more intense fires. Low limbs and waxy, resinous needles in white fir and Douglas-fir aid torching and crowning. As a result, these species are selectively decreased in stands so that a higher frequency of ponderosa pine and western larch remain. Vertical continuity of fuels is minimized and canopy closure is inhibited. Fire reduces residue loading and exposes mineral soil seedbeds.

A fire frequency of one to ten years is thought to be normal for grassland ecosystems (Martin, 1982; Volland and Dell, 1981). These fires spread quickly and are of low intensity. They frequently cover vast acreages. Growth and vigor of many native grasses, forbs, and brush are stimulated by fire. Frequently occurring natural fires of the past retarded expansion of most brush species and western juniper, thus maintaining a higher component of grasses and forbs in these ecosystems than is found today.

Due to fire suppression and exclusion policies of the past 80 years, the natural ecological cycles involving nutrients, energy, and vegetation dynamics have been altered. Timber harvests have somewhat replaced fire's ecological role through removal and disposal of woody fuels. Grazing also changed vegetation types by removing fine fuels such as grasses, forbs, and succulent brush species. However, neither timber harvest nor grazing duplicates past fire effects. As a result, formerly open pine stands are being replaced by a mosaic of closed canopy, multistoried stands that cover large areas of the Ochoco National Forest. These stands are highly flamable and are more susceptible to destruction by wildfire than the natural fire-maintained open stands that existed previously (Hall, 1976; Volland and Dell, 1981).

Wildfire

Wildfires are common occurrences on the Ochoco National Forest and Crooked River National Grassland during the dry season. There are an average of 108 wildfire starts per year; 80 percent of these are caused by lightning. Abandoned campfires make up 60 percent of the human-caused fires. Risk from human-caused ignitions is beginning to increase as recreation and hunting use increases. The average area burned by wildfire under current suppression management is 750 acres per year.



Prescribed Fire

Up until the late 1970's, fire suppression policies increased the risk of a damaging wildfire. Since then an understanding of the role of fire in ecosystems has caused a return of fire to forest management. The use of prescribed fire on the Ochoco National Forest and Crooked River National Grassland reduces the risk of severe wildfire in treated areas. Approximately 20,000 acres of timber harvest each year requires a variety of residue treatments, including prescribed burning. Prescribed burns for other resource management and natural hazard reduction are conducted on several thousand acres each decade. Prescribed fires are often planned to emulate natural fire frequencies.

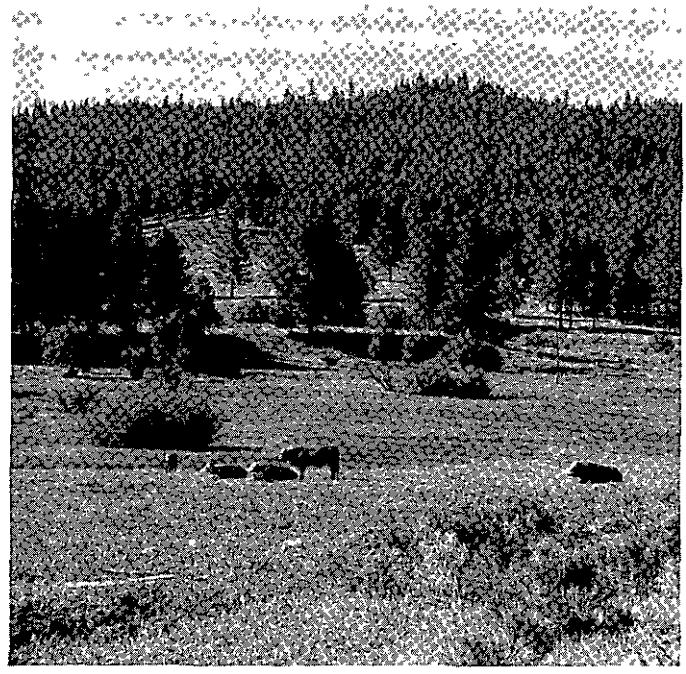
Forage

Much of the forage resource consists of native grasses that grow in a variety of plant communities ranging from grassland to juniper/shrublands. In addition, forage is made available through timber harvest. Dense canopies of trees intercept sufficient light to inhibit forage development on the forest floor. Timber harvest opens up the canopy creating an increase in forage production. Within plantations, the grass can become a problem by reducing seedling survival and inhibiting growth. The forage is utilized by deer and elk for food, however, the major use is for livestock grazing.

Current Status of Livestock Use

The Forest and Grassland supply forage for approximately 14,000 cattle and 3,500 sheep annually. This forage provides summer grazing for livestock belonging to 105 permittees throughout the five surrounding counties. The carrying capacity for range allotments is based on forage production and the forage requirements for livestock. The unit of measure is an animal unit month (AUM), which equals 800 pounds of utilizable forage. Forage requirements for a mature cow with a nursing calf for one month is approximately 1.3 AUM's. Approximately 75,000 AUM's are permitted annually.

Cattle numbers permitted on the Forest and Grassland have not varied significantly over the past decade; however, there has been a conversion from sheep to cattle. This conversion has occurred during the past twenty years. This can be attributed to economics, predator problems, and to a diminishing supply of herders. Most ranching operations throughout the area remain traditional cow-calf operations where the calves are sold each fall.



Grazing Allotments

The Forest and Grassland have a combined total of 90 grazing allotments. Most allotments are subdivided by fences into two or more "pastures." These pastures are incorporated into grazing systems that rotate livestock use on a scheduled basis. A few remaining allotments that are small, isolated, and usually with mixed ownership, do not have fenced subdivisions. These are scheduled for grazing during a specific season.

Many range allotments have forage in upland areas that receive only light use or no use due to a lack of water or low level of management. Allotment plans are being updated to effectively use this upland forage through herding, fencing, and water developments. The goal is to graze this upland forage and to reduce the use where livestock have concentrated in the past, such as riparian areas. More intensive management is also being used to control use of forage in riparian areas. Any long-term change in numbers or season of use is subject to the requirements of an updated allotment plan.

Vegetation condition data for the Forest and Grassland is mostly outdated. Due to restricted budgets, very little vegetation analysis has been done in the last twenty years. Recent allotment management plans have been prepared using the old data which has been field verified and updated. No data is available that accurately reflects condition classes over the entire Forest and Grassland. Best professional judgement indicates the majority of the uplands are one condition class better than 20 years ago. Some riparian areas have improved, and others have remained degraded. New plant association guides for vegetation analysis are to be published for the Ochoco National Forest in 1989.

Demand

The ability of local ranchers to utilize Forest and Grassland forage during the summer months, while producing several crops of hay on the base ranch for winter use, is economically essential to many ranches. Allotments have been fully occupied for many years. When an allotment becomes available it is quickly filled. This indicates the continuing high demand for forage available on the National Forest and Grassland.

Forest Health

Historically, fire has played a major role in determining the kind of vegetation that occupied the lands of the Ochoco National Forest and the Crooked River National Grassland. Natural fire was responsible for limiting the accumulation of forest residues, eliminating overly dense and stagnant pockets of ponderosa pine reproduction, and retarding succession to more tolerant conifers such as white fir and Douglas-fir.

With the exclusion of fire, the vegetation has substantially changed and the stability of the vegetation systems has been significantly reduced. Because of the increase in fuel loading, the probability of a high intensity wildfire that can damage overstory trees has increased. This effect is currently being mitigated through the Forest's prescribed burning program. Overly dense thickets, which are predisposed to insect attack because of their low vigor, are being addressed through the prescribed burning and thinning programs. The tolerant conifers which are increasing in abundance on the cooler and moister sites, are more susceptible to insect outbreak and root pathogens as well. Consequently, the Forest's vegetation is more at risk from insect and disease than it was in presettlement times.

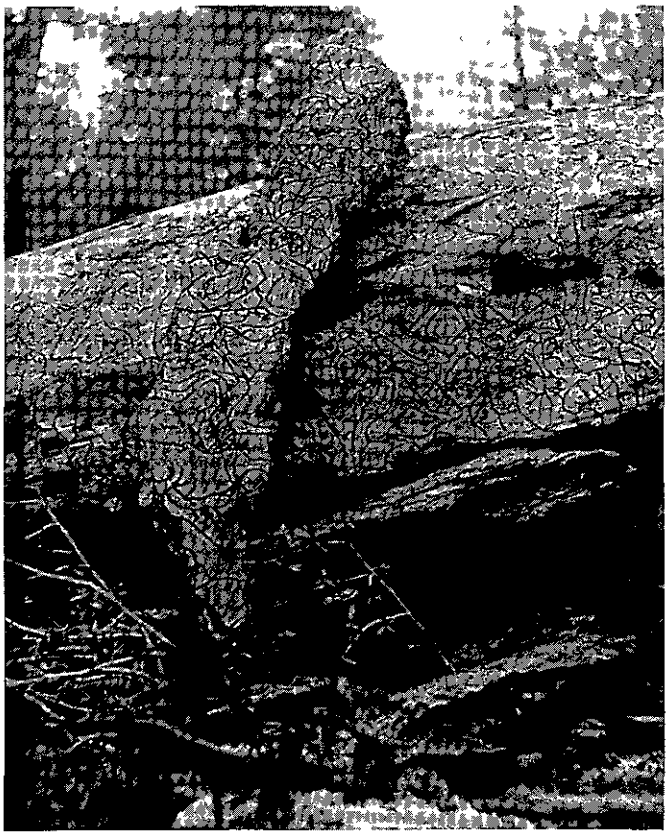
Major insect epidemics occur periodically on the Ochoco National Forest. In the 1950's, a major outbreak of Douglas-fir tussock moth (a defoliator of white fir and Douglas-fir) occurred. This outbreak was controlled with a massive spray program. In the mid 1970's, even-aged lodgepole pine stands were maturing and became susceptible to mountain pine beetle attacks. Most of these stands have suffered severe mortality (90% or more of the trees killed). An outbreak of western spruce budworm, a defoliator, occurred in the early 1980's. This outbreak is still occurring and has affected almost every mixed conifer stand in the Ochoco National Forest. Spraying was considered in an environmental analysis in 1983 and 1984, but no treatment was attempted except on a small research plot in 1984.

Insect and disease losses are principally addressed through silvicultural treatments. Harvesting and thinning techniques are selected to control dwarf mistletoe, mountain pine beetle, Western spruce budworm, Western pine beetle, heart rot, and root rots. Proper timing of slash treatment and thinning operations is used to control the pine engraver beetle.

The major threats to forest health on the Ochoco National Forest and the Crooked River National Grassland can be divided into the following five categories: bark beetles, defoliators, dwarf mistletoe, root diseases and stem decays, and animals. Each of these categories is discussed below.

Bark Beetles

Insects that lay eggs beneath the bark of host trees are referred to as bark beetles. Larvae emerging from the eggs tunnel and feed on the tree's cambial layer (Doliner 1984). These include mountain pine beetle, western pine beetle, pine engravers (Ips), and fir engravers. These are a major problem in pine types. The damage from these insects increases in over-stocked or over-mature stands (Mitchel, et al, 1983).



Defoliators

Insects that consume tree foliage are referred to as defoliators. These include western spruce budworm and Douglas-fir tussock moth. These are a major concern in mixed conifer stands, and damage from these insects occurs primarily in multi-aged or over-mature stands. These insects can also cause damage or destruction to cones and seeds (Wickman, et al, 1981, Gara 1981, Schmidt 1983).

Dwarf Mistletoe

This is a parasitic flowering plant which has no apparent leaves, and occurs only on above-ground parts of conifers (Doliner 1984). Damage to the host includes growth reduction and lowered wood quality. Mistletoe may kill or predispose the host to attack from other pests (Graham 1967). Dwarf mistletoe damage on ponderosa pine and Douglas-fir is a major concern on the Ochoco National Forest. Western larch may also be seriously infected in more localized areas. The amount of stand infestation and subsequent growth loss is frequently increased by partial harvest and long rotations.

Root Diseases and Stem Decays

These diseases are caused by a variety of fungi that infect the host tree through root contact or past injury. Damage from root rots and stem decay include growth loss, wood decay, and tree mortality. Rots and decays also predispose the infected tree to insect attack. The most common root rots are laminated, Fomes annosus, and Armillaria root rot. The most common stem decay is caused by Indian paint fungus. Mortality and usable wood loss can occur. Management activities that increase losses are partial cutting, which maintains susceptible species on the site, and logging.

Animals

Both wild and domesticated animals can cause damage to trees Damage to small trees from wild animals is primarily caused by big game (elk and deer) and pocket gophers. Damage to large trees from wild animals is primarily caused by porcupines. Damage from domesticated animals is primarily caused by livestock grazing.

Other Pests

Other forest pests, such as the larch casebearer, impact the trees in the Ochoco National Forest at times, but the magnitude of damage is significantly less than those listed above.

Forest Residues

Existing Condition

The Forest currently carries approximately 17 million tons of forest residues in the form of dead woody biomass. Activity residues make up 360 to 720 thousand tons at any one point in time. The rest, 16 2 million tons, is an accumulation of natural dead and down woody material.

Descriptions of the natural vegetation types in this area prior to significant fire exclusion and other management activities (Hall, 1976), provide background information which can be used to estimate natural residue loadings in the Blue Mountains In ponderosa pine types, residual pine types were typically in the 5-10 ton range with isolated areas ranging up to 30 tons. Most of the loading was in large woody material that survived the last fire (or fell since then), and needle and grass accumulation since the last fire. Duff layers were typically shallow, 1-2 inches due to frequent ground fires (see the discussion on local fire history in this chapter). In mixed conifer types, residue loadings were typically 10-20 tons per acre with more woody branch-type material in addition to the larger logs. Duff layers were also deeper, in the 2-4 inch range. This is due to the longer return interval of fire in these damper sites.

An analysis by Forest Interdisciplinary Team members (specialists from wildlife, range, watershed, timber and fire management) indicates that an average of 10.4 million tons of woody residues Forest-wide would provide an acceptable level of dead and decaying biomass to maintain long-term site productivity in local stand types. This represents a per acre loading of about 10.9 tons and is within the range of 8-14 tons per acre recommended for Inland Douglas-fir and associated species (Harvey, et al 1987).

Disposal of this apparent excess (about 7 million tons) is the crux of this management question and this analysis. See Chapter 2 and 4 for discussions on mitigation measures associated with treatment of excess residues and unwanted vegetation. Also, see Chapter 4 for a detailed discussion of the consequences of the alternatives on this resource.



Objectives

Determining how much and what kind of dead woody biomass to leave on site for maintenance or enhancement of long-term productivity. There is a lack of good, local information on how much is desirable for our sites. The most applicable recent work was for Inland Douglas-fir types of the northern Rocky Mountains of Idaho, Montana, and NE Washington. Most current literature dealing with Oregon applies to the wetter forest types of the Cascades and west of the Cascades. The dry, east-side types have not been intensively studied.

The large amount of residues on hand allows for considerable flexibility in adjusting the desired level upward if future research shows that need. There is ample room to take advantage of a wide variety of utilization and disposal options while still retaining adequate levels of residue for site productivity needs Manipulation of woody residues is a practical mitigation measure to ameliorate the effects of timber harvest, which removes much of the standing crop

and often creates major soil disturbance (Harvey, et al, 1987). Forest Service Region 6 direction (FSM 2403, R-6 Supplement 345, 3/85) provides guidance on ways to deal with residue management. Briefly, it states that residual woody biomass shall be considered first for retention on-site for long-term productivity. Any excess to that site need shall be made available for further utilization prior to any disposal.

The best utilization of material excess to site productivity needs, and the best disposition of material excess to utilization demand, remain as problems to be resolved.

Resource Concerns

Periodic drought and high lightning fire occurrence may limit the levels of forest residues that can be reasonably maintained on the ground and still prevent unacceptable wildfire losses.

Lack of the right temperature/moisture conditions (especially in ponderosa pine and associated species types) may limit the speed of organic decomposition commonly experienced in warmer/wetter environments, such as western Oregon and Washington (Harvey, et al, 1987). This can lead to accumulation of site nutrients in above-ground biomass out of reach of the roots in the soil layers. Many dry soils of the Intermountain West approach deficiencies in one or more nutrients within 125-150 years due to above ground nutrient storage in dead woody biomass (Behan, 1970).

Leaving too much residue above natural levels increases the likelihood of unacceptable damage to soils and vegetation from wildfires when they do occur (Hall, 1976; Harvey, et al, 1987; Boyer and Dell, 1980, Volland and Dell, 1981).

Too much residue on a site may inhibit herbage production and access for wildlife and livestock (Hall, 1976; Volland and Dell, 1981). Tree planting costs increase rapidly with increased residue loads.

Fuelwood

For many years firewood gathering was an incidental program on the Ochoco National Forest and Crooked River National Grassland. Firewood from the desired species and of the desired size was readily available close to towns for the relatively few local residents using wood fuel. Larch and juniper were the primary species utilized.

As a result of the oil crises of 1974 and 1979, many people began to view wood as an economical and reliable method of home heating. Firewood permits issued by the Ochoco National Forest and Crooked River National Grassland increased from 303 in 1971 to a peak of 7,361 in 1981. As a result, firewood close to population centers is now generally scarce, and smaller pieces of less desirable species must be used.

Lodgepole pine has become a favored species in recent years, primarily due to an increase in the number of dead snags caused by mountain pine beetles. Timber sale residues have also become a major source of firewood. The practice of yarding unmerchantable material to landings adjacent to roads has helped make this wood available.

The volume of firewood removed from the Ochoco National Forest and Crooked River National Grassland has declined since 1984 to less than 6,000 cords annually. This is due to a combination of factors, including high employment levels, abundance of dead lodgepole on the Deschutes National Forest, and the lack of quality wood cutting areas close to population centers on the Ochoco National Forest and Crooked River National Grassland. Future demand for firewood will depend on factors such as: the relative costs of alternate energy supplies, the distance of firewood supplies from towns, levels of logging residue available, and competition for the use of logging residues from the chip market.

Lands

The Ochoco National Forest and Crooked River National Grassland administer a lands adjustment program that frequently requires coordination with other land management agencies and private landowners to obtain easements and implement land exchanges. Land easements are obtained to provide temporary or permanent access to National Forest lands through other ownerships. Land exchanges are sought to consolidate land ownership in order to improve administrative efficiency.

The special use program deals with permits for special uses. Special use permits cover all uses other than timber sales, firewood permits and Christmas tree permits.

Lands

The Ochoco National Forest and Crooked River National Grassland have about 195,300 acres of private, State of Oregon and other Federal lands within their administrative boundaries. Proposals for land adjustments on intermingled lands are received from the various owners and managers. The Forest Service also participates in land exchanges with other government agencies, such as the State of Oregon and the Bureau of Land Management. The Ochoco National Forest and Crooked River National Grassland exchange lands primarily to block-up management areas or to acquire lands needed to meet management objectives. Congress has not authorized any funds for the purchase of lands by the Ochoco National Forest or Crooked River National Grassland.

Of the 132,970 acres of private land found within the boundaries of the Ochoco National Forest, the majority, approximately 110,000 acres, lies in large tracts along the fringe of the main Ochoco National Forest block The remaining 23,000 acres of private land consist of numerous scattered parcels. Eighty acres of State of Oregon land are found within the Ochoco National Forest boundary - a 40-acre parcel near Mahogany Butte and a 40-acre parcel near Allen Creek. Approximately 6240 acres of isolated parcels of National Forest System lands are scattered within large private tracts. Administration and management of these parcels is generally difficult and expensive.

Table 3-7 shows the acreages in other ownerships within the boundaries of the Ochoco National Forest and Crooked River National Grassland.

TABLE 3-7
OTHER LANDS
(See Any Alternative Map)

Land Ownership	Ochoco National Forest (acres)	Crooked River National Grassland (acres)
Private	132,970	52,670
State of Oregon	80	1,400
Other Federal (Primarily BLM)	0	8,180
Total	133,050	62,250

The 52,670 acres of private land within the Crooked River National Grassland consists of numerous scattered parcels, while the State of Oregon lands and other Federal lands are mostly concentrated along the Crooked, Deschutes, and Metolius Rivers. Land ownership on the east side of the Crooked River National Grassland is much more consolidated than the west side. There are, however, isolated parcels of both private and National Grassland land on the east side.

The Forest Service leases 2,695 acres of land on the Crooked River National Grassland to the State of Oregon for the Cove Palisades State Park. This lease will expire April 19, 1990, but will automatically be renewed for 15 years unless written notice is given by either party 90 days prior to the termination date. The State of Oregon has been responsible for the development and operation of the recreational facilities, while the Forest Service maintains control over minerals and fire management.



Special Uses

Special use permits are issued for a variety of uses and activities. Some examples include: electronic sites, telephone lines, roads, reservoirs, pipelines, airstrips, endurance rides, dog field trials, and other organized group events. Special use permits are grouped into several categories. A summary of the special use permits on the Ochoco National Forest and the Crooked River National Grassland, by category and Ranger District, is displayed in Table 3-8.

TABLE 3-8
SPECIAL USE PERMITS

	Category 1/									
Ranger District	100	200	300	400	500	600	700	800	900	Total
Big Summit	1	0	0	0	0	0	0	3	4	8
Paulina	0	0	0	0	0	0	0	0	3	3
Prineville	4	2	0	0	2	0	1	1	7	17
Snow Mountain	1	0	0	0	0	0	0	0	1	2
Crooked River National Grassland	15	4	1	0	2	16	6	26	5	75
Total	21	6	1	0	4	16	7	30	20	105

1/ Category
100 = Recreation
200 = Agriculture
300 = Community
400 = Industry
500 = Public Information
600 = Energy Generation & Transmission
700 = Transportation
800 = Utilities & Communications
900 = Water

The Ochoco National Forest and Crooked River National Grassland provide transmission corridors and facility locations for various utilities. Eight major transmission lines, 230 KV or larger, cross the Crooked River National Grassland. Numerous small power lines serve wells and residences located throughout the Ochoco National Forest and Crooked River National Grassland. A 36-inch natural gas pipeline crosses the east side of the Crooked River National Grassland from north to south, two smaller lines branch from this mainline to supply the communities of Madras and Prineville. Several telephone lines (buried and overhead), along with two electronic communication sites, are located on the Ochoco National Forest and Crooked River National Grassland.

Demand

The demand for electrical and telephone facilities has been increasing each year as more and more parcels of private land scattered throughout the Ochoco National Forest and Crooked River National Grassland are developed for residential purposes. The demand for transmission facilities is also increasing as population centers in Oregon and California increase. The western leg of a proposed Alaska Natural Gas Transportation System, a 42-inch line, is proposed to parallel the existing 36-inch line on the Crooked River National Grassland. In December 1988, the Federal Energy Regulatory Commission received an application requesting the authority to expand the pipeline system. If this authority is granted, construction on this western leg could begin within 2 years. The construction of another major electric transmission line has also been proposed. This line would cross only private land within the boundaries of the Ochoco National Forest.

Minerals and Energy

Mineral commodities are classified by law into three categories: locatable, leasable and saleable. The manner in which each is managed, and the authority of the Forest Service to control the exploration for and development of each commodity, varies considerably.

Locatable Minerals

Locatable minerals are those minerals which, when found in valuable deposits, can be acquired under the General Mining Laws of 1872, as amended. Examples of locatable minerals on the Ochoco National Forest include, but are not limited to, gold, mercury (cinnabar), and uncommon varieties of gemstones. Citizens and those who have declared their intent to become citizens of the U.S., have a statutory right to explore vacant unwithdrawn public land for these minerals. Upon discovering a valuable deposit, they have a right to locate, mine, and remove the minerals.

Forest Service control of these activities is limited to minimizing impacts on surface resources. This is accomplished by requiring that mining operations are conducted in accordance with an approved plan of operations. The Forest Service reviews the plans of operations to ensure that environmental protection standards are met. These include standards for air, water, cultural resources, and threatened and endangered species. Assuring prompt reclamation or restoration of disturbed lands is accomplished as part of the operating plan process.

The mine operator is required to submit a proposed plan of operations whenever mining operations are likely to cause significant surface disturbance. After receiving a proposed plan of operations, the Forest Service will conduct an environmental analysis and determine whether an environmental impact statement is necessary. The District Ranger will then do one of the following: (a) approve the plan, (b) notify the operator that the proposed operations do not require a plan of operations, (c) notify the operator of any necessary changes in, or additions to, the plan

of operations, or (d) notify the operator that an environmental impact statement must be prepared before the plan can be approved.

If unforeseen surface disturbance occurs during mining operations, the Forest Service may require the operator to furnish a modified plan of operations. In this situation, mining operations may continue unless the operations are causing resource damage that is unnecessary, unreasonable and irreparable.

Designated wilderness areas and other withdrawn areas are not open to mining claim location. However, these areas are subject to valid existing rights perfected prior to the date the area was withdrawn. Refer to Table 3-9 for a list of areas withdrawn from location under the mining laws.

TABLE 3-9
AREAS WITHDRAWN FROM MINING

Area	Acres
Black Canyon Wilderness	13,400
Bridge Creek Wilderness	5,400
Mill Creek Wilderness	17,400
Ochoco Divide RNA	1,920
Delintment Lake	360
Walton Lake	240
Ochoco Ranger Station	230
Ochoco Highway Zone	1,020
Rager Ranger Station	160
Total	40,130

Acquired lands are not subject to location under the 1872 Mining Law, but are subject to mineral leasing under the Acquired Lands Leasing Act as "hardrock leasables." Most of the Crooked River National Grassland was acquired under Title III of the Bankhead-Jones Farm Tenant Act.

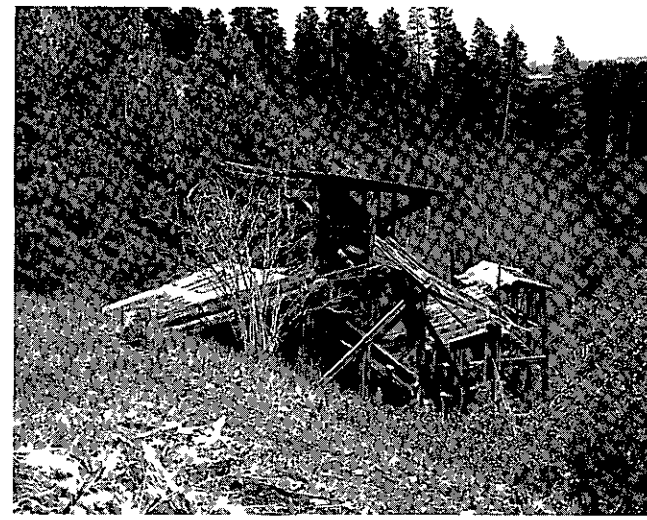
The primary locatable minerals sought on the Ochoco National Forest and Crooked River National Grassland are cinnabar (mercury), gold, and semiprecious gemstones (agate, thunder eggs, jasper, etc.). There are approximately 1,000 mining claims located on the Ochoco National Forest National. Most of the Crooked River National Grassland is not open to mineral entry under the general mining laws.

Mercury and Gold

Approximately 8080 acres on the Big Summit and Prineville Ranger Districts are classified as having high potential for the occurrence of cinnabar (from which mercury is extracted) or gold. An additional 86,400 acres on these Districts, and approximately 19,250 acres on the Crooked River National Grassland are classified as having moderate potential for the occurrence of mercury or gold. Refer to maps entitled Mineral Potential - Locatable Minerals and Mineral Potential - Oil and Gas for a display of where the potential for discovery is concentrated.

A high mineral potential is used where geologic characteristics, favorable for resource accumulation, are known to be present, and evidence exists that indicates mineral concentration or mineralization has taken place. On the Ochoco National Forest, the rating of high mineral potential is based on past mineral production. Refer to Table 3-10 for a list of mines on the Ochoco National Forest which are known to have produced mercury or gold.

A moderate mineral potential exists where geologic



conditions are favorable for mineral accumulation, but where the evidence of mineralization is questionable or has not yet been found. Areas classified as having a moderate potential could be reclassified as having high potential if new information is acquired, or if economic conditions change.

Areas classified as having moderate mineral potential exhibit one or more of the following characteristics:

1. The area is underlain by rocks of the Clarno Formation which have been intruded by igneous rocks, faulted or hydrothermally altered (this is the geology of producing mines in the area).
2. Agate, jasper or thundereggs have been found in the area (these indicate the presence of a epithermal mineral deposit, the type of mineral deposit mined in the area).
3. The Oregon Department of Geology and Mineral Industries sampling programs on the Ochoco National Forest in 1982, 1984, and 1985, or the Bureau of Land Management sampling program on the Crooked River National Grassland in 1986, detected anomalous values of precious metals.

Mining companies have been conducting extensive exploration for large, low-grade epithermal deposits of gold in central and eastern Oregon during the past several years. The discovery of a major gold deposit in eastern Oregon triggered a "rush" in 1988. Large, low-grade gold deposits are generally extracted using open pit mining and heap leaching techniques. On the Ochoco National Forest, the areas classified as having moderate or high potential for the occurrence of gold or mercury are underlain by large, low-grade epithermal deposits, and the Forest and Grassland are experiencing some exploration activity. Thus, the potential exists that the Forest or Grassland could become the site of a major gold mine. This event would trigger an Environmental Impact Statement (EIS) and Forest Plan Amendment.

The rest of the Ochoco National Forest is classified as having a low mineral potential for locatable minerals. This rating is assigned to areas where geologic characteristics are unfavorable for mineral accumulation, or where there is no significant evidence of mineralization.

Areas of the Ochoco National Forest, near the Spanish Gulch and Maury Mountain mineralized areas, are classified as having low potential, because even though they are close to Forest Service land, the geologic features occurring at the mines do not occur on the nearby Ochoco National Forest lands.

Semiprecious Gemstones

Thundereggs, jasper, agate and petrified wood are collected by rockhounds on the Ochoco National Forest. Central Oregon is nationally known for its rockhounding opportunities, and this popular activity is important to the local economy.

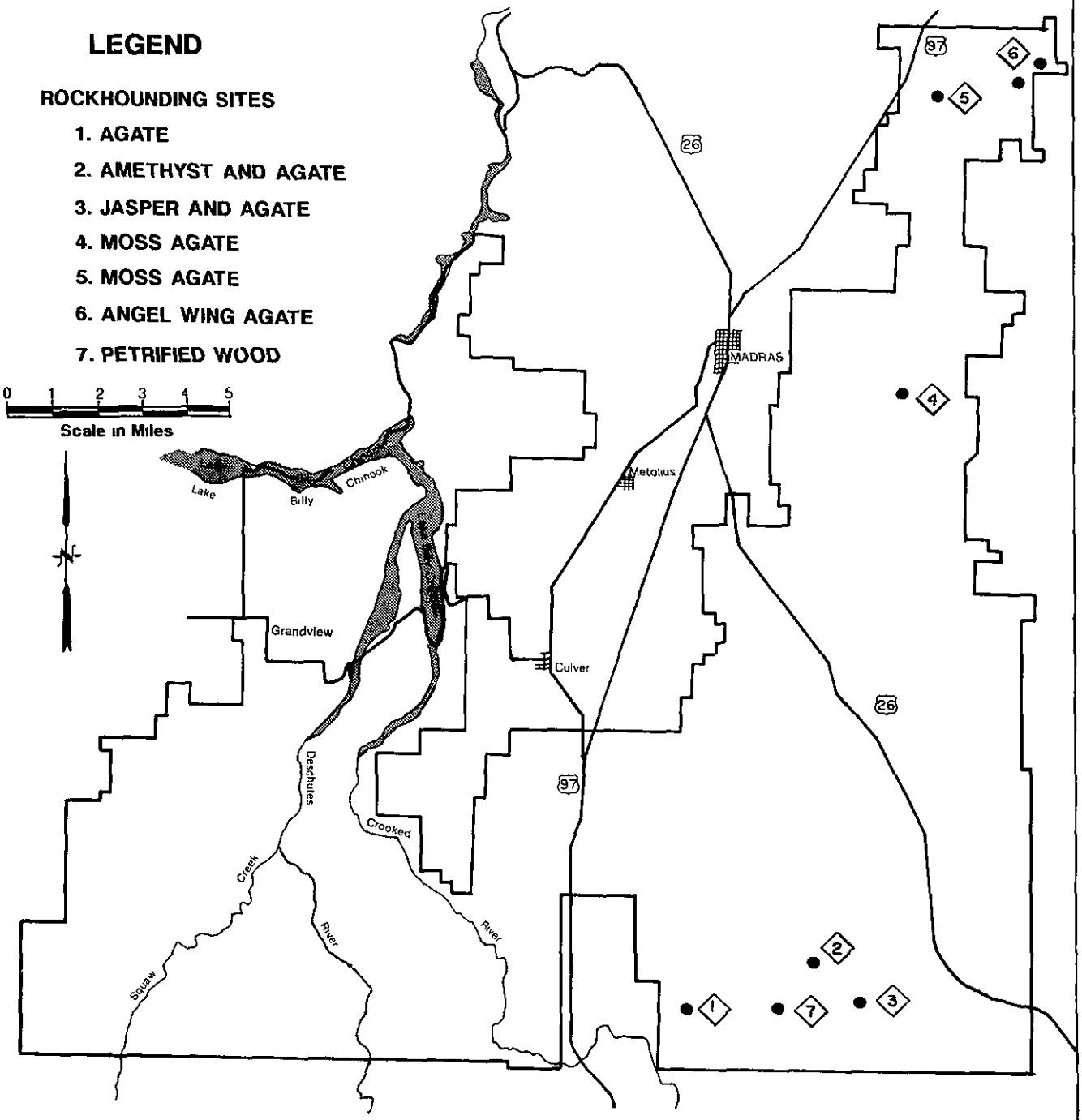
Hunting and collecting rocks and minerals as a hobby does not require a permit or mining claim if the specimens are collected for personal, noncommercial use. Thundereggs, jasper and agate are locatable minerals, and several individuals have located mining claims and are mining these materials commercially. The Prineville Rockhound Club maintains four mining claims for public use, and the Tualatin Valley Gem Club maintains one claim on the Prineville District for these materials. By law (Act of September 26, 1962; 76 Stat. 652), petrified wood is not locatable. Limited quantities of petrified wood may be collected from public lands on a free-use basis.

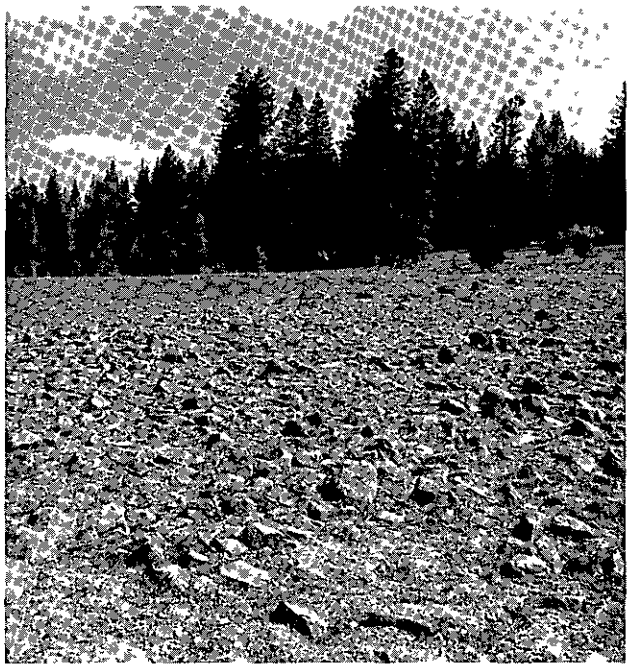
TABLE 3-10
MERCURY AND GOLD MINES

Name	Location	Commodity	Total Historic Production
Kidnap Springs Area			
Strickland Butte Mine	T13S R17E Sec 14	Hg	10 flasks
Allison Prospect	T13S R17E Sec 23	Hg	3 flasks
Kidnap Springs Prospect	T13S R17E Sec 23	Hg	5 flasks
Watson Prospect	T13S R17E Sec 23	Hg	1 flask
Howard Creek Mining District			
Little Hay Creek Prospect	T13S R19E Sec 27	Hg	3 flasks
Taylor Ranch Mine	T13S R19E Sec 34	Hg	248 flasks
Ophir-Mayflower Mine	T13S R20E Sec 29, 30	Au	>2500 oz
Scissors Creek Placers	T13S R20E Sec 30	Au	>500 oz
Byram-Oscar Mine	T14S R18E Sec 23	Hg	63 flasks
Champion Mine	T14S R19E Sec 3	Hg	37 flasks
Staley Mine	T14S R19E Sec 7	Hg	448 flasks
Round Mountain Prospect	T14S R20E Sec 3, 4	Hg	2 flasks
Blue Ridge Mine	T14S R20E Sec 15	Hg	301 flasks
Devils Food Prospect	T14S R20E Sec 16	Hg	1 flask
Mother Lode	T14S R20E Sec 20, 29	Hg	503 flasks
Amity Mine	T14S R20E Sec 32	Hg	409 flasks
Maury Mountain Area			
Maury Mountain Mine	T17S R19E Sec 10	Hg	609 flasks
Towner Mine	T17S R19E Sec 10	Hg	183 flasks
Spanish Gulch Area			
Andrews	T13S R25E Sec 7	Au	Unknown
Waterman	T13S R25E Sec 7	Au	Unknown
Spanish Gulch Placers	T13S R24E Sec 12	Au	5,000 oz

Figure 3-9

ROCKHOUNDING AREA





Leasable Minerals

Leasable minerals are mineral commodities that have been specifically excepted from the General Mining Law by Congress, principally through the following acts: the Federal Onshore Oil and Gas Leasing Reform Act of 1987, the Mineral Lands Leasing Act of 1920, the Mineral Leasing Act for Acquired Lands of 1947, the President's Reorganization Plan No. 3 of 1946, and the Geothermal Act of 1970. Leasable minerals include oil and gas, geothermal resources, and locatable mineral deposits with acquired status (hardrock leasables). These minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of Interior.

The Secretary of Agriculture, through the Forest Service, has consent authority for leasing of geothermal resources and hardrock leasable minerals on all National Forest System lands. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 contains key provisions altering the Forest Service's authority for the management of leasable minerals. The Secretary of Agriculture now has consent authority for the issuance of oil and gas leases on National Forest System lands. In addition, no oil and gas permits to drill may be granted without the analysis and approval of a surface use plan by the Forest Service. Regulations implementing these authorities have been published as a proposed regulation in the Federal Register and are being finalized at the National level.

The availability of reserved lands for mineral leasing depends on whether the implementation of development activities could meet land management direction. On acquired lands, permits or leases are subject to conditions ensuring that the lands are used for the purpose for which they were acquired or are being administered.

The policies and procedures by which mineral use authorizations for federally owned leasable minerals are to be processed may be found in the Interagency Agreement between the Forest Service and the Bureau of Land Management (BLM) dated June 19, 1984.

Oil and Gas

The original authority for classification of mineral potential on public lands rested with the U.S. Geological Survey (USGS). This agency classified the State of Oregon in 1976. The following criteria were used to define lands as prospectively valuable for oil and gas:

1. The area is underlain by a section of sedimentary rocks, either marine or nonmarine, 1,000 feet more in thickness;
2. The sedimentary strata have not been metamorphosed or intruded by igneous rocks to the extent that any oil or gas would have been driven off; and
3 The fact that the rocks may now be under a thick cover of lava or other type of deposit does not eliminate them.

Using these criteria, approximately 85 percent of the Ochoco National Forest and Crooked River National Grassland was classified as being prospectively valuable for oil and gas (refer to Map of Mineral Potential - Oil and Gas).

In 1982, the responsibility for classification was shifted from USGS to the Minerals Management Service, and then to the Bureau of Land Management. In 1984, the BLM proposed the following as a new definition for "prospectively valuable for oil and gas":

> A classification of public lands in which geologic data suggest that the underlying rocks may contain the potential for hydrocarbon accumulation.

Unfortunately, due to a lack of funding and staff, the BLM has not reclassified Oregon for oil and gas potential.

The oil and gas potential of the Ochoco National Forest and Crooked River National Grassland remains poorly defined. Although much of the Ochoco National Forest has been leased for oil and gas, very little exploration or development has occurred. One well was drilled in the Maury Mountains (T17S R23E Section 31). This well encountered marine sediments beneath the tertiary volcanic cover. However, much more work will be necessary before the potential is well-understood.

Geothermal Energy

The Oregon Department of Geology and Mineral Industries has classified the entire Ochoco National Forest and Crooked River National Grassland as favorable for the discovery of geothermal resources. This classification is based on various geothermal, volcanic and tectonic phenomena, including thermal wells, youthful volcanism, mineralization, and anomalous concentrations of faults and lineaments However, approximately two-thirds of Oregon is given this classification, and it is probable that only parts of this area are truly underlain by thermal waters.

An unnamed spring producing 10 grams per minute of 85° F water is located at T19S R26E Section 5, on the Snow Mountain Ranger District. Two thermal wells are located near the boundary of the Crooked River National Grassland, southeast of Madras. One well, located in NE1/4NE1/4 Section 24, T11S R13E W.M., intercepts water measuring 25°C (77°F); the other well, with water at 21°C(70°F), is located in SE1/4 NE1/4 Section 24, T11S R13E W.M.

Hydro-electric

The development of hydro-electric power facilities on the Ochoco National Forest and the Crooked River National Grassland is limited by low runoff and unfavorable economic constraints. Existing developments occur at Pelton and Round Butte dams on the Deschutes River, and at Opal Springs on the Crooked River. Several sites have been considered for development that would create impoundments on National Forest System lands, but no licenses have been granted by the Federal Energy Regulatory Commission.

Saleable Minerals

Saleable minerals include common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. In general, these minerals are of wide-spread occurrence and are of relatively low unit value. They are generally used for construction materials and for road building purposes. Saleable minerals which have some property giving them distinct and special value, remain locatable. Before a deposit can be sold, a determination of "common variety" must be made by minerals staff and legal counsel.

These materials are disposed of under the authority of the Materials Act of July 31, 1947, as amended by the Act of July 23, 1955. Disposal of saleable minerals from public lands administered by the Forest Service is at the discretion of the Forest Service.

Saleable minerals may be disposed of through competitive sale, sale by negotiated contract, or by preference right negotiated sale. Free use permits may be issued to nonprofit associations or government agencies. Mineral materials on lands acquired under the authority of the Bankhead-Jones Act may be disposed of only to public agencies, and are only to be used for public purposes.

The Ochoco National Forest and Crooked River National Grassland produce approximately 147,850 cubic yards of rock annually. This rock is used by the Forest Service, National Grassland, the State of Oregon, and local counties and cities to maintain their roads and highways.

Access Restrictions

Mineral and energy resources on the Ochoco National Forest and Crooked River National Grassland have been classified in terms of "potential" and "existing land access restrictions." Table 3-11 displays the existing land access restrictions in each mineral and energy potential category.

Categories for mineral and energy potential refer to the degree that geologic conditions are favorable for the occurrence of locatable and leasable sources. In this table, "locatable" refers to gold and cinnabar deposits on the Ochoco National Forest. "Leasable" refers to oil and gas on both the Ochoco National Forest and Crooked River National Grassland, and also to gold and cinnabar on the Crooked River National Grassland.

For each mineral and energy potential category, access restrictions have been applied to all lands within the boundaries of the Ochoco National Forest and Crooked River National Grassland, according to specific resource management objectives.

For locatable minerals, the acreage listed as withdrawn represents those areas listed in Table 3-9. The areas classified as having high access restrictions include: wilderness study areas, research natural areas, roadless areas, scenic and recreation rivers, old growth, and developed recreation areas. Areas with moderate access restrictions include: big game winter range, eagle roosting areas, riparian areas, trails, and visual management corridors. All remaining areas, not placed in the withdrawn, high, or moderate categories, have been placed in the low access restriction category.

TABLE 3-11
MINERAL AND ENERGY POTENTIAL
AND ACCESS RESTRICTIONS
(Acres)

	Locatable			Leasable	
Access Restrictions	High	Moderate	Low	Prospectively Valuable	Not Prospectively Valuable
Withdrawn	0	13,020	27,110	34,360	1,840
High	2,080	6,750	60,595	82,105	26,790
Moderate	1,760	13,890	220,610	199,620	52,080
Low	4,240	52,740	441,840	530,505	27,845
Total 1/	8,080	86,400	750,155	846,590	108,555

1/ The total locatable area does not equal the total leasable area due to the provisions of the Bankhead-Jones Farm Tenant Act that require most of the Crooked River National Grassland to be administered under the leasable system

For leasable minerals, the acreage listed as withdrawn represents wilderness areas. In the areas classified as having high access restrictions, leases will be issued with "no surface occupancy" stipulations. In areas having moderate access restrictions, leases will be issued with stipulations restricting operating seasons or requiring facilities be set back from specified features.

Demand

The demand for mineral and energy resources will continue to increase as developed sources decline, and as populations increase. The degree of exploration and development of new sources will fluctuate with economic changes, and mineral and energy shortages.

The collection of semiprecious gemstones may increase slightly, depending on population trends and leisure time activities.

Old Growth

Old growth is an important component of the Ochoco National Forest and the Crooked River National Grassland. The old growth stage in plant succession supports a unique combination of features that provides habitat for over 100 wildlife species, and contributes to biological diversity. Old growth also enhances visual and recreational qualities of the Forest and Grassland.

During the most recent inventory, conducted in 1987, old growth was identified (using the Regional definition) as "any stand 10 acres or greater in size with the following general characteristics: 1) contains mature or overmature trees in the overstory that are well into the mature growth stage; 2) usually contains a multi-layered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand."

The 1987 inventory was conducted primarily by Ranger District personnel. Stands were delineated using information from aerial photograph interpretation, stand exam data, and local knowledge. Field verification of stand boundaries and condition was not completed for all stands. A total of 93,800 acres of ponderosa pine and mixed conifer old growth were identified and mapped. Of this, 20,500 acres lie within wilderness.

The inventory used in the Ochoco National Forest and Crooked River National Grassland DEIS, conducted in 1982, identified a total of 80,000 acres of ponderosa pine and mixed conifer old growth (along with more than 50,000 acres of old growth juniper). The difference in the estimated totals obtained from the two inventories appears to be due to the old growth definitions and criteria that were used. The 1982 inventory used more specific stand characteristics (which were designed primarily to meet wildlife habitat objectives) than those identified in the Regional definition. Furthermore a 50-acre, rather than 10-acre, minimum size constraint was used for stand selection. Therefore, the broader definition used for the 1987 inventory allowed inclusion of additional stands.

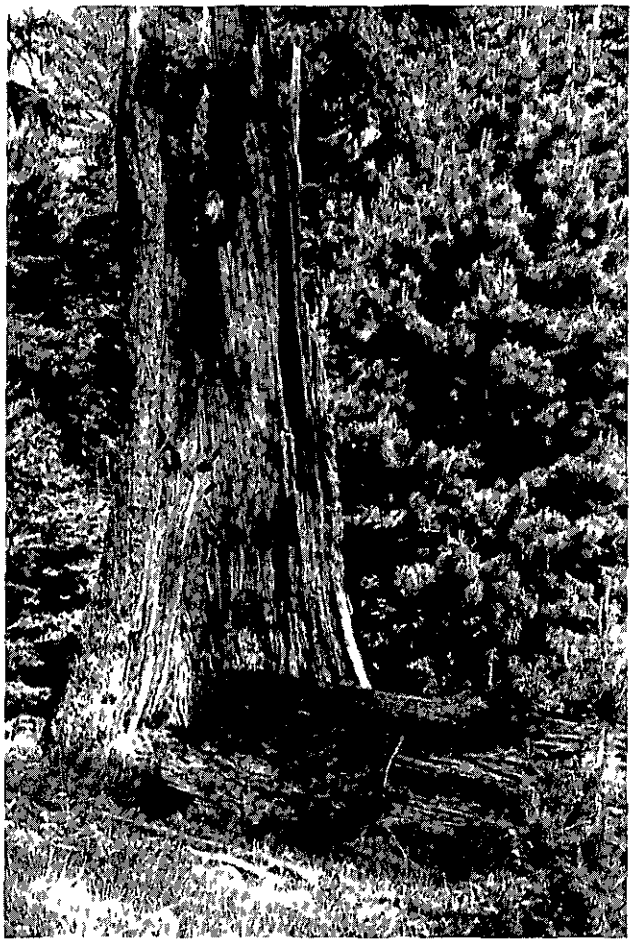
The following definitions were used for the allocation process.

1) Suitable Old Growth meets the Regional definition and provides reproductive habitat for the pileated woodpecker. To the extent possible, 300 acre contiguous stands of old growth were selected, and stands were distributed across the Forest in a 1 per 12,000 acre block pattern.

2) Capable Old Growth does not meet the Regional definition but exists in a site which is capable of producing old growth characteristics in the future. The assumption was made that all lands able to produce 20 cubic feet per acre per year of wood are capable of eventually producing suitable old growth. Capable areas were allocated to expand an old growth stand to 300 acres, or to distribute stands in a pattern that will meet long-term habitat requirements for the pileated woodpecker.

3) Allocated Old Growth (either suitable or capable) is permanently set aside as wildlife habitat during the planning process.

4) Unallocated Old Growth meets the Regional definition but has not been set aside as wildlife habitat during the planning process. Unallocated areas may exist in general forest, wilderness, roadless, and research natural areas.



Recreation

Outdoor recreational opportunities on the Ochoco National Forest and Crooked River National Grassland are generally less primitive than those found on many other National Forests in the Pacific Northwest. A combination of easy terrain, high quality stands of pine timber, and good forage for livestock prompted early commercial use of the area. As a result, 89 percent of Ochoco National Forest lands have been accessed by roads for various management activities.

Recreational Opportunities Spectrum (ROS)

Recreational opportunities on the Ochoco National Forest and Crooked River National Grassland were classified using the ROS land classification system (Clark and Stankey, 1979). ROS inventory identifies recreational settings that vary from an undisturbed natural environment with little human contact to a highly modified environment with frequent human contacts. It serves as a basis for defining the types of outdoor recreational opportunities the Ochoco National Forest and Crooked River National Grassland might best provide. Table 3-12 lists and summarizes the recreational opportunities by ROS classification. The reader is referred to the glossary for specific definitions of each ROS classification.

Developed Recreation

The Ochoco National Forest and Crooked River National Grassland currently maintain 22 campgrounds, 4 boating sites, and 4 picnic areas. These developed recreational facilities have a capacity to accommodate 1880 persons at the same time.



Dispersed Recreation

There are an estimated 950 dispersed recreational sites on the Ochoco National Forest and Crooked River National Grassland that are frequently used during the summer and fall. Most of these sites have no facility development (e.g., toilets, drinking water, tables). Some of the more heavily used sites do have minimal facilities for resource protection and public health purposes, such as pit toilets and potable water.

Specific dispersed recreational opportunities available include hiking, backpacking, picnicking, camping, hunting, fishing, gathering forest products, trail biking, driving for pleasure, bird watching, water skiing, rockhounding, off-road vehicle travel (see Appendix D, Travel Plan, in the Ochoco National Forest Plan), swimming, horseback riding, mountain biking (see publication, "Developing Mountain Bike Opportunities on the Ochoco National Forest, available at the Forest Supervisors Office), winter sports, general leisure, and sightseeing.

TABLE 3-12
RECREATIONAL OPPORTUNITIES

Type of Area	Code Letters	Inventoried Acres (Criteria Boundary)	Acres Currently Managed
Wilderness	W	36,200	36,200
Primitive Not Trailed 1/		3,000	0
Primitive Trailed 1/		3,300	0
Semiprimitive 1/		29,900	36,200
Primitive	P	0	0
Semiprimitive Nonmotorized	SPNM	50,280	29,090
Semiprimitive Motorized	SPM	6,630	0
Roaded Natural and Rural	RN or R 2/	851,390	879,210
Urban	U	0	0
Totals		944,500	944,500

1/ The acreages for these wilderness types had not been compiled at press time

2/ Roaded Natural and Rural categories were combined since they are managed almost identically on this Forest

Source Recreation Spectrum Opportunity Inventory for the Ochoco National Forest and Crooked River National Grassland

Off-Road Vehicle Use

The use of ORV's on the National Forest and Grassland Systems has been recognized as a legitimate recreational pursuit when in concert with the environmental setting, when the effects are minimized on the land and other resources, when public safety is provided for, and when conflicts with other users are controlled. The Forest has been operating under the 1977 ORV Plan to date. This Plan provides both controls and monitoring measures.

The use of ORV's was initially identified as an issue on the Henderson Flat area on the Grassland It was not carried forward in the original ICO's for the DEIS because it was specific to the Grassland and was seen as a local issue that could be dealt with outside the planning process. Henderson Flat continues to be a problem however, and has been the subject of criticism by some publics, including a recent appeal on a decision to sign an existing trail for ORV use. The Prineville Ranger District has also received recent criticism about ORV use and environmental damage.

Problems with ORV use presently fall into two categories: 1) environmental damage when use occurs during periods when soils are subject to damage, and when use occurs on sensitive areas, such as riparian areas, and 2) social issues surrounding those who own and wish to pursue ORV use opportunities on the Forest and Grassland, and those who want to preclude such use as being inappropriate and in conflict with other resources. Off-road vehicle use continues to be a popular recreation pursuit on the Forest and Grassland.

Trails

The Ochoco National Forest and Crooked River National Grassland maintain 96 miles of trails. A majority of the trails exist as short segments of a formerly extensive system that has largely been replaced with roads. Two of the trails, Twin Pillars and Round Mountain, are designated National Recreation Trails. Portions of the Summit Trail have been designated a National Historic Route. Segments of the 19th century Camp Watson Military Road can also be found intact. Approximately 97 miles of snowmobile routes and nine miles of cross-country skiing routes exist.



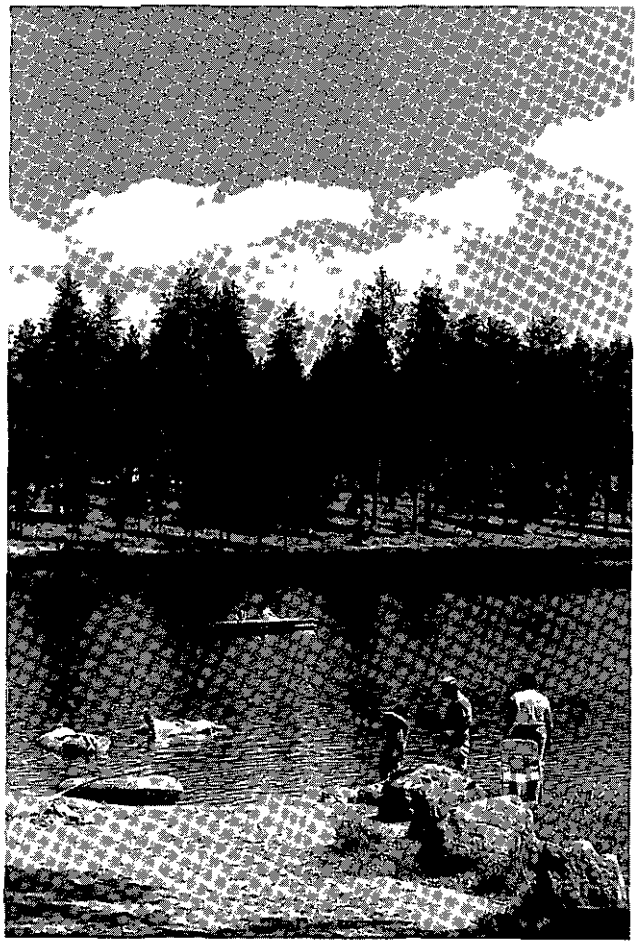
National Recreation Strategy

The Ochoco National Forest is committed to the National Recreation Strategy goal of providing customer satisfaction with more, high-quality recreation services. Customer satisfaction will be improved by seeking out new ideas, providing interpretive services, promoting an outdoor ethic, providing opportunities to all user groups, promoting tourism that will help build strong communities and improve quality of life, and matching human resource needs with recreational opportunities. Partnerships with private enterprise, other agencies, and user groups will be developed to encourage, establish, and sustain a diverse and balanced range of recreational opportunities. The Ochoco National Forest and Crooked River National Grassland will be seeking partners to help to develop and maintain recreational facilities, test innovative ideas, establish mutual cooperation, represent groups with special needs, and provide funding.

Demand

The Ochoco National Forest and the Crooked River National Grassland is heavily utilized for the following four activities.

1. Rockhounding - The Ochoco National Forest and the Crooked River National Grassland contain numerous locations where gemstones may be found. These are of significance regionally, if not nationally, and attract visitors from many areas.
2. Big Game - The Ochoco National Forest and the Crooked River National Grassland contain excellent big game hunting opportunities for both deer and elk, which are also a major attraction to hunters statewide. Many of the hunters come from western Oregon locations, notably Portland and the Willamette Valley.
3. Water-Related Recreation - The relatively few lakes and reservoirs (Antelope, Walton, Billy Chinook, Haystack, and Delintment) on the Ochoco National Forest and Crooked River National Grassland receive heavy use.



4. River-Related Recreation - Sections of the Crooked River, North Fork of the Crooked River, and the Deschutes River have all been classified as Recreational or Scenic under the Oregon Wild Rivers Act. Lower Squaw Creek has been determined eligible for further study under the National Wild and Scenic Rivers Act.

Numerous other managed recreation sites are located on the Ochoco National Forest and Crooked River National Grassland Most are significant only within the Zone of Influence identified earlier in this chapter. These include designated recreation areas at Stein's Pillar, Bandit Springs, Deep Creek, and Lookout Mountain.

Off-road vehicle use is not, at this time, considered a "major" recreational use on the Forest except in specific isolated areas (e.g., Henderson Flats). Demand is expected to increase.

Current recreational use relies heavily on the road system. Road related uses total approximately 90 percent of the present recreational use. The predominate recreational activities are camping, motorized travel, picnicking, and hunting. Recreational use by year and ROS classification is shown in Table 3-13. Recreational use is measured in Recreation Visitor Days (RVD's), which are defined as recreational use of an area for a 12 hour period. The drop in total RVD's between 1970 and 1975 is attributed primarily to the oil embargo and the resulting gas shortage. The overall trend conforms closely with population trends, however, resulting in expectations of continued increases in recreational use for the foreseeable future.

Estimates of future recreational use depend on many uncertain factors and should be viewed as trends useful for making relative comparisons. The following assumptions were made to estimate future recreational demands:

1) For most forms of recreation uses demand follows population trends;

2) Stream fishing demand varies directly with fish habitat and populations; and

3) Construction of trails, trailheads, and campsites shifts demands higher for some categories of recreation use.

Table 3-14 displays a representative set of demand projections by ROS class. The Roaded Natural/ Rural category has been split into two categories to show the differences between developed and dispersed recreation.

TABLE 3-13
RECREATIONAL USE
(Thousand RVD's)

	ROS Classification					
Year	W (Total)	SPNM	SPM	RN/R (Developed)	RN/R (Dispersed)	Total
1965	N/A	27 0	9 0	55 4	166 3	257 7
1970	N/A	32 9	15 6	84 4	253 1	385 0
1975	N/A	24 7	9 6	64 7	194 1	293 1
1980	N/A	35 0	13 7	94 8	284 4	427 9
1988	13 7	28 5	15 2	97.1	290 3	444 8

Source Recreation Information Management System, Ochoco National Forest Files

TABLE 3-14
RECREATIONAL DEMAND
(Thousand RVD's)

	ROS Classification					
Year	W (Total)	SPNM	SPM	RN/R (Developed)	RN/R (Dispersed)	Total
1990	15 5	32 2	17 0	117 4	345 8	527 9
2000	17 2	35 4	18 8	134 1	384 2	589 7
2010	18 4	38 3	20 2	145 6	410 4	632 9
2020	19 8	41 3	21 8	158 3	435 3	676 5
2030	21 8	44 8	23 6	172 4	468 4	730 7

Scenic Resources

The Ochoco National Forest and Crooked River National Grassland encompass a variety of vegetation, climatic, and geologic zones. These zones can be observed from the Crooked River National Grassland's rolling range country that is interspersed with deep canyons and scattered volcanic buttes to the Ochoco National Forest's extensive stands of ponderosa pine and unique rock features. Most visitors travel through the Ochoco National Forest on Highway 26, which passes through open park-like stands of old growth ponderosa pine. The degree of visitor sensitivity to these stands is difficult to quantify, but the public is perceived to enjoy seeing large yellow-barked pine trees in open park-like settings.

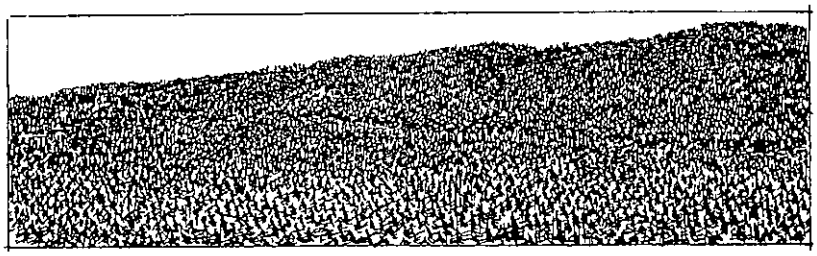


The appearance of the Ochoco National Forest and Crooked River National Grassland has changed over time. Elimination of fire, and an accompanying change in plant succession, has had the most effect. In the past, these changes have been gradual and not always readily evident to the casual observer. Recent intensive management practices, such as timber harvest, wildfires, livestock grazing, and road construction, have increased the apparent rate of change on the landscape, and modifications have become more obvious. Visual impacts of clearcutting and prescribed burning are the most notable.

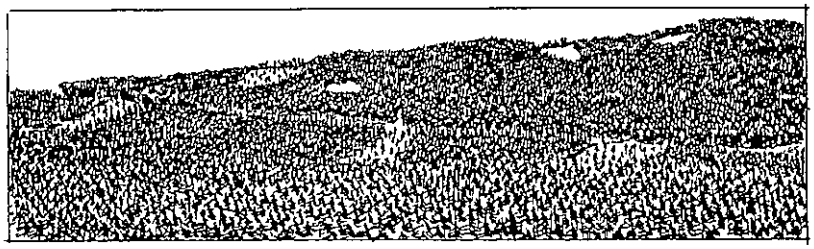
The scenic resources of the Ochoco National Forest and Crooked River National Grassland have been inventoried in terms of Visual Quality Objectives (VQO's). These categories are based on the presence or absence of distinctive scenery, proximity to viewpoints, and the amount and type of traffic through viewing areas. Each category describes the degree of acceptable alteration from the natural landscape that would be consistent with scenic objectives. Land in the "preservation" category consists of the existing wilderness areas. The "retention" category contains roadless areas managed to retain roadless characteristics under current plans, and foreground corridors along major roads and trails. Corridors along other heavily used roads fall into the "retention" and "partial retention" categories. Remaining lands are inventoried as "modification" or "maximum modification". These two categories have been grouped, since the effects on management are very similar. A detailed description of these categories can be found in the glossary under the heading "Scenic Quality Objectives." Table 3-15 shows the amount of Forest and Grassland presently in each category. Figure 3-10 illustrates the appearance typified by timber harvest activities in each category.

Figure 3-10

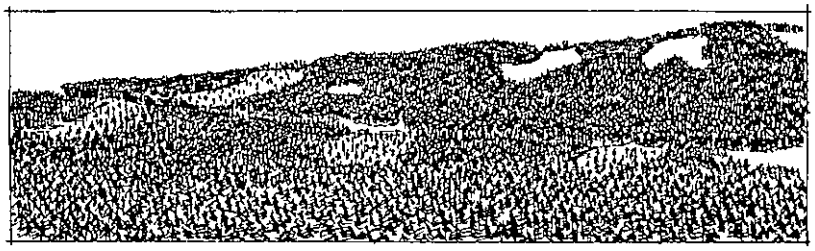
VISUAL QUALITY OBJECTIVE CATEGORIES



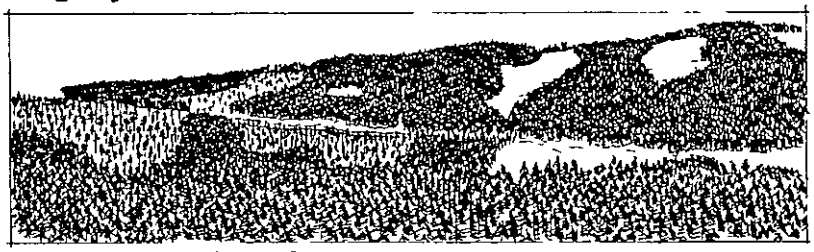
Natural — PRESERVATION



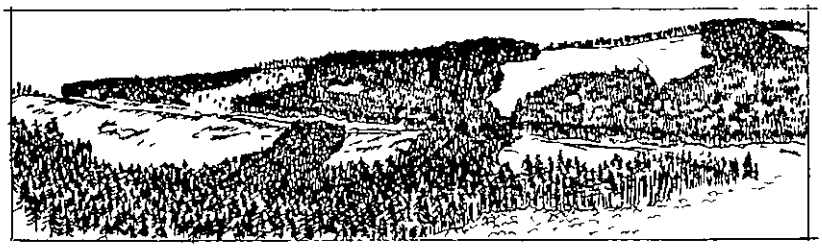
Natural Appearing — RETENTION



Slightly Altered — PARTIAL RETENTION



Moderately Altered — MODIFICATION



Heavily Altered — MAXIMUM MODIFICATION

TABLE 3-15
EXISTING SCENIC OBJECTIVES

Category	Acres	Percent of Forest & Grassland
Preservation	38,260	4%
Retention	102,220	11%
Partial Retention	71,370	7%
Modification and Maximum Modification	743,250	78%
Total	955,100	100%

Source Visual Quality Objective Inventory for the Forest and Grassland

Social and Economic Setting

The "Zone of Influence" for the Ochoco National Forest has been examined at three levels.

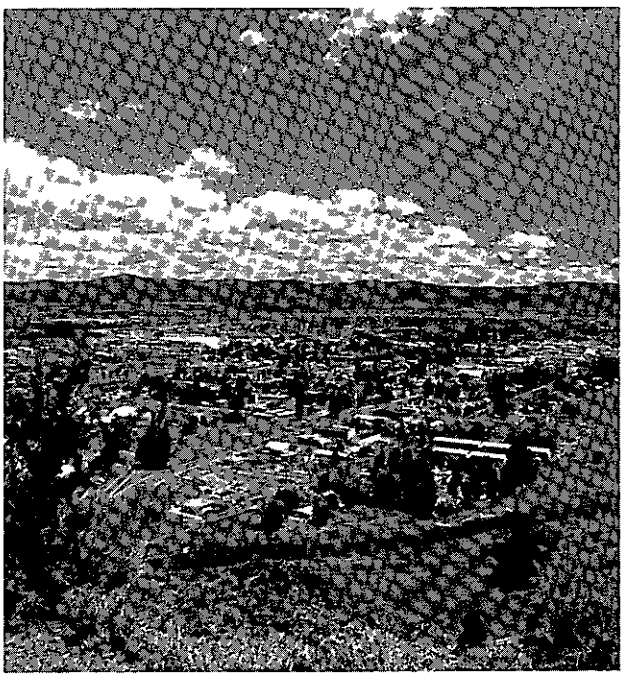
Zone of General Influence: the area on which the Ochoco National Forest has a definite and measurable effect.

Zone of Primary Influence: the area which the Ochoco National Forest significantly affects.

Zone of Extended Influence: this is the largest area on which the Ochoco National Forest makes an impact. The effect of the Forest might not be significant on any single community outside the Zone of General Influence; nevertheless, the total effects on all such communities are significant.

Zone of General Influence

The Zone of General Influence for the Ochoco National Forest and Crooked River National Grassland consists of six Oregon counties. The Ochoco National Forest is located in Crook, Grant, Harney, and Wheeler counties. The Crooked River National Grassland lies entirely in Jefferson County. Deschutes County is added to the Zone of General Influence because its population and economy make use of Ochoco National Forest and Crooked River National Grassland resources. These six counties are shown in Figure 3-11, and the amount of Ochoco National Forest and Crooked River National Grassland acreages in each county are shown in Table 3-16.



A "Socio-economic Overview" containing more detailed information was prepared for the six-county region, and is located in the Ochoco National Forest Supervisor's Office.

TABLE 3-16
NATIONAL FOREST AND GRASSLAND
ACREAGES BY COUNTY

County	Ochoco NF Acreage	Crooked River NG Acreage
Crook	434,050	0
Deschutes	0	0
Grant	59,400	0
Harney	222,280	0
Jefferson	0	111,380
Wheeler	128,810	0

Zone of Primary Influence

The Zone of Primary Influence is considered to be only those counties which are directly affected by the management decisions of the Ochoco National Forest. Crook and Harney counties constitute this zone.

The Forest's contribution to the economies of Crook and Harney counties is substantial, but it varies over time. It depends upon how much timber of what species is processed locally. This in turn is related to timber prices, which tend to rise and fall with the general health of the national economy. (The higher the price of the timber, the less significant hauling costs are, and the greater the percentage that may be purchased by more distant operators.) Another factor involved is the desire of local remanufacturing companies to buy local milled lumber. Even the personalities of mill executives can affect decisions to buy or not to buy Forest timber.

Figures from 1987 indicate that one million board feet of Forest ponderosa pine generates 11 local jobs and $220,000 (1987 dollars) of local income. One million board feet of associated species generates three local jobs and $60,000 in income.

Crook County

Crook County has a population of 13,500 with 5,455 people living in Prineville, the County seat and only incorporated city. Out of a total of 4,270 wage and salary jobs in the county, 1,600 (37%) are in wood processing, and an additional 830 (19%) are in government (Business and Employment Outlook, District 10, 1988-89).

Prineville has 13 employers with more than fifty employees. Of these, seven are milling or re-milling firms, four are governmental agencies, and the remaining two are the Pioneer Memorial Hospital and the Les Schwab tire production facility. Sawmill employment has declined from 620 jobs in 1977, to 450 in 1988. A dramatic increase in millwork employment (from 540 jobs in 1977, to 1200 in 1988) has compensated for this decline, however.

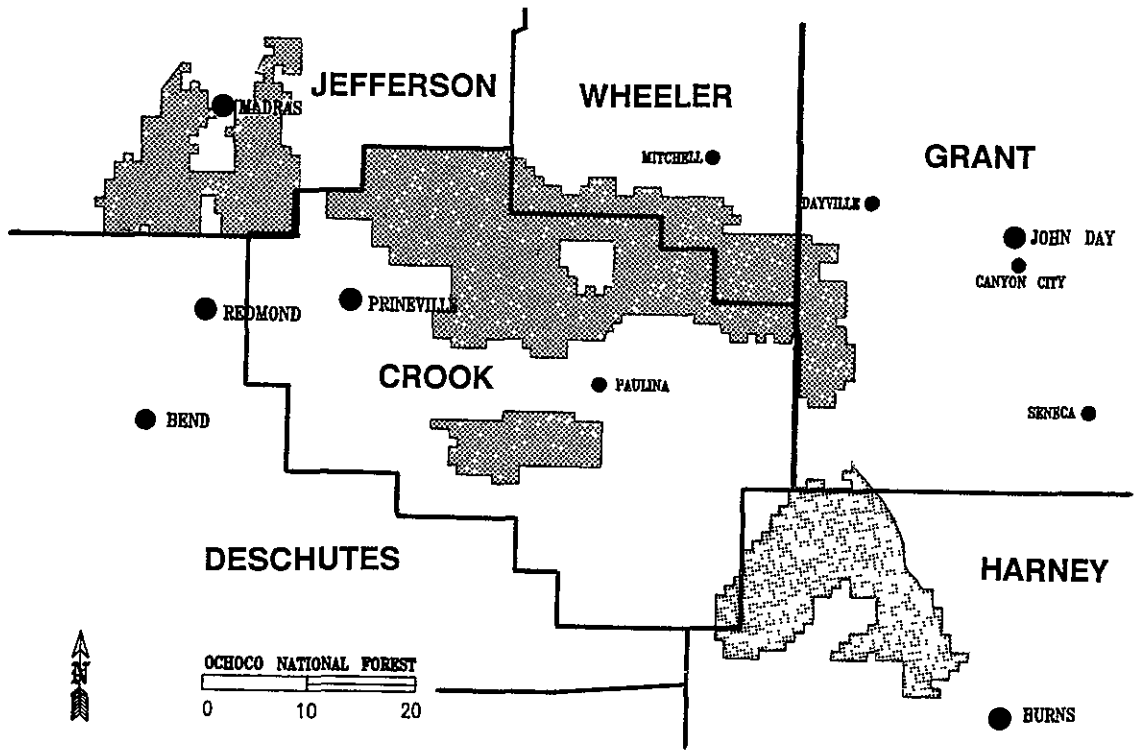
Prineville's wholesale and retail trade sectors compete with the Bend urban area 35 miles away and, to a lesser extent, with the Redmond area 18 miles away. Retail sales per capita for the State of Oregon are $5,454; they are $6,467 for Deschutes County and only $2,857 for Crook County (Oregon County Economic Indicators 1984, pp. 1 and 17).

Harney County

Harney County has 7,100 inhabitants including 4,175 residents of Burns and Hines. The county has a wage and salary employment of 2,180 jobs. This includes 460 (21%) wood products jobs and 720 (38%) government jobs (Business and Employment Outlook, District 14, 1988-89).

Since 1980, when the Hines Mill closed and was put up for sale, the Harney County economy has rebounded. Snow Mountain Pine purchased the mill, invested in plant modernization, and diversified the product line. Currently, mill employment is at a lower level than before the modernization, and the Burns/Hines economy is still substantially dependent on the milling of logs. The analysis of Harney County contained in this document assumes that Snow Mountain Pine will be able to continue production at its present level of output.

Figure 3-11
SIX COUNTY DISTRIBUTION MAP



Changes in the Structure of the Wood Products Industry

The wood products industry has been undergoing significant and fairly rapid changes. Major changes include:

New "small log" log mills designed to process the smaller diameter of timber that will be increasingly harvested in the future;

Increased mechanization, both in the woods and in the sawmills; and

Increased mechanization in the remanufacturing mills, along with production of more "finished" projects.

It is somewhat difficult to compare the future employment levels that will be produced by the small log mills with the historic employment levels produced by the large log mills. On the one hand, more work is needed to produce the same volume, on the other, more of the work is mechanized.

The effects of increased mechanization, both in the woods and in the sawmills, have been reported both in the popular media and in professional literature. One study in Montana shows that the output of lumber per sawmill worker increased more than 80% from 1980 to 1986 (Keegan and Polzin, 1987). Another Montana study shows a doubling in lumber output per dollar cost (Keegan, Martin, and Stevenson, 1987) This second article also states that there are factors other than modernization that contribute to these increases, but the authors attribute two

thirds of the change to modernization. Lumber production levels, they say, were nearly as high in 1986, as in the boom period of the late 1970's, but employment is far less.

Local counties have followed the same pattern of resumed high production with less employment. The Ochoco National Forest obtained data regarding employment and production levels from the mills in Crook and Harney counties for the years 1977, 1981, and 1987. The totals are shown in Table 3-17.

TABLE 3-17
TOTAL SAWMILL PRODUCTION AND EMPLOYMENT
CROOK AND HARNEY COUNTIES

	1977	1981	1987
Total MBF	285,000	87,000	278,000
Employment	1604	266	641
MBF Per Employee	180,000	330,000	430,000
Number of Mills	7	4	5

* MBF - Thousand board feet

Total Sawmill Production and Employment, Crook and Harney Counties

The figures in Table 3-17 show that nearly the same output was produced in 1987 as in 1977, but with 60 percent fewer employees. Also, the number of mills declined from seven to five.

The remanufacturing industries have also been improving their plants, but the effects seem to be different. One might assume that here also, mechanization would cost jobs. However, the plants are producing more "finished" products such as complete door casings, or laminates of hardwood over pine. Remanufacturing employment in Crook and Harney counties has steadily increased over the last ten years, which seems to indicate that this mechanization is creating jobs, not eliminating them.

Zone of Extended Influence

The Zone of Extended Influence is considered to be the State of Oregon. The Forest affects this extended zone in three significant ways.

A portion of Forest timber is milled or remanufactured outside the other Zones of Influence but inside the State.

Elk and deer hunters come from many parts of the State, especially Portland and other cities in the Willamette Valley. An estimated 6200 RVD's are generated annually in big game hunting from this zone.

Other recreational users come to the Forest from throughout the state.

One million board feet of Ochoco National Forest ponderosa pine produces 14 jobs statewide, and $290,000 in income. One million board feet of associated species generates five jobs and $100,000 in income.

Social Setting

The Social-Economic Overview of the Ochoco National Forest and Crooked River National Grassland[1] lists six "lifestyle" categories into which many of the six-county residents fall. These categories are Native Americans, ranchers, loggers, mill workers, small-town merchants, and government employees.

The Native Americans consist mainly of the Warm Springs Confederated Tribes located in Wasco and Jefferson counties (the largest group), and the Paiutes in northern Harney County.

All of the lifestyles occurring in the area are affected by decisions relating to management of the Ochoco National Forest and Crooked River National Grassland. The rancher, the logger, the millworker and perhaps the Native American depend directly on the Ochoco National Forest for jobs, wood, and forage. Significant numbers of public service employees' jobs are related to the Ochoco National Forest, and the local merchants depend on the economic well-being of all groups. Thus, significant

[1]Spitz, J 1982 Socio-Economic Overview of the Ochoco National Forest and Crooked River National Grassland Mimeo 137 p

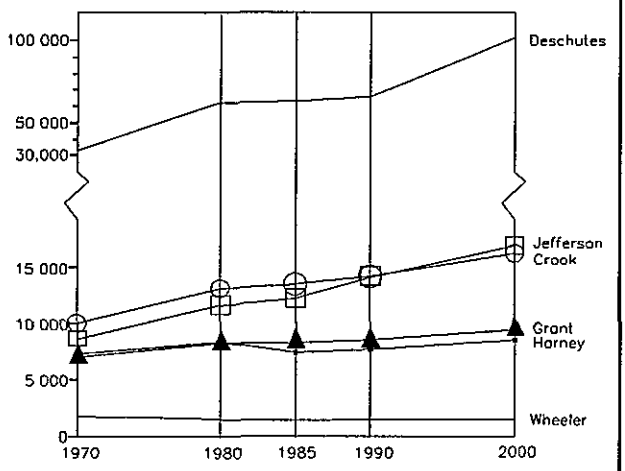
changes in Ochoco National Forest management can affect lifestyles and community well-being.

Residents of the area are involved with Ochoco National Forest activities relating to leisure. Their lifestyles emphasize recreational uses of the Ochoco National Forest and Crooked River National Grassland in many ways.

Demographics

Table 3-18 and Figure 3-12 present population figures for the region. Deschutes County was the fastest growing county in the state during the 1970's, and rapid growth is anticipated through the end of the century. Nearly 60 percent of the people in the six-county area lived in Deschutes County in 1980. The percentage is projected to rise to 66 percent by the year 2000. Jefferson County is also growing rapidly and will soon be the second most populous county in the six-county area.

Figure 3-12
County Population



The remaining counties are more rural and will not likely share in the anticipated growth. Crook, Grant, and Harney counties grew substantially in population during the 1970's when the timber market was strong, but the population has remained stable or decreased during the years 1980 - 1985. Wheeler County's sawmill closed in the 1970's, resulting in a population decline for that decade. The projections from 1980 through the year 2000 predict little change in population for those counties.

Table 3-19 displays data about minorities in the area. Jefferson County has the largest percentage of minorities because of the Warm Springs Indian Reservation and a large Hispanic population. Hispanics are the largest minority group in the other counties (except Wheeler, which has no recorded minorities) and are the fastest-growing minority group in the six-county region.

Indian Rights and Claims

Activities of the Ochoco National Forest affect two American Indian Reservations: the Warm Springs Confederated Tribes located in Wasco and Jefferson Counties, and the Paiutes in northern Harney County.

The American Indian Religious Freedom Act (Public Law 95-341) of 1978 states, "That henceforth it shall be the policy of the Unites States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites." Under the Tribes of Middle Oregon Treaty of 1855, rights such as hunting, fishing, and root gathering are reserved to the Tribes in the area ceded by the Tribes.

TABLE 3-18
COUNTY POPULATION - ZONE OF GENERAL INFLUENCE

Year	Crook	Deschutes	Grant	Harney	Jefferson	Wheeler
1970	9,985	30,442	6,996	7,215	8,548	1,849
1980	13,091	62,142	8,210	8,314	11,599	1,513
1985	13,400	65,400	8,230	7,350	12,150	1,430
1990	14,100	75,800	8,500	7,700	14,000	1,500
2000	16,200	102,100	9,400	8,500	16,900	1,500

Source Business and Employment Outlooks, Program Year 1988 and 1989, JTPA Districts 10, 12, and 14 Chapter 2 and Appendix B State of Oregon Employment Division, Department of Human Resources

TABLE 3-19
MINORITY POPULATION - ZONE OF GENERAL INFLUENCE
(% OF TOTAL POPULATION)

Minority	Crook	Deschutes	Grant	Harney	Jefferson	Wheeler
Native Americans	1 6	0 6	1 0	2 5	16 6	0 0
Hispanic	2 6	1 8	1 7	3 7	7 4	0 0
Other Minorities	0 7	0 6	0 0	0 7	0 3	0 0
Total Minorities	4 9	3 0	2 7	6 9	24 3	0 0

Source State of Oregon Employment Division, Department of Human Resources, Jason Yohannan, Eastern Oregon Regional Economist

TABLE 3-20
ECONOMIC MEASURES
ZONE OF GENERAL INFLUENCE AND STATE OF OREGON

Category	Crook	Deschutes	Grant	Harney	Jefferson	Wheeler	Oregon
Average Per Capita Income (1984)	$10,525	$10,337	$9,477	$10,279	$10,963	$12,011	$12,399
Unemployment Rate (1987)	7 5	7 8	9 6	7 9	6 6	10 3	6 2
% Economically Disadvantaged Age 14+ (Projected 1988-89)	18 9	18 9	20 2	16 0	22 5	30 5	18 6
% AFDC Recipients (Projected 1988-89)	0 8	0 6	0 6	0 6	1 2	0 0	1 0

Source: Business and Economic Outlook, Program Year 1988 and 1989, JTPA Districts 10, 12, and 14 Chapters 2 and 6. State of Oregon Employment Division, Department of Human Resources

Both the Warm Springs Confederated Tribes and the Paiutes have traditional areas of the Ochoco National Forest for root gathering and berry picking.

During the development of this FEIS and Ochoco National Forest Plan, recognition was given to the importance of the Comprehensive Plans for both the Warm Springs Confederated Tribes and the Paiutes of Northern Harney County.

Economic Conditions

Table 3-20 gives an economic picture of the region. Wages are around 10% lower than the state average and 20% lower than the national average (not shown). Employment in the region is higher than the state average. However, the percentage of those who are "economically disadvantaged" and the percentage of Aid For Dependent Children (AFDC) recipients generally follow the state average. The exception is Wheeler County, which has the most unemployment, the highest percentage of economically disadvantaged persons, the highest per capita income, and no AFDC claims.

Figure 3-13
County Economic Bases

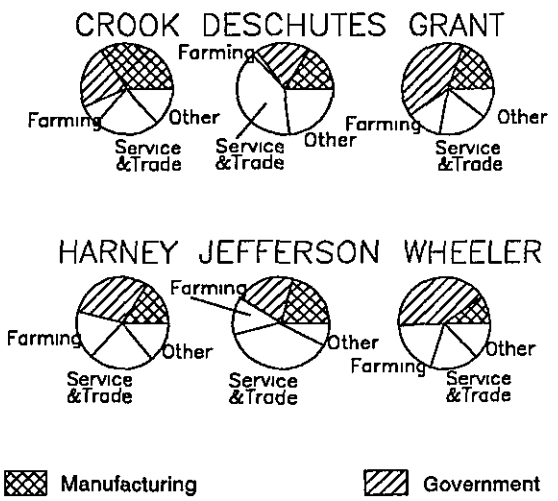


Figure 3-13 shows the economic make-up of the six counties. Most of the manufacturing sector is the milling or remilling of timber, and much of the government sector concerns forestry. Combining these sectors together gives a rough idea of the importance of the wood products industry in each county. This combination is indicated by the shaded areas on the graphs.

The Deschutes County and Jefferson County economies are the most diversified; the timber industry is surely important, but there are other well-developed economic sectors also. In contrast, Crook and Grant counties are heavily dependent on timber, and to a somewhat lesser extent, Harney County is also. Wheeler County's private economic sectors are small by contrast. The government sector dominates there.

A special factor of economic importance is the 25 percent monies, i.e. the distribution of 25 percent of total federal receipts to the counties. These monies are distributed according to the proportion of National Ochoco National Forest and Crooked River National Grassland acres in each county, and are often an important part of the counties' budgets. Data for fiscal year 1983 is shown in Table 3-21. Crooked River National Grassland monies are handled in a separate account from Ochoco National Forest monies.

TABLE 3-21
25% FUNDS DISTRIBUTED TO COUNTIES

County	Total County Budget		25% Monies		% of Total County Budget	
	FY 1983	FY 1987	FY 1983	FY 1987	FY 1983	FY 1987
OCHOCO NATIONAL FOREST						
Crook	3,589,600	7,222,200	1,135,800	3,985,100	32	55
Grant	4,790,100	11,613,000	154,900	545,300	3	5
Harney	5,410,900	8,886,900	584,500	2,049,600	11	23
Wheeler	1,136,500	1,741,200	333,800	1,182,700	29	68
CROOKED RIVER NATIONAL GRASSLAND						
Jefferson	3,735,138	4,146,371	16,600	6,000	0 4	0 1

Soil

Soil development across the Ochoco National Forest and the Crooked River National Grassland has been influenced primarily by geologic events and climate, along with the interactions of topography, time, vegetation, and biological processes. Soil development has occurred on assorted geologic materials that were covered by volcanic ash from Mt. Mazama (Crater Lake) about 6700 years ago. Basalt and andesite flows are the primary materials on much of the Forest east of Lookout Mountain (approximately 40% of the total Forest and Grassland area). Older andesites, basalts, and pyroclastic sediments underlie most of the area to the west of Lookout Mountain (approximately 23 percent of the total area). Soils are often weathered to clays in this portion of the Forest. Resistant welded tufts are found extensively south of Snow Mountain (approximately 17 percent of the total area). The remaining 20 percent of the Forest and Grassland contains scattered pockets of highly weathered tufaceous sediments, recent landslide debris, sedimentary rocks, rhyolite, and metasedimentary rocks.

The Soil Resource Inventory (Ochoco National Forest, 1977) for the Ochoco National Forest and Crooked River National Grassland identified 111 different land types occurring separately or in combination with other land types. Land types reflect differences in soil, vegetation, and landforms. There are approximately 10-12 different soil types represented in this classification. Three broad soil type categories have been identified for use in management activities: volcanic ash, residual, and nonforest soil types. Table 3-22 describes the three soil types and their related management implications in general terms.

Volcanic Ash Soils

These soils compose 30 percent of the entire Forest and Grassland area, and approximately half of the forested lands. Ash soils were formed from widespread air-fall volcanic ash deposited from Mt. Mazama about 6700 years ago The present distribution of volcanic ash soils has resulted largely from the influences of topography and elevation on wind and precipitation patterns. Most of the more recent air-fall volcanic ash deposits from Mt. Mazama have been re-worked onto north and east slopes, basins,

and broad upland plateaus. The present dry climate of the Forest and Grassland does not favor the weathering of volcanic ash soils.

Residual Soils

These soils (comprised of loess, volcanic ash, old and weathered volcanic ash, and residual materials)

TABLE 3-22
OCCURENCE OF GENERAL SOIL TYPES

Soil Type	Depth	Texture	Management Hazards/ Limitations	Percent of Forest and Grassland
Volcanic Ash	>6" ash overlying residual materials, 1-3 feet total depths	Overlying loams, clays and assorted gravels & cobbles in places	High compaction and displacement hazard under a wide range of soil moistures	30
Residual (mixed with loess & ash)	1-1/2 to 2-1/2 feet	Silt loams, clay loams, clays with assorted gravels & cobbles	- High surface erosion hazard & muddiness potential from skidding & roads in wet season - Low timber production - Dry sites potentially difficult to regenerate	30
Nonforest	<1 foot	Gravelly loams & clay loams	- Droughty, low vegetative capacity - High erosion hazards & muddiness potential from roads - Low water holding capacity	40

Ash soils range in color from dark brown to yellowish brown, with many deposits being light gray to nearly white when dry. They have a sandy loam texture with a gritty feel, and are homogenous with little structural development. Gravels and cobbles are prevalent in these soils due to colluvial action (the movement of rock fragments and other soil materials as a result of gravitational action) and uprooting of trees by wind.

Ash soils are generally found on the more moist sites. These soils compact easily, are susceptible to displacement, but are also the most productive soils on the Forest.

compose 30 percent of the entire Forest and Grassland area, and approximately half of the forested lands. Residual soils are clayey soils that were formed from widespread continuous air-fall volcanic ash deposited between 20 and 30 million years ago. These soils lack the distinct volcanic ash layer, which has either eroded off or mixed with the underlying soil materials. Residual soils are found on south facing slopes, exposed slopes with northerly aspects, and as buried soils on north and east exposures.

As a rule, residual soils have thicker, darker surfaces and exhibit better cohesion than volcanic ash soils. Residual soils are nongravelly to gravelly with a loam, silt loam, or clay loam texture. These soils have better structure than ash soils and are more resilient.

However, the productivity of residual soils is lower than ash soils, and reforestation on residual soils can be difficult on droughty sites.

Nonforest Soils

These soils make up the remaining 40 percent of the area. These soils are generally more shallow and have a higher rock content than the other two soil types. Nonforest soils with sparse ground cover, low water holding capacity, and on southerly aspects have high erosion hazards. Some of these soils have little vegetative cover at the present time, and there is no potential to increase this protective ground cover. There is high potential for stream sedimentation and other types of water degradation resulting from management activities on these soils.

Cumulative Effects/Long-Term Soil Productivity

Soil is a basic nonrenewable resource. The demands for sustained timber and forage production create a need for maintaining long-term soil productivity. The ability of soils to remain productive depends largely on the management practices allowed. Future management will likely include rest rotation grazing systems, shorter rotations of timber, the use of fertilizers, mechanical timber harvesting, and more complete utilization of woody residues. The cumulative effect of repeated activities, over a long period of time, has the greatest potential of lowering forest soil productivity. Thus, the maintenance or enhancement of the soil resource is, by necessity, a primary goal of management.

By definition, the components of long-term soil productivity have been identified as the preservation of:

1. Surface litter and topsoil layers,
2. Soil organic matter and its replacement;
3. Soil organisms and biological systems; and
4. Soil porosity, structure, drainage and aeration.

Air and water movement into and within the soil affect biological activity, and ultimately nutrient availability necessary for vigorous plant growth. Changing the soil properties through human activities which induce compaction, puddling, erosion, displacement, or mass movement (Boyer, 1981) will lower the site's ability to produce. In particular, soil compaction on many sites has led to decreased water infiltration, accelerated erosion of topsoils, and damage to soil biological systems.

The goal is to maintain or enhance soil productivity. This allows the Forest Soil Program to measure, quantify and evaluate the effects of management activities on the natural capacity of soils to heal after disturbances. The "Forest-Wide Standards and Guidelines" (Appendix D) for soils provide a basis from which to measure these changes.

The prevention of damages before they occur is better than trying to rebuild the productive capacity. In the past, the Forest has used soil moisture as a criteria to control ground skidding equipment. This has had limited success because of varing soil moisture levels within a sale area. The current emphasis is toward a "fixed ground skidding" network designed to concentrate the disturbance within allowable levels. Where lands exceed these levels of soil damage, reclamation measures are warranted. These may include tillage of compacted soils, back blading of mounds or berms, fertilization, or spreading of biologically rich organic materials to rebuild the organic matter levels.

"Caring for the land" starts with good land stewardship and ethic. This will require changes to many of our presently acceptable operations. These changes will take time, but on many sites we have just began the cutting cycles which will go on, generation after generation, for hundreds of years.

Timber

Management of the timber resource affects many other resources and has significant economic affects. Timber management activities affect fish and wildlife habitat, recreation, water, and forage, as well as other resource values and uses. Economic returns from timber sales contribute significant sums to both the Federal Treasury (approximately $28 million in 1988) and local counties (over $7 million in 1988).

Historical Perspective

Past management practices have had a major influence on today's conditions. In the late 1800's, the Forest was mostly open pine stands with grass or scattered pine reproduction in the understory (The Oregon Trail, 1977). Grazing and repeated wildfires (see Fire, this chapter) perpetuated this condition into the early 1900's (Hodgson, 1913). In the mid 1900's, fire prevention and control of grazing permitted the establishment of white fir and Douglas-fir on the upper elevations and north slopes and



dense thickets of ponderosa pine on south slopes. In the 1940's and 1950's logging became a major influence on the Forest. Logging at this time emphasized partial cutting in ponderosa pine stands. Generally, the old growth pine was removed, leaving an understory of pine seedlings and saplings. Stocking was usually clumpy with openings occurring between thickets of pine reproduction. Mixed conifer stands were generally avoided because they were found on steeper slopes and contained less valuable species. When these stands were logged, only the ponderosa pine was removed, accelerating succession to white fir and Douglas-fir.

Timber harvest in the 1960's and 1970's also emphasized partial cuts from two-storied stands of ponderosa pine. Many of the residual understories have been thinned. The Forest completed a total of 39,000 acres of thinning between 1972 and 1984. Some shelterwood regeneration cutting in ponderosa pine types and clearcutting in mixed conifer types also occurred in the latter part of this decade.

Timber Resource Plan

Timber harvesting in the 1980's was conducted under the direction outlined in the Timber Resource Plan for the Ochoco National Forest. This Plan was approved by the Regional Forester on May 1, 1979, and was implemented on October 1, 1979. The Timber Resource Plan was intended to be in effect for 10 years (Fiscal Year 1980 through Fiscal Year 1989) or until amended, superseded or replaced.

Since implementation in 1979, the Timber Resource Plan has been amended once. In 1984, the Oregon Wilderness Act allocated 9845 acres of previously available commercial forest land to wilderness. In response, the Timber Resource Plan was amended to reflect the necessary change in the land base, as well as in the programmed harvest.

Timber Harvest Levels

Past timber harvest levels have been influenced by the Ochoco National Forest's programmed sale level and by economic conditions. Table 3-23 shows the programmed sale level, the actual sale level, and the actual harvest level for the past twenty years. The much higher actual sale level than programmed sale level in 1970-1974 was due to salvaging of a large blowdown. The much lower cut levels during the 1980's reflects the decline in building and construction related to the recession. The programmed harvest levels represent the regulated volume that can be compared to the allowable sale quantities in Table 2-8, Chapter 2 - Alternatives, Including the Proposed Action.

TABLE 3-23
PAST TIMBER HARVEST LEVELS 1/

Fiscal Year	Programmed Sales	Actual Sales	Actual Cut
1970	131 0	189 4	118 1
1971	131 0	160 2	133 3
1972	131 0	168 7	157 4
1973	131 0	145 7	163 6
1974	131 0	130 3	159 2
1975	131 0	126 2	134 9
1976	131 0	133 4	137 8
Trans Qtr 2/		24 8	34 8
1977	131 0	134 3	143 4
1978	131 0	154 0	146 0
1979	131 0	133 3	90 0
1980	132 7	136 2	84 4
1981	132 7	136 3	83 5
1982	132 7	113 6	42 9
1983	132 7	133 5	97 1
1984	132 7	146 9 3/	134 0
1985	129 8 4/	110 3	162 0
1986	129 8	163 4	149 4
1987	129 8	165 6	146 1
1988	129 8	142 3	127 0

NOTE Programmed Sales include regulated volume only, Actual Sales and Cut includes total volume

1/ Volumes shown are average annual sawlog material in millions of board feet

2/ Transition quarter when start of fiscal year was changed from July to October

3/ This was not adjusted for 273 7 MMBF of turnback volume

4/ This figure was adjusted to 129 8 after passage of the Oregon Wilderness Act of 1984

Economics

Timber sales originating on the Ochoco National Forest have contributed significant amounts of revenue to the Federal Treasury and to local counties (Table 3-24). Gross receipts to the Federal Treasury have varied from 7.3 million dollars (1982) to 28.4 million dollars (1988). The low points in 1982 and 1983 reflect the slowdown in housing construction during the recent recession.

Timber sale costs are shown in Table 3-24. Other than in 1984, annual expenses directly associated with the timber sale program have averaged approximately seven million dollars. The high costs in 1984, resulted from high road construction costs relating to unusual market conditions and timber sale extensions.

Below-Cost Timber Sales

Disregarding 1982, annual receipts from Ochoco National Forest timber sales have been approximately 2 to 3 times larger than timber sale program costs. The relatively low receipts in 1982 were equal to the costs at that time. There are very few sales (less than one percent) on this Forest that return less than the costs ("below cost" sales). Those that do are generally sales for beetle-killed lodgepole pine, other salvage, or special situations such as the removal of hazard trees from campgrounds or administrative sites.

Present Conditions

The classification of Ochoco National Forest lands, in terms of timber production, has changed between this FEIS and the current Timber Resource Plan (1980). These differences reflect changes in multiple resource management objectives that have taken place locally, regionally and nationally during the last 10 years.

Within the Ochoco National Forest, approximately 533,180 acres, or 63 percent of the net National Forest System acres, are available, capable, and



suitable for timber production (see Table 3-25). The remaining 37 percent of these acres fall into one of the categories in Table 3-25.

The 533,180 acres of Ochoco National Forest lands, that are available, capable, and suitable for timber production, have been stratified into three vegetation types: low site ponderosa pine, ponderosa pine, and mixed conifer. The three timber types were defined based on similarities in tree species composition and productivity. Vegetation types represent an aggregation of plant associations. Table 3-26 displays the productivity and acreage in each type. Approximately two thirds of the acreage is occupied by ponderosa pine stands.

TABLE 3-24
TIMBER SALE COSTS AND RECEIPTS
(MILLIONS OF DOLLARS)

Year	Gross 1/ Receipts	Timber Sales Program 2/	Reforestation and TSI	Brush 3/ Disposal	Other Resource Support	Roads 4/	Total Costs
1980	136	11	09	04	01	40	65
1981	192	11	11	04	02	40	68
1982	73	14	09	02	02	46	73
1983	103	14	01	03	02	39	59
1984	199	16	05	02	02	81	106
1985	111	16	05	05	02	06	34
1986	292	12	02	07	01	10	32
1987	248	14	02	10	02	12	40
1988	258	16	01	10	02	12	41

1/ Figures include all collections for K-V, BD, Purchaser Credit, etc
2/ Figures include silvicultural exams, timber sale preparation, and timber sale administration
3/ Figures include the Forest Service portion of the brush disposal (BD) work based on BD collections
4/ Figures include road design, construction, reconstruction, and maintenance from both appropriations and purchaser credit

TABLE 3-25
TENTATIVE TIMBER LAND SUITABILITY 1/

	Forest	Grassland	Total
Total Area within Forest/Grassland Boundary	978,550	173,630	1,152,180
Other Ownership	133,050	62,250	195,300
Net National Forest System (NFS) Acres 2/	845,500	111,380	956,880
Nonforested Acres			
Water	200	0	200
Nonforest (<10% cover) 3/	264,620	111,170	375,780
Other Purposes 4/	8,120	0	8,120
Total Nonforest Acres	272,940	111,170	384,110
Forested Acres			
NFS acres minus nonforest acres	572,560	210	572,770
Deductions			
Withdrawn			
Wilderness	26,520	0	26,520
RNA's	1,730	0	1,730
Other (Forested land on Grassland)	0	210	210
Subtotal	28,250	210	28,460
Lands Growing (20 cu ft /acre/year)			
Unsuitable	8,570	0	8,570
Suitable 12,420			
Regeneration Difficulty	2,560	0	2,560
Total Deductions	39,380	210	39,590
TENTATIVELY SUITABLE TIMBER ACRES (Forested Acres Minus Deductions)	533,180	0	533,180

1/ Figures are from 1984 Tentative Timber Land Suitability table unless otherwise noted
2/ From "Land Areas of the National Forest System as of September 30, 1987," FS-383 Current figures show a net increase of over 6,000 acres in National Forest System lands over 1984 figures
3/ Adjusted from 1984 figures It is assumed here that most of the increase shown in NFS lands was on the National Grassland and was likely nonforest land
4/ Other purposes include administrative sites (464 acres), recreation sites (725 acres), and roads (6,934 acres)

TABLE 3-26
PRODUCTIVITY BY VEGETATION TYPES

Vegetation Type	Site Index 1/ (Base Age 100 Yrs)	Growth 2/ (Cu Ft /Ac /Yr)	Acreage 3/
Low Site Pine	60-70 (PP)	15-23	13,150
Ponderosa Pine	65-75 (PP)	23-58	333,970
Mixed Conifer	70-75 (PP) 70-80 (DF)	33-115	186,060

1/ Site index refers to the average height (in feet) of a tree at a specified age (PP refers to ponderosa pine, Df refers to Douglas-fir)
2/ Productivity is measured here as cubic feet of commercial wood produced per acre per year
3/ Does not include forested lands classified as wilderness or research natural area
Sources: Site index and growth figures are from Hall, 1973 Acreage figures were computed from the 1982 Forest Inventory

TABLE 3-27
STANDING TIMBER VOLUME

Vegetation Type	Big Summit District	Paulina District	Prineville District	Snow Mountain District	TOTAL
Mixed Conifer					
Acres	67 070	55,700	39,170	24,120	186,060
MMCF	212	155	123	66	557
MMBF	1,206	895	694	385	3,180
Ponderosa Pine					
Acres	72,930	56,900	70,570	133,560	333,960
MMCF	123	91	122	206	542
MMBF	671	488	699	1,176	3,034
Ponderosa Pine (Low Site)					
Acres	1,460	1,720	1,870	8,110	13,160
MMCF	1	2	2	8	12
MMBF	8	9	10	43	70
TOTAL					
Acres	141,460	114,320	111,610	165,790	533,180
MMCF	337	248	247	280	1,111
MMBF	1,885	1,392	1,403	1,604	6,284

Source Timber Resource Inventory (1982) volumes projected to 1990 using empirical yield tables Acreages are adjusted for areas under contract at time of inventory and areas sold since the inventory

TABLE 3-28
SIZE CLASSES BY TIMBER TYPE
(Acres)

	Low Site Pine	Ponderosa Pine	Mixed Conifer
Sapling	0	76,450	32,400
Pole	0	26,910	0
Sawtimber	0	70,200	78,670
Two-storied	13,150	160,400	75,000

Ponderosa pine and western juniper dominate the relatively arid low site ponderosa pine type. Ponderosa pine and some Douglas-fir occur in the ponderosa pine type. The mixed conifer type includes ponderosa pine, white fir, Douglas-fir, western larch, Englemann spruce, and lodgepole pine. Quaking aspen is found occasionally in moist areas.

Estimates of vegetation types from the most current (1982) timber inventory are summarized below. Table 3-27 displays existing standing timber volume data, for each of the Forest's four Ranger Districts, in terms of million cubic feet (MMCF) and million board feet (MMBF). The acreage and volume figures shown do not include lands in designated wilderness or research natural areas.

Low site pine types generally occupy a transition area between the ponderosa pine type and nonforested areas. Scattered individual pine trees or clumps are intermingled with juniper, mountain mahogany, and nonforested openings. Generally individual trees are harvested on these types only when sufficient advance reproduction already exists.

One third of the ponderosa pine stands are relatively even-aged. The other two thirds of the ponderosa pine stands are two-storied or multi-storied in structure. These stands have some large old growth ponderosa pine (overstory trees) with younger trees of pine or other species below (understory). The understory is variable in terms of the number and size of the trees and is generally manageable.

Approximately 95 percent of the Forest's mixed conifer stands are mature (over 100 years old) and single- or multi-storied in structure. These stands contain mixtures of ponderosa pine, white fir, Douglas-fir, western larch, and lodgepole pine. Generally, it is not feasible to manage the understory of mixed conifer stands.

The two major timber types (ponderosa pine and mixed conifer) have been subdivided into four categories to reflect the size of the trees present and the approximate age of the stand. The four categories are

Sapling- even-aged stands or plantations with trees not yet large enough for commercial harvest;

Pole- generally even-aged stands capable of providing commercial products, but younger than culmination of mean annual increment (biological rotation age);

Sawtimber- generally even aged stands older than culmination of mean annual increment (biological rotation age); and

Two-storied- two-storied or multi-storied stands containing an overstory of sawtimber sized trees and a definite understory.

These categories are averages, representing a broad range of field conditions. Table 3-28 displays the acreages in each category by timber type.

Tree Improvement Program

The improvement of any species through genetic selection is dependent upon sufficient natural genetic variation. All of the commercial tree species found in the Ochoco National Forest show considerable natural genetic variation. Consequently, these species lend themselves to improvement through a tree improvement program.

In 1975, the original tree improvement plan for the Ochoco National Forest was approved by the Regional Forester. Since that date an active tree improvement program has been in effect. The original tree improvement plan was revised in 1980 and will be revised again in 1989. The tree improvement plan for the Ochoco National Forest covers all of the Ochoco National Forest and that portion of the Burns Ranger District, Malheur National Forest, located in the Silvies-Malheur Breeding Block.

The tree improvement program for the Ochoco National Forest has the following goals:

1. Ensure the application of genetic principles to natural or artificial regeneration systems.
2. Provide improved seedling stock for artificial regeneration (reforestation). This includes:
    a. Selecting a minimum number of superior trees ("select trees" or "parent trees") from wild stands, based on their phenotype or outward appearance, for each commercial species.
    b. Establishing natural stand seed production areas for species in which sufficient seed cannot be collected from select trees.
    c. Establishing mass selection plantations (plantation seed production area established with progeny from select/parent trees) for species placed in low-level programs.
    d. Establishing untested seed orchards for species placed in intermediate-level programs (none are planned at this time).
    e. Establishing tested seed orchards and evaluation plantations for species placed in high-level programs.
3. Develop and maintain a broad genetic base for all species for gene conservation and the preservation of genetic diversity.
4. Develop and implement suitable advanced generation breeding strategies for all tree improvement program intensity levels (low, intermediate, and high).

Since the Ochoco National Forest began its tree improvement program in 1975, 2380 parent trees have been selected from the wild population, and two ponderosa pine seed orchards and 19 ponderosa pine evaluation plantations have been established.

For more detailed information on the tree improvement program for the Ochoco National Forest, see the Tree Improvement Plan. A revision of this plan will be completed in fiscal year 1989.

Vegetation Management

Vegetation is considered undesirable when it hinders the achievement of management objectives. Undesirable vegetation includes grasses, shrubs, and noxious weeds, as well as noncrop tree species. Undesirable vegetation can compete with crop trees for water, nutrients, and light during the early stages of development. This competition can greatly delay the regeneration of desirable forest trees.

The treatment of undesirable vegetation on the Ochoco National Forest and Crooked River National Grassland has included: prescribed fire, manual, mechanical, biological and chemical treatment methods. The use of chemicals, however, has not been available since 1984. In that year, the Pacific Northwest Region of the Forest Service was enjoined from using chemicals for vegetation management until an adequate "worst case analysis" had been prepared. In lieu of a worst case analysis, a Final Environmental Impact Statement has been prepared on Managing Competing and Unwanted Vegetation in the Pacific Northwest Region. The decision of the Regional Forester concerning this FEIS was made on December 8,1988, and includes the use of all tools available for managing competing and unwanted vegetation, including chemicals. After subsequent appeals and mediation through the U.S. District Court in Portland, Oregon, the injunction was lifted on May 24, 1989, by Judge James M. Burns. This decision, however, reflects the Regional Forester's desire to reduce the Pacific Northwest Region's reliance on herbicides, and emphasizes 1) the prevention of vegetation management problems, 2) the preference for the use of non-herbicide methods and 3) that the use of herbicides will require special considerations.

The Ochoco National Forest and Crooked River National Grassland have not used chemicals for the treatment of competing or unwanted vegetation since the injunction issued in 1984, but will maintain options for chemical use under the direction of the final Record of Decision and FEIS for Managing Competing and Unwanted Vegetation in the Pacific Northwest Region

Timber Supply and Demand

Timber Supply and Projections for the Pacific Northwest Region

The principal projections used in developing long-range plans and programs for the management of national forests are contained in the Forest and Rangeland Renewable Resources Planning Act (RPA) Assessment and 1984 Update. These projections focus on the situation for the long-term (50 years), and do not necessarily recognize current short-term regional fluctuations. A summary of those projected RPA trends (year 2030) for timber supplies follows.

Hardwoods

The current balance between growth of wood and its removal shows that the hardwood forests and eastern softwood forests can support additional timber harvests; however, this balance will change, and future harvests, particularly in the decade beyond 2000, could vary over a wide range. Nonetheless, if commercial timberland owners continue to respond to price and inventory changes, timber harvests can be increased substantially in most geographic regions during the next few decades. The largest hardwood increase will be in the South, which is expected to rise from about 3.4 billion cubic feet from 1980 to 9.4 billion cubic feet in 2030 (RPA, 1984).

Softwoods

Total projected softwood roundwood harvests would rise 24 percent from 9.6 billion cubic feet in 1980 to 11.9 billion cubic feet in 2030. Though the outlook is for increased softwood harvests nationally, there are important differences among the major softwood timber producing regions.

In the Douglas-fir subregion, projected annual harvest from 1980 to 1990 is about 2.3 billion cubic feet. It then declines slightly to about two billion cubic feet per year. This level is roughly maintained through the rest of the 50-year projection period (RPA, 1984).

In contrast, the other major source of softwood timber harvest is the South, which is projected to rise from about 4.1 billion cubic feet in 1980 to 7.3 billion cubic feet in 2030. Much of the expansion in the South with softwoods, as well as hardwoods, is due to the fact that its wood products production has become more diversified compared to other regions of the country.

Timber Demand and Projections for the Pacific Northwest Region

Over the next ten years, timber demand from the Pacific Northwest will grow slowly. Although there is a backlog of unfulfilled housing demands, the future will depend primarily on strength in personal income and the availability of affordable housing and financing. In addition, projections of exports to the Pacific Rim countries show a continuing slow economic growth. The analysis acknowledges there will be a declining trend in the construction sector. Structure replacement, rather than new construction, will characterize the market. The projections for increases in demand may be described as considerably restrained and cautious (Nomura, 1981).

The long-term outlook for the solid wood products industries contains a number of challenges. Evaluation of recent data and information indicates that the demand for timber is changing to a moderate rate of increase as compared to the slowdown that occurred in the early 1980's.

The ability to sustain this increase on a long-run basis is linked to the critical issue of costs. The short-term future of timber and wood products demand is clouded by factors such as the severity and length of the housing and wood products recession that began in 1980. The long-term trends in wood, availability of wood substitutes, and a shift in business management strategies and methods, all contribute to a potential shift in future demand (Haynes and Adams, 1985).

Wood supply will continue to be an issue in the sense that it will be highly dependent on the ability of producers to lower costs to be competitive with wood substitutes (Schallau, 1986).

Although overall current timber supply levels in the Pacific Northwest Region may be capable of meeting future demand, there are some problems within the subregional market areas. This needs to be recognized in terms of a shifting of industry within the

region, and also in the shifting emphasis on the types of wood products produces, as well as the ability of the subregion to supply the various kinds of wood needed.

With a new vision for the future and a concerted effort by the wood products industry to broaden the economic base, the Pacific Northwest could, in time, regain much of the previous strength of one of its larger revenue-generating, basic industries.

A broader vision of the future that includes developing a flexible regional basis for stabilizing wood supplies and applies to forward-looking perspective on wood fiber management, will also allow the Pacific Northwest Region to increase exports to international markets. To achieve this, the forest products industry will need to learn the workings of a different market system and provide more products in the form demanded (Campbell, 1983). In addition, actions by industry, such as modernizing facilities, adopting state-of-the-art technology, reducing costs, and diversifying into other sectors of production (similar to what the southern region has done) could help to rebuild and stabilize the wood-based sectors of the region (Schallau, 1985).

Supply of Timber from the National and International Perspective

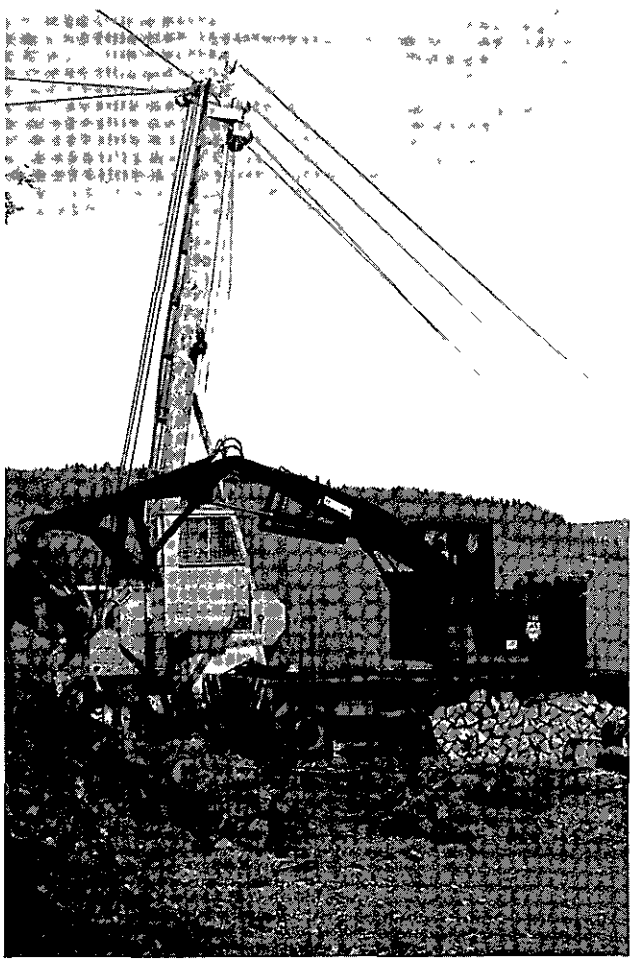
Currently, part of the timber formerly supplied by the Pacific Northwest Region is being supplied by the South and Canada. However, the supply situation from these other sources can change in as little as six years or certainly within 15 years. The projected change indicates a drop in supply capability of 30 to 50 percent from the current relatively high levels. The South should be able to maintain or show a slow increase in harvest because of its remaining inventory and some substitution of hardwoods. However, both the economic and physical supply of softwoods from that area may begin to show decline by the year 2030.

At about the same time, this drop in supply capability begins to occur for the other sources, the growth of wood fiber on private lands in the Pacific Northwest could then become a major source of supply for softwoods to meet national and international demand. Further, during the period before the private lands in the region regain their full supply potential, the public forest would be viewed as a major, relatively stable, supply of wood fiber (Schallau, 1985).

Local Timber Supply

To put the timber supply potential of the Ochoco National Forest in the context of its relationship to the Oregon timber industry in the six county general zone of influence, it is necessary to consider the timber supply picture of the area as a whole.

Historically, the Ochoco National Forest has supplied an average of 127 MMBF of timber per year - 21 percent of the total timber harvested from lands in the six county general zone of influence. This percentage has been relatively stable over the last two decades with the exception of one year where the closure of a mill caused defaulting of timber sale contracts. Because of this long-term stability, it is



assumed that this supply picture will continue into the future. Table 3-29 summarizes the timber harvested, by ownership, from lands in the six county general zone of influence.

Currently, the timber volume marketed from the Ochoco National Forest comes from natural stands, many of which have succeeded to white fir and Douglas-fir. The silvicultural objective of the harvest is to create and even-aged stands. Consequently, three categories of logs are available to mills: 1) large ponderosa pine (greater or equal to 20 inches); 2) small ponderosa pine (less than 20 inches), and 3) small white fir and Douglas-fir.

In the long-run, with conversion to a managed forest, both the large ponderosa pine and the small white fir and Douglas-fir components will be decreasing. At this time, the supply of timber will be more uniform in quality than is currently available.

The three major influences on the potential supply of timber from the Ochoco National Forest are: 1) the number of acres available for harvest; 2) the harvest flow schedule (nondeclining even-flow, or some departure from even-flow) and 3) the intensity of management on those acres. The acreage available is important, because the standing timber volume available for harvest is directly related to acreage. Departure from nondeclining even-flow can temporarily increase harvest levels, but also results in a decrease in harvest levels sometime in the future. Management intensity will have the greatest influence on potential supply levels on the Ochoco National Forest, because it affects the growth rate of trees. The future timber supply outputs for the Ochoco National Forest and the associated environmental consequences of these outputs are discussed by alternative in Chapters 2 and 4, respectively, of this document.

Local Timber Demand

Timber demand has been assessed for the Forest through the 1980 Renewable Resources Planning Act (RPA) and the State of Oregon Forestry Program. The Forest Service's Pacific Northwest Region has distributed the 1980 RPA program goals to the 19 Forests in the Region. The Ochoco National Forest was assigned a goal of 25 million cubic feet (150 million board feet) to be sold annually for the next 50 years.

The Ochoco's share of the Forestry Program for Oregon as identified by the State, increases over time as shown in Table 3-30.

Current programmed sale levels are estimated to be approximately 21 million cubic feet annually.

The demand for Ochoco National Forest timber is confined to the six county zone of general influence. Very few logs leave this immediate area for primary processing. Excluding Deschutes County, few logs are imported to the rest of the zone of general influence for primary processing. This situation may change if timber supply is curtailed to mills in western Oregon.

During the 1980's, adjustments were made in the milling sector of the economy to adjust for the local supply shortage. One mill closed in 1982, and others were retooled to more efficiently handle the smaller timber that is more commonly available. Currently, it is estimated that the primary processing industry is operating at 78 percent capacity. Approximately, one third of the milling capacity is now designed to handle small wood.

Within the zone of general influence, mills range in their dependence on the Ochoco National Forest timber from about 20 to 95 percent. Typically the mills designed to handle large pine logs are the most dependent on timber from public lands.

The relatively high values returned from past timber sales on the Ochoco are a result of the competitive pressures exerted through bidding on timber sales. Stumpage prices received for old growth ponderosa pine have commonly ranged from $100 to $300 per thousand board feet. Nearly every sale offered has been bid on by two or more purchasers pushing prices significantly higher than those appraised (overbid). This suggests that the demand for increased offerings of timber volume is present and is likely to continue, provided economic conditions permit profitable product conversion.

TABLE 3-29
Volume Timber Harvested
in the General Zone of Influence 1/
(Million Board Feet)

	Public Ownership 2/				Private Ownership 2/			
Year	Ochoco NF	Other National Forests 3/	Other 4/	Subtotal	Forest Industry	Other 5/	Subtotal	Total
1970	118	340	44	502	99	28	127	629
1971	133	384	44	561	50	17	67	628
1972	157	390	7	554	66	26	92	646
1973	164	445	9	618	50	25	75	693
1974	160	399	4	563	83	44	127	690
1975	135	345	4	484	82	49	131	615
1976	138	396	7	541	104	19	123	664
1977	143	386	15	544	28	34	62	606
1978	146	376	21	543	35	17	52	595
1979	90	295	47	432	43	13	56	488
1980	84	227	14	325	49	12	61	386
1981	84	227	29	340	47	7	54	394
1982	43	256	42	341	107	5	112	453
1983	97	372	49	518	25	13	38	556
1984	134	445	29	608	22	11	33	641
1985	162	504	38	704	25	9	34	738
1986	149	497	51	697	40	42	82	779
1987	146	322	46	514	44	54	98	612
Total	2,283	6,606	500	9,389	999	425	1,424	10,813
Average	127	367	28	522	55	24	79	601

1/ Sources A) Gedney, et al (in print) Timber Resource statistics for all forest land, except National Forests, in eastern Oregon Pacific Northwest Research Station, Forest Sciences Laboratory, Portland, OR 34p

B) National Forest Inventory Statistics

2/ Crook, Deschutes, Grant, Harney, Jefferson, and Wheeler counties

3/ Deschutes and Malheur National Forest lands

4/ Bureau of Land Management, Native American, Other Federal, State of Oregon, County, and Municipal lands

5/ Farmer and other miscellaneous lands

TABLE 3-30
THE OCHOCO NATIONAL FOREST PORTION OF
THE FORESTRY PROGRAM FOR OREGON
(Million Cubic Feet/Year)

1980	1990	2000	2010	2020	2030	2040	2050	2060	2070
21 00	18 96	19 44	19 74	20 60	21 64	22 31	22 59	22 59	22 94

Transportation

A transportation system is vital to the management and use of the Ochoco National Forest and Crooked River National Grassland. Although primarily constructed to facilitate timber harvest, the existing transportation system also aids other land and resource management by providing access for recreation, reforestation, firewood gathering, range management, minerals exploration, and most other activities. Road related recreation (camping, picnicking, and hunting) accounts for 90 percent of the Forest and Grassland's recreational use. Roads are also important for fire protection.

Existing Condition

In 1989, the transportation system on the Ochoco National Forest and Crooked River National Grassland consisted of 4554 miles of roads that are interconnected with the county, state, and federal road systems. Functional classification of forest roads are arterial, collector, and local roads. Arterial roads are primary roads that provide main access into the Ochoco National Forest and Crooked River National Grassland. Collector roads are secondary roads accessing smaller land areas, and generally provide linkage between arterial, public, or other collector roads. Local roads serve as the terminal roads or provide minor linkage with other roads. The entire transportation system on the Ochoco National Forest and Crooked River National Grassland can be found in the publication "Ochoco National Forest Road Atlas." This publication is available at the Forest Supervisor's Office in Prineville.

Since the transportation system on the Ochoco National Forest has been developed primarily to support timber and range management activities, its development has been concentrated on the more gentle south slopes found on the southern portions of the Ochoco National Forest. This part of the Ochoco National Forest (approximately two-thirds of the total area) has the transportation system needed to provide access for most present and future management activities. There are an average of 4.1 miles of existing road for each square mile in developed areas. The northern one-third of the Ochoco National Forest has a less extensive transportation system and has more difficult terrain for road construction. Most of the roadless area on the Ochoco National Forest occurs here. Roads occupy about one percent of the total land area.

Primary access to the Crooked River National Grassland is provided by state highways and county roads. These roads are suitable for passenger car use. The remainder of the transportation system on the Grassland is composed of roads constructed by previous land owners (prior to 1960, the area was composed of homesteaded lands). These roads were designated as Public Usage Roads by Jefferson County. Under this designation, the county assures that the roads remain open to public use. However, the roads are to be maintained by the public that uses them. Under terms of a cooperative agreement with Jefferson County, the Forest Service maintains approximately 84 miles of these roads for public and administrative use. These roads are normally suitable only for high clearance vehicle use and are impassable or closed seasonally during wet weather. The Grassland has more roads than are necessary for management, but the Public Usage designation prohibits closure. The open, flat terrain generally makes road closure ineffective. Approximately nine percent of the National Grassland has been identified as roadless.

Road Standards

Approximately 910 miles, or 20 percent of the total road system, are arterial and collector roads that are maintained and generally considered safe for passenger car travel at speeds less than 25 miles per hour. The remaining 3644 miles (80 percent) of roads are local roads that are designated as high clearance access roads. Examples of high clearance vehicles include pickups and all purpose vehicles.

Roads under the jurisdiction of the Ochoco National Forest and the Crooked River National Grassland are designated as "development roads." These

roads are not classified as public roads, and for this reason, the Forest and Grassland have the authority to regulate or restrict their use. Consequently, approximately 11 percent of the total road system, is closed on either a long-term or seasonal basis for the protection of other resources.

Until recently, most roads were constructed to relatively high standards. This was done to avoid traffic management problems, extend the log hauling season, and avoid road damage during wet weather. Economic pressures combined with more vigorous analysis has led the Ochoco National Forest to use lower standard roads, in many cases, than may have been used in the past. This change necessitates more active traffic management by the Ochoco National Forest, including temporary delays, seasonal road closures, and detours.

Expected Development

Use of the road systems on the Ochoco National Forest and Crooked River National Grassland is expected to increase. Continued use of the system is closely tied to the level of future management activities and recreational use. Most future road construction will likely take place on the northern slopes of the Ochoco National Forest where costs are expected to be higher than the historic average

Unroaded Areas

In response to the Wilderness Act of 1964, the Forest Service initiated the first Roadless Area Review and Evaluation (RARE) in 1972, to identify study areas for possible inclusion in the National Wilderness Preservation System. An "unroaded area" is defined as an area exclusive of improved roads constructed or maintained for travel by means of motorized vehicles intended for highway use. RARE identified nine roadless areas totaling 115,705 acres on the Ochoco National Forest and Crooked River National Grassland.

The findings of the first RARE had not been acted upon when, in 1977, the Forest Service began a second study known as "RARE II." The first phase of RARE II was to identify areas suitable for wilderness status, not to decide whether such areas would be designated as such. The second phase was to recommend which unroaded areas should be allocated for wilderness or other designations, which for multiple use, and which for further study.

On the Ochoco National Forest and Crooked River National Grassland, RARE II, completed in 1979, designated one roadless area comprising 10,000 acres in the inventory of unroaded areas. Of those inventoried acres, a total of 108,547 acres actually met the roadless criteria. Table 3-31 displays the roadless areas identified under RARE II and their current status.

Approximately 93,110 acres on the Ochoco National Forest and Crooked River National Grassland remain unroaded. This remaining unroaded area includes 36,200 acres in three officially designated wilderness areas, 4030 acres managed as wild and scenic rivers, and 52,880 acres unclassified. Much of this area contains steep slopes, erosive soils, low value timber stands, and/or represents places in which it is difficult to construct roads. The unclassified acreage of unroaded area is contained in six separate unroaded areas: Green Mountain, Lookout Mountain, Rock Creek, Cottonwood, Silver Creek and Deschutes Canyon-Steelhead Falls. These unroaded areas are described briefly here, and in detail in Appendix C.

Green Mountain

This unroaded area contains terrain that is more rugged than most of the Ochoco National Forest, but is otherwise fairly typical. The southern portion of the area consists of ponderosa pine stands interspersed with nontimbered openings. The remaining area contains dense mixed conifer stands. The Green Mountain Trail serves the primary recreation use of the area, i.e. off-road vehicle use and hunting. Current direction for the area is to provide high quality big game habitat and to manage for timber production.

Lookout Mountain

This unroaded area contains sub-alpine and alpine type plant communities interspersed with large openings. The large, open plateau at the top of the mountain is unique to the Ochoco National Forest and visible from U.S. Highway 26. The majority of the timbered slopes contain mixed conifer stands, but pure lodgepole and ponderosa pine stands also occur in the area. Lookout Mountain is popular for big game hunting, snowmobiling, cross country skiing, hiking, and horseback riding. As a part of the deliberations leading to passage of the Oregon Wilderness Act of 1984, the Senate Committee on Energy and Natural Resources recommended that the Forest Service "examine the feasibility of continuing the current use in the National Forest Plan and determine the land allocation in the Forest Plan." Current direction is to emphasize recreational values and maintain the character of the forest over time, without permanent removal of this area from timber production.

Rock Creek

This unroaded area contains deep canyons, 800 to 1000 feet in depth, and consequently, represents one of the most rugged areas on the Ochoco National Forest. The upper portions of the area are primarily open ridge tops and talus slopes. Timbered stands contain old growth mixed conifer. Diverse habitats in the area support a variety of wildlife, including wintering bald eagles, and possibly wolverines. Primary use of the area is for hunting and fishing. Current direction is to provide high quality big game habitat and to manage for timber production.

Cottonwood

This unroaded area contains ridges and canyons which form a steep, deeply dissected landscape. Stream bottoms and north-facing slopes are densely covered with mixed conifer timber stands, while southerly aspects contain open ponderosa pine stands and natural openings. Diverse wildlife habitats are believed to support black bear, wolverines, and mountain lions. Hunting and fishing are the primary recreational uses. Current direction is to provide high quality big game habitat, and to manage for timber production.

Silver Creek

This unroaded area is a shallow canyon area with a basalt outcrop around the canyon rim. It features old growth ponderosa pine stands and scattered small openings, which make it unique in that all other unroaded areas on the Ochoco National Forest are dominated by mixed conifer stands. This area is also the only roadless area on the south end of the Ochoco National Forest (Snow Mountain District). Portions of a proposed Research Natural Area lie in Silver Creek. Primary recreational uses are hunting and fishing. The main canyon area (approximately 3300 acres) is currently managed as a roadless area. Current direction for the surrounding upland area is to develop it for timber production.

Deschutes Canyon-Steelhead Falls

This unroaded area is unique from several standpoints. It contains deep, sheer canyons along the Deschutes River and Squaw Creek which support productive riparian areas and fish habitat. Pockets of ponderosa pine and juniper occur in the narrow stream bottoms. The surrounding plateau area contains juniper, sagebrush, bitterbrush, and grasses. It is the only unroaded area on the Crooked River National Grassland. The area is popular for fishing, hunting, and sightseeing. The Deschutes Canyon-Steelhead Falls unroaded area was placed in the "Further Study" category by RARE II; for this reason the Oregon Wilderness Act of 1984 directed that this area be studied for potential wilderness designation through the forest planning process.

The Oregon Wilderness Act of 1984 released all of these unroaded areas except the Deschutes Canyon-Steelhead Falls area from being considered for wilderness in this plan. These areas are to be managed for multiple use in accordance with current land management plans, and not necessarily for

protection of wilderness suitability. Recommendations concerning the future management of these unroaded areas, including the Deschutes Canyon-Steelhead Falls area, are presented in the alternatives described in Chapter 2.

Figure 3-14 displays the general location of the remaining unroaded areas on the Ochoco National Forest and Crooked River National Grassland, and Table 3-32 shows the size and estimated recreational use capacity of each area.

TABLE 3-31
UNROADED AREA SUMMARY

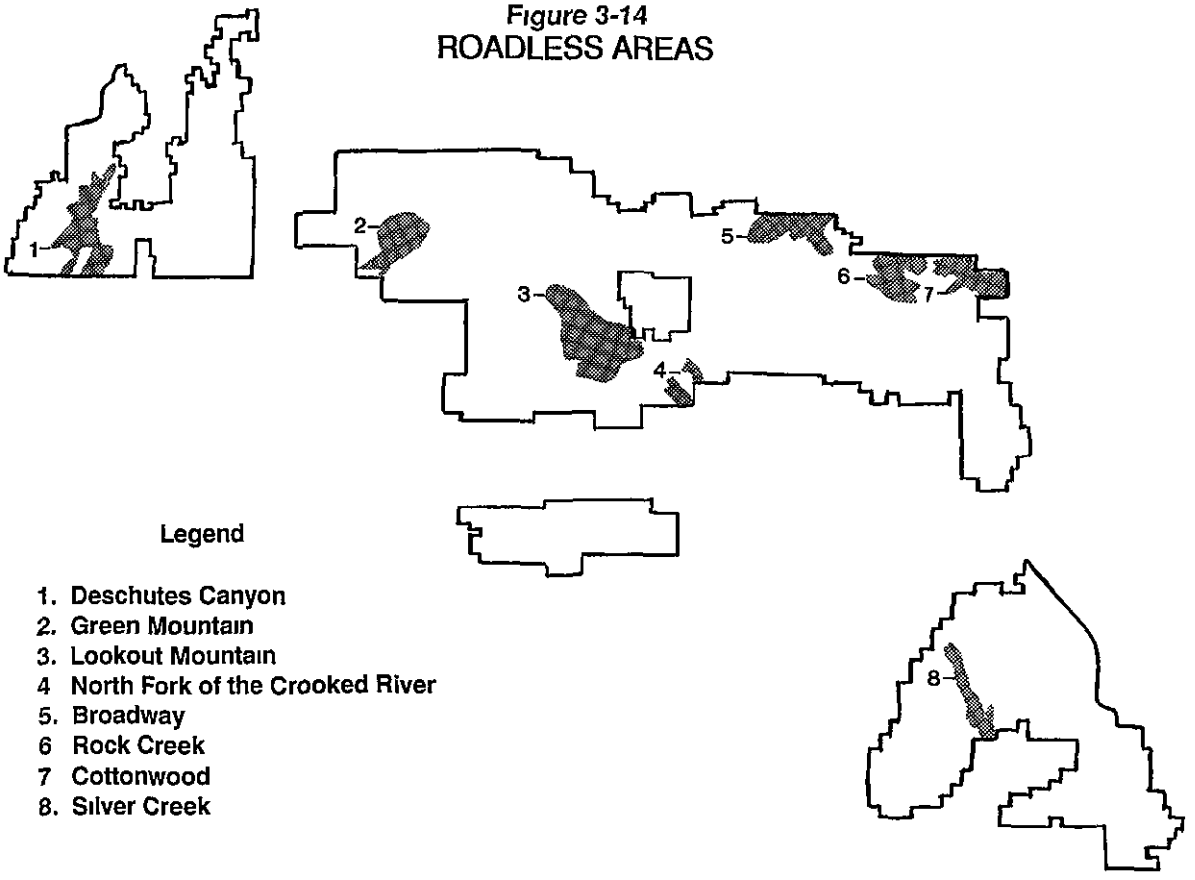
UNROADED Area	Original (RARE II) Acres	Current Acres	Reason for Acreage Change
Black Canyon	13,200	0	Wilderness established by PL 98-328
Bridge Creek	5,500	0	Wilderness established by PL 98-328
Broadway	8,650	0	Timber harvest and road construction
Cottonwood	11,051	9,780	More accurate mapping and inventory
Deschutes Canyon-Steelhead Falls	10,000	7,840	2,000 established as scenic river by the Oregon Rivers Bill
Green Mountain	6,630	6,630	
Lookout Mountain	15,260	14,270	More accurate mapping and inventory
Mill Creek	17,300	0	Wilderness established by PL 98-328
Rock Creek	9,286	11,410	More accurate mapping and inventory
Silver Creek	11,670	7,460	Timber harvest and road construction
Total	108,547	57,390	

TABLE 3-32
REMAINING UNROADED AREAS
SIZE AND CAPACITY

Unroaded Area	Criteria Acres	Recreation Visitor Days/Yr	Location
Green Mountain	6,630	7,000	Prineville Ranger District
Lookout Mountain	14,270	16,300	Big Summit Ranger District
Rock Creek	11,410	12,400	Paulina Ranger District
Cottonwood	9,780	12,700	Paulina Ranger District
Silver Creek	7,460	2,400	Snow Mountain Ranger District
Deschutes Canyon-Steelhead Falls 1/	10,000	2,600	Crooked River National Grassland
Total	59,550	51,400	

1/ Includes area designated as wild and scenic river

Figure 3-14
ROADLESS AREAS



Water

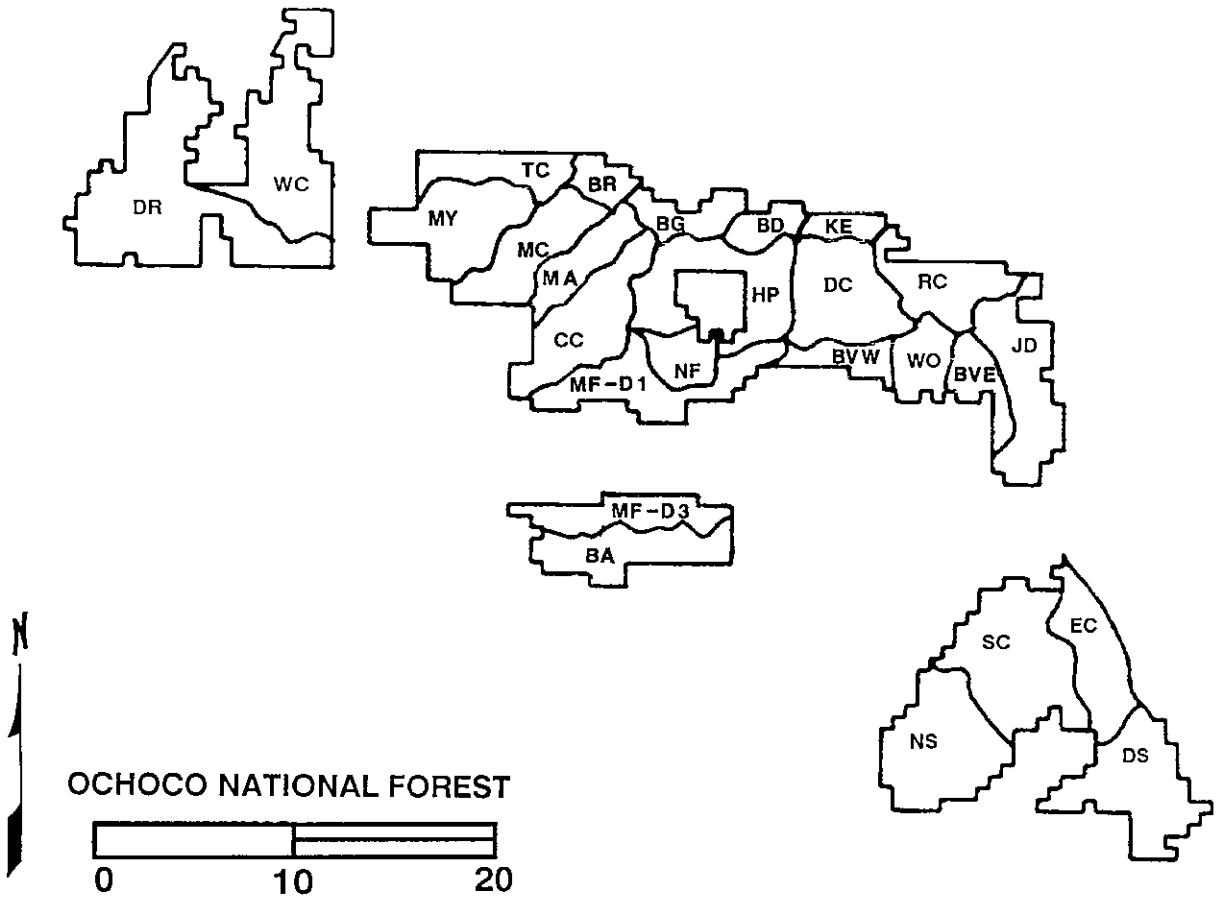
Watersheds on the Ochoco National Forest and Crooked River National Grassland are characterized by relatively low precipitation and humidity, rapid evaporation, abundant sunshine, and wide monthly and daily ranges in temperature. Mean annual precipitation on the Forest is 21 inches with a range from 11 inches at lower elevations to 33 inches at the highest elevations. Precipitation on the Grassland averages 10.5 inches and ranges from 7 to 19 inches. Most of this precipitation occurs between October and June, and over half falls as snow.

The average annual precipitation for all watersheds on the Ochoco National Forest yields approximately 574,000 acre feet of runoff. More than 80 percent of this runoff occurs during the months of February through May, with 35 percent occurring in April alone. Streamflow on the Forest is lowest during September. Runoff from the Crooked River National Grassland is minimal, except for major storm events. Surface flow in streams and rivers on the Crooked River National Grassland largely results from runoff originating outside the Grassland boundary, or from ground water.

Most Ochoco National Forest streams drain into the Crooked River, a tributary of the Deschutes River. The north slopes of the Big Summit and Paulina Ranger Districts, and the east slopes of the Paulina Ranger District, empty into the John Day River. The majority of runoff from the Snow Mountain Ranger District flows into the Malheur/Harney Lakes basin, which has no surface outlet. The watersheds of the Crooked River National Grassland drain into the Deschutes River directly, or via the Crooked River. Figure 3-15 depicts the locations of the watersheds on the Ochoco National Forest and Crooked River National Grassland.

Figure 3-15

WATERSHEDS ON THE FOREST AND GRASSLAND



CROOKED RIVER
Bear Camp (BA)
Beaver Creek (East) (BVE)
Beaver Creek (West) (BVW)
Deep Creek (DC)
Howard-Porter (HP)
Marks Creek (MA)
McKay Creek (MY)
Middle Fork (MF-D1)
Middle Fork (MF-D3)
Mill Creek (MC)
North Fork (NF)
Ochoco Creek (OC)
Wolf Creek (WO)

DESCHUTES RIVER
Deschutes River (DR)
Trout Creek (TC)
Willow Creek (WC)

JOHN DAY RIVER
Bear Creek (BR)
Bridge Creek (BG)
Badger Creek (BD)
Rock Creek (RC)
Keeton Creek (KE)
John Day Tributaries (JD)

MALHEUR-HARNEY LAKES
Dry-Stinger (DS)
Emigrant Creek (EC)
Nicol-Sawmill (NS)
Silver Creek (SC)

Watershed Conditions

Watershed conditions on the Forest and Grassland range from undisturbed to deteriorated. The cause of deterioration is linked to human activities which have taken place over the last 150 years. Beaver trapping and timber harvest in riparian areas have reduced the stream's ability to capture sediment and to slow runoff. Roads and skid trails constructed adjacent to streams have concentrated runoff, accelerating bank erosion and downcutting. Livestock concentration near streams has damaged bank vegetation, increased mass wasting of upper banks, and degraded water quality. Many streams experience increased stream temperatures and sedimentation from these activities. After several decades of these types of impacts, the natural ability of some watersheds to recover and to return to a stable condition has been reduced. Problems associated with damaged streambanks are compounded by the occurrence of a major storm event.



The water quality in most streams meets applicable State Water Quality Standards most of the time. However, approximately 50 percent of the total miles of streams on the Ochoco National Forest are in a degraded condition. Streams in poor condition have seasonal problems with turbidity and/or temperature. On-going and future management activities are designed to upgrade these streams to excellent condition; however, full recovery of all currently degraded streams will probably not be achieved for several decades.

Physical stream surveys have been conducted on most of the perennial streams on the Ochoco National Forest and Crooked River National Grassland. The existing stream conditions have been classified as acceptable or unacceptable. Streams in acceptable condition have at least 80 percent of the banks in stable condition, and a minimum of 80 percent shade, or 100 percent of the potential shade.

A summary of stream conditions on the Ochoco National Forest and Crooked River National Grassland is displayed in Table 3-33.

TABLE 3-33
STREAM CONDITIONS
(Miles)

Ranger District	Acceptable	Unacceptable
Crooked River National Grassland	11 3	20 4
Prineville	86 8	85 2
Big Summit	109 0	106 3
Paulina	139 5	67 0
Snow Mountain	69 3	122 8
Total	415 9	401 7

Cumulative Effects/Major Storm Events

Cumulative effects of past and present land management practices have contributed to the unacceptable condition of many Forest watersheds These "cumulative effects" have the potential to result in degraded water quality or stream habitat conditions. The risk is highest when a watershed that has been made more hydrologically sensitive experiences a major storm event.

In order to monitor these cumulative effects and to provide an assessment of risk, a watershed sensitivity rating system has been developed. This system indicates the relative risk of a watershed not meeting water quality goals when developed for timber or range management. Each of the 26 major watersheds on the Ochoco National Forest and Crooked

River National Grassland have been assigned a sensitivity rating of low, medium or high. Criteria used to develop the watershed sensitivity rating include soil depth, compaction hazard, road density, slope, fisheries value, and existing and potential riparian condition.

Each watershed has also been assigned a "threshold value." The threshold value identifies the upper limit of timber harvest without incurring significant damage from a major storm event. The threshold value is a reflection of the watershed sensitivity, with low thresholds indicating high sensitivity. Table 3-34 displays the sensitivity ratings and threshold values assigned to each of the 26 major watersheds on the Ochoco National Forest and the Crooked River National Grassland.

TABLE 3-34
WATERSHED SENSITIVITIES AND THRESHOLD VALUES

Watershed	Sensitivity	Threshold Value
Middle Fork Crooked River (D-1)	Low	35 percent
Middle Fork Crooked River (D-3)	"	"
Dry Stinger Creek	"	"
Beaver Creek (East)	"	"
Beaver Creek (West)	"	"
Bear/Camp Creek	"	"
North Fork Crooked River	Medium	30 percent
Marks Creek	"	"
Emigrant Creek	"	"
McKay Creek	"	"
Howard/Porter Creek	"	"
Ochoco Creek	"	"
Mill Creek	"	"
Silver Creek	"	"
Deschutes River	"	"
Willow Creek	"	"
John Day River (tributaries)	High	25 percent
Rock Creek	"	"
Trout Creek	"	"
Bridge Creek	"	"
Deep Creek	"	"
Wolf Creek	"	"
Nicoll/Sawmill Creek	"	"
Badger Creek	"	"
Bear Creek	"	"

On watersheds where project scoping identifies an issue or concern regarding the cumulative effects of activities on water quality or stream channels, a cumulative effects assessment is made. This includes land in all ownerships in the watershed. Activities on National Forest System lands in these watersheds will be dispersed in time and space at least to the extent necessary to meet minimum management requirements. On intermingled ownerships, scheduling efforts will be coordinated.

Stream Dynamics and Potential Impacts

The frequency and magnitude of storm events has a major effect on the character of drainages. Frequent storm events of low magnitude (less than one year return period) carry so little energy that the affect on a drainage is small. Large storm events (100 year return period) are so rare that, although their immediate effect is great, their long-term impact is only moderate. It is the intermediate events (5-25 year return period) which exhibit both sufficient energy and frequency to exert a major impact on channel morphology.

The majority of stable channels on the Forest are defined by the two year average annual flow. Flows greater than the two year event overflow the natural banks and inundate the flood plain. With bank overflow, flow velocities decrease markedly and sediment in transport is deposited, building floodplains and increasing soil fertility.

When the stream channel becomes incised, flow events greater than the two year return period are contained within the main channel. These larger magnitude flow events result in a greater amount of energy being released within the channel. The result is a continued excavation of channel bottom and banks, lowering of the floodplain water table, and destruction of fish habitat through pool filling and streamed gravel cementation.

Livestock grazing, timber harvest, and road construction can adversely impact stream systems. These activities can decrease evapotranspiration, increase snowpack, raise stream temperature, compact the soil, and create water repellent soil layers. These potential effects can be mitigated through the use of Standards and Guidelines (Appendix D) and Best Management Practices (BMP's). Effects on resources will need to be monitored.

Water quality criteria have been established by the State of Oregon under direction of the Clean Water Act. Water quality goals for streams are set on an individual project basis to meet these criteria. During environmental analysis, an Interdisciplinary Team (IDT) will select appropriate BMP's that are designed to protect the water resource. These selected BMP's are used in the preparation of the timber sale contract or other project plan. Individual projects are then monitored to determine whether or not the selected BMP's contribute to meeting the established water quality goals.

Riparian Areas, Floodplains, and Wetlands

Riparian Areas

Riparian areas are associated with streams, springs, lakes and other bodies of water. They are sensitive to land use activities and require special attention. Conservation and protection of riparian areas is a national concern.

Maintaining the integrity of riparian areas is essential to the maintenance of water quality. In addition to providing stream bank stability, riparian communities serve as filter strips to prevent sedimentation from remote non-point sources of erosion. They also serve as a source of woody material which stabilizes streambanks, and provides nutrients to the stream ecosystem.

Riparian areas and their associated water resource are a focal point for recreation, including fishing, camping, boating, hiking, and hunting. In addition, many wildlife species are dependent on this diverse habitat for food, cover, and water. Of the 378 terrestrial wildlife species found in the Blue Mountains, 285 are dependent upon or use riparian habitat more than any other ecosystem. (Thomas, 1979). Perennial streams usually support trout and other species of fish. The riparian vegetation is of critical importance for escape cover, stream shade, and streambank stability in order to maintain water quality and aquatic habitat for trout and other cold water fish species.

Floodplains

As defined in Executive Order 11988, floodplains are those areas subject to a one percent (100-year recurrence) or greater chance of flooding in any given year, and need to remain unmodified so they can pass floods safely. Because of the terrain found on the Ochoco National Forest and Crooked River National Grassland, floodplains are located within riparian areas and are generally contained within 100 feet of stream banks. Roads, road crossings, campgrounds, grazing and timber harvest are the primary causes of impacts to floodplains on the Ochoco National Forest and the Crooked River National Grassland.



Figure 3-16

RIPARIAN ANALYSIS

PRINEVILLE

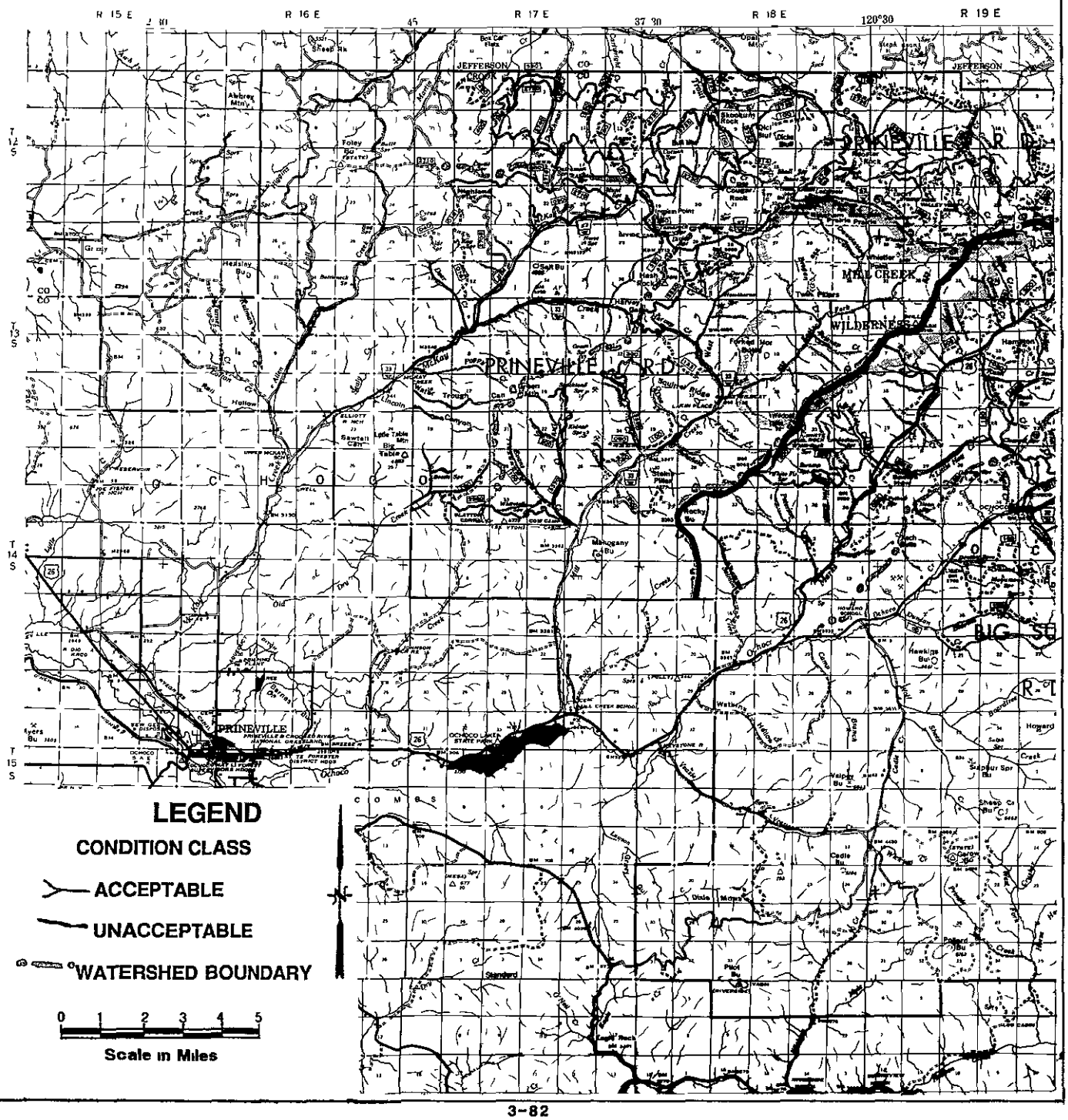


Figure 3-17

RIPARIAN ANALYSIS

PRINEVILLE (MAURYS)

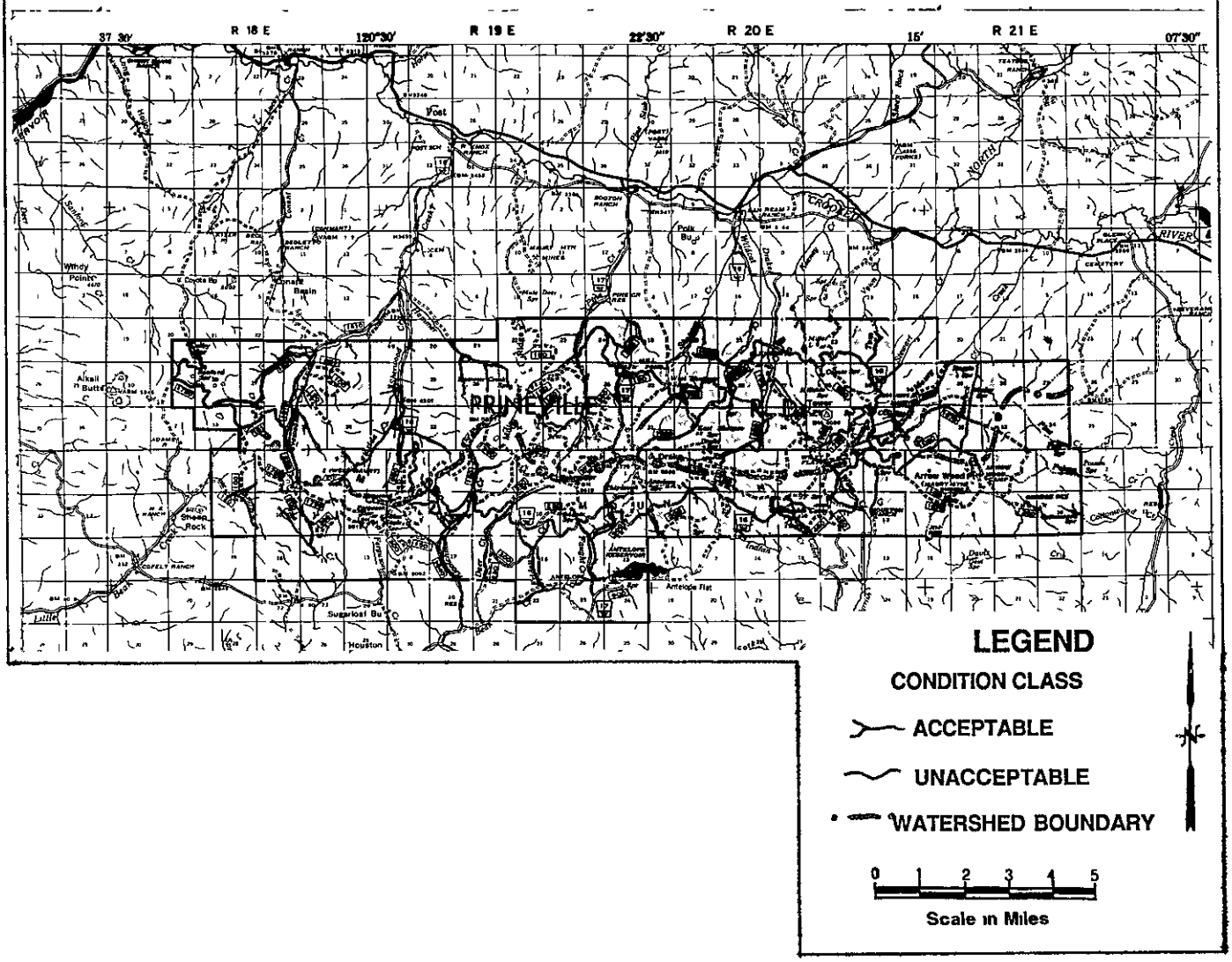


Figure 3-18

RIPARIAN ANALYSIS

BIG SUMMIT

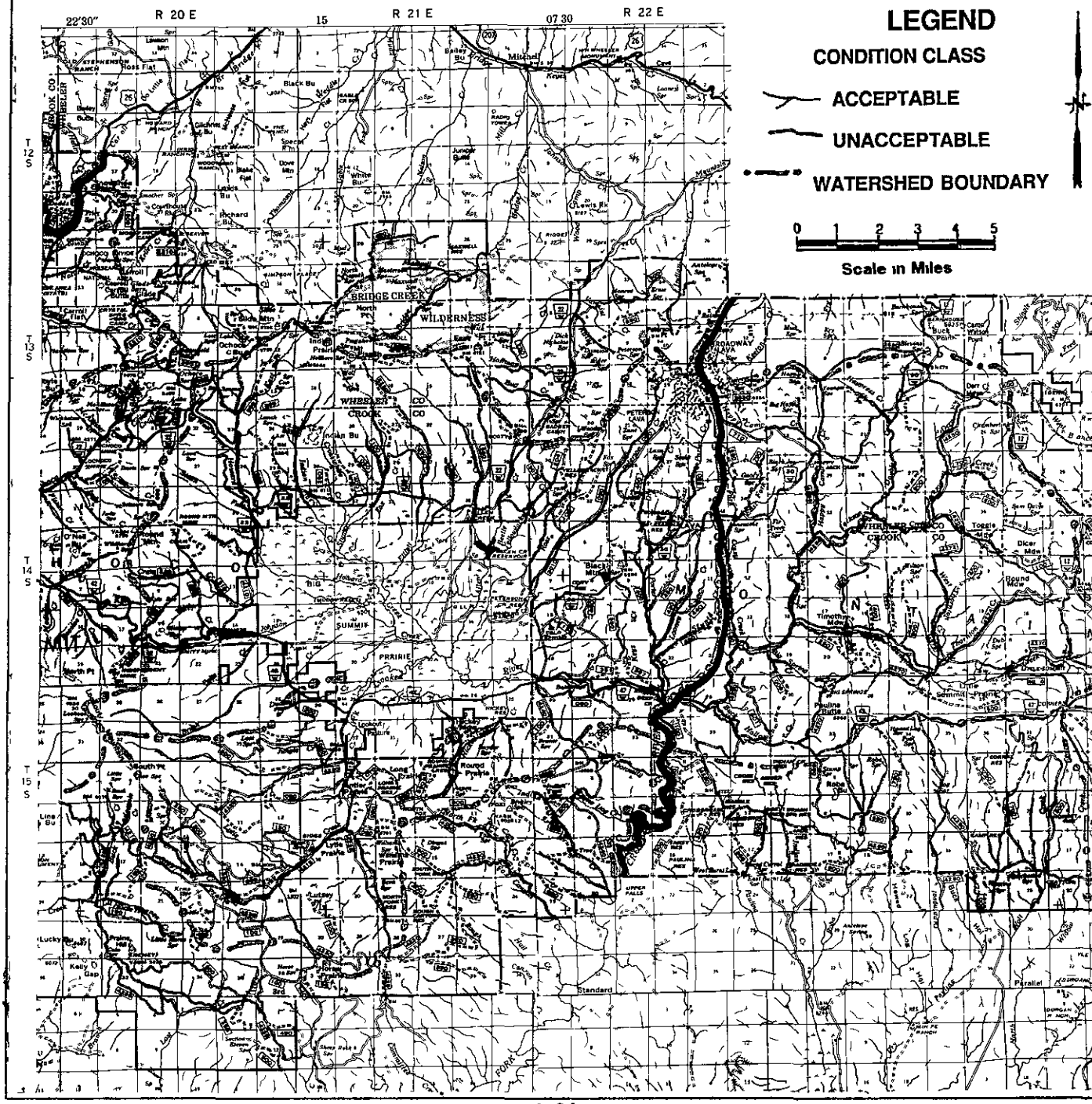


Figure 3-19

RIPARIAN ANALYSIS

PAULINA

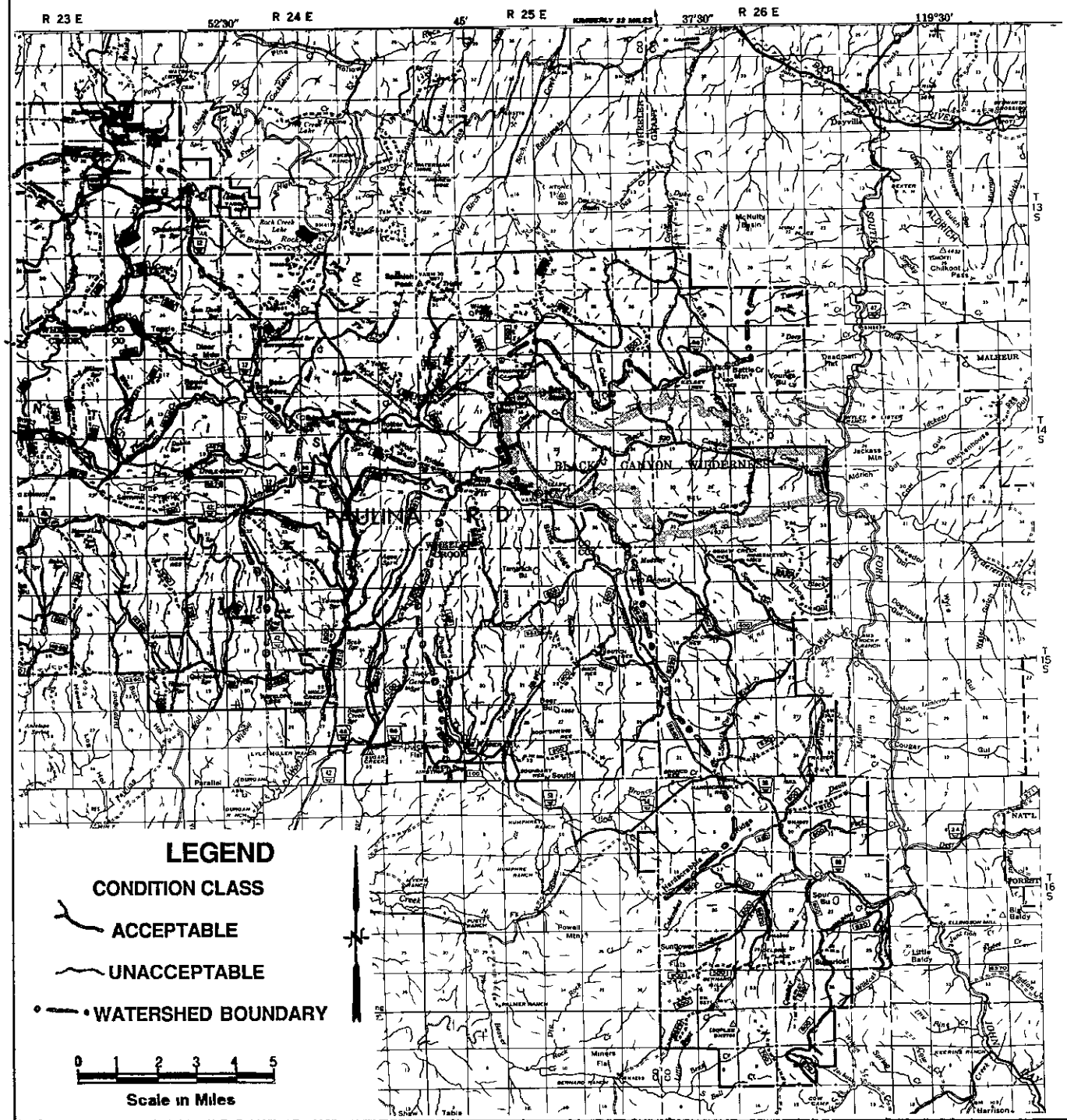


Figure 3-20

RIPARIAN ANALYSIS

SNOW MOUNTAIN

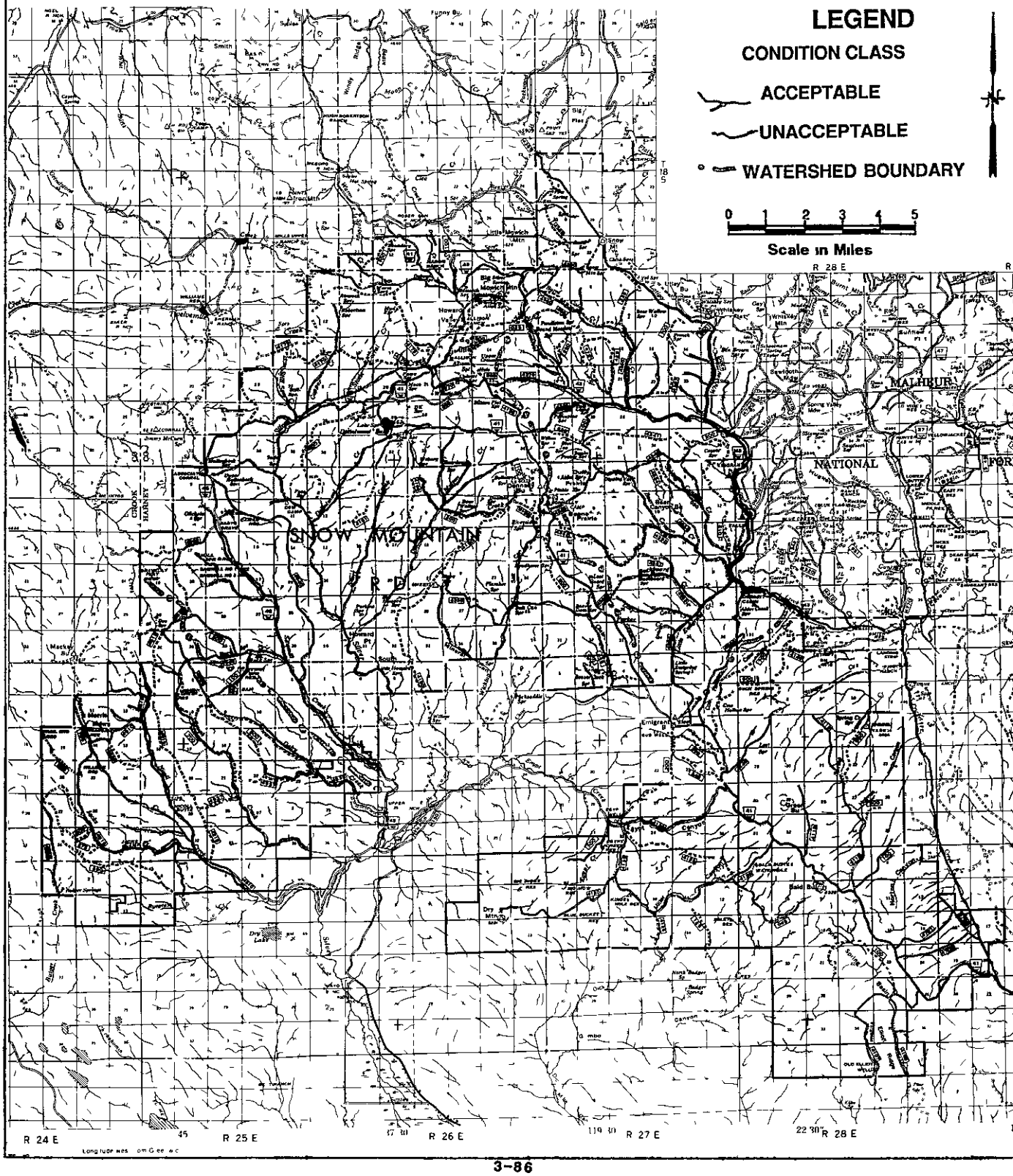
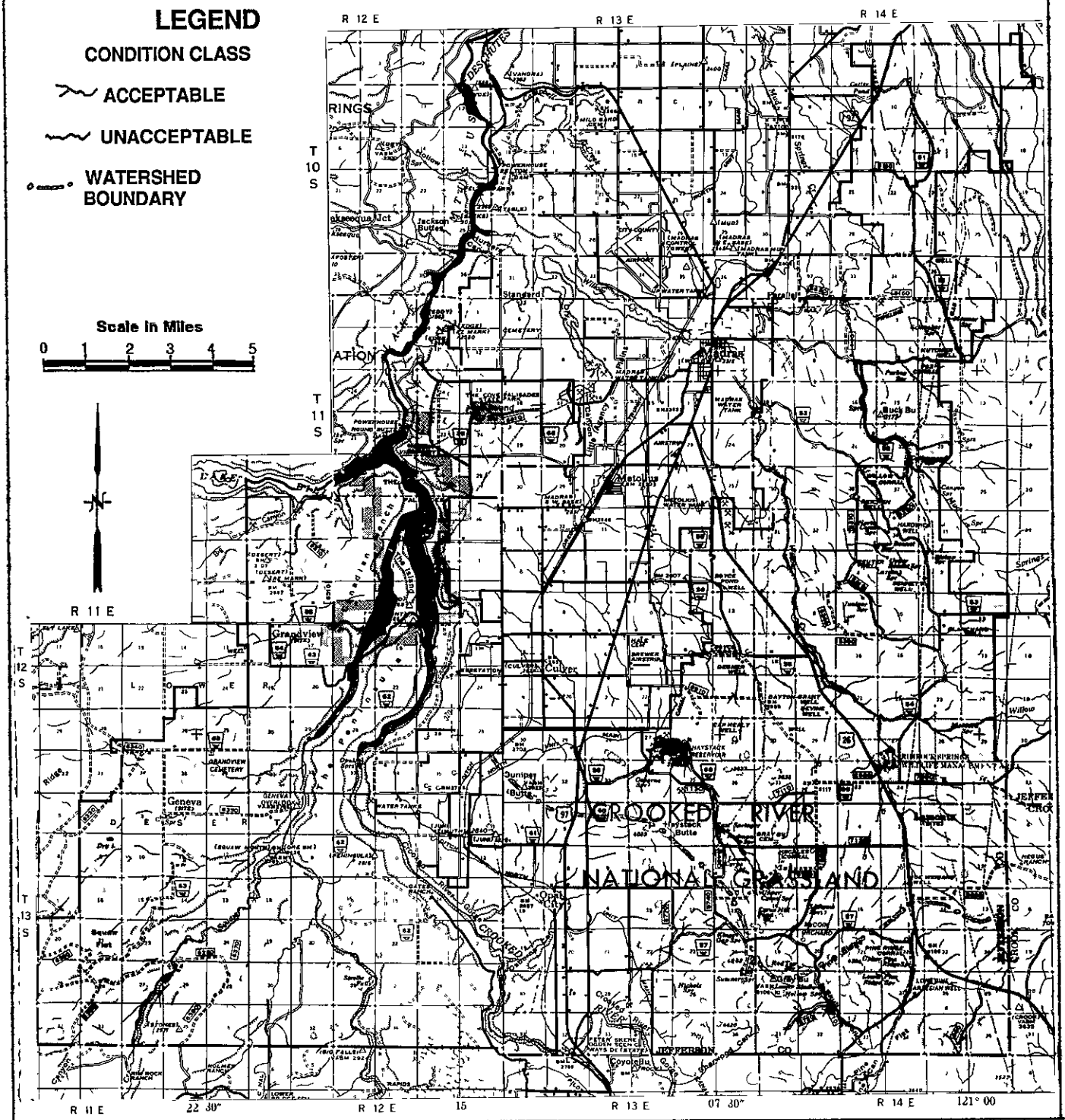


Figure 3-21

RIPARIAN ANALYSIS

CROOKED RIVER NATIONAL GRASSLAND



Wetlands

Wetland basins collect and hold water, buffering the effects of floods and conserving moisture for drier seasons of the year. Executive Order 11990 requires the conservation and protection of wetlands for their unique values. The Ochoco National Forest and Crooked River National Grassland do not have an inventory of wetlands separate from the riparian classification.

Demand

Surface flow from the Ochoco National Forest is in demand for irrigation. The quantity used is small when compared with that distributed by irrigation canals from local reservoirs. Except during drought periods, the supply of water for surface flow irrigation exceeds the demand. Throughout the life of this plan, the cost of irrigating additional lands is expected to be prohibitive.

Runoff from the Ochoco National Forest is captured by downstream reservoirs for later use. Two major reservoirs fed by the Ochoco National Forest, the Ochoco and Prineville reservoirs, have a combined capacity to store over 200,000 acre feet of water. Half of the Ochoco Reservoir's basin is administered by the Ochoco National Forest and 84% of the runoff originates on Forest land. Only 19% of the Prineville Reservoir basin is Forest land, however, this portion generates 39% of the runoff. The Haystack Reservoir on the Crooked River National Grassland is a redistribution reservoir that is supplied water through the North Unit Main Canal of the Deschutes River. The watersheds of the Crooked River National Grassland do not contribute significant amounts of water to this reservoir. The major consumptive use of reservoir water is for agricultural crop irrigation, with demand being highest from April to September. Water sports, fishing, and other recreational activities are also important and increase uses of the water in these reservoirs.

Direct uses of water by the Forest Service include water developments for livestock and wildlife, campgrounds, fire control, dust abatement and administrative sites. The largest volume of water appropriated by the Forest Service is used for livestock watering. Some water use rights are reserved to the Forest Service (e.g. fighting fires), others the Forest Service has applied for and received through the State of Oregon (e.g. water developments), and other rights are obtained through temporary permits (e.g. dust abatement). An emerging issue on the Ochoco National Forest is the need to recognize the importance of maintaining continuous flows within perennial channels, as well as a natural range of flows within all channels. These types of flows are important for channel maintenance and for the survival of fish and wildlife species dependent on this water.

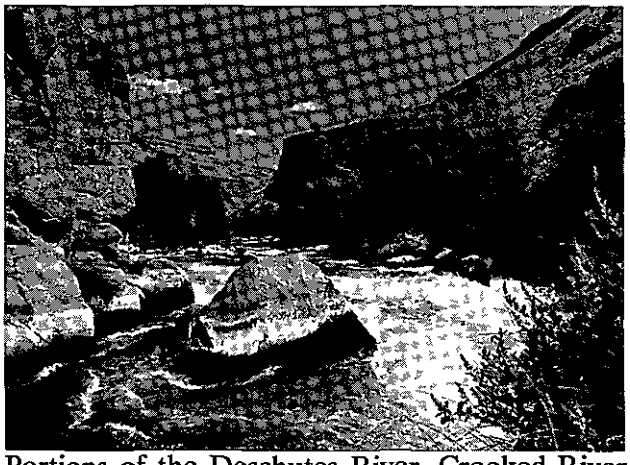
Ground water yields from wells vary greatly. Lands of the Ochoco National Forest are underlain by a variety of massive, fractured, or jointed volcanic rock and interbedded water-laid deposits. As a consequence, water yield from wells on the Forest ranges from less than 5 gallons per minute (gpm) at hand pump wells in campgrounds, to between 25 and 200 gpm from wells at administrative sites. The majority of these wells have some artesian properties.

Wild and Scenic Rivers

In 1968, through an act of Congress (Public Law 90-542), the National Wild and Scenic Rivers System was created. The policy of the United States, as established in the Act, is "... that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

The Wild and Scenic Rivers Act defines three classes of rivers: "wild," "scenic," and "recreational." Wild river areas are those rivers, or sections of rivers, that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These

represent vestiges of primitive America. Scenic river areas are those rivers, or sections of rivers, that are free of impoundments, with shorelines or watersheds still largely primitive and natural appearing. Limited access by roads may occur in places. Recreational river areas retain natural, free flowing characteristics, but shorelines may show evidence of some agricultural or forestry uses, past water diversions, or existing minor improvements or diversions.



Portions of the Deschutes River, Crooked River and North Fork of the Crooked River on the Ochoco National Forest and Crooked River National Grassland were designated in 1988, under the National Wild and Scenic Rivers Act through the Oregon *Omnibus Wild and Scenic Rivers Act (see* Figure 3-22). As required by the Wild and Scenic Rivers Act, management plans are being developed for each of these wild and scenic river areas and will be completed within three years of each river's official designation. These rivers are discussed below.

Deschutes River

The portion of the Deschutes River that flows through the Crooked River National Grassland has been designated as "Scenic." This area is to be managed by the Bureau of Land Management.

Crooked River

The portion of the Crooked River that flows through the Crooked River National Grassland has been designated as "Recreational." This area is to be managed by the Bureau of Land Management.

North Fork of the Crooked River

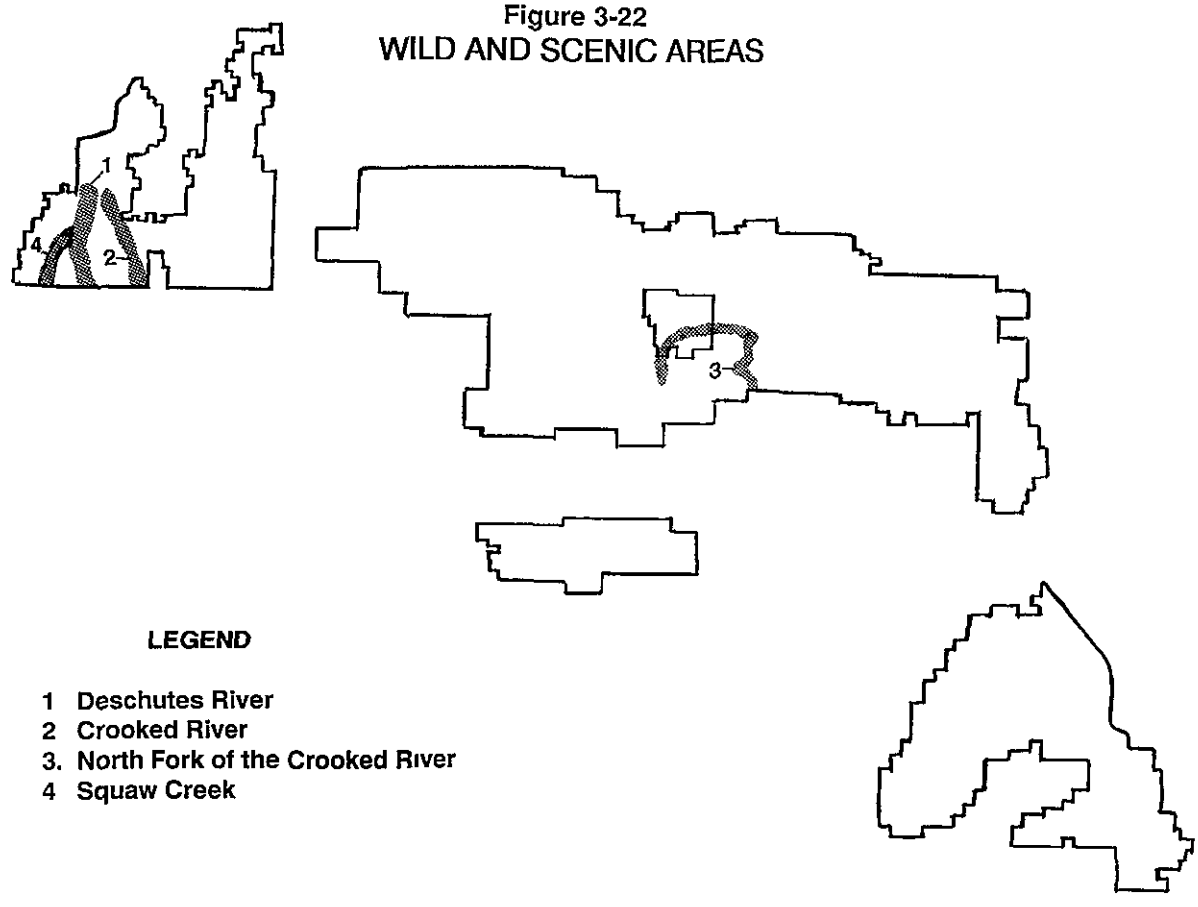
The portion of the North Fork of the Crooked River that flows through the Ochoco National Forest has been designated in three segments. The first segment, from the river source to where the river enters the Big Summit Prairie has been designated as "Recreational." The second segment, from where the river exits the Big Summit Prairie to the confluence of Deep Creek, has been designated as "Recreational." The third segment, from the confluence of Deep Creek to the Ochoco National Forest boundary, has been designated as "Scenic." The portion of this river, between segments one and two, that flows through the Big Summit Prairie (private land), has no official designation under the Oregon Wild and Scenic Rivers Bill.

Lower Squaw Creek

Lower Squaw Creek on the Grassland has been evaluated for its eligibility and suitability for designation as a "Scenic River" in the Wild and Scenic Rivers System. The suitable segment runs from the Grassland boundary to the confluence with the Deschutes River, 1,370 acres.

The possible recommendation of this segment of Lower Squaw Creek is discussed in Chapter 2 of this FEIS under Alternatives B-Modified and I. Any recommendation would be preliminary, and would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

Figure 3-22
WILD AND SCENIC AREAS



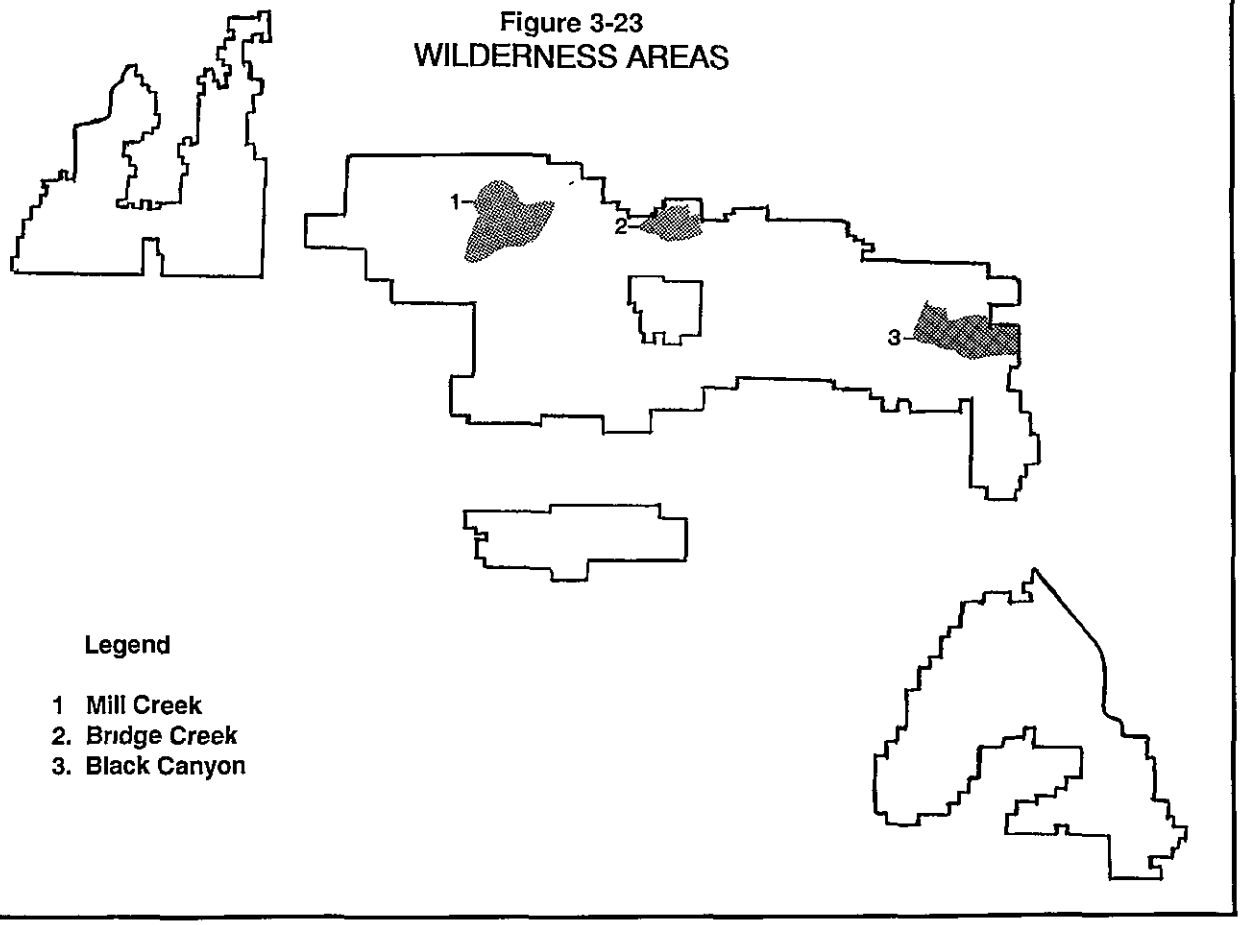
Wilderness

On June 26, 1984, President Reagan signed the Oregon Wilderness Act (Public Law 98-328). This Act resulted in wilderness designation for the following three roadless areas on the Ochoco National Forest: Black Canyon, Bridge Creek, and Mill Creek (Figure 3-23). Wilderness plans have been developed for the Bridge Creek, Mill Creek, and Black Canyon areas, and can be found in Appendix F of the Forest Plan. Each wilderness area is described briefly here.

Black Canyon Wilderness

This wilderness area (approximately 13,400 acres) is dominated by steep, xeric canyons with shallow streams in the bottoms. Almost half of the area consists of nontimbered openings on the ridge tops and south facing slopes. The timbered areas consist of mixed conifer and old-growth ponderosa pine stands. The varied and diverse vegetative conditions provide excellent habitat for nearly 300 different species of wildlife. The area provides yearlong habitat for both deer and elk. There are seven entry points into the area, tying 14.5 miles of trail together to access the canyon bottom. The rugged, steep, and broken terrain of the canyon allows for isolation and solitude, offering one of the most primitive recreational opportunities on the Forest.

Figure 3-23
WILDERNESS AREAS



Mill Creek Wilderness

This wilderness area (approximately 17,400 acres) has a variety of terrain, from steep, broken, lattice type patterns of ridges and canyons, to an almost flat plateau area. The area is mostly old-growth mixed conifer with some high elevation meadows and small openings. There are many small streams and an abundance of riparian habitat. There are several valid gemstone mining claims that utilize primitive roads for motorized access. An 18-mile trail system covers much of the area and connects several campgrounds located just outside the Wilderness boundary. The opportunities for solitude are low due to the proximity of Forest roads and heavy recreational use.

Bridge Creek Wilderness

This wilderness area (approximately 5,400 acres) contains an escarpment that essentially divides the area into two plateaus. Over half of the vegetation is dense mixed conifer, and the remaining area is predominantly a "dog hair" thicket of lodgepole pine. The area contains a working irrigation system consisting of a dam, pipeline, flume, and ditch. The absence of maintained trails in this area provides opportunities for recreational experiences with little chance of encountering other people. Current use is relatively low.



Wilderness Study Areas

In addition to the above wilderness areas, approximately 1,125 acres of land administered by the Ochoco National Forest are included in the Bureau of Land Management's North Fork Wilderness Study Area (OR-5-31). The BLM Draft Environmental Impact Statement (April 1985) for wilderness in Oregon's public domain lands, selected a "No Wilderness" alternative for this area. Wilderness characteristics on Ochoco National Forest lands will be protected until a Final Environmental Impact Statement is issued, and a decision is finalized.

The Deschutes Canyon-Steelhead Falls roadless area (Figure 3-6) on the Crooked River National Grassland was also affected by the Oregon Wilderness Bill. This area was placed in the further planning category by the second Roadless Area Review and Evaluation (RARE II). The Oregon Wilderness Bill directed that areas in this category be analyzed in the forest planning process and a recommendation of wilderness or nonwilderness be made as a result of that process. The Forest Service and Bureau of Land Management have jointly studied the area's wilderness potential as reported in Appendix C. Recommendations for wilderness designation, continued roadless area management, or further development of the area are presented in the alternatives described in Chapter 2.

Wildlife and Fish

Wildlife

The Ochoco National Forest and Crooked River National Grasslands provide habitat for a wide variety of wildlife. Over 375 different species of reptiles, amphibians, birds, and mammals are known or expected to occur on the Ochoco National Forest and Crooked River National Grassland.

Wildlife habitat provided by the Ochoco National Forest is not duplicated in the immediate area. The Ochoco National Forest is relatively isolated from its neighboring national forests, and adjacent forest lands are not extensive. Compared to the surrounding "high desert," the Ochoco National Forest offers a greater diversity of habitats.

The Ochoco National Forest and Crooked River National Grassland have become a popular focal point for hunters due to the large deer population, the occasional trophy sized elk, and the relative closeness to population centers west of the Cascades. Wildlife viewing and fishing are also popular recreational pursuits.

Mule Deer

Mule deer reached high density levels during the late 1950's and early 1960's. A decline in deer population followed with a leveling by the mid-1970's. Deer populations have remained relatively constant since. Considering loss of natural winter ranges and increased agricultural depredation, the Oregon Department of Fish and Wildlife (ODFW) set a management objective of 22,600 mule deer. Current population levels supported by the Ochoco National Forest and Crooked River National Grassland habitat approximate this objective.



Rocky Mountain Elk

Rocky Mountain elk populations on the Ochoco National Forest were lower prior to 1975. Fearing competition with deer for the winter range resource, the ODFW traditionally held an either sex elk hunting season. With new information, the ODFW initiated controlled harvest on antlerless elk during the mid-1970's. This modification of the hunt resulted in a slow but steady increase in elk numbers during the past few years. Now there are approximately 2,300 elk on the Ochoco National Forest according to a 1989 ODFW estimate.

Antelope

Antelope have slowly increased in population and have expanded their range on the Ochoco National Forest for the past two decades. No significant additional increase in their population is anticipated since the suitable habitat appears to be fully occupied. The current population on the Ochoco National Forest is estimated to be 590 animals. Antelope on the Crooked River National Grassland and adjacent private lands are estimated to be between 70 and 160 animals. This herd has grown from an introduction of twelve animals by the ODFW in 1969.

Small Game and Furbearers

Small game on the Ochoco National Forest and Crooked River National Grassland are not abundant. The most common are California valley quail, morning dove and waterfowl. Ruffed and blue grouse, snowshoe hare, and common snipe are less abundant.

The most common furbears are beaver, muskrat, mink, long- and short-tailed weasels, raccoon, bobcat, and coyote. Presently, beaver trapping for pelts is not allowed on the Ochoco National Forest and Crooked River National Grassland. Beaver are increasing by natural recruitment and by relocation of live-trapped "problem" beaver from other areas..

Demand

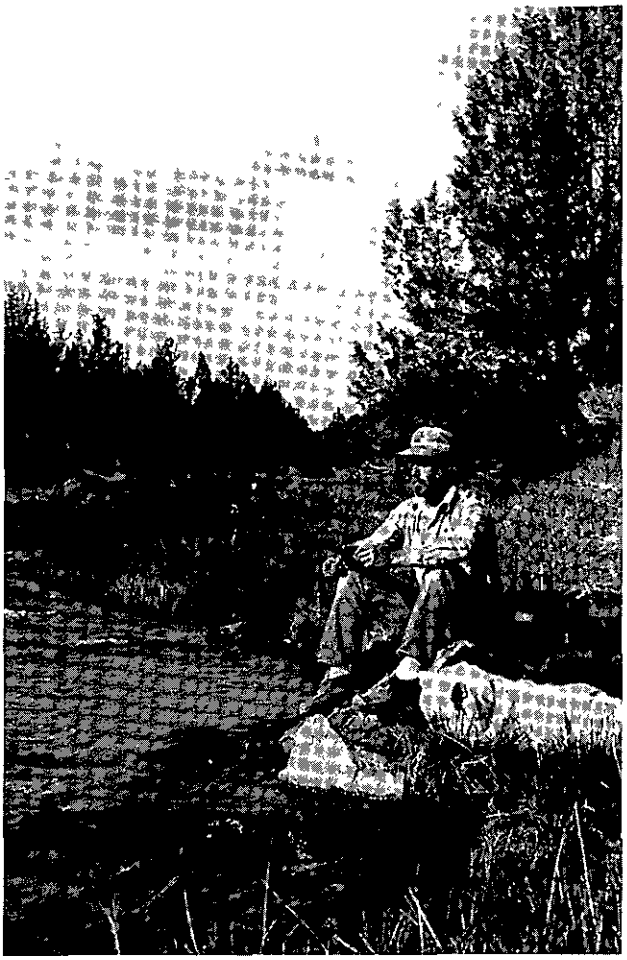
The demand for wildlife provided can be divided into two categories: consumptive and non-consumptive. Probably the best examples of consumptive demand for wildlife are hunting and fishing. The Oregon Department of Fish and Wildlife (ODFW) has established desired population levels (management objectives) for some big game species. The ODFW management objective for mule deer is 22,600. The previous level for elk, 1200, has been raised to the current management objective of 2,600. These management objectives have been used as indicators of demand during the planning process.

Though not quantified, non-consumptive wildlife demand is a recognized aspect of habitat management. Examples of this type of demand are viewing and photographing wildlife. The recent development of the Rimrock Springs Wildlife Viewing Area on the Crooked River National Grassland is an example of providing for this demand. Trails and viewing sites are provided to enhance wildlife viewing opportunities.

Fish

The Ochoco National Forest and Crooked River National Grassland have about 800 miles of streams. Two major rivers, the Crooked River and Deschutes River, flow through the area adjacent to portions of the Crooked River National Grassland. Only the North Fork of the Crooked River is bounded by significant amounts of Ochoco National Forest.

The Ochoco National Forest and Crooked River National Grassland have about 500 miles of streams that support rainbow trout. Brook trout are present in 20 miles of stream. Redband trout are found in streams on the Snow Mountain Ranger District.



Rough fish species (bridgelip and coarse scale) present in streams which compete with trout include suckers, dace, and sculpins. The Ochoco National Forest has three lakes (reservoirs) that provide trout fishing: Walton Lake, Delintment Lake, and Antelope Reservoir. The Crooked River National Grassland encompasses part of the Haystack Reservoir and Lake Billy Chinook shorelines. These reservoirs support trout and other warm water fish, including brown trout, kokanee, mountain whitefish, small and largemouth bass, chiselmouth, and black crappie.

The Ochoco National Forest and Crooked River National Grassland have another 195 miles of streams identified as having the potential to support rainbow trout when stream condition is improved.

Anadromous Fish

Anadromous fish habitat is now present in approximately 42 miles of stream in the northern sections of the Ochoco National Forest. These streams are used by steelhead. The estimated number of adults using these streams for spawning is 304. An additional 45 miles of perennial streams flow into stream reaches where spawning occurs. These additional stream miles are important in maintaining water quality where spawning and rearing occur.

Demand

Trout and the warm water game species are of economical value for recreational fishing. Steelhead, economically valued for commercial and sport fishing, are used by Indians for economic and ceremonial purposes. The Grassland and the portion of the Forest which occurs north of the Paulina Highway (State Hwy. 380) are included in the ceded area established in the Treaty of 1955 between the U.S. Government and the Indian tribes of Middle Oregon. This includes the Confederated Tribes of Warm Springs.

Table 3-35 lists the drainages and associated tributaries on the Forest that support anadromous fish.

Viable Populations

The Ochoco National Forest and the Crooked River National Grassland must maintain viable populations of all native and desired non-native plant and animal species. This was accomplished by defining management requirements for those species or habitats that were considered limiting or sensitive to management activities. These species and habitats are represented by management indicator species. For a further discussion of management indicator species see the Biological Diversity section in this chapter. Species listed as Threatened, Endangered, or Sensitive require additional measures to ensure their survival and recovery.



Threatened, Endangered, and Sensitive Species

The Endangered Species Act of 1973 requires that all Federal agencies protect threatened and endangered species and their habitats to aid population recovery. The U.S. Fish and Wildlife Service has responsibilities for maintaining Federal threatened and endangered lists for animals. Two species on these lists, the peregrine falcon and the bald eagle, have been observed on the Ochoco National Forest and Crooked River National Grassland. Other species have been listed by the U.S. Fish and Wildlife Service in a category indicating that insufficient data exists for a formal determination to be made.

TABLE 3-35
Ochoco National Forest
NATIONAL FOREST ANADROMOUS STREAMS AND USE

Drainage	Stream	Miles with Perennial Flow	Miles with Steelhead Spawning **	Number Adults ***
Trout Creek	Auger	3 0	1 50	6
	Dick	1 0	0 25	4
	Trout	6 0	1 50	10
	Potlid	3 0	0.50	2
	Cartright	2 0	0 60	4
	Dutchman	2 0	0 60	6
	Big Log	2 0	1 00	4
Bear Creek	Bear Creek plus Tributaries	7 0	3 50	21
	Dodds	2 5	1 25	11
Bridge Creek	West Branch	1 0	0 50	2
	Bridge (Main)	4 0	4 00	25
	Maxwell	1 5	*	*
Badger Creek	Badger	3 0	3 00	10
	Hoffman	1 5	*	*
	Milk	1 5	0 50	10
	Bug	1 0	*	*
	Indian	2 0	*	*
Rock Creek	Rock Creek plus Tributaries	7 5	7 50	47
	Baldy Creek plus Tributaries	4 0	1 00	6
	Bear	2 0	*	*
	Fir Tree	1 5	*	*
Cottonwood	Cottonwood	9 0	4 75	16
Black Canyon	Black Canyon	11 0	6 50	92
	South Prong Black Canyon	4 0	1 00	8
Wind Creek	South Fork Wind Creek	2 0	1 00	6
	North Fork Wind Creek	2 0	1 25	8
TOTALS		87 0	41 70	304

* Data not available

** From actual and estimated use based on stream inventories from 1959-1985 Oregon Department of Fish and Wildlife, John Day, Oregon

*** Estimated adult escapement to spawn

Management of habitat for threatened and endangered animal species is designed to promote recovery of the species leading to their removal from threatened or endangered lists. Habitat management for sensitive species is planned to avoid any effects that might cause the species to become threatened or endangered.

Threatened Species

Bald Eagles winter on the Ochoco National Forest. Winter roost sites, an important part of their habitat component, are known to exist on the Big Summit, Prineville, Paulina, and Snow Mountain Ranger Districts. Roost sites are also suspected on the Crooked River National Grassland as well, no nesting sites have been found. A Bald Eagle winter roost study, contracted by Oregon State University was completed in 1987. The purpose of the study was to locate roost sites and develop guidelines for protection. A Bald Eagle Recovery Plan is schedule for completion in 1989, which will provide specific direction for management of roosting sites.

Endangered Species

Peregrine Falcons are occasionally observed on the Ochoco National Forest or Crooked River National Grassland. Infrequent sightings indicate migrating individuals. There are no known nesting sites on the Ochoco National Forest or the Crooked River National Grassland.

Sensitive Species

The Regional Forester has responsibility for designation of sensitive species. Sensitive species are not on federal lists. Regional Forest Service policy is that species listed by the State of Oregon as threatened, endangered, or sensitive, and not on Federal lists, will be considered sensitive by the Forest Service. The most current list of Region 6 Sensitive Species for the Ochoco National Forest and Crooked River National Grassland is shown in Table 3-36.

Table 3-36

Threatened, Endangered, and Sensitive Species

		Federal	State	R-6	N.F.
Sensitive Birds					
Ferruginous Hawk	*Buteo regalis*	Cat. 2		OR	S
Swainson's Hawk	*Buteo swainsoni*	Cat. 2	S	OR	D
N. Bald Eagle	*Haliaeetus leucocephalus*	T	T	*/OR	D
Western Sage Grouse	*Centrocerus urophasianus*	Cat. 2		*/OR	D
Greater Sandhill Crane	*Grus canadensis tabida*		S	*/OR	D
Western Snowy Plover	*Charadrius alexandrinus nivosus*	Cat 2	T	*/OR	S
Long-billed Curlew	*Numenius americanus*	Cat. 2		*/OR	D
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*				
Sensitive Mammals					
Preble's Shrew	*Sorex preblei*	Cat. 2		OR	S
California Wolverine	*Gulo gulo luteus*	Cat. 2	T	*/OR	D
Sensitive Fish					
Redband Trout	*Salmo* spp	Taxonomic uncertainty			D
Malheur Mottled Sculpin	*Cottus bairdi* spp.	Cat. 2		OR	D
Sensitive Plants					
Brandegee Onion	*Allium brandegei*		T	OR	S
Sierra Onion	*Allium companulatum*		T	OR	D
Swamp Onion	*Allium madidum*	3c	S	*	D
Prairie Sage	*Artemisia ludoviciana* spp *estesii*	Cat. 2	T	OR	S
John Day Milk-Vetch	*Astragalus diaphanus* var. *diaphanus*	Cat 2	E	OR	S
John Day Milk-Vetch	*Astragalus diaphanus* var *diurnus*	Cat. 2	E	OR	S
Deschutes Milk-Vetch	*Astragalus tegetarioides*	Cat. 2	T	OR	S
Long Bearded Sego Lily	*Calochortus longebarbatus* var. *peckii*				D
Long Bearded Sego Lily	var. *longebarbatus*	Cat 2	T	*/OR	S
Bristle-flowered Collomia	*Collomia macrocalyx*	Cat 2	S	OR	D
not listed	*Lupinus cusickii*	Cat. 2	T	OR	S
Henderson Ricegrass	*Oryzopsis hendersonii*		T	*/OR	D
Scapose Silene	*Silene scaposa* var *scaposa*	Cat. 2	T	OR	S

Definitions

Federal: 1985 Federal Register Notice of Review
- T = Threatened
- Category 2 = Needs additional information before proposing a federal listing
- Category 3c = Deleted species, taxon more abundant and widespread than previously thought

State Oregon State Status Regional Forester's
- E = Endangered
- T = Threatened
- S = Sensitive

R-6 Sensitive Species List
- OR = Sensitive in Oregon
- * = Potential candidate for Regional Forester's list

N F Ochoco National Forest
- D = Determined to be present
- S = Suspected to be present

Chapter 4

Environmental Consequences

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

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Chapter 4

Environmental Consequences

Introduction

The purpose of this chapter is to disclose the environmental consequences (effects) of the six alternatives described in Chapter 2, based on currently available scientific and/or analytical information. Effects are discussed for "components of the human environment," which includes the natural and physical environment and the relationship of people with that environment. Discussions are not necessarily limited to effects that occur on the Ochoco National Forest and Crooked River National Grassland, but also include a reasonable assessment of effects on both people and natural resources within the entire affected area, as discussed in Chapter 3.

Changes Between the DEIS and FEIS

Many changes were made between the Draft and Final Environmental Impact Statements which resulted in changed analysis and environmental consequences discussed in this chapter. Based on public comment to the DEIS four additional issues, concerns and opportunities (ICO's) were added to the original list of twelve (see Issues, Concerns and Opportunities - Chapter 1). The four added ICO's include: Anadromous Fish, Historic Trail Preservation - Summit Trail, Off Road Vehicle (ORV)Use, and Round Mountain. Issues of regional and national importance have also evolved, or increased in intensity since the DEIS. These include: biological diversity, forest residues (related to long term productivity), forest health (formerly discussed as "forest pests"), and old growth (formerly discussed under "vegetation").

Eleven alternatives for management of the Forest and Grassland were presented and analyzed in the DEIS. Some alternatives were subsequently modified or dropped from further detailed study. Two alternatives were added to respond to the ICO's and public comments. One of these alternatives (Alternative No Change [NC]) was added in response to the Supplement to the DEIS, which was simply a continuation of the existing Ochoco National Forest Timber Resource Plan. The other (Alternative I - Preferred) is a completely new alternative. See Chapter 2 for detailed discussion of final alternatives.

Regional and Washington Office (U.S.D.A. Forest Service) reviewers of the DEIS commented that many of the discussions on environmental consequences revolved around Forest and Grassland programs of work, rather than on the actual environment. In addition, some public comments suggested that environmental consequences were inadequately addressed in the DEIS. Changes in discussions in this chapter of the FEIS reflect those comments, as well as higher order changes in regulations, policy and procedures germane to the National Environmental Policy Act of 1969.

Major Assumptions

Management requirements, as discussed in detail in Chapter 2, are a legal requirement of NFMA (National Forest Management Act) and are designed to limit the potential environmental effects of any of

the alternatives. Standards and guidelines, as discussed in Appendix D, serve as specifications for implementing the management requirements and as an enforcement mechanism for meeting the desired future conditions associated with the respective alternatives. All effects disclosed in this chapter (4) assume that standards and guidelines are being met for all of the alternatives. Environmental effects of management would be unacceptable in the absence of these standards and guidelines, because they would result in a reduction of long term productivity of Forest and Grassland resources.

Some routine operations that the Forest engages in are considered environmentally insignificant. These are discussed in this chapter (Activities with No Significant Environmental Effects).

This chapter contains complex discussions about the environment, and the reader's understanding of it will be improved with a thorough review of both Chapter 2 and Chapter 3. Environmental components are the subject of the analysis in this chapter and have been introduced in the same order in Chapter 3. Outputs such as timber harvest levels vary by alternative and are presented in Chapter 2. The objective of this chapter is to further elaborate on the environmental effects that would occur as the result of producing the outputs, programs and resources discussed in the previous chapters, by alternative. Because of the issues, concerns and opportunities, some of the "programs and resources" are also discussed as environmental components (e.g. timber supply). Environmental components are introduced alphabetically and discussed in various detail, based on the significance of the issues, concerns or opportunities surrounding them. These components include:

Air Quality
Biological Diversity
Cultural Resources
Facilities
Fire
Forage
Forest Health
Forest Residues
Fuelwood
Lands
Minerals and Energy
Old Growth
Recreation
Scenic Resources
Social and Economic
Soil
Timber
Transportation System
Unroaded Areas
Water (including Riparian Areas, Wetlands and Floodplains)
Wild and Scenic Rivers
Wilderness
Wildlife and Fish

For each environmental component, the following discussions are provided: (a) direct effects, (b) indirect effects, (c) cumulative effects, (d) mitigation measures, and (e) conflicts with other plans and policies.

Direct Effects are those caused by an action, that occur at the same time and place of the action. As an example, a newly constructed road will affect the soil resource by removing land from production and dedicating it to the transportation system.

Indirect Effects are those caused by an action but are later in time or farther removed in distance from the action; however, they are still reasonably foreseeable. An example would be the increase in growth rate of trees on a particular parcel of land as a result of a properly applied silvicultural treatment, or an increase in water turbidity (and therefore a decrease in water quality) as a result of excessive soil erosion.

Cumulative Effects are those that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Use of heavy machinery for logging or slash piling may have unnoticeable effects on soil after just one

entry, but repeated use over a period of years may compact that soil to the point where it is no longer able to grow vegetation. This would be a clear example of a "cumulative effect" of a management action on the soil resource.

Mitigation Measures are actions taken to reduce the risk associated with an environmental effect. The objective may be just to reduce the severity of the effect, or to eliminate the effect all together. From the CEQ Regulations (40 CFR 1508.20), mitigation includes:

1. Avoiding the effect altogether by not taking a certain action or parts of an action.

2. Minimizing effects by limiting the degree or magnitude of the action and its implementation

3. Rectifying the effect by repairing, rehabilitating, or restoring the affected environment.

4. Reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action.

5. Compensating for the effect by replacing or providing substitute resources or environments.

Conflicts with other plans and policies for a specific resource might include, as an example, a discrepancy in planned outputs of big game from the Forest, versus those planned or scheduled by the Oregon Department of Fish and Wildlife.

Following the disclosure of effects by environmental component are five special sections which discuss: (a) the relationship between short term uses of man's environment and the maintenance and enhancement of long term productivity, (b) irreversible and irretrievable commitments of resources associated with the preferred alternative (I), (c) unavoidable environmental effects associated with the preferred alternative (I), (d) other specifically required disclosures, and (e) conflicts with other federal, regional, state and local plans (including Indian Reservation Plans) as an overview.

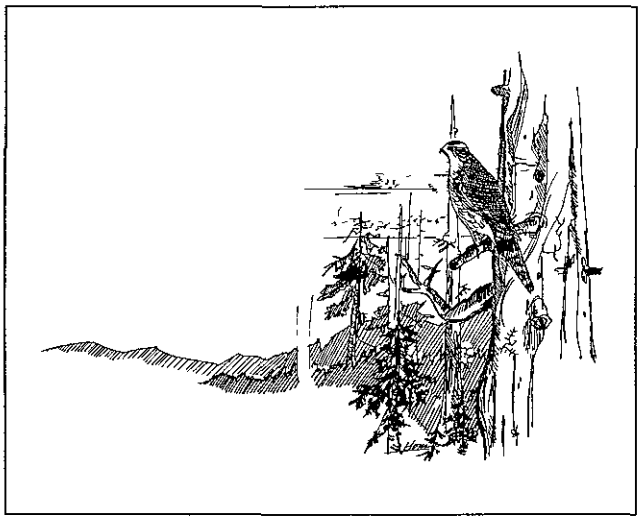
Activities with No Significant Environmental Effects

The Forest engages in some management activities that do not involve significant environmental effects. These activities are categorized as routine operations, and individually or cumulatively have been found to have no significant effects based on public issues or experience with the procedures normally employed by the Forest Service. Routine operations include such things as renovation and upkeep of facilities, trail maintenance, actions controlled by permit systems including firewood gathering, collection of plant materials, outfitter and guide services, placement and maintenance of climatological instruments, custodial maintenance, administrative actions, and others.

Other actions of limited size or magnitude have also routinely been found to produce little or only limited short-term effects on the environment. This determination for future actions involves careful consideration by Forest officials, but may be addressed as categorical exclusions (40 CFR 1508.4) in environmental assessment and project planning. Some low impact silvicultural treatments, pest management activities, range and wildlife improvement projects, watershed improvement projects, mineral and energy activities, land transfers and other vegetation management activities may fall in this category (7 CFR 1b.3). Some actions categorically excluded require a maintained project file, as well as preparation of a Decision Memo; these are subject to review under 36 CFR 217.6.

Environmental Consequences of the Alternatives

Air Quality



Two by-products of management activities prescribed in the alternatives have the potential of significantly affecting air quality. They are smoke and dust. The quantities of these pollutants have indirect effects on visibility and in limited circumstances on human health.

Direct Effects

Dust

A potential for short-term air quality impairment from dust is created by a variety of management practices. Machinery operations related to timber management often raise clouds of dust. Traffic on roads is another source of dust. Prescribed burn areas can also be a source of dust on windy days, depending on time of burn, subsequent rainfall and revegetation. Road construction and maintenance machinery operations are also dust contributors both in the actual road work and in rock crushing operations. These impacts are usually of a local nature and short duration.

Anticipated levels of fugitive dust from these management activities are considered too low for detailed projections. They will also tend not to vary greatly among alternatives. They will be discussed further in the mitigation section

Smoke

The principal smoke emissions affecting visibility are the fine particulates added to an airshed. Particulates contributed to the air by activities are measured by tons of total suspended particulates (TSP).

Smoke contributes most of the particulate material that originates from the Forest and Grassland. The two major sources of smoke for the area are from wildfires and prescribed burning.

The TSP production from wildfires is highly variable, estimates for the Ochoco National Forest and Crooked River National Grassland range from 25 tons/year in years of infrequent wildfires to 4,000 tons in years of numerous wildfires.

The TSP production from prescribed burning will vary among the alternatives, depending on the mix of management activities such as range improvements, timber management practices, wildlife habitat improvement, road construction, and natural residue hazard reduction. The following assumptions are made in the discussion of smoke-generated TSP's:

> The estimated TSP's contributed by smoke from wildfires will not vary among alternatives and therefore are not included in projections.
>
> TSP production rate used was 25 pounds per ton of activity residue consumed and 40 pounds per ton of natural fuels consumed (personal communications with Dave Sandberg, PNW Forest Residues Lab, Seattle, WA, 1989).

Table 4-1 depicts a decline in emissions projected for all alternatives over time. This is due to the expected gradual reduction in natural residue loadings from current levels and an increase in utilization of activity residues. All alternatives level off and reach an equilibrium of 4 to 6 thousand tons of TSP per year near decade four.

Table 4-2 displays the percent change in the production of TSP's from the 1983-85 Baseline established by Region 6 (U.S.D.A. Forest Service, 1988). The Forest will meet the State's goal of a demonstrable reduction in emissions from Eastern Oregon sources (State of Oregon, 1987). See Cumulative Effects for further discussion of this Forest's TSP contributions in relation to the State of Oregon and Region 6 of the Forest Service.

There is also an indirect effect on winter air quality in local urban communities through the fuelwood provided by the Forest and Grassland. This form of utilization of former waste residue helps reduce smoke emissions from the Forest but now tends to concentrate those emissions in the towns. A discussion of this indirect effect is included in the Fuelwood section of this Chapter.

TABLE 4-1
Total Suspended Particulate Emissions
(Tons / Year)

	ALTERNATIVES					
DECADE	NO CHANGE	B-MOD	E-DEP	I Preferred	A	C-MOD
Last	9,200	9,200	9,200	9,200	9,200	9,200
First	7,300	7,900	7,600	7,400	7,300	7,700
Second	6,900	6,400	6,700	7,000	6,900	6,900
Third	6,700	6,400	5,400	6,400	6,700	7,100
Fourth	5,500	5,300	4,500	4,200	5,500	5,700
Fifth	4,900	5,600	4,300	5,400	4,900	6,000

TABLE 4-2
Total Suspended Particulate Emissions
Percent Change from 1983-85 Baseline of 9000 Tons/Year

	ALTERNATIVES					
DECADE	NO CHANGE	B MOD	E-DEP	I Preferred	A	C MOD
Last	+2	+2	+2	+2	+2	+2
First	-19	12	26	-28	-19	24
Second	-23	-29	-26	-22	-23	23
Third	-26	29	-40	-29	-26	21
Fourth	-39	41	-50	-53	39	37
Fifth	-46	-38	-52	-40	46	-33

Indirect Effects

Visibility

Smoke and dust reduce visibility. There is a direct relationship between TSP amounts and visibility impairment. For example, the amount of visibility impairment (measured in days of smoky conditions) will be twice as much if TSP production doubles. The percent change from present TSP levels can be interpreted as resulting in a similar percent change in visibility quality. The effects of each alternative on visibility can be seen in Table 4-2. The reductions in TSP levels represent a similar reduction in visibility impairment compared to the 1983-85 Baseline period.

Human Health

The FEIS on Managing Competing and Unwanted Vegetation (U.S.D.A. Forest Service, 1988) provides a detailed investigation into the effects of smoke on human health. The following is a summary of that investigation pertinent to this FEIS:

> Short-term effects due to high level exposures immediately adjacent to prescribed fires or wildfires include "...eye irritation, coughing, and shortness of breath in moderate-to-heavy smoke...." This type of exposure is generally experienced only by forest workers since the general public is not normally involved in such activities.

Documentation of adverse effects from long-term exposure to wildland fire smoke is virtually nonexistent. Forest workers are at some risk of low-level exposure contributing to such health effects as emphysema or lung cancer. Long-term effects from even lower levels of smoke experienced by the public-at-large are less well known. Individuals with chronic lung disease or other respiratory ailments may experience additional irritation from the infrequent episodes of stagnated smoky airmasses.

There are a number of potentially toxic components known to exist in wildland smoke. However, the levels experienced under normal conditions and exposures are well below any levels known to cause harmful effects on humans. Some of the more common are carbon monoxide, carbon dioxide, carbon particles, and trace amounts of a number of chemicals that may enter the lungs on the surface of particulate matter. Close to 90 percent of the particulate matter is small enough (less than 2.5 microns diameter) to penetrate deeply into the lungs.

Some of the components (polycyclic aromatic hydrocarbons) are known carcinogens under exposures much higher than that documented from wildland smoke. Other components, such as the aldehydes, are acute irritants. These are most likely to affect forest workers who receive high exposures at burn sites.

Cumulative Effects

Visibilty

Because of the regional scope of visibility effects and problems, Region 6 of the Forest Service has been conducting cumulative effects analysis on TSP production through subregional analysis of emissions (for example, Eastern Oregon). The FEIS for Managing Competing and Unwanted Vegetation (U.S.D.A. Forest Service, 1988) contains the latest information on this continuing analysis. In that analysis, the Ochoco National Forest contributed approximately 15 percent of the emissions from Forest Service sources in Eastern Oregon. The Eastern Oregon subregion is projected to reduce emissions by 23 percent under the selected alternative in the Vegetation Management Plan. The Ochoco National Forest and Crooked River National Grasslands will contribute to that reduction in all of the Alternatives in this FEIS.

Human Health

The projected reductions in emissions for all alternatives should continue to widen the gap between probable exposures and any possible health effects, chronic or acute.

Mitigation Measures

These general mitigation measures are applied to the extent commensurate with the resource goals and objectives of each project.

Dust

Fugitive dust abatement will be aided through:

Road watering, oiling or paving as warranted by conditions.

Controls on machinery operations timing in relation to other use activities.

Dust abatement controls on stationary sources such as rock crushing operations.

Smoke

Smoke abatement techniques provided in the Vegetation Management FEIS will be guidelines for the Forest and Grassland.

Protection of visibility in Class I areas and the overall air quality is an important objective. All prescribed burning will be done in accordance with all state and local air quality regulations. Special care will be taken to prevent smoke from affecting the visibility in Class I areas during periods of high visitor use (closest to the west are the Central Cascade Wildernesses, but more likely to be affected is the Strawberry Wilderness to the east).

Prescribed burning will be planned to avoid smoke intrusion into smoke-sensitive areas identified in the Oregon Smoke Management Plan (Bend is the closest).

The "best available technology" will be used to reduce smoke, taking into account other land management practices and costs, as determined on a case-by-case basis. The "best available technologies" applicable to prescribed burning on the Forest and Grassland include, but are not limited to:

Utilization of woody material prior to disposal of excess.

Reducing felling breakage through directional felling.

Rigorous mop-up of prescribed burns where long duration smoldering of duff may be a problem.

Rapid (mass) ignition to reduce smoldering phase of combustion.

Burning only during optimum conditions, including burning at the highest fuel moistures practical in order to reduce fuel consumption, time ignitions in coordination with surrounding land managers to avoid overloading local air masses., and avoid burning during stable atmospheric conditions which decrease the probability of adequate smoke dispersion.

Vegetation treated with herbicide will not be burned for at least one year.

Conflicts with Other Plans

Smoke management plans in existence (Oregon State and Madras Seed Growers) provide a cooperative framework to minimize conflicts between prescribed fire users in scheduling burns. These will also minimize conflicts with other users of the Forest and Grassland and surrounding country.

Biological Diversity



Direct Effects

Management of vegetation for the production of goods and services is a primary activity on the Forest and Grassland. As a result, the abundance and distribution of plants and animals is constantly changing. Maintenance of biological diversity is essential to the long-term goals of the Forest; outputs of both commodity and noncommodity resources are dependent upon sustaining diversity. Compared to the "natural forest" of presettlement times, all alternatives have significant effects on biological diversity. Refer to Chapter 3 for discussions on how diversity has changed from historic times to its current condition.

Effects Common to All Alternatives

Regardless of the alternative considered, the ecosystem will continue to change. Soils, as a living component of the ecosystem, have changed and will continue to change due to the elimination of fire. Most plant communities have been accumulating high fuel loadings for over a century, and the danger of catastrophic wildfires that destroy forest floor organic materials is increasing. On the other hand, these increases in organic materials have probably increased the productive potential of soils on some sites (Harvey, et al, 1988). In the absence of fire or comparable processes, most plant communities will change towards "climax conditions," represented by vegetative species that are able to survive and reproduce continually. Most mixed conifer timbered communities will eventually be dominated by white fir, replacing those species such as ponderosa pine, western larch, lodgepole pine and Douglas fir. Western juniper will continue to invade grassland/shrub communities, and is already considered by many the "natural species" on these sites.

None of the alternatives are designed to return the Forest and Grassland ecosystems to that which existed historically. Even though management objectives for wilderness and research natural areas include limited re-introduction of natural and prescribed fire (See Appendix D, Standards and Guidelines), and management prescriptions for timber harvesting and forage production are to a great degree based on "reversing the successional trend"

in both forested and non-forested communities, National Forest goals for the production of goods and services preclude a return to the "natural forest." Hence, it is significant that biological diversity as represented by the "natural forest" of the past is an irretrievably lost resource, particularly in respect to vast acreages of open pine/grassland vegetation that are believed to have occurred over most of the Forest.

However, all of the alternatives except Alternative No Change are designed to meet legal requirements (36 CFR 219.27) for the preservation and enhancement of diversity of plant and animal communities to the extent practical. Management requirements (Appendix F), land allocations, and standards and guidelines (Appendix D) represent tools for achieving legally mandated, and socially desirable levels of protection for all species of plants and animals, while providing needed outputs of goods and services to the nation. See Table 2-8, Chapter 2, to reference the following discussions concerning the effects on biological diversity.

Alternative No Change

Alternative No Change has the highest potential for reducing overall biological diversity on the Forest and Grassland. As management requirements for prevention of serious environmental impacts are not applicable to this alternative, it can be inferred that significant effects would occur with its implementation, including probable loss of minimum habitat for major wildlife indicator species, such as the pileated woodpecker, and degradation of water and riparian related resources.

Data is not available to determine the future condition of the forest under this alternative in terms of distribution of successional stages over time (see Table 2-8, Chapter 2). Based on the high levels of timber production with this alternative, though, it is reasonable to assume that accelerated liquidation of mature and overmature stands would result in a relatively young forest over most of the acreage available for management, and that later successional mature and old growth stands would be concentrated in wilderness and unroaded areas

Alternative B-Modified

Alternative B-Modified, with an emphasis on commodities production but modified to provide amenities important to the local community, will tend to reduce biological diversity over the long term. Timber production levels approaching maximum possible potential will tend to hasten the liquidation of old growth at a rate that will shift the structure of the forest to early successional stages. High use of uneven-aged management in this alternative will help to reduce the visible effects, but late successional stages of mature trees and old growth will be highly concentrated in wilderness and limited unroaded areas. Old growth, planned at minimum levels for dependent wildlife species, will tend to be fragmented across the managed forest, with interconnective habitat limited to that offered by riparian, and to some extent, visual management allocations. Research Natural Area allocations are limited to two areas: Ochoco Divide and The Island, which do not provide representation of a cross-section of plant community types across the Forest and Grassland, therefore limiting gene pool reserves for plant and animal species. Snag habitat for cavity nesters remains at relatively high levels in the short run but declines to 33 percent of potential by the fifth decade, lower than all other alternatives except NC. As this and all alternatives provide for legally sufficient protection of threatened and endangered plants and animals, no future extinctions are projected, but the risk of extinction is higher than with the other alternatives except No Change, as options for providing future habitat needs (currently unpredictable) are limited. Since this alternative does provide for maximum acreages of excellent riparian, as with Alternative C-Modified and I, fish and wildlife habitat as a component of biological diversity will be maintained for a variety of species. As riparian areas represent primary habitat for over 75 percent of species on the Forest and Grassland, this represents a positive, significant effect on biological diversity.

Alternative E-Departure

Alternative E-Departure, with a short-term emphasis on high commodities production (especially timber), but with declining emphasis over time, will also reduce biological diversity, but substantially less than

legal guidelines allow, and also less than either Alternatives No Change or B-Modified. Wilderness, unroaded areas, old growth, and Research Natural Areas are represented with relatively large acreage allocations with this alternative, which provides a large reserve where natural processes are generally allowed to occur. Snag habitat for cavity nesters is maintained at high levels, with 55 percent of potential at the end of the fifth decade, but riparian in excellent condition is limited to 9.4 thousand acres, or about 50 percent of Alternatives B-Modified, I, or C-Modified. Within the intensively managed areas of the Forest, stand conversion of old growth to early successional stages occurs at a rapid rate, and with almost full dependence on even-aged management, meaning that diversity is primarily maintained horizontally, in contrast to uneven-aged management which tends to provide vertical diversity (if all successional stages are represented). Old growth allocations for dependent wildlife species are about 45 percent above minimum required for maintenance of viable populations, but no specific allowances for interconnective travelways between habitats is recognized.

Alternative A

Alternative A represents current direction, or "No Action" required by NEPA and is a basis for comparison with the other alternatives. It has been revised since 1979 (date of Decision Notice) to include management requirements to bring it in line with the National Forest Management Act (NFMA) of 1976, and therefore meets minimum acceptable levels for maintenance of biological diversity. Allocations to wilderness, unroaded, Research Natural Areas, and "excellent riparian" are limited (similar to B-Modified, except riparian, which is less in A), therefore providing a relatively small reserve where natural processes are allowed to occur, generally unimpeded. Snag habitat is provided at levels similar to B-MOD, E-Departure, and I (52 percent). Very little use of uneven-aged management is scheduled in this alternative, therefore minimizing visual and structural stand diversity provided through other alternatives such as B-Modified, I and C-Modified. Old growth is provided, but on a rotating, managed stand basis (as opposed to dedicated), which provides some level of risk that old growth conditions cannot be replicated through silvicultural means. Alternative A is just slightly better than Alternative B-Modified in terms of assuring maintenance of long-term productivity and biological diversity.

Alternative I (Preferred)

Alternative I is designed to provide a mix of commodities and public amenities as a response to public issues, concerns and opportunities, primarily from the local and state area. While Wilderness and Research Natural Areas are allocated at relatively large acreages, both old growth and unroaded area acreages are relatively small, representing a limited area where natural processes are generally allowed to occur. Maximum acreage of excellent riparian is an important aspect of this alternative, with additional mitigation for connective travelways provided for movement of wildlife species, especially between old growth habitats. This is significant in that it provides additional options for genetic exchange between wildlife populations, and raises the level of awareness for future management of this potentially critical habitat, which is not recognized in the other alternatives. Large acreages of uneven-aged management are provided within a mosaic of even-aged forested areas of varying rotation lengths; this represents increased diversity within the manipulated portion of the Forest over Alternatives No Change, B-Modified, and E-Departure, even though overall distribution of different successional stages is similar. Snag habitat is maintained at high levels, increasing over current levels to about 54 percent of potential in the fifth decade.

Alternative C-Modified

Alternative C-Modified probably provides the best representation of biological diversity (future maintenance) of all the alternatives (see Table 2-8, Chapter 2). This alternative provides the largest acreage allocations to Wilderness, unroaded areas, old growth, Research Natural Areas, excellent riparian (equal to B-Modified and I), retention and partial retention visual quality objectives, and snag habitat. No acres are allocated to fully intensive timber management practices, and forage production is reserved for use for big game and other wildlife. A more

equitable distribution of plant successional stages (forested) is provided over the long term than the remaining alternatives, therefore providing increasing options for management to deal with uncertain changes to the ecosystem. Large acreages of uneven-aged stand management are provided within a mosaic of well distributed even-aged stand and species types. High levels of both game and nongame wildlife species are provided, thus representing a major, critical component of diversity.

From a negative standpoint, infestations of serious insect and disease populations are more likely to persist over time with this alternative (see Effects on Forest Health, this chapter), because of the current and continuing habitat that this alternative provides (e.g. for spruce budworm, tussock moth). Increases in wildfire acreage and intensity is highly probable with this alternative, because of the large acreage of untreated natural fuels persisting over time. Mitigation of these two critical effects is possible (see Mitigation Measures, this section).

Indirect Effects

"Biological Diversity" relates to the distribution and abundance of different plant and animal communities and species; in essence this represents the total living ecosystem on the Ochoco National Forest and Crooked River National Grassland; therefore further discussions of indirect effects on the environment are unnecessary. Other effects discussions provided in this chapter (e.g. Wildlife and Fish, Old Growth, Soils, etc.) are in fact discussions about biological diversity, but are separated in order to provide specific insights into each of them as individual components.

Cumulative Effects

No quantitative analysis was completed to determine the cumulative effects of the alternatives on biological diversity. The Forest has instead chosen major indicators of diversity and developed quantitative and qualitative representations of these indicators. These include:

- Riparian Areas in Excellent Condition
- Riparian Areas Designated for Connective Habitat
- Snag Habitat for Cavity Nesters
- Existing Old Growth
- Acres of Forested Land by Successional Stage
- Acres of Nonforest Land by Plant Community Type
- Maintenance of Viable Populations of Sensitive Plant and Animal Species

The first six have been quantified and projected over the fifty year planning horizon. Table 4-3 displays these for decades 1, 2 and 5 of the planning period. The last indicator (viable populations) is not quantifiable, but instead represents a management objective (requirement) for all Forest and Grassland activities.

These indicators are probably inadequate to describe biological diversity in total because current knowledge concerning all components necessary for maintenance of diversity is also inadequate. There is, though, mounting evidence on an international scale that "keeping all of the pieces" (of the ecosystem) is essential for long-term production of goods and services to the public, as well as to life itself. All of the alternatives are designed to provide legally mandated levels of diversity; therefore, no significant, cumulative effects are predicted. The risk of initiating a future significant effect on biological diversity probably lies in the level of lands allocated (or more appropriately, not allocated) to nonhuman consumption or use. Based on this assumption, the alternatives can easily be risk rated by level of allocation to this function, as shown in Table 4-4.

TABLE 4-4

	ALTERNATIVE
Low Risk of Cumulative Effect	C-MOD I A E-DEP B-MOD
Lower Risk of Encounter	NC

TABLE 4-3
BIOLOGICAL DIVERSITY

		ALTERNATIVE					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Riparian Areas in Excellent Condition	M Acres						
Decade 1			10 0		10 0		10 0
2			11 2		11 2		11 2
5		5 4	17 5	9 4	17 5	5 4	17 5
Riparian Areas Designated for Connective Habitat	M Acres						
Decade 1		0	0	0	1 0	0	0
2		0	0	0	1 0	0	0
5		0	0	0	1 0	0	0
Snag Habitat for Cavity Nesters (Average across the Forest)	Percent of Potential						
Decade 1		*Unknown*	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69
Existing Old Growth	M Acres						
Decade 1		93 8	93 8	93 8	93 8	93 8	93 8
2		80 0	80 6	82 5	83 9	73 0	85 8
5		40 0	42 4	55 0	55 1	53 0	78 2
Acres of Forested Land by Successional Stage							
Stage I and II (Grass forb/Shrub-seedling)	M Acres						
Decade 1		Unknown	9	9	9	9	9
2		Unknown	55	40	30	37	19
5		Unknown	45	41	34	43	21
Stage III (Pole sapling)	M Acres						
Decade 1		Unknown	146	172	151	170	138
2		Unknown	140	181	151	176	147
5		Unknown	69	88	63	106	42
Stage IV (Young)	M Acres						
Decade 1		Unknown	205	159	184	159	191
2		Unknown	167	127	192	123	158
5		Unknown	192	205	190	178	166
Stage V ((Mature)	M Acres						
Decade 1		Unknown	118	138	134	139	140
2		Unknown	129	142	115	151	162
5		Unknown	224	183	230	191	265
Stage VI (Old Growth)	M Acres						
Decade 1		Unknown	94	94	94	94	94
2		Unknown	81	82	84	84	86
5		Unknown	42	55	55	53	78
Acres of Nonforest Land by Plant Community Type							
Timberline Meadows	*M Acres*	*3450*	*3450*	*3450*	*3450*	*3450*	*3450*
Meadows	M Acres	16,850	16,850	16,850	16,850	16,850	16,850
Juniper Dominant	M Acres	137,650	137,650	137,650	137,650	137,650	137,650
Grass Dominant	M Acres	50,900	50,900	50,900	50,900	50,900	50,900
Sagebrush Dominant	M Acres	80,100	80,100	80,100	80,100	80,100	80,100
Biscuit Root Scabland	M Acres	12,550	12,550	12,550	12,550	12,550	12,550

Mitigation Measures

Fire has historically been one of the primary forces for change and diversity east of the Cascades (Hall, 1976). Without a thinning agent such as fire, most tree species tend to stagnate in a closed canopy condition, shading out much of the understory forbs and shrubs leading to a marked reduction in total species diversity and productivity (Volland and Dell, 1981). The diversity of plants is what drives the diversity of animals which depend on them for shelter and subsistence (Ream, 1981). Therefore, major reintroduction of fire into the ecosystem appears to be an effective way to recapture diversity, as represented by the "natural forest." But, conflicts with other resource objectives (e.g. air quality) will probably reduce its effectiveness, through significant limitations on burning. Within these limitations though, the Forest has developed prescribed burning prescriptions, designed to emulate natural fire frequencies by plant community type (see Standards and Guidelines, Appendix D, and Forest and Grassland Plans, Chapters 4).

Silvicultural prescriptions are also designed (where compatible with other resource emphases) to "reverse the successional trend" in forested stands. This includes (in some cases) the use of regeneration harvest on transitional plant community types, where fire exclusion has allowed non fire adapted species to invade (e g. white fir and Douglas-fir). Reforestation and stand maintenance with early succession species (such as ponderosa pine, western larch and lodgepole pine) is very effective in recapturing stand conditions indicative of presettlement times.

Conflicts with Other Plans and Policies

Other than Federal legal requirements (36 CFR 219.27) for maintenance of biological diversity, no specific objectives of Regional, State or local agencies are known to exist.

Cultural Resources



By comparing general resource activities (e.g., recreation, range, or timber) against their potential to "discover" or "impact" sites, the relative effects of the alternatives on cultural resources can be appreciated. Specific resource activities can have both a negative (destruction or removal) and positive (discovery) effect on cultural resources.

Effects to cultural resource sites include direct, indirect and cumulative impacts as the result of intentional and inadvertent damage (negative) to the cultural evidence left by past Forest and Grassland users.

Effects in general are the result of ground-disturbing activities. The risk of impacting sites is directly related to the amount of ground-disturbing activities conducted in a given area. The positive effects to the cultural resource program are: finding and protecting significant archaeological, historic and cultural sites; and increasing our knowledge of past Forest and Grassland users. These effects are reflected in the varying emphases of the alternatives.

The rate at which cultural resources will be depleted in the future (i.e., vandalized, lost to erosion, scientifically excavated) involves several factors. These factors include the timber and beef markets, recreational use of the Forest, funding levels, and academic research interests.

The following resource activities have been identified as possessing significant interactions with cultural resources: Recreation, range, timber, riparian, mineral and energy development, transportation, and fire (Bryant, 1982, Haase, 1983, Philipek, 1985, Schuster, 1984; and others).

Direct Effects

Direct effects which can threaten cultural resource sites are most often associated with road building, timber harvesting, trail and campground construction, reservoir construction, livestock trampling and the development of springs for human or livestock use.

Direct effects to cultural resources may be realized as recreational facilities are developed or expanded. The construction of campground facilities, reservoirs, boat ramps, or trails can disturb significant cultural resources, as these facilities are often associated with areas of higher site potential (e.g., meadows, springs, terraces, promontories, and ridgetops) Associated increases in recreational use of the Forest would result in additional visitors, increasing the potential for unauthorized collection of artifacts and excavation (looting) of sites. Incidents of vandalism, intentional or otherwise, would likely increase.

Positive effects associated with the expansion or development of recreational facilities would include a concomitant increase in opportunities to enhance and interpret significant cultural resource sites for public education and enjoyment.

Significant interactions between cultural resources and range-related activities are most directly associated with livestock levels, water developments, and mechanical treatment programs. For example, breakage or displacement of artifacts through trampling can be severe, depending on the number of livestock and the density of artifacts/sites. The development of springs and reservoirs for livestock use can impact cultural resources occurring in and around the developed areas. The relative stability of many seeps and springs, reflected in their recurring use by Native American as well as Euro-American groups, increases the possibility that significant sites may be adversely affected by such development activities.

Nonstructural range improvements include the use of prescribed fire, broadcast seeding, and chemical applications to reduce competition from non-palatable species. These practices are not necessarily threats to cultural resource sites. Prescribed burning can increase the effectiveness of cultural resource surveys by enhancing ground visibility in heavily vegetated areas. Similarly, water developments and mechanical treatment practices afford an opportunity to inventory additional acres in advance of the associated activities.

Excavations or impoundments to create stock watering reservoirs can have obvious effects on cultural resource sites, either through the excavation activity itself or in the resulting inundation of stream terraces. Mechanical treatment to enhance forage production, achieved through the use of heavy equipment, can generate substantial ground disturbance which threatens archaeological sites. Plowing, disking, drilling, pushing, piling, and chaining represent potential mechanical treatment practices.

Timber sale activities involve cultural resources more than any other Forest activity. Haul road and landing construction, tree felling, skidding, slash disposal, and tractor yarding are among those activities which have the potential to alter or destroy surface or shallow buried sites. Silvicultural treatment of timber sale areas may result in direct effects caused by increased ground visibility, presence of tree planting crews and ground disturbance by equipment. On the other hand, the timber management program results in direct positive effects on cultural resources; the inventory data base can be continually evaluated, with the goal of compiling sufficient data to support scientifically sound efforts at cultural resource site allocation and inventory design.

Stream alluviation can preserve, yet obscure, such sites by burying them under successive layers of alluvium. Streambank erosion can both expose and destroy buried sites which otherwise might not be observed. Cultural resource sites on this rather arid Forest are strongly associated with water. The management of riparian areas produces a positive direct effect of providing opportunities to inventory those drainages with significant terrace development and/or streambank erosion.

Mineral and energy development activities (geothermal and oil and gas exploration, placer or lode mining) would cause ground disturbance to areas with both historic sites (historic mines and districts) and archaeological sites. The remnants of early mining activities at the Mayflower, Amity, Blue Ridge, and Independent mines represent historic sites which may meet National Register eligibility criteria. Various treatment options (including mitigation measures) for these eligible historic sites would have to be considered prior to the resumption of mining.

The re-introduction of mining at levels even approaching historic work seems unlikely for the foreseeable future, however, any increase in mining activity would result in an increased likelihood of cultural resource site discovery and possibly degradation.

The effects of road construction on cultural resource sites are obvious. Because the major components of the Forest's transportation system are sometimes superimposed on historic and, to a lesser degree, prehistoric routes of travel, the likelihood of direct impacts to cultural resource sites is high. The development or improvement of transportation systems would increase the potential for cultural resource site discovery and degradation by land and resource users. As previously unroaded areas are entered, cultural resource inventories, once afforded a degree of de facto protection, would be threatened.

Brush disposal through controlled burning can result in direct impacts to the surface components of archaeological sites if the fireline intensity is high. Fire suppression and brush disposal activities can lead to the discovery of cultural resource sites by crews who may inadvertently or intentionally disturb them. Suppression of wildfires can adversely affect significant cultural resources. The emergency nature of these activities frequently demands an immediate response that may override traditional cultural resource procedures. Fire management activities can also have the positive direct effect of increasing the visibility of such sites, thus increasing our inventory and knowledge.

Effects by Alternatives

Highlights of the direct effects to cultural resources by the five alternatives include:

Alternative B-Modified

Potential effects to cultural resources will be increased as the timber harvest level is expanded to attain the timber outputs in the first decade (130 million board feet). Opportunities to inventory and evaluate cultural resource sites will increase. The relatively small number of range structural improvements (138) will limit associated effects. The high level of road construction (14 miles/year) would lead to the potential for increased conflicts with cultural resource sites.

Alternative E-Departure

Potential effects to cultural resources are associated with intensive timber management practices producing 123 million board feet in volume. A trail system with 132 miles of new trail and the projected construction of 138 range structural improvements will increase potential threats to sites while enhancing the Forest's site survey data. Corresponding emphasis on unroaded opportunities and big game outputs maintain anonymity (and thus, protection) of cultural resources. In general, opportunities to locate and evaluate cultural resource sites will be moderate.

Alternative I (Preferred)

The timber harvest level is moderate for the first decade at 123 million board feet. Opportunities to inventory and evaluate sites will increase in response to the range and timber emphases. The corresponding emphasis on unroaded recreation will afford a degree of site protection through continued site anonymity.

Alternative A

While intensive timber management practices will result in a harvest level for the first decade at the same level as Alternative I (123 million board feet), they do so without the component of uneven-aged management. Only 27 structural range improvements will be made and no new trails will be constructed. Overall, potential impacts to cultural resources will not differ significantly from the current situation.

Alternative C-Modified

This alternative would provide for the lowest timber volume of any alternative (94 million board feet). Similarly, annual AUM's would be reduced by 12 percent. The emphasis on obtaining excellent riparian conditions on 15,600 acres of land would increase the opportunity to inventory areas of generally high site potential (e.g., terraces). Elsewhere, the low levels of timber and range development would serve to insulate significant cultural resources from potential adverse effects. The potential for site vandalism would increase, as the trail system would be greatly expanded (e.g., 187 miles of new trail, first decade).

Indirect Effects

Direct effects to cultural resource sites caused by various ground-disturbing management activities would potentially reduce opportunities to enhance and interpret cultural resources. Recreational activities with some reliance on cultural resources or cultural heritage interests would be impacted if adverse effects to cultural resources were always mitigated through data recovery.

On the other hand, increased management activities can also provide opportunities for site treatments that result in increases in recreation opportunities with cultural resources, such as: interpretive and historic trails, reconstructed historic structures and interpretive signs and sites.

Range improvements in the vicinity of springs and seeps may be constrained by the treatment needs of cultural resource sites. Cultural resource values could reduce the opportunities for range improvements and capacities, but it is unlikely that it would be to a significant degree.

The availability of timber resources and their contribution to local and regional economies can be affected to a limited degree by the presence and treatment needs of National Register eligible cultural resource sites. Preservation in place or data recovery treatment of buried archaeological sites could result in limitations upon timber resources, silvicultural prescriptions and reforestation efforts.

The presence of cultural resource sites along streams and creeks could result in the enhancement or protection of alluvial terraces and other streamside features. In this case positive indirect effects could result to watersheds if cultural resources were preserved and stabilized in-place.

The availability of mineral and energy resources as contributors to local and regional economies could be affected by cultural resource values to a limited extent. The presence of National Register eligible historic mining and associated structures or cultural resource sites in proposed energy development areas or utility corridors may require treatments and mitigative measures that would slightly increase the cost of mining and energy development.

Significant cultural resource sites located in the proposed locations of new and reconstructed transportation systems, travel corridors and trails must be treated. This treatment can range from preservation in place through project modification and site avoidance to mitigation through complete data recovery of the site and its cultural resource values. In general these indirect effects would be felt by users of these transportation systems and would cause impacts to social and economic systems.

The indirect effects of cultural resource upon other Forest and Grassland resources not discussed above are considered to be minor to nonexistent and hence are not treated in this section.

Cumulative Effects

The cultural resource review and compliance process has provisions for the consideration of cumulative effects on National Register listed or eligible sites (cf., 36 CFR 800). Cumulative effects are associated with past, present, and reasonably foreseeable future actions (40 CFR 1508.7). With regard to cultural resources, cumulative effects can best be viewed as indirect effects which are later in time and farther removed in distance from a proposed undertaking (36 CFR 800.3(a)). They are more closely linked to changes in the integrity of a site's setting, feeling, or association, rather than to immediate site effects such as physical destruction or alteration.

Management activities which possess a greater potential to alter not only a site's physical integrity, but also its environmental setting or ambience, have a greater potential for cumulative effects on cultural resources. In this light, timber, fire, transportation, range and recreation have a higher risk in declining order of causing cumulative effects to significant cultural resource sites on the Ochoco Forest.

Mitigation Measures

Adverse effects to significant cultural resources will be mitigated through project redesign or data recovery. *Treatment of Archeological Properties - A Handbook* (ACHP 1980) will be used to guide the development of data recovery plans. Additionally, coordination with the State Historic Preservation Office (SHPO) and Advisory Council on Historic Preservation will be conducted as per 36 CFR 800, the Lithic-Dominated Sites Programmatic Memorandum of Agreement, and the Depression-Era Programmatic Memorandum of Agreement (see Standards and Guidelines, Appendix D).

A cultural resource inventory (survey) will be conducted prior to the initiation of any project activity which involves ground disturbance, regardless of the selected alternative. All sites will be evaluated against the National Register eligibility criteria. Adverse effects to significant sites will be avoided by project redesign or mitigated through the development of case-specific mitigation plans.

A variety of techniques can minimize or eliminate the adverse effects of timber harvesting on significant sites. These techniques include directional felling of trees, hand piling of slash, designation of skid trails, logging over snow, the construction of protective earthen padding over site areas in road corridors and, of course, avoidance of sensitive areas.

An opportunity exists to involve cultural resource specialists in planning responses to wildfire suppression needs. For example, the specialist can be consulted in planning the location of firelines, access roads, and base camps.

Similarly, the Forest Archeologist will be assigned to the Forest Fire Rehabilitation Team, thus affording timely cultural resource input following the destruction of vegetative cover.

Conflicts with Other Plans and Policies

Conflicts with the State of Oregon's comprehensive goals and priorities for historic preservation planning are not expected due to the review and compliance relationships between the Forest and Oregon SHPO as required by Federal law and policy regarding cultural resource management.

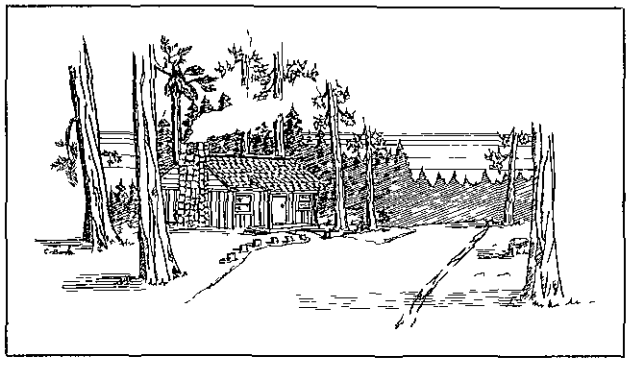
Conflicts can result with heritage/preservation plans issued by various Indian Tribes or Confederations holding ceded lands rights and privileges or cultural and religious interests in lands administered by the Ochoco National Forest and Crooked River National Grassland. However, consultation between the Forest and the respective Tribal Councils or their representatives will minimize or eliminate such conflicts.

Conflicts may arise between the plans and desires of local communities, county historical museums, Indian Tribes and the like over the treatment of cultural resource sites and the curation and storage of prehistoric and historic artifacts. However, such conflicts can be minimized or eliminated through the public comment and appeals process required for all cultural resource treatment and allocation decisions.

In some cases, planned increases in recreation development and facilities by the State of Oregon, other Federal Agencies or Counties can produce increased potential for direct and cumulative effects on cultural resources; however, no discrepancies are known at this time regarding cultural resources between the Forest and other agencies.

Facilities

On the Ochoco National Forest, facilities include buildings, water systems, and dams. Levels of construction and maintenance of these facilities was not varied by alternative in preparation of the Forest Plan. Instead maintenance will be guided in the implementation phase through the preparation of a Facilities Master Plan. Decisions on building acquisition, use and disposal of forest buildings will be documented in this Plan.



Water systems at recreation and administrative sites will be reconstructed as needed to meet the current State standards. Irrigation and Livestock watering dams will be maintained or improved, but no new structures are foreseen.

No significant direct, indirect, or cumulative effects are foreseen with these projects.

Fire



Assumptions and Interactions

Natural processes and management activities affect the amount and characteristics of wildfire and prescribed fire in the environment. Significant interactions affecting area burned and fire intensity are changes in:

vegetation;
residues,
ignition sources, and
control effectiveness.

Assumptions important to this discussion are:

Wildfire will burn approximately 7,500 acres per decade under all alternatives. The variation in acres burned from year to year is from less than 100 to over 4,000. It appears that any variation between alternatives would be insignificant in comparison to natural variation. Therefore, individual alternatives were not modeled and no differences between alternatives are being estimated.

Prescribed fire use and characteristics are affected by a wide variety of management practices related to wilderness, range, timber, wildlife, and hazard reduction. All use of fire directly relates to two principal goals: live vegetation management and dead vegetation (residues) management. The management prescriptions associated with the Forest Plan are the basis for the estimation of the amount of prescribed fire use.

Vegetative and Residue Changes

Vegetation change and residue manipulation affects local residue profiles. The fuel profile determines the character of fire in both intensity and the area burned. Vegetation and residue manipulation includes all aspects of utilization or control of the live and dead plant materials on the Forest. These include range and wildlife habitat improvements, timber management practices, firewood collection, and wildfire hazard reduction programs.

Ignition Sources

Ignition sources accompany human activities. Anything that can create a spark, flame, or excessive heat can start a fire under the proper fuel and weather conditions. Ignition sources from human activities increase the frequency of fire above natural levels causes by lightning. Ignition sources may include friction of a yarding cable across a punky log, sparks from a tractor track sliding on a rock, hot carbon particles from an exhaust, a cigarette, campfire, or arson.

Control Effectiveness

Control effectiveness depends on a variety of interrelated activities. These include: residues manipulation to retard the spread or intensity of wildfires, early detection to catch wildfires when they are small, suitable access to speed suppression response, and appropriate suppression response (both forces and strategies).

Direct Effects

Vegetation/Residue Changes

Table 4-5 displays the level of prescribed fire that will occur by the various alternatives. Fires will change the vegetation and residue profile of an area. This in turn will affect the character of future fires. Generally, burned areas will first be revegetated by herbaceous vegetation. This type of vegetation will result in future fires having rapid rates of spread, low fire intensities, and low resistance to control efforts. Thus, in those alternatives with a relatively large prescribed burning program, the extent of future wildfires may be greater. However, the amount of resource damage will be decreased.

Industrial operations source fires currently average five per year. They cause 75 percent of the human caused acreage loss and 90 percent of the dollar cost and loss. A change of one or two fires per year is all that is anticipated due to changes in operations activities among the alternatives. The average size of operations fires is 30 acres with a suppression cost of $40,000 and resource loss of $15,000.

Control Effectiveness Changes

No significant change in this is expected. The most direct effect of the alternatives on this subject is the lowering of average fire intensity through the reduction in average residue loading projected in the effects section on Forest Residues. Total residues remaining after treatments will decline from 16 to 19 percent by the fifth decade. This will translate into a similar reduction in average fire intensity. The improvement in control effectiveness, however, is almost equally offset by the expected increase in numbers of human-caused fires, mentioned above, and by an expected decrease in the amount of timber activity with its related residue treatment, personnel, and equipment. Both of these decrease control effectiveness.

TABLE 4-5
ANNUAL ACREAGE OF PRESCRIBED FIRE USED

	To Treat Natural Fuels				Percent Change from Natural Fire Levels 3/	
Alternatives	Hazard Reduction	Other 1/	To Treat Activity Fuels 2/	First Decade Total	First Decade	Long Term
NC	6800	5500	12900	25200	-9	-11
B-MOD	4100	7700	15900	27700	-1	NC
E-DEP	5200	6500	14100	25800	-8	-21
I	4900	7500	14200	26600	-5	- 1
A	6800	5500	12900	25200	-9	-11
C-MOD	4700	8500	13500	26600	-5	+ 4

1/ This consists of fuel treatment for a variety of management objectives in range, wildlife, and vegetation management and is not specifically related to fire hazard reduction

2/ Residue treatment (after timber harvest activities) to meet a variety of management objectives, but primarily related to fire hazard reduction

3/ Prior to the fire suppression activities of the past 80 years the natural fire level probably burned 28 000 acres annually This is based on a weighted average for the different vegetation types on the Forest and Grassland Current treatment levels range from 15 to 22 thousand acres per year

Ignition Source Changes

The largest change anticipated in ignition sources is expected in the increased recreation demand shown in Table 2-8, FEIS Chapter 2. This increased demand and use (11 percent to 381 percent depending on the category) is expected to increase human-caused wildfires from this source by approximately 50 percent. This is not a significant increase in total fire load. The Forest and Grassland experience about 10 fires per year due to recreation sources. Five more per year is only a five percent increase in the current total of 107 (includes 92 lighting ignitions per year).

Indirect Effects

Changes in extent and intensity of fire (wild or prescribed) in the ecosystems associated with the Forest and Grassland have significant effects on many resources, programs, and outputs.

Air Quality

This resource can be significantly affected by the amount of fire in the environment. See Effects on Air Quality, this chapter.

Biological Diversity

Fire has historically been one of the primary forces for change and diversity east of the Cascades (Hall 1976). In general, most tree species in the Blue Mountains province tend to stagnate in a closed canopy condition without a thinning agent such as fire. This condition shades out much of the understory forbs and shrubs leading to a marked reduction in total species diversity and productivity (Volland and Dell, 1981). The diversity of plants is what drives the diversity of animals which depend on them for shelter and subsistence (Ream, 1981).

The amounts of prescribed fire use projected in Table 4-5 come fairly close to that level experienced by the Forest historically. This should provide near normal levels of diversity provided fire is applied under a variety of intensities, in different times of the year, and with due regard to the site specific conditions.

Cultural Resources

There should be minimal effects on cultural resources of a prehistoric nature. Historic structures, however, could be destroyed. See Effects on Cultural Resources, this chapter.

Facilities

No significant effects are expected unless a prescribed fire escapes and threatens facilities. Fence lines and signs are the most likely affected.

Fire

Control effectiveness is not expected to change significantly over time for any of the alternatives. See Table 2-8, FEIS Chapter 2 (Fire). The reasons for this are the offsetting changes going on; an increase in ignitions and a decrease in residues from present levels.

Forage

The amount of fire (natural or prescribed) in the ecosystem has a significant effect on forage production and quality (Hall, 1976; Volland and Dell, 1981). Production increases for several years in grassland communities and for a few years in timber stands (depending on canopy cover). Palatability is increased also, but for a shorter duration than production increases.

Alternatives B-Modified, I, and C-Modified stay within five percent of historic fire levels, therefore coming close to natural forage rejuvenation cycles. Alternatives NC and A stay about 10 percent below historic rejuvenation cycles, providing lower production and quality of forage. E-Departure would drop from 8 to 21 percent below historic levels of rejuvenation.

Forest Residues

Other than utilization by society, levels of residues are controlled primarily by the amount of fire in eastern Oregon ecosystems (see Effects on Forest Residues, this chapter).

Alternatives B-Modified, I, and C-Modified stay within five percent of historic fire levels, therefore coming close to a natural level of residue recycling. Alternatives NC and A stay about 10 percent below historic recycling levels, providing higher levels of forest residue. E-Deperture would drop from 8 to 21 percent below historic levels of recycling and would provide the highest level of forest residues.

Fuelwood

The level of fire on the Forest and Grassland should not significantly impact the amount of fuelwood available, providing mitigating guidelines emphasizing utilization before disposal of residues are initiated.

Insects and Disease

Significant effects (both good and bad) can occur depending on the intensity and periodicity of fire in the environment. Too much fire intensity can injure trees, predisposing them to insect attack and/or disease entry. Too little fire can cause stand stagnation leading to insect attack and can allow significant buildup of diseases in decaying organic matter which

in turn can infect crop trees. Too little fire can also lead to invasion of stands by successional species not adapted to the periodic severe drought common east of the Cascades. Insect epidemics are common in these conditions, causing severe mortality and setting up excessive residue accumulations leading to severe stand replacement fires much hotter than would be the case under a more natural fire periodicity.

All of the alternatives have approached the use of fire with this in mind. Alternatives B-MOD, I, and C-MOD stay within five percent of historic fire levels therefore coming close to a natural level of fire periodicity appropriate for local ecosystems. Alternatives NC and A stay about 10 percent below historic fire periodicity. E-DEP would drop from 8 to 21 percent below historic levels of fire periodicity

Lands
No significant effects.

Minerals and Energy
No significant effects.

Old Growth
In the short term (the next decade or two) there should be no significant effects from the alternatives. However, given the current restriction on use of prescribed fire in these stands, residues will continue to accumulate to high levels. Douglas-fir and true firs will continue to replace ponderosa pine and larch, insects and disease will increase causing more mortality, drought will inevitably recur, and eventually an ignition will provide the start of a stand replacement fire which will be next to impossible to control within the old growth stand.

Periodic low to moderate intensity fire is the only way to maintain a stand of "Old Growth" ponderosa pine or to maintain ponderosa pine as a component of local mixed conifer stands. In either case, ponderosa pine will fade from the picture through mortality and lack of regeneration. The longer fire is excluded, the less chance of successfully reintroducing it without stand destruction.

Recreation
Fire affects recreation through effects on other resources such as forage, scenic resources, and wildlife and fish.

Scenic Resources
Short-term effects of fire are evident to forest visitors passing near recent fires of any kind. While most people are not pleased by the appearance of a burn during the first year or two, most are supportive of the use of fire to maintain open stand conditions and provide for the improvement of wildlife habitat. The visual variety provided by the Type One natural fire regime of this area (frequent fires of low to moderate intensity) has high scenic resource value (Bacon and Dell, 1985).

All of the alternatives have approached the use of fire with this in mind. Alternatives B-Modified, I, and C-Modified stay within five percent of historic fire levels therefore coming close to a natural level of fire periodicity appropriate for local ecosystems. Alternatives NC and A stay about 10 percent below historic fire periodicity. E-Departure would drop from 8 to 21 percent below historic levels of fire periodicity.

Social and Economic
No significant impact.

Soil
Fire is an important natural phenomena in local ecosystems. It provides a decomposer function to recycle nutrients from accumulating organic matter above ground back into the soil organic horizons for continued plant nutrition (Hall, 1976). Without this action, soil nutrient deficiencies begin to occur 100 to 150 years after the last fire. The reason for this is the local climate. It is dry, with long hot summers and long cold winters. Effective organic decomposition occurs during a relatively short period of the year (spring and fall). This situation allows the accumulation of site nutrients in dead and dying vegetation above the soil structure. The accumulation beyond the reach of roots continues until the stand stagnates. At this point soil nutrient stability is achieved

at a balance of slow uptake and slow return. The frequent return of fire in this system prevented soil nutrient deficiency and resulting stand stagnation by completing the oxidation process called organic decomposition.

Significant impacts are avoided by all alternatives through the amount of fire prescribed (approaching natural levels) and through mitigation measures incorporated into the alternatives.

Timber

Approximately half of the total prescribed fire (see Table 4 -5) projected in the alternatives is directly related to the timber program in the form of slash disposal after sale and silvicultural activity. While the estimates shown are primarily for hazard reduction purposes, Martin (1976) lists several silvicultural objectives served as well, including:

Provides site preparation for natural and artificial regeneration.

Removes barriers to planting.

Reduces vegetation competition.

Recycles nutrients into the soil.

Removes shelter from predators of animals destructive to seedlings.

Total acreage of activity fuels treatment using fire affects 90 percent of the sale activity acres in each alternative.

Alternative NC range is 12,500 to 14,600 acres per year.

Alternative B-Modified range is 12,900 to 16,100 acres per year.

Alternative E-Departure range is 9,500 to 14,100 acres per year.

Alternative I range is 9,300 to 15,200 acres per year.

Alternative A range is 12,500 to 14,600 acres per year.

Alternative C-Modified range is 12,800 to 16,100 acres per year.

Transportation

No significant effect.

Water

No significant effect as long as normal mitigation measures applicable to all alternatives are carried out to prevent erosion and minimize impacts on riparian zones (see Effects on Water, Mitigation Measures, this chapter).

Wilderness

Because of the importance of fire in local ecosystem dynamics (see preceding discussions), all alternatives have projected a near normal fire occurrence in the wilderness areas. This will range in periodicity from ten to a hundred years depending on the wilderness and its vegetation associations. In light of the small size of the areas and the continuous nature of fuels and vegetation between wilderness and surrounding areas, human ignition prescribed fire will be the option of choice until such time as a more natural mosaic of vegetation and fuel conditions exist inside and outside of the areas (FSM 2324.2). Once this is established, a more extensive use of natural ignition prescribed fire will be possible. When prerequisite prescribed fire planning has been accomplished for each wilderness plan, the application of appropriate prescribed fire can commence. In the meantime, all ignitions within wilderness on the Forest will be considered wildfire and will be suppressed using appropriate suppression response.

Wildlife and Fish

The effects of the prescribed fire levels on wildlife and fisheries will be driven by the effects on habitat structure already discussed in previous paragraphs. Alternatives E-Departure, NC, and A would have the least benefits for wildlife (but well within acceptable range). Alternatives B-Modified, I, and C-Modified would have the most benefits with regard to wildlife.

Cumulative Effects

There will be a gradual reduction in average fire intensity levels for wildfire and prescribed fire as the current residue loads return to more natural levels. This will lead to lower relative costs in both the use of prescribed fire and the suppression of wildfires.

Damage from wildfire will decrease as residue levels return to more natural levels.

Judicious use of prescribed fire will help return vegetation and residue levels to a more natural mosaic. This will in turn continue the existence of suitable habitat for local fauna and reduce the chances of catastrophic wildfire with higher than normal intensities and extent.

Biological diversity and site productivity will be maintained or improved through the maintenance of a more natural presence of fire in those ecosystems adapted to its presence.

Mitigation Measures

The following activities are proposed to prevent or ameliorate the adverse effects of too much or too little fire in the ecosystem.

Monitor the effectiveness of fire management direction (provided by the Forest Plan) in meeting resource needs. Make adjustments as needed based on running average analysis of the past two to five years experience to detect trends.

Maintain effective cooperative agreements with adjacent land managers to provide for cost effective resource protection and management through the sharing of current knowledge, skills, personnel, and equipment.

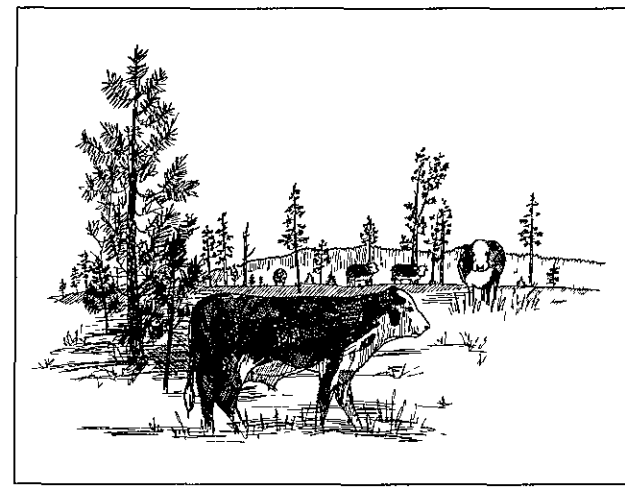
Improve residue utilization to reduce fuel loads, thereby reducing average intensity levels of prescribed fire, reducing expected damage from wildfire and also reducing costs of fire management through lower personnel needs.

Apply mitigation measures relating to prescribed fire use discussed under other resource area sections in this chapter (especially Air Quality, Forest Residues, and Soils).

Conflicts with Other Plans and Policies

There are no known conflicts with other plans and policies.

Forage and Livestock Use



Direct Effects

Forage production potentially increases with all alternatives as a direct result of timber harvest, nonstructural and structural range improvements, and prescribed fire (see Table 4-6).

Forage

Timber harvest opens up tree canopies, allowing sunlight to reach the ground, which increases forage production. In recent years, timber harvest has become more intensive with more overstory removal, shelterwood, clearcutting, and group selection. This has the potential to boost forage production more than "selective" harvesting (see Table 2-8, FEIS Chapter 2 Timber); these all are predicted to increase forage production over present levels. The degree of increase varies by alternative. Using total acres of harvest, the alternatives can be ranked in order of increasing forage production as: C-Modified, I, A, E-Departure, B-Modified, and No Change. Alternative A is higher than Alternative I, even though I has slightly more total harvest acres, because Alternative A has more acres in even-aged management. It is thought that acre for acre, even-aged management produces more forage than uneven-aged management. These projections do not take into account quality of forage, effects of grazing management, or other activities and uses on vegetation productivity.

Prescribed burning of natural fuels and range improvements (primarily juniper removal and prescribed burning) can increase forage production (Hall, 1976). Table 2-8 in Chapter 2 (Forage), shows acres of prescribed burning of natural fuels and acres of non-structural range improvement. However, it is assumed here that the most important influence on forage production is timber harvest, the ranking in order of increasing forage production shown above is unchanged even with the effects of prescribed burning and non-structural range improvements.

Grazing by domestic livestock removes forage and converts it to a commodity. Properly done, livestock grazing has minimal environmental effects. Likewise, use of forage or vegetation by wildlife or recreational livestock, or leaving it ungrazed for recreational purposes, contributes to important uses and enjoyment of the National Forests. Grazing effects diversity in plant communities and can effect species composition and conditions of plant communities. Properly timed, grazing will maintain and encourage a number of highly palatable and nutritious plant species in the community, and plant vigor will be high. Grasses will include a large proportion of perennial species that tend to decrease with improper grazing use. For many plant communities these would include blue bunch wheatgrass and idaho fescue. Shrubs and forbs will vary depending on the plant community.

Improperly done, livestock grazing can have adverse environmental effects. Repeated heavy grazing that is not properly timed can reduce species diversity and shift species composition toward greater undesirable species, and noxious weeds. Plant species diversity will be low, as will plant vigor. Annual grasses such as cheatgrass and perennial grasses that tend to increase with heavy grazing (i.e. sandberg wheatgrass), will replace the more desirable and palatable decreaser species. Forbs and shrubs will vary depending on the plant community. In some communities, grasses can be almost completely replaced by weedy forbs. Less desirable species result in lower productivity and can impact other uses on the Forest and Grassland. If the impacted areas are along streamsides and wet meadows, water quality, fisheries, and recreation can be affected.

Indirect Effects

The predicted increases in forage production have the potential to increase usable forage for livestock and wildlife, if proper management is done (see Mitigation). Livestock AUM's available for harvest by alternatives are shown in Table 4-7. As discussed above, AUM's are affected by differences in timber harvest acreages, non-structural range improvements and prescribed burning. Other factors that affect AUM's are differences in structural range improvements and riparian prescriptions (see Effects on Water, this chapter, and paragraph below).

Livestock Use

Analysis and modeling done for the Ochoco National Forest and Crooked River National Grassland has indicated that, theoretically, a forage surplus exists on a forest-wide basis after meeting the needs of both the game and livestock for each alternative. Therefore, it has been assumed that forage is not a limiting factor for big game numbers in any alternative. This is not to say that localized competition does not occur where livestock use has exceeded allowable use. Those localized situations are in fact recognized to exist, and are an effect resulting from intensive livestock use under extensive management systems.

Riparian prescriptions in the alternatives are designed to improve streamside conditions (see Management Prescriptions, Chapter 2). As conditions improve, they should produce more forage and increase plant species diversity with a larger variety of herbaceous and woody species. Along with the vegetation changes, improvement in the stream channels and water quality will result. Alternative B-Modified, C-Modified, and I have one riparian prescription which is designed to improve riparian conditions in all watersheds to "excellent condition." They will, therefore have similar effects on diversity, riparian condition, and forage production. Alternatives NC, A and E-Departure have two riparian prescriptions which will result in some watersheds having "excellent condition" riparian areas, and some watersheds having only "fair condition" riparian areas. The fair condition riparian areas would have less variety in herbaceous and woody plant species, which means less diversity. Channel conditions, water

TABLE 4-6
FORAGE

		ALTERNATIVE					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Potential Forage Production	M AUM s/Yr						
Decade 1		77 5	75 0	79 0	75 0	79 1	73 1
2		Unknown	82 0	78 9	81 5	78 9	73 3
5		Unknown	85 0	79 4	84 6	86 5	74 4
Structural Improvements	Number						
Decade 1		27	138	138	138	27	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Nonstructural Improvements	Acres						
Decade 1		N/A	13097	12477	12832	12530	8760
2		N/A	4337	3717	4072	3770	0
5		N/A	4337	3717	4072	3770	0

TABLE 4-7
LIVESTOCK USE

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B MOD	E DEP	I Preferred	A	C-MOD
Livestock Use	M AUM s/Yr						
1st Decade		77 5	70 0	79 0	70 0	77 5	73 1
5th Decade		77 5	80 0	79 4	80 0	79 1	74 4

TABLE 4-8
DIFFERENCES IN "EXCELLENT CONDITION" BY ALTERNATIVE

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Riparian Areas In Excellent Condition	M Acres						
Decade 1			10 0		10 0		10 0
2			11 2		11 2		11 2
5		5 4	17 5	9 4	17 5	5 4	17 5

quality, and wildlife habitat would also be less desirable than for other alternatives. Table 4-8 shows the differences in "excellent condition" riparian, by alternative.

Increased forage production may have an indirect effect on wildfire hazards. Herbaceous vegetation that is not utilized by livestock and wildlife dries up in the latter part of the summer and becomes fine fuels. These fuels can increase the risk of fire and help fires spread (see Effects on Fire, this chapter).

Forage production has a direct effect on potentially available AUM's, which in turn has an indirect effect on the local economy, community cohesion and lifestyles (see Effects on Social and Economic Issues, this chapter). Since all alternatives have the potential to increase AUM's over time, these effects are mostly short-term in nature and reflect the changes the livestock grazing industry is faced with throughout the western U S. on public lands.

Cumulative Effects

Forage production will increase with the implementation of all of the alternatives, as discussed above. This is in itself a cumulative effect that results from a number of actions occurring over time on the Forest and Grassland. Availability of this forage for both livestock, wildlife and scenic resources will provide increasing, positive cumulative effects over the planning period. Any negative cumulative effects would result from improper allocation of this increasing resource to one or more uses at the expense of others. Based on the increasing level of concern from both management and the public about proper allocations of resources, this is unlikely to occur.

Because 50 percent of the riparian areas on the National Forest grazing allotments are in less than satisfactory condition, measures necessary for their recovery may result in temporary reductions in permitted stocking on those allotments with degraded riparian areas and poor range conditions. The reductions in permitted stock may effect the economics of the grazing operations on affected allotments, even though jobs associated with grazing in general are not expected to go either up or down (significantly) with any of the alternatives (see Direct Effects on the Social and Economic component of the environment, this chapter). But the long-term benefits of such actions are improvements in water quality, wildlife habitat, and forage production.

Mitigation Measures

Standards and guidelines are developed for each alternative (see Appendix D). These will be used in developing individual allotment management plans (AMP), which will ensure that livestock grazing is properly done.

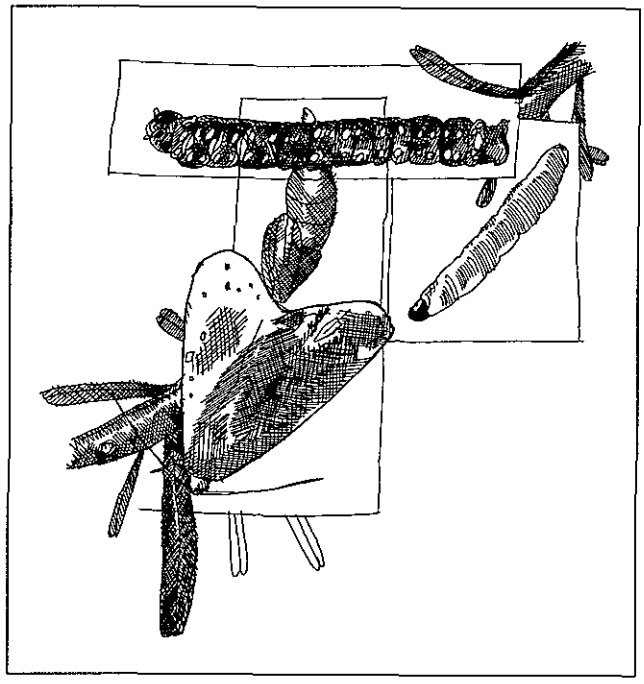
Forage utilization standards (Standards and Guidelines, Appendix D) identify what level of use can be made of forage while either maintaining satisfactory conditions or improving unsatisfactory conditions to satisfactory.

Application of intensive grazing systems such as rest rotation, deferred rotation, double rest, riparian pasture, holistic, etc., if properly done, provide for distribution and use of forage, while not exceeding utilization standards and all resource management objectives.

Timing of use by domestic livestock is used to meet vegetation management objectives.

Fencing can be used to exclude or better control use of domestic livestock or preferred areas that tend to get overused.

Monitoring of use and conditions will provide basis for adjustment of management and permitted stock where necessary to assure that grazing objectives and satisfactory conditions are achieved.



Forest Health

Direct Effects

Interactions

"Forest Health" is a condition where living and nonliving influences on the Forest and Grassland, (e.g. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices, fire, interrupted plant succession) do not threaten management objectives either now or in the future. Deposition of air pollutants and potential changes in climatic conditions (e.g. the Greenhouse Effect) have tremendous potential for reducing forest health and therefore long-term productivity of associated resources (Knauer, et al, 1988). National concern for this issue resolves primarily around insects, diseases, and atmospheric deposition effects. It is beyond the scope of this analysis to discuss atmospheric effects, therefore, discussions revolve around those agents over which the Forest has some degree of control.

Fire plays a major role in maintenance of forest health on the Ochoco National Forest. Too much fire intensity can injure trees, predisposing them to insect and/or disease entry Too little fire interrupts natural ecological cycles in many plant communities on the Forest and Grassland, historically leading to tree stand stagnation or species conversions to undesirable species, also leading to insect or disease infestation. Insect epidemics, in particular, are common in these conditions, causing severe mortality, fuel accumulation, and eventually, stand replacement fires.

There are many naturally occurring organisms that have the ability to alter the forest environment. Of particular concern are those organisms that may negatively affect establishment and growth of trees. Most common of these are defoliating insects, bark beetles, fungal pathogens, dwarf mistletoe, small mammals, big game, and livestock. The risk of forest stand damage from these pests by implementing the alternatives through various management activities is discussed below.

Defoliators

Insects that consume tree foliage are called defoliators. Of particular concern are the western spruce budworm and the Douglas-fir tussock moth, both have produced Forest-wide epidemics in recent years. Host tree species (e.g. white fir and Douglas-fir) will increase as a result of natural regeneration on mixed conifer types, especially with a light harvest, which maintains shaded conditions favorable for those species (Hall, 1973; Minore, 1979, Seidel, 1979). This can contribute to increased defoliator populations and subsequent damage (Carlson, 1983). Other defoliators, such as larch casebearer are a concern but populations are not expected to change significantly as a result of selecting a particular alternative. Tree planting that emphasizes non-host tree species (pines and larch) may reduce defoliator habitat and damage to future stands. Both precommercial and commercial thinning may reduce height diversity in a stand, reduce the proportion of host species and maintain stand vigor, all of which may reduce damage from defoliators (Carlson, 1983). Harvesting of mature timber by clearcutting or shelterwood eliminates the habitat for defoliators and thus can reduce their populations. Small isolated timber harvest areas have little impact, but scheduled harvests over large acreages may significantly reduce populations by

reducing the proportion of host species and breaking up the continuity of desirable habitat (Carlson, 1983). Overstory removal can have similar effects if the host trees are removed. Selective harvests maintain host species in stands and create an uneven-aged condition which encourages the increase of defoliator populations and damage (ibid.).

Numerous natural controls play a part in regulating defoliator populations. Birds eat large numbers and are particularly effective in young stands (Garton, 1983; Wickman, 1981). However, as trees mature and conditions favoring defoliators improve, the effectiveness of birds in controlling defoliators decreases (Campbell, 1983; Carlson, 1983; Wickman, 1981).

Bark Beetles

Bark beetles are that group of insects that lay their eggs below the bark of host trees. The larvae tunnel and feed in the inner bark (Doliner, 1984). The interactions of management activities on bark beetles are:

The most effective control of damage from bark beetles is to maintain trees in a vigorous condition (Sartwell, 1976; Amman, 1977, Dolph, 1983). This can be accomplished through precommercial or commercial thinning. The degree of stocking required to maintain cover for big game (60 to 100 sq.ft./acre of basal area) may not maintain bark beetle resistant stands in pine types (Dolph, 1983).

Harvesting of mature and overmature stands, prompt salvage of infested trees and maintenance of non-susceptible species are other activities that can reduce bark beetles.

Bark beetle populations may continue to remain high but not necessarily epidemic in areas where control measures are not applied, such as in classified wilderness.

Root Rots and Stem Decays

This includes a variety of fungi or bacteria which cause diseases that infect the roots (root rot) or stem (stem decay) of host trees and cause growth loss, mortality of trees, or decay of sound wood. Loss in infested stands is estimated to be as high as 75 percent of normal growth (Filip, 1983). The following activities can affect the occurrence of root rots:

Natural regeneration in mixed conifer stands may result in an increase in root rots and stem decays in subsequent stands. This is based on the assumption that the new stand would be dominated by true fir (Seidel, 1979). Planting can reduce root rots and stem decays in future stands if resistant species are used (Seidel, 1981; Schmitt, 1984).

Clearcutting infested stands followed by regeneration with resistant species can reduce future incidence of root rots and stem decays (Filip, 1983; Dolph, 1980, Seidel, 1981). Shelterwood harvests can have the same effect as clearcutting if resistant species are used for reforestation, but infected shelter trees may provide a source for the new stand's infestation. Sanitation and salvage cutting can remove obvious infected trees, but increases likelihood for future occurrence of rots (Schmitt, 1984). Selection cutting may increase infestation from root rots and stem decays (Dolph, 1980, Schmitt, 1984; Filip, 1983).

Commercial and precommercial thinning can reduce root rots and stem decays by removing infected or wounded trees, increasing the proportion of resistant species, and maintaining stand vigor in some cases (Dolph, 1980; Roth, 1977). However, care must be taken to prevent injury to residual trees or the benefits of thinning may be lost (Aho, 1977; Dolph, 1980).

Forest stands with little or no timber management activities would have endemic levels of fungal activity similar to what presently exists except when wildfires occur, reducing the number of more susceptible tree species, such as those that occur in true fir stands.

Dwarf Mistletoe

Dwarf mistletoe damages the host by reducing growth, lowers wood quality, and kills or predisposes its host to attack from other pests (Graham, 1967). Dwarf mistletoe on ponderosa pine and Douglas-fir is of primary concern on this Forest. The following section discusses the timber management activities that may occur in the alternatives considered and the activities' effect on dwarf mistletoe.

Reforestation by planting or natural regeneration can reduce dwarf mistletoe by removing infection sources (Dolph, 1980), selecting resistant species (Seidel, 1981), and creating an even-aged stand (Barrett, 1979). Planting is usually more successful than natural regeneration to reduce mistletoe because of more control over these factors.

Clearcutting is an effective way to eliminate dwarf mistletoe in a forest stand as it removes the infection source (Dolph, 1980; Seidel, 1981). Shelterwood harvests with later overstory removal can reduce dwarf mistletoe infestation if the overstory is removed before regeneration is three feet tall (Dolph, 1980). Sanitation and salvage harvests in mature stands to reduce mistletoe have not been effective. In fact, repeated sanitation and salvage cutting creates a multiple-aged condition which can favor the spread of dwarf mistletoe (Barrett, 1979). Selection harvest also creates multiple or uneven-aged conditions which tend to promote spread of dwarf mistletoe (Seidel, 1981; Barrett 1979).

Both precommercial and commercial thinning are effective methods of removing dwarf mistletoe-infected trees. Thinned ponderosa pine stands sometimes outgrow the vertical spread of dwarf mistletoe (Barrett, 1985).

Small Mammals

Small mammals that damage trees include rodents such as rabbits, pocket gophers, ground squirrels, mice, voles and porcupines. These animals feed on tree seedlings and seeds, directly affecting reforestation of an area. Some interactions are:

Timber harvesting tends to increase small mammal populations as it increases the abundance of ground vegetation on which many feed (Stoszek, 1976). Even-aged management especially increases the amount of food available for small animals, such as pocket gophers, which have caused serious damage in plantations.

Scarification or broadcast burning for site preparation will temporarily reduce all or part of the above habitat (Stoszek, 1976, Crouch, 1976). As a result, populations may change locally, but the overall effect on total small mammal populations over time is expected to be insignificant.

Comparisons of Alternatives

Defoliators

Research literature is compelling towards use of management prescriptions that utilize even-aged management (in mixed conifer) and the use of prescribed fire for control of defoliators The objective is to "reverse the successional trend" created by nearly a century of fire suppression, selective harvesting (without proper follow-up cultural practices), and an overall lack of awareness of ecological principles. Significant outbreaks of defoliators have occurred recently, and will in all likelihood continue in the future. The long-term effects are unknown, but if predictions are accurate, recurring large scale defoliations will be common until forest stands are brought under an "integrated pest management" strategy. Effects will probably be cumulative.

Alternatives No Change and B-Modified would be most effective in reducing losses to defoliators because of the large number of acres treated, followed by A, E-Departure, I and C-Modified. But all of these alternatives would provide significantly reduced risk over the situation today.

Bark Beetles

Alternatives No Change and A are probably the most effective at reducing the risk from bark beetle damage, followed by B-Modified and I. E-Departure would be lower because of the larger acreage with big game emphasis, and Alternative C-Modified would have many acres at high risk from bark beetles.

Root Rots and Stem Decays

All alternatives would be effective in reducing these risks from root rots and stem decays in lands managed for varying levels of timber production. Alternative No Change, A or E-Departure would be most effective. Other alternatives (B-Modified, I, and C-Modified) would also reduce damage below today's level but probably not as effectively because of the amount of uneven-aged management.

Dwarf Mistletoe

Alternative No Change, A or E-Departure would be most effective for prevention of dwarf mistletoe. Alternatives B-Modified, I, and C-Modified would also reduce damage below today's level, but probably not as effectively as other alternatives because of the amount of uneven-aged management.

Small Mammals

Animal damage from small mammals will probably increase with those alternatives that emphasize even-aged management (especially clearcutting and shelterwood harvesting). The alternatives can be ranked according to the risk associated with this interaction as follows:

High Risk
- Alternative B-Modified
- Alternative No Change
- Alternative A
- Alternative E-Departure
- Alternative I
- Alternative C-Modified

Low Risk

Indirect Effects

Maintaining a healthy forest condition provides numerous positive benefits; recent (1987) Congressional Appropriations hearings on the Forest Service surfaced increasing public concern about maintenance of healthy forests to insure long-term production of many benefits, including timber, scenic resources, wildlife habitat and others (Knauer, et al, 1988). Likewise, conditions favoring an "unhealthy forest" reduce these same resource potentials.

Stagnate stands of ponderosa and lodgepole pine are predisposed to attack by bark beetles. When this occurs, cover for wildlife is reduced or eliminated, visual quality is lowered, and timber productivity temporarily foregone. These affects will many times last until the stand is either naturally or artificially (planted) regenerated, and has grown for fifteen to twenty years, at least. This is an irretrievable loss of that particular resource value for an extended period of time.

Defoliation by spruce budworm, tussock moth and others can last up to ten years or longer. Similar effects to bark beetle damage occur except that it usually is temporary (tussock moth causes more mortality) and wildlife cover is not eliminated. Loss of timber productivity and reduction of visual quality are the primary indirect affects from defoliation.

Root rots and stem decays tend to increase with poor timber management practices (such as excessive tree damage during logging and slash piling) and tend to affect that resource the most. Innoculum built up in stands occurs over time and the affects are slow and incessant; many times these affects are not noticeable to the untrained observer until epidemic levels occur. Cover for wildlife will be reduced over time, even though during initial infection stages, this affect is minimal. Without management, monitoring, and treatment of root rots and stem decays, timber stands eventually "fall apart," eliminating timber, wildlife and scenic values.

Dwarf mistletoe (a parasite) also builds up to damaging levels at a relatively slow rate, and death of trees occurs after long periods of time, depending on the species which is infected. Again, only severe damage is noticeable to the untrained observer, but affects are long lasting, and when serious, only relieved with stand regeneration. The major indirect affect is on timber production, but with long lasting infestations, visual quality, wildlife cover, and other resource values are reduced.

Cumulative Effects

During conditions where populations are above normal, all of the organisms discussed under "Direct" and "Indirect Effects" (with the exception of small mammals), are symptomatic of forest stand conditions that are not in line with natural processes on the Ochoco National Forest. Changes in major species composition (as the result of exclusion of fire) have created conditions favorable for these organisms to flourish, and cumulatively there is substantial long-term risk to management objectives, including timber production, wildlife cover, visual quality and outdoor recreation. In some mixed conifer stands, dwarf mistletoe, root rots, and spruce

budworm have been found together, causing stand damage to the point where the only option is to replace the stand with species adapted to site conditions (ponderosa pine, western larch and lodgepole pine). In some pine stands, dwarf mistletoe can predispose trees to attack by bark beetles, creating cumulative stand damage.

Computer models are available to predict damage from individual organisms (and to some degree, multiple organisms) over time. But, the ability to predict the overall cumulative effect of these organisms on the Forest resources is low. Based on available information, the alternatives can be ranked in terms of their risk of maintaining conditions favorable for cumulative, negative effects on forest health. Assumptions are: 1) wilderness and unroaded areas, where use of fire for forest stand maintenance is not an integral part of management, will provide future "breeding areas" for defoliators, bark beetles and dwarf mistletoe. Stem decays will also be prevalent, but root rots will probably stay at low, endemic levels, 2) the Forest will maintain sufficient quality control in treated stands to minimize infestations, which will hold true for all of the alternatives, 3) those alternatives which emphasize uneven-aged management will have a higher risk of sustaining higher levels of defoliators, dwarf mistletoe, and root rots; and 4) alternatives with higher timber harvest schedules will treat more acres in the short term, therefore reducing habitat for major insects and diseases (assuming that #2 holds true). The ranking by alternative is:

High Risk
- Alternative C-Modified
- Alternative I
- Alternative E-Departure
- Alternative No Change
- Alternative A

Lower Risk
- Alternative B-Modified

Mitigation Measures

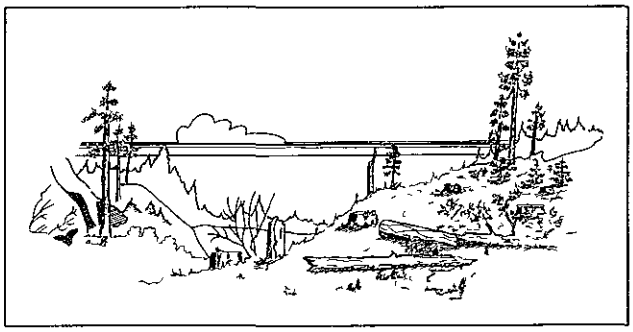
There is a risk of insects and/or diseases increasing to epidemic populations in large blocks of mature or overmature timber (such as in wilderness or old growth areas) and in situations where single species (monocultures) dominate stands. This risk can be reduced by managing adjacent stands for maximum resistance, i.e. resistant species, low densities, young age classes, and maintaining a diversity of species.

The following practices are used to reduce the damage resulting from root rots and stem decays: favoring resistant species (Schmitt, 1984), managing stands to rotation ages of 125 years or less (Aho, 1977), and treating stumps in areas of known infestations (Schmitt, 1984). These measures may be moderately successful except in severely infested stands. In the latter situation, natural regeneration should not be done if timber production is a goal (Filip, 1983).

See Standards and Guidelines for Forest Health (Appendix D) for additional mitigation measures.

Conflicts with Other Plans and Policies

There are no known conflicts with other plans or policies. There is a possibility of conflict with state or private agencies in control of future defoliator outbreaks on areas adjacent to wilderness or roadless areas, as it may not be cost effective for the Forest Service to spray these areas. If they were not sprayed they would provide a reinfection source for adjacent lands. This is a likely situation with the Lookout Mountain area, as it borders privately owned timber lands.



Forest Residues

Direct Effects

Projected levels of forest residues on the Forest are shown in Table 2-8, Chapter 2. All alternatives show a gradual decline over time. The differences between alternatives are negligible. The same table shows a comparison between alternatives on how forest residue levels would relate to the desired residue level for maintenance of long-term site productivity. Tables 4-9 and 4-10 expand on that analysis.

Alternative No Change

By the fifth decade, total pretreatment residues will have declined 17 percent compared to the present levels. Residues in excess of site needs will have declined by 35 percent. Total residues remaining on site after treatments will have declined by 17 percent and will be approximately 25 percent greater than needed for long-term site productivity.

Alternative B Modified

By the fifth decade, total pretreatment residues will have declined 13 percent compared to the present levels. Residues in excess of site needs will have

TABLE 4-9
FOREST RESIDUES
Percent of Desired for Long-Term Site Productivity

	ALTERNATIVES					
RESIDUE LEVEL	NO CHANGE	B-MOD	E-DEP	I Preferred	A	C-MOD
PRETREATMENT						
Current	191	191	191	191	191	191
Decade 5	159	165	156	164	159	163
POST TREATMENT						
Current	151	151	151	151	151	151
Decade 5	125	126	127	126	125	122

TABLE 4-10
Forest Residues in Excess of Long-Term Productivity Needs
(Thousand Tons)

	ALTERNATIVES					
RESIDUE LEVEL	NO CHANGE	B-MOD	E-DEP	I Preferred	A	C-MOD
PRETREATMENT						
Current	9,430	9,430	9,430	9,430	9,430	9,430
Decade	6,098	6,800	5,842	6,692	6,098	6,598
POST TREATMENT						
Current	5,330	5,330	5,330	5,330	5,330	5,330
Decade 5	2,588	2,670	2,852	2,724	2,588	2,264

declined by 28 percent. Total residues remaining on site after treatments will have declined by 17 percent and will be approximately 26 percent greater than needed for long-term site productivity.

Alternative E-Departure

By the fifth decade, total pretreatment residues will have declined 18 percent compared to the present levels. Residues in excess of site needs will have declined by 38 percent. Total residues remaining on site after treatments will have declined by 16 percent and will be approximately 27 percent greater than needed for long-term site productivity.

Alternative I (Preferred)

By the fifth decade, total pretreatment residues will have declined 14 percent compared to the present levels. Residues in excess of site needs will have declined by 29 percent. Total residues remaining on site after treatments will have declined by 17 percent and will be approximately 26 percent greater than needed for long-term site productivity.

Alternative A

By the fifth decade, total pretreatment residues will have declined 17 percent compared to the present levels. Residues in excess of site needs will have declined by 35 percent. Total residues remaining on site after treatments will have declined by 17 percent and will be approximately 25 percent greater than needed for long-term site productivity.

Alternative C-Modified

By the fifth decade, total pretreatment residues will have declined 14 percent compared to the present levels. Residues in excess of site needs will have declined by 30 percent. Total residues remaining on site after treatments will have declined by 19 percent and will be approximately 22 percent greater than needed for long-term site productivity.

Indirect Effects

Changes in residue levels brought about by the alternatives have the following significant indirect effects on other resources, outputs, and programs:

Air Quality

As residue levels decrease through time (see Chapter 2, Table 2-8) the amount of excess residues to remove from the land will be less. This is one of the major factors in the reduction of smoke emissions from prescribed burn treatments of these residues (see Chapter 2, Table 2-8, Total Suspended Particulates Output).

Biological Diversity

The kind and quantity of woody biomass residues on the land have a significant effect on the types of flora and fauna able to exist on or utilize the land (Harvey, et al, 1987; Hall, 1976). While the levels of residues will be decreasing, they will remain well above the levels required for maintenance of long-term site productivity (see Tables 4-9 and 4-10).

Cultural Resources

The gradual reduction in residue levels will allow for lower impact disposal methods (less mechanical and lower intensity prescribed fire) in the future. In the meantime, the amounts of residue present tend to hide cultural resource sites (this can be good or bad) and the treatments may be more likely to damage the sites.

Facilities

No significant effect.

Fire

Levels of dead woody residues have a significant effect on fire intensity and the resultant effects on the environment (Hall, 1976; Boyer and Dell, 1980; Volland and Dell,1981). See Effects on Fire, this chapter, for a detailed discussion on fire effects. Given the projected decline in average residues with time (see above) fire intensities should decrease over time. This will have a further effect of lower suppression costs and lower damage from wildfire. Prescribed fire should become less intense, as well as easier to apply.

Forage
Forage type, amount, and quality are affected by the level of forest residues. The reduction in residue levels will make more space available to above ground growth of forage species. Most of the nutrients from those residues burned will return to the rooting zones and be available for reuse more quickly than through organic decay in our dry climate. Careful maintenance of sufficient decaying woody material in the organic soil horizons will provide nutrient storage sites for the recycling nutrients (Harvey, et al, 1987). See further discussion of nutrient cycling effects under Soils in this section and in the Soils section of Chapter 4.

Forest Health
Decaying forest residues provide a pool of insects and decay organisms that can harm, as well as benefit the forest (Harvey, et al, 1987) The desired residue levels in this Plan provide a balance between the positive and negative contributions to forest health. The gradual return toward the desired level (see Table 4-10) is a deliberate attempt to avoid taking off too much residue until better information is available for this Forest.

Fuelwood
The reduction in excess residues forecasted will gradually approach the demand levels for fuelwood.

Lands
No significant effect.

Minerals and Energy
No significant effect.

Old Growth
No significant effect beyond those discussed in Effects on Biological Diversity, Soils, Wildlife and Fish, this chapter.

Recreation
Dispersed recreation areas will see a gradual reduction in levels of residues as part of the return to more open, park-like stand conditions where prescribed burning and other treatments have occurred.

Scenic Resources
See Recreation in previous paragraph.

Social and Economic
The excess residues shown in Table 4-10 indicate a potential utilization resource available to the local communities in the form of a variety of miscellaneous wood products and fuel wood supply. The amount available will decline over time as shown in all alternatives.

Soil
Levels of dead, decaying forest residues are extremely important to the physical structure of the soil as well as the associated nutrient cycling from the soil to living plants, to dead organic matter, and back to the soil (Harvey, et al, 1987; Boyer and Dell, 1980). The last step occurs through oxidation of dead organic matter by either slow organic decay or by the rapid process of fire.

Erosion prevention is another important function of forest residues in that they intercept precipitation and reduce overland flow of water. The declining levels of residues in the alternatives remain well above the levels considered necessary for maintenance of the above factors important to long-term site productivity.

Timber
Timber stand regeneration is affected in a number of ways by the levels of forest residues remaining on site (Harvey, et al, 1987). The forest residue levels projected in the alternatives provide moderate barrier potential to tree planting while still providing an abundance of shading material and future decayed wood material important for moisture and nutrient reserves, and mycorrhizal activity sites.

Transportation System
No significant effect.

Water
Residue levels affect the hydrologic cycle of a forest through interception by above ground debris, and through percolation rates modified by soil organic matter (Harvey, et al, 1987). The levels of residues projected should maintain more than adequate amounts to maintain soil characteristics in support of clean water production from the Forest.

Wildlife and Fish

Forest residues are an important part of both wildlife and fisheries habitat. They function as shelter and food sources for a large variety of terrestrial, avian, and aquatic fauna (Pierovich, et al, 1975). See Wildlife section of this chapter for further discussion. The projected residue levels in all of the alternatives will provide enough material to meet anticipated needs.

Cumulative Effects

Cumulative effects of changes in levels of forest residues will be expressed through discussions in a variety of other resources and programs including:

Air Quality
Biological Diversity
Fire
Forage
Forest Health
Fuelwood
Soil
Timber
Water
Wildlife and Fish

Detailed discussions on cumulative effects related to the above resource and program areas incorporate the expected levels of forest residues implicitly or explicitly.

Mitigation Measures

The Pacific Northwest Region of the U S. Forest Service has provided broad direction concerning the proper consideration of the retention, use, and disposal of forest residues (FSM 2403, R6 SUPP 345, 3/85). In summary:

Forest residues will be managed as a resource important to long-term productivity. With this in mind:

Retention on site is the first consideration.

If there is more material than is needed for long-term productivity considerations, utilization of excess is the next consideration

If there is still excess material on the site, the third priority is disposal.

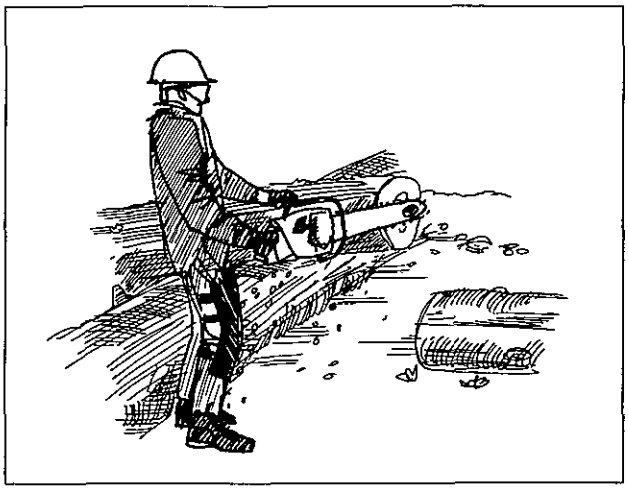
Disposal methods will consider costs, impact on site and resources, and ability to meet a variety of resource objectives.

In response to this direction the Forest is formalizing a Residue Management Plan which will ensure that project level planning will take into account the above considerations.

Conflicts with Other Plans and Policies

There are no conflicts with the plans and policies of other agencies or adjacent land owners.

Fuelwood



The public considers the harvesting of fuelwood an issue on the Ochoco National Forest. The record number of permits issued for firewood was 7,361 in 1981; this has declined to less than 6,000 cords in 1984. Future demand is uncertain, but is directly related to local employment levels and energy prices. The major source of fuelwood currently is the cull material left after logging operations.

Direct Effects

The availability of fuelwood is related to the timber harvest level. In addition to providing cull material at the landing, the timber program also builds and opens roads which improves access to natural mortality in timber stands. Consequently, the alternatives with the highest timber harvest level provide the most available fuelwood. The levels of fuelwood production by alternative are displayed in Table 4-11. As can be seen, availability exceeds current demand for all alternatives through the fifth decade, even though the quality of firewood may be reduced Large diameter, standing or fallen dead firewood will become harder to find and publics will have to depend more on residues from slash piles, etc., which may be small diameter limb wood. State and federal air quality concerns may reduce the desirability of firewood use in the future, or at least make it less desirable economically.

Indirect Effects

As traditional fuelwood becomes harder to find, more people may switch to other sources of heat or obtain more fuelwood from commercial sources. People may shift fuelwood demand to the Deschutes National Forest because of the extensive supplies of quality, dead lodgepole pine.

The falling of snags for fuelwood may effect the populations of cavity nesting species but standards and guidelines (Appendix D) are designed to protect habitat for these species, regardless of the alternative. The alternatives provide for different management allocations for snag habitat, and those with lower allocations exhibit more risk of serious impacts from firewood gathering violations. Table 4-12 displays snag habitat allocations for the different alternatives over the planning period. Alternative B-Modified (and probably No Change) contains the

TABLE 4-11
FUELWOOD

		ALTERNATIVE					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Fuelwood	M Cords/Yr						
Decade 1		140	150	131	130	140	120
2		124	140	123	120	124	100
5		116	130	100	110	116	90

TABLE 4-12
SNAG HABITAT FOR CAVITY NESTERS

		ALTERNATIVE					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C-MOD
Snag Habitat for Cavity Nesters (Average across the Forest)	Percent of Potential						
Decade 1		Unknown	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69

highest level of risk in the long run, due to the relatively low level of snag habitat projected in the fifth decade (33 percent). The minimum level for sustaining viable populations of cavity nesters is 20 percent, so none of the alternatives (including B-Modified) are considered to have serious affects on snag habitat.

Although fuelwood collection reduces the total suspended particulates from slash disposal operations, particulates increase in the towns where the fuelwood is consumed. Currently, no restrictions have been applied to consumers by the State regarding wood stove use in the Forest's zone of influence. But, because of precedence in other communities in the state, it can be assumed that regulation of wood stoves will occur in the future.

Cumulative Effects

The cumulative effects of the timber harvest program in all alternatives will result in a reduction of size and amount of cull material available. Also, as stands are brought under management, the amount of natural mortality will decrease. Consequently, other lands (private or public) may serve as the supplier for the fuelwood consumer. No significant indirect effects (cumulative) are predicted, including those potential effects on cavity nesters as standards and guidelines are designed to maintain habitat well above minimums (20 percent).

Mitigation Measures

The Forest can make more material available through leaving roads open longer or allowing fuelwood cutting instead of precommercial or early commercial thinning. This is an administrative process that could be done with any alternative, but may conflict with other objectives including road closures for wildlife, soil protection and maintenance.

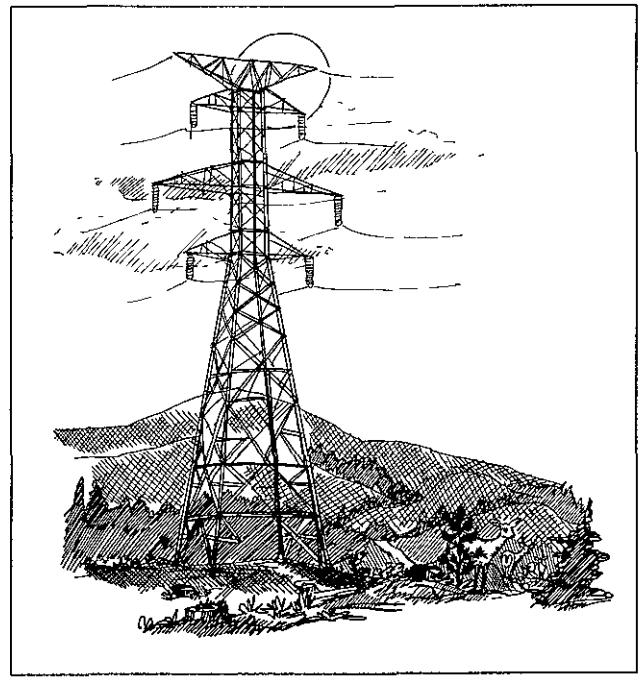
The Forest fuelwood program prohibits cutting of dead, standing trees (except for lodgepole pine) and should prevent most falling of snags for the benefit of cavity nesters, therefore reducing the indirect effects on this other important resource. But, based on experience, there will still be some unauthorized falling of dead trees, particularly western larch snags.

If urban air quality becomes an issue in the future, the Ochoco National Forest will cooperate with restrictions applied by State or County governments regarding fuelwood use as a means of mitigating indirect affects on air quality.

Conflicts with Other Plans and Policies

There are no known conflicts with other plans or policies.

Lands



Under all alternatives, the land exchange program will result in a more consolidated land ownership pattern, reduced administrative costs and fewer trespasses. Because land exchanges account for only a small change in the number of acres managed by the Forest and Grassland, this activity does not constitute any significant environmental effects, either directly, indirectly or cumulatively.

Special Use Permits

Direct Effects

Special use permits are issued for a variety of uses and activities on the Forest and Grassland (see FEIS Chapter 3). The different alternatives (NC, B-Modified, E-Departure, I, A And C-Modified) emphasize different mixes of resource outputs, including those that may require special use permits (e.g. outdoor recreation events). Selection of one alternative over another may result in a shift in the types of special use permits requested of the Forest, because of the long term shift in resource emphasis that certain alternatives exhibit. For example, Alternative C-Modified emphasizes amenity-oriented resource outputs such as developed, dispersed and backcountry recreation; this could ultimately result in an increase in recreation-type permits. In contrast, Alternatives NC and B-Modified emphasize commodity-oriented outputs such as timber harvest and livestock grazing. Special use permits would probably tend to follow a more utilitarian approach with these alternatives, simply because the Forest would (in the long term) become less desirable for extensive recreational use; the Forest and Grassland would appear more manipulated. But none of the alternatives have been designed to specifically exclude different uses of the Forest; all have been prepared in a framework of multiple use. Therefore, no significant direct effects on the special use permit system are anticipated

Indirect or Cumulative Effects

Issuance of special use permits for utility corridors (powerlines and energy transmission), can have significant indirect effects on other resources. Land is many times taken out of production from other uses, or at least reduced in terms of availability. None of the alternatives propose additional utility corridors for the foreseeable future. Any proposals for this use would require analysis through revision or amendment of the selected alternative. Therefore, no significant indirect (or cumulative indirect) effects are anticipated.

Mitigation Measures

Standards and guidelines (Appendix D - Lands) stipulate measures to take in order to mitigate the effects of actions on other resource values (indirect effects). Central to these measures is that any proposed action must be consistent with emphases associated with individual management areas; this applies to issuance of special use permits as well (including utility corridors). All applications for permits must be reviewed through an interdisciplinary process in accordance with NEPA regulations.

Mitigation measures for pipelines, power lines and phone lines may include:

Erosion control (minimum clearing widths);

Revegetation (primary with grasses and other noninterfering vegetation;

Removal of hazard trees along right-of-ways;

Construction of diversions or settling ponds near water crossings, or limit construction to specific seasons;

Location or camouflage to mitigate visual affects on the landscape; or

Restriction of off-road vehicles to limit soil erosion.

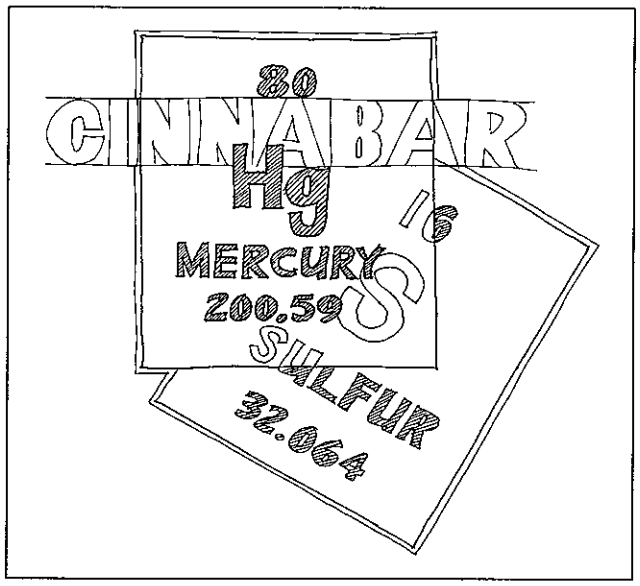
Conflicts with Other Plans and Policies

None have been identified.

Minerals and Energy

Direct Effects

Restrictions on access and the timing of operations are applied to mineral and energy exploration and development to ensure protection of other resources. The extent of these restrictions varies by alternative. Table 2-8, Chapter 2 (Minerals and Energy) displays access restriction as percent of the Forest and Grassland withdrawn, highly restricted, moderately restricted or with few restrictions. Alternative C-Modified restricts access the most, while Alternatives NC, A, and E-Departure restrict it the least.



Alternatives B-Modified and I are similar in that there is a moderate level of access restriction; the differences lie mainly in the low to moderate categories.

Indirect Effects

Mineral and energy development can have significant impacts on other resources. At the present level of activity on the Forest and Grassland, these effects are minor. However, if activity increases in the future, these effects could become significant. Because Alternative C-Modified restricts access the most, the indirect effects discussed below would be least under this alternative. Conversely, the significance of these effects would be greater under Alternatives NC, A and E-Departure.

Because mining removes land from production, it could result in a reduction in biological diversity, soil productivity, forage, timber, and wildlife habitat. Grass is often planted to rehabilitate mines and oil well sites, which could mitigate the effects of forage available to livestock and wildlife.

The remnants of early mining activities at the Mayflower, Amity, Blue Ridge and Independent mines represent historic sites which may meet National Register eligibility criteria. Attempts to reestablish any of these mines could result in the destruction of historic sites.

Recreational opportunities are limited or lost in areas of active mineral and energy development. Mining could negatively impact the character of unroaded areas and wilderness areas (existing claims only). Open pit mines, tailings piles, mill sites and oil well and storage facilities all have negative visual impacts. The staking of mining claims for agates or thundereggs might preclude the free use of those areas by rockhounds.

Placer mining has a direct effect on water quality, because it increases turbidity. Placer mining also kills fish eggs by silting in gravel deposits. Similarly, erosion from tailings piles can increase sedimentation in streams. The leaching of chemicals used in mineral processing could also decrease water quality.

Noise generated by road building, blasting and heavy equipment use could disturb wildlife. Wildlife habitat may be lost to open pit mining, placer mining, or the construction of mills. Oil well drilling can create openings in timber, which may benefit or harm wildlife.

Cumulative Effects

At present levels of activity, the cumulative effects of mining on other resources is probably insignificant.

There is some potential for increased interest in mining of locatable minerals, particularly gold and mercury. A proposal for a major site would trigger an Environmental Impact Statement and Amendment to the Forest Plan. Increased activity from mining operations could have cumulative effects including those resulting from decreased water quality (and therefore reductions in fish production). About 86,400 acres on the Forest and 19,250 acres on the Grassland have "high potential" for mineral occurrence. In a "worst case" situation, all of these acres could be placed under mining production, causing a cumulative affect on major resources on the Forest including timber, forage, wildlife, visuals, and water quality.

Mitigation Measures

The effects of mineral and energy development on other resources is mitigated through the use of operating plans and permits The plans and permits contain site-specific restrictions and rehabilitation requirements to minimize and mitigate adverse environmental impacts. A proposal for a major mining operation on the Forest or Grassland would require an Environmental Impact Statement and/or Forest Plan amendment.

Wilderness areas are withdrawn from mineral entry and energy leasing. No new mining claims may be established, and no energy leases may be issued in these areas. In addition, some facilities, developed recreation areas and a strip of road along Highway 26 have been withdrawn from mineral entry. A detailed discussion of these withdrawals may be found in FEIS Chapter 3.

Restrictions on oil and gas leasing to protect other resources are listed in Appendix D, Standards and Guidelines. As appropriate, leases may be issued with "no surface occupancy" stipulations, seasonal use stipulations, stipulations requiring drilling and storage facilities be set back a specified distance from an area or feature, or stipulations requiring that facilities be located out of view or camouflaged.

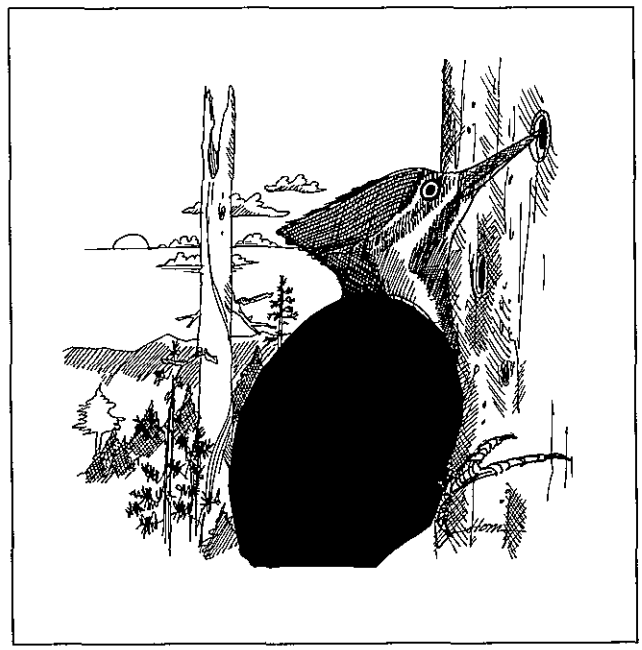
Mining claimants must have an approved operating plan before beginning any surface-disturbing operation. Operating plans in some areas, such as eagle roosting sites, will include a stipulation prohibiting activity from December 1 to May 1. In other management areas, measures will be included to ensure that operations meet management emphasis as much as is reasonable and economically possible.

All operating plans include a rehabilitation plan, and claimants are bonded to ensure that reclamation work is performed.

Conflicts with Other Plans and Policies

None have been identified.

Old Growth



Direct Effects

Issues over old growth are very complex and exist on a local, regional and national level. The reader is encouraged to review other chapters of this document before proceeding with the environmental consequences on old growth discussed here, in order to get a better picture of the existing condition (Chapter 3) and alternative proposals for management of old growth (Chapter 2). Some of the information from these chapters has been repeated here, but is limited to that needed to understand the effects.

As of December 1988, there were approximately 93.8 thousand acres of old growth (meeting the Regional Guide definition) on the Ochoco National Forest. An additional 50 thousand acres of "juniper old growth" (not meeting the Regional Guide definition) also exist, primarily on the Crooked River National Grassland. Total acres of inventoried old growth (93.8 thousand acres) will decline with every alternative as a direct result of timber harvesting. The rate of decline does not vary appreciably by alternative, but the difference in amount remaining at the end of the first, third and fifth decades varies

by almost 100 percent. Alternative No Change maintains the least amount at the end of 5 decades (about 40 thousand acres); Alternative C-Modified maintains the most (about 78.2 thousand acres). Table 4-13 displays how different alternatives treat the existing old growth over time, by major species groups (ponderosa pine and mixed conifer).

There are approximately 574 thousand commercial, forested acres on the Ochoco National Forest. Table 4-14 displays the percentage of these lands that will be remaining in old growth at the end of the five decade planning horizon. There are no estimates of the percentage of these total forested acres that were in old growth condition prior to the establishment of the Ochoco National Forest (1908).

TABLE 4-13
OLD GROWTH

		ALTERNATIVE					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I Preferred	A	C MOD
Old Growth in roadless management areas with no programed harvest (F5, F8, F10, F11, D4, G5)	M Acres						
Ponderosa Pine			1 1	N/A	4 1	N/A	5 4
Mixed Conifer			2 0	N/A	12 5	N/A	12 9
Juniper			0 5	0 5	0 5	0 5	0 5
Total			3 6	N/A	17 1	N/A	18 8
Existing Old Growth areas in areas programmed for harvest (F7, F9, F11B, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28)	M Acres						
Ponderosa Pine			12 8	N/A	9 8	N/A	1 5
Mixed conifer			39 6	N/A	28 8	N/A	14 5
Total			52 4	N/A	38 6	N/A	16 0
Total Existing Old Growth	M Acres						
Pondersoa Pine							
Decade 1		23 2	23 2	23 2	23 2	23 2	23 2
2		18 0	16 2	18 5	18 2	20 0	19 2
5		5 0	9 2	13 0	13 0	12 0	19 0
Mixed Conifer							
Decade 1		70 6	70 6	70 6	70 6	70 6	70 6
2		62 0	64 4	64 0	65 7	53 0	66 6
5		35 0	33 2	42 0	42 1	41 0	59 2
Total Existing Old Growth Forest	M Acres						
Decade 5		40 0	42 4	55 0	55 1	53 0	78 2
Total Existing and Capable Old Growth							
Decade 1	M Acres	93 8	93 8	93 8	95 1	93 8	99 1

TABLE 4-14
FORESTED ACRES REMAINING IN OLD GROWTH

	Alternative					
	NC	B MOD	E-DEP	I Preferred	A	C MOD
% of Forested Acres Remaining in Old Growth (after 5 decades) 1/	6 5	7 9	10 3	10 3	9 9	14 6

1/ Includes only old growth meeting the Regional Guide difinition, does not include "old growth juniper" on the Crooked River National Grassland

Indirect Effects

Wildlife Habitat

Indirectly, reductions in old growth will result in declining habitat for old growth dependent wildlife species and therefore may reduce the breeding viability needed to maintain current populations. Pileated woodpeckers (management indicator species) require both reproductive habitats (old growth) and secondary feeding areas (high snag levels) of equal acreage in close proximity to each other (*A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region,* USDA Forest Service, June 1986). These combined habitat conditions are needed at no less than one per 12 to 13 thousand acres in order to maintain a viable breeding population. Secondary feeding areas may be of little value to dependent species, if the reproductive habitat is not available. On the contrary, reproductive habitat (old growth) should always contain characteristics of secondary feeding areas, in order to be classified as old growth.

Alternative No Change does not include provisions for secondary feeding areas, as Management Requirements have not been applied to it. In addition, only about 1/3 of the acres of old growth allocated in this alternative (32,860 acres) would actually be in a suitable condition at one time, because allocations are based on a managed, long rotation condition. Even though 26,500 of suitable habitat are provided in wilderness, roadless areas and research natural areas, they tend to be concentrated and isolated from other habitat areas. Alternative No Change has a high risk of indirectly affecting populations of pileated woodpeckers on the Ochoco National Forest because of poor overall distribution, and because total acres outside wilderness, roadless areas and RNA's are insufficient to maintain viable breeding populations.

Alternative B-Modified is designed to provide this habitat at the minimum level (see Management Requirements, Appendix F), established at 18,000 acres of reproductive and 18,000 acres of feeding areas across the Forest (outside of wilderness, roadless areas, and RNA's). (Minimum levels are designed to provide some level of insurance against natural catastrophe and should not, therefore, be considered a "threshold" below which the population would suffer irreparable damage.) As in Alternative I, revised minimum direction for flexibility in distribution was applied, so that the "best" available old growth within any 12 to 13 thousand acre area was selected, in lieu of a rigid distribution pattern which was maintained for Alternatives E-Departure, A and I. In addition, about 23,600 acres of suitable old growth are provided in wilderness, roadless areas and RNA's, but this tends to be concentrated and isolated. This alternative provides adequate long-term protection for maintaining species viability of old growth dependent species, but provides few additional options if habitat areas are destroyed by local catastrophe.

Alternative I (Preferred) was designed so that old growth was provided at the minimum level, but as in Alternative B-Modified, the "best" available old growth stand was selected within the minimum geographical area (12 to 13 thousand acres), in lieu of rigid distribution requirements. In addition, selected stands were maintained at higher acreages than required (300 acres), so that continuity of unique stands could be maintained. Also, specific mitigation measures designed to enhance movement between old growth blocks were designed into this alternative (see Mitigation Measures). In total, this alternative allocates 19,250 acres of old growth and an equal acreage of supplemental feeding areas, which is 1,250 acres above the minimum requirement. There is an additional 30,300 acres of old growth provided in unroaded, wilderness and Research Natural Areas, but again, these areas tend to be somewhat isolated. Even though optional habitat areas are not provided in this alternative as insurance against catastrophic events, additional mitigation measures and 1,250 additional allocated acres (equivalent to four reproductive old growth areas) above the minimum requirements are included.

The remaining alternatives (E-Departure, A, and C-Modified) all contain sufficient levels of old growth allocations (reproductive plus feeding areas), and exhibit a low risk of affecting viable populations of dependent species.

Biological Diversity

As an important element of biological diversity, old growth will be represented at different levels across the Forest over time. Table 4-15 displays acres of forested land by different successional stages for decades 1, 2 and 5 of the planning period (Stage VI representing old growth conditions). Alternative B-Modified (and probably No Change) results in the least acres of Stage VI at the fifth decade; Alternative C-Modified provides the most. The remaining alternatives (E-Departure, I and A) are all similar in terms of total acres remaining.

As discussed under Indirect Effects on Wildlife Habitat, the distribution of old growth (Stage VI) will also vary by alternative, with much of the old growth concentrated in wilderness, unroaded and research natural areas. None of the alternatives provide for an even distribution of acres and distance across the Forest over time.

Scenic Resources

Declining old growth does not necessarily equate to a decline in scenic resources on the Ochoco National Forest. Many open, parklike stands of ponderosa pine exist in current visual corridors, but have not been inventoried as "old growth" because official definitions (of old growth) preclude these particular stand conditions, even though tree ages in these stands average three hundred years and older (in many cases). Prime examples of these stand types occur in the Highway 26 Visual Corridor, but are not indicated in current (1988) old growth inventories (see Existing Old Growth Map - map packet). The alternatives provide various levels of land allocations to scenic resources (see Effects on Scenic Resources, this chapter). Management prescriptions for "retention" and "partial retention" call for long rotation stand management (200 to 300 years) to simulate old growth character as a visual resource, independent of official definitions. Additionally, "unique areas" are provided for with similar retention and partial retention objectives with the different alternatives. Direct comparisons of "big trees" for scenic resources, versus "old growth" are not possible, as the management objectives (and definitions) are substantially different.

Cumulative Effects

The cumulative effects of old growth habitat on the pileated woodpecker (management indicator species) were analyzed within an affected area which includes four National Forests in eastern Oregon (Ochoco, Wallowa Whitman, Malheur and Umatilla). Results of the analysis are summarized in Ochoco National Forest Memo, 1920 Land and Resource Management Planning - Wildlife Standards and Guidelines, April 23, 1982. A minimum legal requirement for maintenance of a viable population for this affected area was established at 500 birds (250 pairs). This number was derived from a formula found in Conservation Biology, Souli and Wilcox. Based on: 1) a 60 percent occupancy rate (derived from population ecology of pileated woodpeckers and consultation with Dr. Jack Ward Thomas); 2) a maximum five mile spacing requirement, and 3) acres of potential old growth available on each Forest, numbers of birds (pairs) and old growth acres were assigned on the basis of maintaining a genetically viable population as shown in Table 4-16.

It was affirmed at that time that all respective Forests would provide old growth habitat at minimum levels or higher.

In response to direction from Deputy Assistant Secretary of Agriculture Douglas MacCleery in March 1985, minimum requirements for wildlife in Region 6 were completely reassessed. The results are contained in "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region," USDA, Forest Service, June 1986, on file at the Ochoco National Forest. During this assessment, an analysis of risk of population viability was developed for major indicator species in Region 6. It was determined that the pileated woodpecker was not at high risk currently, even though it may be at risk in the future (15-50 years). Management direction was subsequently changed to provide for greater flexibility in application of habitat management, especially concerning distribution of habitat areas. Alternatives B-Modified and I have been updated to reflect the increased flexibility in mitigation measures (see Mitigation Measures, below and in Appendix F).

TABLE 4-15
Acres of Forested Land By Successional Stage

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Acres of Forested Land by Successional Stage							
Stage I and II (Grass forb/Shrub-seedling)	M Acres						
Decade 1		Unknown	9	9	9	9	9
2		Unknown	55	40	30	37	19
5		Unknown	45	41	34	43	21
Stage III (Pole sapling)	M Acres						
Decade 1		Unknown	146	172	151	170	138
2		Unknown	140	181	151	176	147
5		Unknown	69	88	83	106	42
Stage IV (Young)	M Acres						
Decade 1		Unknown	205	159	184	159	191
2		Unknown	167	127	192	123	158
5		Unknown	192	205	190	178	166
Stage V ((Mature)	M Acres						
Decade 1		Unknown	118	138	134	139	140
2		Unknown	129	142	115	151	162
5		Unknown	224	183	230	191	265
Stage VI (Old Growth)	M Acres						
Decade 1		Unknown	94	94	94	94	94
2		Unknown	81	82	84	84	86
5		Unknown	42	55	55	53	78

TABLE 4-16
Assignments Based on Maintaining Genetically Viable Populations of Pileated Woodpeckers

	FOREST				
	Ochoco	Wallowa-Whitman	Malheur	Umatilla	Total
Number of Pairs of Pileateds	40	75	70	65	250
Acres of Old Growth (M Acres)	20 1	37 5	35 1	32 4	125 1

Alternative No Change provides for about 32,860 acres of "well distributed" old growth habitat, in addition to about 26,500 acres concentrated in wilderness, roadless areas and RNA's. But the 32,860 acre allocation was based on a managed stand condition, so in actuality, only about 1/3 of the allocated acres (approximately 10,950 acres) would actually be in a suitable habitat condition at any one time. As this equates to only about 60 percent of the total acreage needed to maintain minimum species viability, Alternative No Change has a relatively high risk of reducing species viability of pileated woodpeckers on the Ochoco National Forest, and therefore may have a cumulative effect on the population within the affected area. Distribution of habitat areas does not allow for movement of birds, and therefore reduces reproductive capacity and needed exchange of genetic material. The significance of this effect would greatly depend on habitat allocations of other Forests in the affected area, since the Ochoco's contribution to the total population requirements is only about 16 percent of the total needed for species viability. This holds true for all of the alternatives considered.

The remaining alternatives (B-Modified, E-Departure, I, A and C-Modified) provide old growth at levels that equal or exceed minimum acreages needed for maintenance of species viability. Also, as stated previously, minimum requirements were designed to provide some level of insurance against natural catastrophe, and do not represent a critical threshold for species survival. There is an unlikely probability that any of these alternatives would have a significant cumulative effect on the population of pileated woodpeckers within the affected area.

Mitigation Measures

Management requirements for old growth dependent wildlife species habitat are designed to provide some level of insurance against catastrophic event. Some specific components of the requirement (i.e. minimum defense territory, snag requirements) are based on well documented research data (Bull and Meslow, 1977), (Bull, 1975). Other components, such as dispersal distance requirements, are based on professional judgement (Philips and Robers, 1985).

As these management requirements are in fact designed to reduce the risk that land management activities may have on species viability, they in fact serve as mitigation measures for the proposed alternatives, with the exception of Alternative NC, which includes no policy mandated requirements as such. See Appendix F, Management Requirements, old growth dependent species.

An additional mitigation measure was applied specifically to Alternative I (preferred), primarily to reduce the risk associated with allocating old growth at relatively low levels across the Forest. Approximately 1,000 acres of riparian areas on 41 miles of primary Forest streams were identified as "connective habitat" during the land allocation process. The protected area on these streams was expanded from 100 to 200 feet on each side, in order to provide additional security for wildlife while travelling from original or primary habitat areas. According to Bull, 1988, "pileated woodpeckers dispersing to new territories are likely to use these travel lanes if surrounding areas are not forested."

It is not known whether old growth can be simulated over time through manipulation of stands. Specific characteristics, such as size and number of trees per acre, can be replicated with reasonable assurance, but proper size and distribution of both live and dead trees in the stand may not be achievable, given current knowledge and management practices. Based on historical perspective though, it is believed that future management will be at least partially successful in providing old growth from stands previously harvested.

Conflicts with Other Plans and Policies

None have been identified at this time.

Recreation



Direct Effects

Although some recreational activities such as camping can occur in any setting, many people choose different recreational settings for different recreation experiences. The Recreation Opportunity Spectrum (ROS) describes the different settings in terms of the recreation experiences they can offer (see Chapter 3 Affected Environment for a detailed discussion of ROS).

Vegetative manipulation, timber harvest, road construction, and access management are major activities that affect recreation settings. For example, roading and timber harvest increases access for motorized travel and firewood gathering, but at the same time affects the "naturalness" of an area and discourages those seeking a nonmotorized experience in a natural environment. The changes in recreational settings vary by alternative according to different levels of harvest and road construction within unroaded areas. Specific recreational activities (such as hunting and fishing) may be important components of different ROS settings; the effects on these are also discussed when appropriate.

Primitive Setting

There are no areas managed for primitive recreation opportunities, outside of designated wilderness areas, for any of the alternatives (see Effects on Wilderness, this chapter).

Semiprimitive, Nonmotorized Setting

Semiprimitive, nonmotorized recreation opportunities are directly dependent upon areas being maintained as unroaded and managed without use of motorized vehicles. Development of nonmotorized trails can increase use within a particular area, but the major limitation on supply occurs through the management allocation process.

Road building, timber harvest, and other vegetative manipulation eliminates the setting for semiprimitive nonmotorized recreation. Each alternative affects this setting to a different degree, based on acres allocated to unroaded conditions. Table 2-8, Chapter 2, Alternatives Considered displays acres remaining unroaded, plus projected RVD (Recreation Visitor Day) supply and demand over time. Table 4-17 displays a summary of RVD supply and demand projections for the various alternatives over the five decade planning period.

Alternative B-Modified reduces the semiprimitive, nonmotorized setting more than the other alternatives; it calls for road construction and timber harvest at a rapid rate, reducing the total unroaded acres to approximately 16 thousand acres by the end of the first decade. Only portions of Lookout Mountain, Deschutes Canyon/Steelhead Falls, and Silver Creek unroaded areas remain in a semiprimitive, nonmotorized condition. Only about one third of the demand for this setting can be provided in the first decade, despite trail development into these areas.

In Alternatives A and No Change, the area available for the semiprimitive, nonmotorized setting is reduced to approximately 29 thousand acres by the end of the first decade due to road construction and timber harvest. Lookout Mountain, Deschutes Canyon/Steelhead Falls, and Silver Creek would remain semiprimitive, nonmotorized throughout the planning horizon (5 decades). Projected demand for recreation opportunities in this setting cannot be met in the first decade with these alternatives. Lack of trail development into these areas in these alternatives restricts use to less than one half of the available area.

TABLE 4-17
Summary of RVD Supply and Demand Projections

	ALTERNATIVES					
	NO CHANGE	B MOD	E-DEP	I Preferred	A	C-MOD
SPNM RVD'S Supplied	11 1	11 4	35 2	47 2	11 1	55 4
SPNM RVD'S Demand - Decade 1	34 2	34 2	34 2	34 2	34 2	34 2
2	37 4	37 4	37 4	37 4	37 4	37 4
5	48 1	48 1	48 1	48 1	48 1	48 1

SPNM - Semiprimitive, Nonmotorized
RVD'S - Recreation Visitor Days

Alternative I (Preferred) maintains enough unroaded area to provide for the projected demand for this setting through the fourth decade by completing trail systems into all parts of the remaining areas. Projections of supply and demand are nearly equal by the fifth decade (demand exceeds supply by only .9 thousand RVD's; about two percent). Lookout Mountain, portions of Rock Creek/Cottonwood Creek and Deschutes Canyon/Steelhead Falls, and Silver Creek remain unroaded, providing a total of approximately thirty-six thousand acres of semiprimitive, nonmotorized setting. 1/

Alternative E-Departure reduces total acres of unroaded areas to about thirty-five thousand by the end of the first decade, but seven thousand acres (Green Mountain unroaded area) are proposed for motorized recreation. Prescriptions for motorized recreation in this area (Green Mountain) do not eliminate options for future nonmotorized opportunities, but in the short term will conflict with the setting required for this use (semiprimitive, nonmotorized). Demand for the semiprimitive, nonmotorized setting is projected to surpass available supply by the second decade, in part due to the lack of trail development into remaining unroaded areas. By the fifth decade, projected demand exceeds supply by about 13 thousand RVD's (37 percent).

Alternative C-Modified provides semiprimitive, nonmotorized opportunities in excess of projected demand through the full planning period (5 decades). Approximately 57 thousand acres remain unroaded, but as in Alternative E-Departure, Green Mountain unroaded area is managed for motorized recreation, maintaining options for future nonmotorized opportunities. A net area of about 49 thousand acres is provided for semiprimitive, nonmotorized recreation with this alternative; this represents the maximum provided from any of the alternatives.

Semiprimitive, Motorized Setting

Semiprimitive motorized recreation opportunities are also dependent (as are semiprimitive nonmotorized) on maintaining unroaded areas on the Forest and Grassland. Even though some of the current unroaded areas (such as Rock Creek/Cottonwood Creek) are limited in terms of access and terrain for motorized use, development of improvements such as roads and trails could increase the availability for this setting. It is assumed (due to insufficient data) that only one unroaded area (Green Mountain) is suitable for a semiprimitive, motorized opportunity.

FOOTNOTE 1/Some development of Lookout Mountain for recreational purposes is planned, but is designed to maintain semiprimitive, nonmotorized characteristics

Alternative E-Departure and C-Modified manage the Green Mountain unroaded area for semiprimitive, motorized opportunities throughout the planning horizon (5 decades). Table 2-8 (Chapter 2 shows that projected demand for this setting will increase dramatically, exceeding this supply by 11 thousand RVD's (260 percent) in the first decade and 18.1 thousand RVD's (360 percent) in the fifth decade.

The remaining alternatives (No Change, B-Modified, I, AND A) eliminate semiprimitive, motorized opportunities entirely. The demand for this setting is projected to increase to 18 thousand RVD's by the first decade and to 25.1 thousand RVD's by the fifth decade.

Roaded Recreation Setting

The roaded recreation setting is important to the majority of the Forest visitors. Access and natural-appearing surroundings combine to provide an ample supply of this opportunity with all of the alternatives (see Table 2-8, Chapter 2, for data on roaded recreation). Alternative C-Modified provides the least amount of this setting over time, but still exceeds demand by 605 thousand RVD's (215 percent) in the fifth decade. Alternative No Change provides the greatest opportunity for roaded recreation; supply exceeds demand by about 960 thousand RVD's (285 percent) in the fifth decade. The remaining alternatives (B-Modified, E-Departure, I, AND A) all provide more than sufficient roaded recreational opportunities throughout the planning horizon (5 decades).

Quality of the Roaded Recreation Setting

The roaded recreational setting is a broad category that encompasses a wide variety of opportunities for the Forest user. Scenic resources may range from heavily altered (Maximum Modification) to unaltered (Preservation), and access can vary from highly restricted (or even prohibited) to minimally restricted. Even though all of the alternatives are similar by providing a surplus of roaded recreational opportunities, they vary greatly by the quality of opportunities within this setting (see Effects on Scenic Resources and Effects on Transportation System, this chapter). In summary, the alternatives can be ranked according to the qualitative effect that they have on the roaded recreational setting as shown in Table 4-18.

TABLE 4-18
Qualitative Effect On Roaded Recreation

	ALTERNATIVE	
	Scenic Quality	Restricted Access
Least Negative Effect	C-MOD I B-MOD E-DEP	A and NC E-DEP B-MOD I
Most Negative Effect	A and NC	C-MOD

Other important factors may affect the quality of the roaded recreation experience. Recreationists can expect to encounter difficult and dusty travel, and possibly safety problems during periods of heavy log hauling. Sights of recently logged areas, including stumps, slash, cull logs, fresh skid trails and landings will be encountered, especially during late spring, summer and fall These effects are common to all alternatives, but may vary significantly as a result of planned timber harvest levels. It is reasonable to assume that the risk associated with these effects can be directly associated with timber outputs as shown in Table 4-19.

TABLE 4-19

	ALTERNATIVE
Higher Risk of Encounter	NC B-MOD E-DEP A I
Lower Risk of Encounter	C-MOD

Trail System

Trail systems oriented to recreational uses are most desirable when traversing terrain that is natural-appearing, offering a variety of landscapes and difficulty. Depending on intensity of timber harvest and road construction, the scenic character of the area and the actual trail routes can be changed or lost resulting in displaced use, trail closures, trail relocations or reconstruction. Each alternative reflects

different trail system proposals based on differences in unroaded areas being maintained and the differences in intensity of harvest outside of unroaded areas (see Table 2-8, Chapter 2, Alternatives Considered for planned trails by alternative).

Alternatives A and No Change include no addition to the trail system due to extensive even-aged management of timber stands. Maintenance of the existing routes would be difficult due to the harvest levels and the roading of unroaded areas for timber harvest.

Alternative E-Departure includes a moderate trail system based on the effects of increased use of even-aged harvest of pine stands. This demonstrates the need for concentrating the system in the unroaded areas and the main East-West Intertie and Summit Historic Route.

Alternative B-Modified includes more uneven-aged management of timber stands which offers more opportunities to develop and maintain trail systems. The harvest of Rock Creek/Cottonwood unroaded area and the lower portions of Lookout Mountain affect proposed and existing summer nonmotorized routes within these areas. Opportunities to develop motorized routes for summer travel, and snowmobile/cross-country ski routes for winter travel, may even be improved by allowing increased use of temporary roads and skid trails, and through extensive use of uneven-aged management.

Alternatives I and C-Modified include eventual construction of the total trail needs on the Forest and Grassland, most of this construction will occur in the first two decades. Primary unroaded areas, as well as unique recreational areas (such as Hammer Creek Area), are maintained in natural or near natural conditions and uneven-aged management of timber stands on the Forest is extensive, thus providing the necessary settings to justify additions to the trail system. As in Alternative B-Modified, opportunities to develop motorized routes for summer travel and snowmobile/cross-country ski routes for winter travel may even be improved by allowing increased use of temporary roads and skid trails, and through extensive use of uneven-aged management.

Big Game Hunting

Hunting opportunities vary primarily with game populations, but can also depend on quality factors such as remoteness and the challenge associated with hunting of unique animals that prefer habitat in wild and secluded areas provided by the Forest's unroaded and wilderness areas (e.g. multi-tined Rocky mountain elk). Populations of primary game animals on the Forest (elk and deer) react somewhat predictably to changes in habitat provided on the Forest and Grassland (see Appendix B, Section 6).

Overall populations of mule deer are expected to remain constant over the next five decades for all alternatives except B-Modified and No Change. This population is estimated at about 22,600 animals. For Alternative B-Modified, the population is predicted to remain constant for two to three decades, but then decline to about 17,200 animals by the fifth decade. This will also reduce a major hunting opportunity on the Forest, which is also assumed to be the number one recreation activity in terms of visitors days used. Alternative No Change is similar to A, but data is not available to make reasonable predictions on deer numbers. No significant negative effects are predicted for Alternative No Change; effects would probably be no worse than Alternative B-Modified.

Rocky mountain elk populations are estimated at 2,300 on the Forest today. As elk appear to be more sensitive than mule deer to changes in habitat, the populations vary more widely with the various alternatives. All alternatives except NC are predicted to increase populations of elk on the Forest over the first decade. As with mule deer, there is insufficient data to predict changes in elk populations with Alternative NC, but populations will probably be similar to Alternative A. In the long term (decades 2-5) populations of elk will begin to decline for all alternatives except C-Modified, but projections indicate that even with this decline, fifth decade populations will still be higher than today's numbers, except for Alternative B-Modified, which results in a rather dramatic decrease to 1700 elk by the fifth decade.

Pronghorn populations are estimated at about 590 animals on the Forest and between 70 and 160 animals on the Grassland. Hunting of pronghorn is not considered significant as compared to deer and elk, mainly due to the limited population. Opportunities for increasing populations are currently limited; the existing suitable habitat appears to be fully occupied, at least on the Forest. Management of pronghorn on the Grassland is an issue related to conflicts with livestock management and motorized recreation, Alternative I, B-Modified and C-Modified allocate areas for pronghorn management emphasis in order to resolve these issues, but significant increases in hunting visitor days are not predicted, despite this.

Recreation visitor days associated with hunting will tend to follow population trends of mule deer and elk over the planning period (see Table 2-8 Hunting Use-WFUD's, Chapter 2). Alternative C-Modified will probably produce the largest increase in hunting use over the long run, even though other alternatives (B-Modified, E-Departure, and A) show a larger increase in the short run, primarily due to more rapid changes in habitat conditions.

Fishing

Fishing opportunities are directly related to stream condition and the ability to produce a quality fishery. Each alternative improves different levels of streams in excellent condition, reflecting levels of activities that degrade streams, irrigation and scheduled improvement projects (see Effects on Water, and Effects on Wildlife and Fish, this chapter). Common to all alternatives (except No Change) is excellent riparian condition for all anadromous fish habitat, resulting in substantial increases in anadromous fisheries over the planning period; habitat for resident fish varies with each alternative. Alternatives C-Modified, I, and B-Modified offer the greatest opportunity for overall fishing as projects are scheduled to bring all streams to excellent conditions. In Alternatives E-Departure and A, investment levels in riparian restoration are limited to high priority areas, resulting in lower projected outputs of resident fisheries. As with hunting, recreational use associated with fishing is directly related to outputs of fish and increases over existing conditions with all alternatives. In contrast to hunting use, fishing and associated recreational activities continue to increase throughout the planning period for all alternatives (see Fish and Recreation outputs, Table 2-8, Chapter 2).

Indirect Effects

Providing recreational opportunities through specific land allocations to semiprimitive motorized and nonmotorized settings produces an indirect but significant effect on other resource uses.

Some effects are more appropriately described as foregone "opportunity costs" rather than as specific actions, as management for these settings reduces or eliminates more commodity-oriented endeavors such as timber harvest, grazing, mineral exploration, and even other recreational pursuits associated with a roaded setting. Appendix C describes specific effects on other resource uses as a result of semiprimitive allocations for individual unroaded areas. Appendix B (Section 7) discusses resource tradeoffs for combined unroaded allocations.

Areas managed for semiprimitive opportunities provide quality hunting experiences not found throughout more intensively managed, roaded areas. These islands of unroaded, nonmanipulated vegetation offer seclusion and escape for many wildlife species, providing a challenge for those hunters wishing to use backcountry skills in pursuit of elusive and, many times, large trophy animals.

Forest health is much more difficult to maintain in areas allocated for semiprimitive opportunities. Opportunities for using silvicultural techniques are limited due to accessibility problems. Options are mainly limited to prescribed fire and aerial application of chemicals. Recurring infestations of spruce budworm are a serious problem on the Ochoco National Forest, and unroaded areas provide islands of habitat for this and other insects and diseases which have increased dramatically as a result of many decades of fire exclusion.

See Effects on Unroaded, this chapter, for more detailed information on indirect effects of unroaded allocations.

Motorized recreational use (ATV and ORV) causes damage to other resources when users fail to obey laws and regulations or when the Forest fails to properly manage it. Soil erosion can be excessive in steep areas, or in areas with low vegetative cover. Riparian areas tend to receive higher resource damage than other areas because of the high level of access within them. Standards and guidelines (see Appendix D) are designed to limit this damage to within acceptable levels, but public trust and respect for the land is a necessary component of the overall management scheme to manage motorized use for the benefit of the users and other resources. See Effects on Soil, Wildlife and Water, this chapter, for more detailed discussions of motorized recreation on other environmental components. Also see Mitigation Measures, this section, for methods to reduce effects of motorized recreation on other resources.

Recreational facilities such as campgrounds, dispersed campsites, trailheads, and trails impact soils and watersheds by taking land out of production for construction purposes and by compacting and displacing soils in areas of heavy traffic. Alternatives C-Modified and I have more effects on these resources than the other alternatives, due to a higher level of planned construction and reconstruction of recreational facilities, and as a result of high levels of scheduled trail construction (see Table 2-8, Chapter 2 for display of recreational developments planned over the planning period).

Cumulative Effects

As unroaded areas continue to be developed for purposes other than backcountry recreation, people searching for these experiences will find fewer and smaller areas offering this opportunity. As a result, wilderness and the remaining unroaded areas may receive increasing use and overcrowding. This produces unacceptable conditions and undesirable use levels for wilderness and unroaded area experiences. The encounters with others become too frequent to allow for the recreation experiences sought. Use of dispersed sites and increases in numbers of dispersed sites is expected to occur as people discover the Forest and Grassland and search for a non-crowded recreation experience. People now utilizing the Deschutes National Forest may move east to avoid the crowds and developments occurring in that area.

Mitigation Measures

The National Recreation Strategy, developed to encourage partnerships and maintain quality recreational opportunities, has been incorporated into Alternatives C-Modified, I and B-Modified. This emphasis on quality outdoor recreation includes the mitigation of other resource activities on recreational opportunities as well as mitigating the impacts of recreation on other resources.

Measures designed to mitigate the effects of various activities are identified in the Standards, Guidelines, and Prescriptions in Appendix D. Some of the major mitigation measures are listed below:

To maintain semiprimitive recreation opportunities, unroaded areas are designated as special management areas and vehicles are restricted to protect the unroaded qualities.

Scenic corridors are designated and corridor plans will be developed to maintain the naturalness along specific roads and trails.

Trails that cross timber sales are managed, maintained and protected during harvests by sale layout and contract preparation and administration. Trails may be relocated to reduce impacts by harvest.

Road systems are designed and maintained to accommodate different types and levels of recreation traffic.

Developed sites are protected from mineral entry through the withdrawal procedures. These sites are also maintained, managed and protected during timber harvest through clauses in the timber contract. Areas where soil compaction is unacceptable will be rehabilitated and/or rested.

Cross-country ski opportunities away from snowmobiles may occur through the issuing of a Forest closure order prohibiting snowmobiles in certain areas.

Traffic controls can be initiated to restrict log haul on weekends and holidays to facilitate recreation traffic.

Roads can be closed after log haul to further protect wildlife habitat resulting in more nonmotorized recreation (hunting) opportunities.

Rockhounding areas can be withdrawn from being individually claimed to keep them available for general public use.

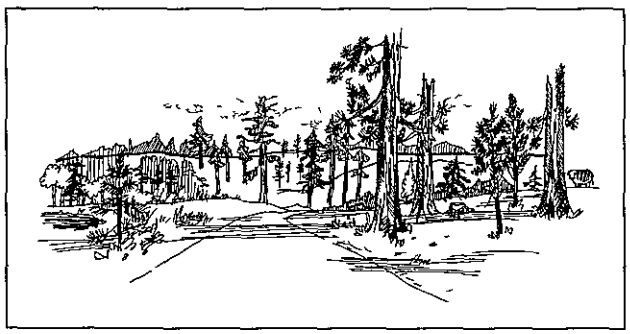
Timber sale areas can be left open for several seasons after harvest for people to gather firewood.

All vehicular use can be restricted on critical winter range during critical times by travel plan implementation.

Conflicts with Other Plans and Policies

None are known to exist.

Scenic Resources



Direct Effects

Effects on scenic quality are measured by the degree of change from the natural condition of an area. A landscape may appear natural or heavily altered depending on the extent of the management activities in the area. Timber harvest, vegetative manipulation projects, and road construction are the primary activities that affect the naturalness of an area.

Visual quality objectives (VQO) have been established for all Forest and Grassland areas based on the National Forest Visual Management System (VMS). The VMS process is briefly described in Chapter 3. These VQO's are describe as follows: Preservation, which allows no alteration of the landscape; Retention, which allows management activities that are not obvious to the casual observer; Partial Retention, which has management activities that are noticeable but do not dominate the landscape, and Modification/Maximum Modification where management activities are obvious and dominate the landscape. (The Forest's visual resource inventory and analysis of the alternatives combined the Modification and Maximum Modification areas.)

Scenic corridors called viewsheds have been identified in the land areas seen from major highways, trails, heavily used recreation sites, lakes and some streams. In the various alternatives, these viewsheds are treated differently based on the emphasis of the alternative. In alternatives E-Departure and B-Modified, where commodity production receives the highest emphasis,only the major viewsheds are managed to maintain their scenic qualities while the other viewsheds are managed for timber production. In alternative C-Modified, most of the inventoried viewsheds are managed to maintain the scenic quality as retention or partial retention corridors based on the recommended VQO.

In all of the alternatives, including the Current Direction alternative, the present naturalness of the Forest will continue to change toward a more heavily altered appearance. This will mean that in most of the Forest the large ponderosa pines will continue to disappear and the number of cleared openings and patches of young trees will increase. The Forest will look less natural.

The degree of this change varies between alternatives. Wilderness areas will be preserved in a natural condition. Areas maintained and managed for their unroaded condition, scenic river corridors and Research Natural Areas (RNA's) will present a natural appearing scene. Areas managed for intensive timber and forage production will present a modified or heavily altered scene. Access routes through or to these various areas may receive special treatment to protect or enhance the view, depending on the amount and sensitivity of the traffic.

Table 4-20 displays the acreage and the percent of area identified for each visual quality objective by alternative.

these viewsheds, management activities will not be evident to most people after about one year from the time the activity has been completed. Fore-

TABLE 4-20
Acreage and Percent of Area by Visual Quality Objective

	ALTERNATIVES					
Visual Objective	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
Preservation 1/						
M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Percent	4 0	4 1	4 5	4 4	4 0	5 3
Retention 2/						
M Acres	102 2	60 7	70 7	96 8	102 2	155 6
Percent	10 7	6 3	7 4	10 0	10 7	16 3
Partial Retention 3/						
M Acres	71 4	28 1	59 4	32 4	71 4	61 5
Percent	7 5	2 9	6 2	3 4	7 5	6 4
Modification/ Maximum Modification 4/						
M Acres	743 2	827 8	781 6	784 9	743 2	687 1
Percent	77 8	86 6	81 8	82 1	77 8	71 9

1/ Preservation includes Wilderness and Research Natural Areas
2/ Retention includes unroaded, old growth, developed recreation, enhanced riparian areas, and access corridors specifically managed for recreation VQO
3/ Partial Retention includes maintained riparian areas and access corridors managed for partial retention VQO
4/ Modification and Maximum Modification includes all other areas timber/range and areas for wildlife habitat improvement

Alternative A and Alternative No Change

In general, the Forest lands outside of viewsheds, wilderness, Research Natural Areas, and the three managed unroaded areas will appear to be moderately to heavily altered. Most of the trees will be smaller than 24 inches in diameter. A mosaic pattern of harvest openings and patches of young trees of varying sizes in blocks of between 20 and 40 acres will dominate the landscape. At least for the next decade, the light colors and fine textures of replanted younger trees will contrast with the darker colors and courser textures of yet uncut older tree blocks. The large, ponderosa pines which have been a dominant visual element in the Ochoco Forest landscape will disappear, to be replaced by young, thicker stands of trees. State Highway 26, the Round Mountain Trail, and Forest Roads 16, 17, 27, 33, 41, 42, 43, and 58, will continue to appear natural. In grounds seen from these roads and trails will maintain a big-tree character. Some other minor access roads will be managed for partial retention, which means that management activities such as timber harvest will be noticeable but will not dominate the view.

Alternative B-Modified

The general overview of the Forest landscape shows the majority of lands would be modified to some extent through timber harvest and road construction. A good portion of the pine stands would appear somewhat natural as uneven-age management is applied. These stands would preview 20-inch diameter trees and more entries into the areas would be evident. Management activities will alter the landscape and will be obvious to the casual observer throughout most of the Forest except along the

Highway 26 visual corridor, on 9,000 acres along a couple of major routes, Bandit Springs, the upper 7,550 acres of Lookout Mountain, Silver Creek, Stein's Pillar, Squaw Creek, Hammer Creek, the wilderness areas and the Wild and Scenic Rivers, management activities will not be obvious. The north slope mixed conifer stands will appear heavily altered as clearcut areas will stand out due to the average timber harvesting and road construction.

Alternative C-Modified

In general the appearance of the Forest will be similar to the current situation; all major roads will be managed to protect and enhance the natural landscape. Views along Forest Roads 16, 17, 22, 26, 27, 33, 38, 41, 42, 43, 47, and 58 should continue to appear natural. Approximately 40,000 acres of other secondary access viewsheds will offer a slightly altered landscape where management activities are evident but do not dominate the landscape. Large blocks of old growth and natural-appearing landscapes will be apparent in the wilderness areas, RNA's, and the 44,000 acres managed as unroaded. The 3,000-acre Bandit Springs cross-country ski area is managed to protect and enhance the natural old growth appearance of this landscape. The Forest area outside of the viewsheds and special management areas will appear moderate to heavily altered from timber harvests and projects to improve wildlife habitat. Seventy percent of the timbered area will be young tree stands.

Alternative E-Departure

In general, the Forest lands outside of the viewsheds, wilderness, RNA's, and the four managed unroaded areas will appear heavily altered in Alternative E-Departure. The large ponderosa pines which have been a dominant visual element in the landscape will be replaced by younger, thicker stands of trees. Eighty-eight percent of the timbered areas will be dominated by managed stands less than 100 years of age. State Highway 26 and the main route to Rager Ranger Station viewsheds will continue to appear natural. Management activities in these two viewsheds will not be evident to most people one year after the activity has been completed. The big-tree appearance will be maintained here also. Forest Roads 17, 22, 26, 27, 33, 41, 42, and 43 will be managed for partial retention, which means that management activities such as timber harvest will be noticeable, but will not dominate the view of the landscape. All other access routes will have no special visual management emphasis and management activities may dominate the scenery.

In addition to the viewsheds along these sensitive travel routes, the 3,000 acre Bandit Springs cross-country ski area and the special wide 7,000-acre scenic zone encompassing Crystal Creek, Walton Lake, Round Mountain, Lookout Mountain, Mt. Pisgah, and East Point will be managed to protect and enhance the old growth natural appearance. Most of the area remaining outside of these special management areas receives an intensive timber management emphasis which will dominate these landscapes.

Alternative I (Preferred)

The Forest and Grassland will offer natural-appearing scenery along all major travel routes in the Forest. Areas such as Steins Pillar, Hammer Creek, and Deep Creek will also maintain the scenic qualities associated with these areas. All of the Lookout Mountain unroaded area will provide unique natural scenery as will the major portion of Rock Creek/ Cottonwood Areas, Bandit Springs Area, Squaw Creek, Silver Creek and the Wild and Scenic River Corridors. Uneven-age management in the pine stands will provide a more natural-appearing landscape in the pine areas across the General Forest. These areas will feature a smaller tree (20-inch diameter) average and evidence of more frequent entry.

Indirect Effects

Maintaining scenic viewsheds affects the quality of recreation opportunities and experiences. People prefer a natural appearing scenic environment for recreation activities. Alternatives that maintain the majority of the viewsheds such as C-Modified and Alternative I will meet the expectations of more recreationist by providing quality to the areas most frequently visited. Alternatives E-Departure and B-Modified maintain fewer viewsheds in the natural appearing condition and will be less acceptable to the recreating public.

Maintaining scenic viewsheds affects the intensity, location and manner in which management activities can be completed. Alternatives that maintain the viewshed corridors such as Alternative C-Modified and Alternative I will be most restrictive on resource management activities in these areas. Timber harvests will be reduced in these areas as well road construction. Locations of units and roads is limited. Prescribed fires must be carefully planned and executed to reduce visual impacts in these viewsheds. Other activities such as mining, utility lines, oil and gas explorations, wildlife habitat projects will have limits and restrictions to maintain viewsheds.

Cumulative Effects

The effects of natural and resource management activities on landscapes constantly change the scenic qualities of that landscape. As management activities become more evident, the naturalness of a particular area will be lost, and recreational opportunities will be less desirable, depending on the user's objectives. The alternatives can be ranked according to the degree of negative change to the landscape and therefore the cumulative naturalness of the Forest.

Mitigation Measures

Landscapes can continue to appear natural by alteration of management activities to blend them into the landscape as designed in the visual retention prescription. Clearcut units can be positioned so they blend into the landscape. Roads can be designed to limit their visual effect on the landscape Activities can be scheduled during periods of low public use, or when damage can be prevented, such as skidding over snow.

TABLE 4-21
Cumulative Effect on Scenery
(and Recreation Opportunities)

	ALTERNATIVE
Least Amount of Effect	C-MOD NC & A I E-DEP
Highest Amount of Effect	B-MOD

Intensities of management activities can be reduced so they are evident but do not dominate the landscape.

Unattractive views can be softened by feathering the effects, maintaining corridors between, planting vegetation and transplanting larger trees to screen the area.

Viewshed management plans can be developed and implemented that will protect, enhance and/or perpetuate the scenic values of the area.

Uneven-aged timber management can be implemented to retain a relatively unbroken canopy and diversity in sizes of trees in an area.

Harvest unit size can be reduced to lessen the visual impact to an area. Residue from timber harvests can be eliminated through various slash disposal techniques and fuelwood gathering.

Many other design techniques can be utilized to mitigate visual impacts of management activities. These are described in the National Forest Landscape Management Series (USDA Vol. 2, Chapter 6, 1973-1985).

Conflicts with Other Plans and Policies

None are known to exist.

Social and Economic

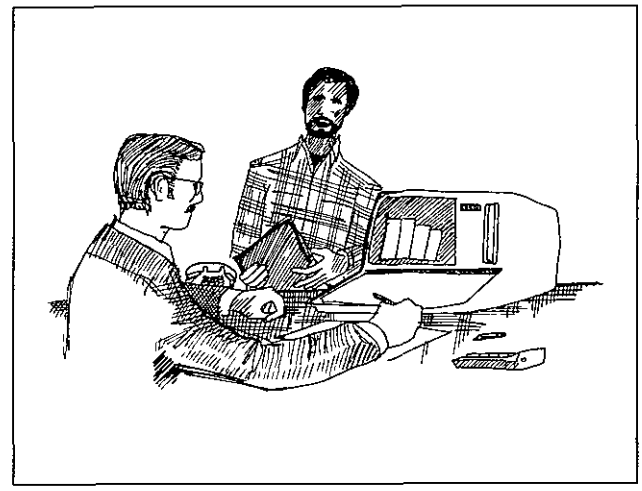


TABLE 4-22
Changes in Employment for Various Economic Sectors by Alternative
(# of Jobs - First Decade)

	ALTERNATIVES				
Economic Sector	B-MOD	E-DEP	I Preferred	A	C-MOD
Logging	14	10	5	5	-7
Sawmills	25	18	10	9	-14
Remanufacturing	35	30	8	3	-55
Range-fed Livestock	1	1	1	1	0
Retail Trade Produced by Wood Products Industries and 25% Monies	31	16	6	3	-22
Produced by Recreation	21	49	45	18	51
Other Sectors	64	73	43	19	-53
Total All Sectors	176	196	118	57	-101

TABLE 4-23
Forest Budget by Alternative
(Millions of Dollars - First Decade)

	ALTERNATIVES					
	NC	B MOD	E-DEP	I Preferred	A	C-MOD
Salary	Unknown	54	53	52	52	51
Supplies, etc	Unknown	27	26	26	26	25
Contracting	Unknown	40	26	24	31	19
Total	120	121	105	102	109	95

Direct Effects

The direct effects of the alternatives include the following:

Employment levels produced by the alternative's mix of outputs.

The amount of the Forest budget.

The amount of 25 percent monies paid to the counties.

It can be seen that expenditures for salaries and for supplies vary less than contracting expenses. Alternative B-Modified provides the most support for local economies, and Alternative C-Modified the least.

The 25 percent monies distributed to the counties are shown in Table 4-24.

Alternative E-Departure provides the most support to the counties in the first decade; Alternative C-Modified provides the least.

TABLE 4-24
25% Monies Distributed to the Counties
(First Decade - Millions of Dollars)

NC	B-MOD	E-DEP	I	A	C-MOD
49	49	51	49	43	35

Indirect Effects

The previously mentioned economic effects of the various alternatives would produce effects on the social fabric of the area. These social effects will be measured by four criteria, as follows.

Effects on work-related lifestyle.

Effects on leisure activities.

Effects on community cohesion and community stability.

Effects on women and minorities.

Effects on Work-Related Lifestyle

Six lifestyles were identified in the Socio-Economic Overview prepared for the Forest and Grassland (pp. 62-92). They are: Native Americans, farmers, loggers, millworkers, small town merchants, and government employees. These lifestyles are related to occupations, but are not limited to them.

In terms of county totals, the numbers and incomes of farmers and of government employees do not vary significantly by alternative. The Native American lifestyle is discussed in the "Women and Minorities" section. Employment levels for loggers, millworkers, and small town merchants will be discussed here.

For loggers, Alternative B-Modified would increase employment by 14 jobs, which is around four percent of total logging employment. This change is considered to be barely significant. Alternatives E-Departure, I, and A would increase employment for these sectors by one percent to three percent, while Alternative C-Modified would decrease employment by two percent. As discussed in the Cumulative Effects section, these changes and all employment changes may be affected by other factors.

For millworkers, the changes range from a three percent employment gain (Alternative B-Modified) to a three percent loss (Alternative C-Modified). None of these changes is considered to be significant. However, the remanufacturing industry will be affected by the Forest Plans of several Forests. This matter is discussed in the Cumulative Effects section.

Merchants benefit from any alternative. Their gain, as expressed in an increased number of employees, ranges from one percent (Alternative A) to four percent (Alternative E-Departure). Small town merchants, however, hire a smaller proportion of employees than do other businesses. Therefore, we consider that the merchants benefit more than these figures indicate.

Effects on Leisure Activities

Recreational activities are important to many central Oregonians. Some people have moved to central Oregon because of the recreation available here.

Alternative C-Modified would provide for the most recreation activities. Elk and fish are at the highest levels of any of the alternatives, as are opportunities for unroaded recreation. Landscapes appear most natural to the driver or hiker. Fuelwood gathering is the one activity which is at its lowest

At the other end of the scale, Alternative A provides, in general, the least recreational opportunities. Unroaded areas and fish are at the lowest levels. Unlike the other alternatives, there is no construction of trails for hiking, ATV's, cross-country skiing, or snowmobiling.

Generally speaking, Alternative B-Modified provides the next lowest level of recreational opportunities. Unroaded areas and elk are at low levels. The scenery is the lowest of all the alternatives. However, fuelwood is at its highest; and trail construction and increased numbers of fish improve the picture.

Alternatives E-Departure and I provide an intermediate situation. Alternative I provides more unroaded areas, trails, and fish; while Alternative E-Departure offers slightly more elk plus a provision for a semiprimitive motorized area.

Effects on Community Cohesion and Community Stability

"Community Cohesion" is an estimation of whether a given alternative will tend to unify or polarize a community. While a diversity of opinions in a community is generally desirable, it is assumed that polarization of the community is harmful and that cohesion is beneficial. It is further assumed that polarization will be caused by the adoption of an

alternative which greatly favors one point of view over others. In contrast, the selection of an alternative that meets to some extent the desires of diverse participants is assumed to produce cohesion.

Judging by this criterion, Alternatives B-Modified and C-Modified would produce polarization. The public response to Alternative E-Departure, the Draft Preferred Alternative, included many negative comments about its "departure" harvest schedule. It is judged that the adoption of Alternative E-Departure would produce polarization. Under Alternative A, existing polarization would not diminish. Alternative I is the one alternative judged likely to promote some degree of community cohesion.

Community stability is judged by two factors.

Continuity of the financial base -- the extent to which tax supported community services will be supported in the future; and

Diversification of the community economy -- the extent to which diversification makes it possible for the community to "ride out" a downturn in one economic sector.

Continuity of the financial base is interpreted from the 25 percent monies and the total employment level. Alternative B-Modified meets this goal best. Alternative C-Modified, and Alternative E-Departure after the second decade, do not meet the goal well. Alternatives A and I meet the goal adequately.

Concerning diversification of the economy: Alternatives B-Modified and C-Modified meet the goal minimally. Alternative A is stronger, and Alternatives E-Departure and I perform the best.

Effects on Minorities and Women

The Native American Religious Freedom Act requires Federal agencies to evaluate their policies and procedures in consultation with Native American leaders in order to protect and preserve Native American religious sites and areas through cultural resource surveys and contact with the tribes. No conflicts were identified with the Tribes Comprehensive Plan. The Forest and Grassland are not recognized as having a significant impact on the resources or the socio-economic concerns for the Warm Springs Reservation.

Changes in employment and employment patterns may have effects on minorities and women. As employment in general increases or decreases, everyone, including minorities and women, will be affected. The question here is whether there are any disproportionate effects on minorities or women.

In the Forest Service, hiring of women and minorities is affected by the Equal Employment Opportunity (EEO) program. It is assumed that if the Federal workforce increases, women and minorities will benefit through the EEO program. Conversely, a decreased Federal workforce may reduce employment opportunities for minorities or women as for all potential employees. As shown in Table 4-9, projected workforce levels vary only slightly among the alternatives, with Alternative B-Modified having the highest number of employees and Alternative C-Modified the lowest. Overall, the difference among alternatives is small.

Another Federal provision relates to contracts set aside for disadvantaged minority contractors (8A contracts). As Federal budgets increase or decrease, the money available for such contracts will rise or fall. However, overall effects of the "8A" contracting in our area are small.

In employment in the private sector, there is no clear evidence that Forest decisions would disproportionately affect minorities. Women might be disproportionately affected by the selection of an alternative. Women's careers tend to be concentrated in clerical, trade and service fields, with significant numbers of women also employed in the mills (State of Oregon, 1984a and 1984b). Women are more likely than men to work part time, frequently in trade or service occupations. If these areas of employment are affected by a given alternative, women might be affected.

Alternative B-Modified would produce a slight increase (three percent) in mill employment which might increase full-time job opportunities for women. Alternative C-Modified would decrease mill employment by three percent and might decrease these job opportunities. No other alternative affects mill employment significantly.

The trade sector (see Table 4-22) is used as an indicator of part time employment. Alternative E-Departure produces the largest increase, a four percent gain. Alternatives B-Modified and I produce a three percent increase. Alternatives C-Modified (+2 percent) and A (+1 Percent) produce gains, but the increases are not as large as those created by the other alternatives. These alternatives all produce, in varying degrees, an increase in part time jobs which might employ women.

Cumulative Effects

The previous sections have examined the socio-economic effects of the Forest upon Crook and Harney counties, the Zone of Primary Influence. (Table 4-22 also includes Wheeler County in the totals, but the Wheeler County contribution is small.) But the Forest's effect extends farther; and many other factors affect the Crook/Harney county region.

One million board feet of Ochoco NF ponderosa pine creates eleven jobs and an income of $220,000 (1987 dollars) within the two county area. But since 10 percent to 15 percent of the pine will be milled elsewhere, and some milled lumber will be remilled elsewhere, the total contribution to the Oregon economy is estimated to be fourteen jobs and a payroll of $290,000.

Other species are more likely to be milled outside the two county area. A harvest of one million board feet of "associated species" will create three jobs and $60,000 in income in Crook and Harney counties. Five jobs and $100,000 in income will be created statewide.

Therefore, when the Extended Area of Influence is considered, differences in timber harvest levels take on more important effects. The employment gains from Alternatives B-Modified, E-Departure, I, and A will be magnified. Likewise, the employment loss from Alternative C-Modified will be increased.

Just as the Ochoco National Forest creates effects in more distant counties, the decisions of other Forests affect local economies. Crook County in particular boasts a large remanufacturing industry. The plants process 120 MMBF of milled lumber each year. Since 40 MMBF to 60 MMBF of this amount comes from the Ochoco NF, 60 MMBF to 80 MMBF originates elsewhere -- primarily on other eastside National Forests.

It would be desirable to estimate the future total ponderosa pine harvest for eastern Oregon. These figures are not easily obtained. However, Table 4-25 contains some figures for anticipated total harvests for the seven National Forests in eastern Oregon.

TABLE 4-25
Total Timber Harvest 1/

Planned Timber Sale Program Quantity from Draft Forest Plans	1 41 MMBF
Average harvest, 1980-1988	1 15 MMBF
Average sales, 1980-1988	1 24 MMBF

1/ Includes Deschutes, Fremont, Malheur, Ochoco, Umatilla, Wallowa-Whitman, and Winema National Forests

It can be seen that total volume for these Forests is predicted to increase by 10 percent to 20 percent. The total ponderosa pine available for remilling may not share this rate of increase, however, for two reasons.

Ponderosa pine is decreasing as a percentage of the total harvest on the Ochoco NF and on some other Forests; and

The ponderosa pine which will be harvested will tend to have a smaller diameter and more defects than the pine harvested in the past.

Given these considerations, it is not clear whether the ponderosa pine available for remanufacturing will slightly increase, stay the same, or slightly decrease.

Because Crook County remanufactures do purchase material from a wide area, an increase in the Ochoco harvest might be compensated for by a decrease in the purchase of other material. Therefore, the increased employment projected for Alternatives B-Modified, E-Departure, I, and A might be diminished. Similarly, the decrease in harvest under Alternative C-Modified might result in a smaller decline in employment.

The timber industry can also be heavily influenced by national environmental, political, or economic factors -- and, increasingly, by international factors. Examples of such factors are the final classification of the spotted owl, a rise or fall in the Federal Reserve prime interest rate, or decisions regarding imports or exports of logs or lumber. The socio-economic effects from these quarters will affect and may even dominate the effects which are predicted above for the various alternatives.

Mitigation

It has been mentioned above that ponderosa pine will tend to be smaller and to have more defects in the future. For Alternative I, silvicultural prescriptions have been altered on parts of the Forest to yield a larger tree with fewer defects.

Other mitigation measures designed to improve future timber yields are discussed in the Timber section of this chapter.

Conflicts With Other Plans and Policies

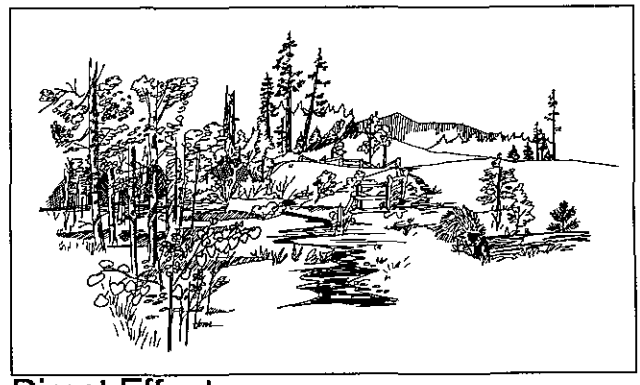
The Crook County - Prineville Area Comprehensive Plan, issued in 1978, sets forth many objectives. Protection of the current timber industry is a primary topic, but concerns for grazing for livestock and wildlife, recreational opportunities, and environmental needs (especially protection of water and soil) are all mentioned. As an overall goal, the county plan states:

> "It shall be the policy of the county to support forest land use and management decisions which maximize the present level of benefitting uses; specific emphasis shall be on timber production to sustain the existing forest products industry, forage production to maintain at least the existing levels of livestock and wildlife habitat, protection of water quantities and quality and to maintain existing dispersed recreation levels in coordination with the USFS planning and management programs." (p. 53)

Alternative C-Modified would conflict with the goal of "timber production to sustain the existing forest products industry." Or, conceivably, the phrase "existing forest products industry" could be interpreted to mean that the planned harvest level should match the 1977 harvest level. Every alternative would conflict with such an interpretation since the 1977 harvest level was 143 MMBF.

No conflicts are seen with plans of any other agencies or groups.

Soil



Direct Effects

Timber harvest and road construction have the greatest potential to affect the soil through compaction, displacement, or erosion. Concentrated grazing and recreation use may adversely affect soil especially in sensitive riparian zones. Intense fire may volatilize soil nutrients.

Effects of Timber Harvest

Due to the relatively gentle terrain on the Ochoco National Forest, tractor yarding is the most common method of timber harvest, especially on slopes under 30 percent. Multiple trips over the soil with a tractor or rubber-tired skidder can cause detrimental soil compaction and displacement. Fifty percent of the acres accessible to tractor harvest exhibit a high compaction hazard (SRI,1977).

Soil compaction reduces site productivity by reducing the air space in the soil, creating a physical barrier to plant roots, and changing the infiltration and percolation rates of water into and through the soil. Displacement occurs when the fertile surface soil is removed or pushed aside, exposing the subsoil. Displacement can occur over large areas during machine site preparation or on smaller areas on skid trails and landings.

Machine piling of slash can triple the area of ground disturbed over that caused by timber harvest, greatly increasing soil damage caused by compaction, puddling and displacement. Dramatic growth reductions have been demonstrated on areas where surface soil has been pushed into windrows or piles along with stumps and logging debris. Since surface soil displacement or removal is a long-term, or nearly permanent, site disturbance, effects on nutrient cycling are significant. (Class 1976; Haines, et al, 1975).

The amount of soil compaction will depend on the number of acres affected by ground-based logging equipment (e.g. tractor or rubber tired skidder) and by the method of post-harvest site preparation. Cable yarding systems move logs to the landing by dragging or partially suspending the logs with cables. These systems cause less soil disturbance than tractor yarding and can be used where tractors are not suitable. Road density is usually less with cable systems since yarding can be done over longer distances with a stationary machine.

For each harvest entry, the extent of soil disturbance depends on the logging system and associated road network, terrain and soil factors, volume of timber removed, size of logs, weather, soil condition and skills of individual equipment operators. The most complex, expensive yarding systems are designed to operate in the steepest terrain and to have the least impact in terms of soil compaction and displacement; thus, careful practices in difficult, erosion-prone terrain may have soil erosion impacts comparable to poor practices carried out on naturally stable flat ground.

Historically, compacted bare soil has occurred (as shown in Table 4-26) from various logging systems and haul roads.

TABLE 4-26
Yarding System Effects on Soil Condition

	% Bare Soil	% Compacted Soil
Tractor yarding	35	27
w/ haul roads	12	6
Total	47	33
Cable yarding	6	6
w/ haul roads	12	12
Total	18	18

Source Sidle, R C 1980 "Impacts of Forest Practices on Surface Erosion" PNW 195, pgs 5 9

Management standards and guidelines allow no more than 20 percent of an area to be displaced or compacted; a Forest goal is to eventually have no more than 10 percent in such a condition, and the Forest has an aggressive program of skid trail designation and tillage of compacted soils (approximately 1,500 acres annually) in order to meet these standards over the long run. Rehabilitation of previously compacted soils will take at least 5 decades, as it will occur during subsequent timber sale entries. This is further complicated with management of existing stands (such as with overstory removal or uneven-aged management) because tillage is logistically very difficult; machinery for tilling also damages existing crop trees. The ideal time to till for compaction is during the regeneration phase of the rotation (e.g. clearcut or shelterwood). Destruction of existing crop trees in order to relieve compaction is done only under the most severe conditions, as the productivity lost from tree removal may outweigh the benefits of relieving the compaction.

Even with compliance with standards and guidelines (20 percent maximum compaction), overall acres of compaction on the Forest will increase in the short term as previously unentered timber stands are harvested. The Forest will only begin to reduce the acres when previously entered (and compacted)

areas are re-entered and rehabilitated. As this is predicted to take at least five decades, it emphasizes the need to maintain an aggressive rehab program. Because the ideal time to till for compaction is during stand regeneration (clearcut, shelterwood, etc., before new seedlings are established), those alternatives that provide for extensive acres of uneven-aged management maintain an "opportunity cost" because the tree stand is never cleared and replanted. Machinery of sufficient size to relieve compaction is also too large to maneuver around existing crop trees under most conditions encountered, therefore presenting conditions that may favor long term maintenance of compacted soils. Overall, the alternatives can be rated in terms how well they manage for compaction over time, based on rate of timber harvest, percent of tractor versus skyline logging, use of even-aged versus uneven-aged management, and total acres available for timber harvest.

Alternative A projects the best overall trend in reduction of soil compaction because of the high percentage of skyline acres scheduled for timber harvest and the small percentage of uneven-aged management. Alternative C-Modified calls for a high percentage of tractor logging, because the majority of steep ground areas are reserved for unroaded recreation and not available for timber harvest. It also provides for extensive use of uneven-aged management, therefore complicating efforts to rehabilitate existing compacted areas. Consequently, it has the worst overall trend in future management of compacted soils.

Effects of Road Construction and Reconstruction

Roads are the major nonpoint source of sedimentation. New road construction during the planning period will affect the soil resource by removing land from production and dedicating it to a portion of the transportation system.

Road construction activities cause the disturbance and removal of soil, which can result in soil erosion and increased sediment in streams. This effect varies by the amount of roads constructed, the season of construction, the types of soils, and the steepness of slope on which the roads are constructed. Maintenance of roads can also cause sedimentation in the streams as grading disturbs mineral soil and results in soil loss through erosion.

Roads constructed during the wet period of the year (November through May) will encourage surface runoff, erosion, and sedimentation. New roads are highly erodible during the first rains and/or snowmelt following construction.

Roads having high cutbanks produce more sediment than roads with low cutbanks. Freezing and thawing, heating and cooling, and raindrop action dislodge soil particles which ravel into drainage ditches and are transported to streams. Road construction on slopes exceeding 70 percent produces gravelly sidecast material that can bury downslope vegetation and create a droughty condition, resulting in reduced soil-site productivity. Sidecast can cause overloading of the fill slope and subsequent failures.

Improper compaction and logs and debris in fills can result in road failures. Improper location and inadequate numbers or sizes of drainage facilities can increase the incidence of road failures and road surface erosion.

Roads lacking adequate surfacing act as a transport mechanism delivering the bulk of the sediment to streams. In addition, roads with insufficient rock surfacing "pump" soil to the surface which erodes during winter use. The most critical conditions exist on roads constructed on soils high in clay.

Road reconstruction on the Forest is a source of sediment that occurs when an old road is cleared of protective vegetation.

Similar to new road construction exposed soils will tend to erode for one to several years after reconstruction.

Since most of the Forest's transportation system is already in place, new construction does not vary significantly by alternative (see Table 2-8, Chapter 2).

TABLE 4-27
Activity Effects on the Soil Resource Based on Historical Conditions

		ALTERNATIVES					
Activity	Unit of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
Acres Logged By Decade	M Acres						
Decade 1		183	162	157	140	144	146
2		141	181	147	135	147	147
5		131	196	115	171	140	164
Tractor Acres	M Acres						
Decade 1		149	130	127	131	105	132
2		99	119	109	101	113	91
5		93	154	90	140	109	141
Skyline Acres	M Acres						
Decade 1		34	32	30	9	39	13
2		42	62	38	39	35	56
5		39	42	25	31	31	13
Machine Piled Acres	M Acres						
Decade 1		66	58	56	50	52	52
2		51	65	53	49	53	53
5		47	70	41	62	50	59
Acres Burned - Rx Activity Fuels	M Acres						
Decade 1		165	146	141	126	129	131
2		127	163	132	121	133	132
5		118	176	104	154	126	147
Acres Burned - Rx Total	M Acres						
Decade 1		252	257	258	246	252	267
2		256	231	249	252	256	263
5		249	259	221	256	249	293
Existing Compaction	M Acres						
Decade 1		102	102	102	102	102	102
2		102	102	102	102	102	102
5		102	102	102	102	102	102
Future Compaction	M Acres						
Decade 1		49	43	42	43	35	44
2		33	39	36	33	37	30
5		31	51	30	46	36	50
Future Soil Tillage	M Acres						
Decade 1		19	17	17	17	14	17
2		13	15	14	13	15	12
5		12	20	12	18	14	20
Bare Soil - End of Decade	M Acres						
Decade 1		15	13	13	13	11	13
2		10	12	11	10	11	9
5		9	15	9	14	11	15
Sediment	M Tons/Yr						
Decade 1		19	17	18	17	15	17
2		15	22	13	21	18	17
5		13	21	12	19	15	19

The potential to increase sediment production lies mainly in roading currently unroaded areas since new road construction adds more sediment than existing roads and the unroaded areas have higher erosion hazard rates than surrounding areas. Examples of unroaded areas with 65 to 85 percent of the area exhibiting severe or greater erosion hazards are Rock Creek, Green Mountain, and Cottonwood. More than half of Lookout Mountain, Silver Creek, and Broadway unroaded areas exhibit severe erosion hazards.

Alternatives with the least impact on these unroaded areas are C-Modified and E-Departure. Alternative I has a moderate potential of impacting these sensitive unroaded areas, while Alternatives No Change, A, and B-Modified pose an increasing risk of soil loss from these areas (see Table 2-8, Chapter 2).

Effects of Grazing

Grazing allotments can be a source of soil compaction and erosion where livestock are concentrated, such as around water sources and riparian areas.

Historical evidence indicates that excessive grazing over long periods of time, or grazing on soils that are too wet can lead to soil damage such as: 1) surface erosion, 2) soil compaction, 3) soil puddling, and 4) nutrient loss.

Cattle use can keep the surface (one to two inches) of soil layers compacted, but generally not any deeper (Alderfer & Robinson, 1947). Natural restoration through freezing-thawing and pioneering vegetation will generally correct, in a few seasons, the type of surface soil compaction done by livestock.

It can be assumed that as we expand the transitory range with more timber harvesting and increase the utilization of existing forage through water developments, additional grazing will follow and negative soil impacts will increase.

The number of Animal Unit Months (AUM'S) does not vary greatly among the alternatives (see Table 2-8, Chapter 2). With adoption of more restrictive utilization standards in riparian areas and range improvements designed to disperse livestock, soil compaction in riparian areas should be reduced.

Effects of Recreation

Recreational impacts on the soil resource have historically been minor on the Forest and Grassland but are increasing, especially with motorized use of All-Terrain Vehicles (ATV's) and other Off-Road Vehicles (ORV's); unregulated use of these has high potential for soil impacts, especially erosion in critical riparian areas. Concentrated recreational use will tend to compact soils and channel runoff. Overall dispersed recreational use will increase as access is provided into additional areas. Recreation use varies by alternative, Alternatives I and C-Modified (and to a lesser degree B-Modified) emphasize recreation strategies that include high levels of trail construction for nonmotorized and motorized, winter and summer use (see Table 2-8, Chapter 2). These three alternatives have equal levels of trail construction for All-Terrain Vehicle use and are, designed to better regulate existing use which is currently unregulated on a majority of the acreage on the Forest and Grassland. The impacts to soils in the trails themselves may increase, but better management for the off-trail areas would result and this facilitates monitoring.

Effects of Fire

The effects of fire on soil are highly variable depending on: (1) the intensity and duration of the fire, and (2) the transfer of heat in the soil (dependent on the physical properties of the soil affected). Significant beneficial effects of low to moderate intensity fires are (1) exposure of mineral soil/ash seed beds for natural tree regeneration, (2) improved nutrient cycling, and (3) reduced levels of some pathogenic microorganisms. Significant adverse effects of high- to extreme-intensity fire are (1) accelerated erosion (due to excessive mineral soil exposure and/or creation of hydrophobic conditions), (2) excessive nutrient volatilization (especially nitrogen and potassium), (3) loss of beneficial microorganisms, and (4) loss of organic matter for nutrient holding capacity of soil. (Boyer and Dell, 1980).

Under extreme compaction, air and water movement can be altered to the point that it affects the biological and chemical properties of the soil which ultimately affects the availability of plant nutrients.

Topsoil removal and intensive burning and cold soils can modify a soil source and create a nitrogen deficiency. Nutrient losses from fire management will be most significant on high elevation, volcanic ash soils. This is because nitrogen deficiencies are most common on colder soils (higher elevations) and on sites where topsoil has been displaced or altered through intense burning. This is most pronounced when a stand reaches crown closure--the period of greatest demand on soil nitrogen supply.

Although the total acreage of prescribed burning is large, including treatment of natural as well as activity fuels, only 20-30 percent of this area is likely to fall into the intensely burned category, or approximately 61,000 to 66,000 acres depending on the alternative. This is not a wide range and does not pose a high risk to the soil resource given the Forest's commitment to fire suppression and fuels management.

Indirect Effects

Changes in soil characteristics will often affect water quality. An increase in soil compaction, erosion, or displacement can cause an increase in stream sedimentation. The effect of sedimentation on fish habitat will be discussed in greater detail in the water section (see Effects on Water, this chapter). Alternative No Change poses the greatest risk in the first decade; however, over time, Alternative B-Modified will likely have a greater impact. Approximately 50 percent of the runoff from the Forest is captured and stored in two reservoirs. Increased sedimentation could reduce the useful storage life of the Ochoco and Prineville reservoirs (Table 4-28).

The values in the table above are estimated to be about seven percent above background or natural levels. Whether this total amount of sediment is delivered each year to the reservoirs or is entrained in streambanks or channel gravels to be flushed into the reservoirs during major storm event is open to discussion. Overall the effects on reservoir storage is small.

Reduced site productivity caused by compaction, volatilization, or erosion can, in turn, reduce the growth rate of future stands and can influence the density and diversity of both cover and forage for wildlife. The actual reduction of site productivity is difficult to predict due to the interrelationship among stand stocking, genetic improvement, mitigation measures, length of line, natural recovery, and climate, among others. Though potential impacts to site productivity are real, they do not vary significantly by alternative.

Cumulative Effects

The cumulative effects of land management activities on adjacent and intermingled ownerships was considered. No measurable off-site effects on soil are anticipated. Compaction, the major effect on soil, is confined on-site. Soil erosion from adjacent ownerships may result in slight increases in stream sedimentation. Sedimentation of streams is discussed in more detail in the Water Effects section, this chapter.

Soil erosion and sedimentation in the headwaters of streams will affect the downstream segments of the drainages. Assuming more roads are constructed

TABLE 4-28
Annual Estimated Sediment Contribution

	Cubic Yards of Sediment Input by Alternative					
Reservoir	NC	B MOD	E-DEP	I Preferred	A	C MOD
Ochoco	250	235	240	230	205	230
Prineville	750	700	705	690	610	690

than are closed each year, sedimentation from road construction and maintenance will accumulate over time.

Alternatives I and C-Modified, which will close a large proportion of roads seasonally or yearlong, will have slightly less impact than the remaining alternatives.

As pointed out in Table 4-28, the contribution of sediment from the Forest is estimated to be approximately seven percent above background levels. It is unlikely this proportionally increased sedimentation will increase over time. However, the accumulation of sediment in both Ochoco and Prineville Reservoirs will have a cumulative effect on the storage capacity of the reservoirs over time, reducing their effective service life by an unknown number of years.

The effects of soil compaction following tractor harvest can last longer than 40 years (Power, 1974). Silvicultural prescriptions that require more than one entry, such as shelterwood cuts, can potentially compact a greater percentage of the area than harvest methods where only one entry is necessary. Salvage harvest is potentially the most damaging.

Local documentation on soil compaction exists from study of a heavy partial cut of old-growth ponderosa pine which removed most of the overstory from a stand of young pine on the Ochoco National Forest in 1961 (Big Summit R.D.). Soil compaction from logging equipment was readily measurable 16 years after cutting. Soil density in skid trails at depths of three and six inches averaged 18 percent higher than the densities in undisturbed soils. At the nine and twelve inch depths, skid trail density was nine percent greater than the density at the same depths in undisturbed soils. Growth of residual young pine trees related negatively to the intensity of soil compaction in the root zone. Moderately impacted trees showed a six percent reduction in growth rate and heavily impacted trees showed a twelve percent reduction over a 16-year period (Froehlich, 1979).

In another study supporting growth loss from compaction in the Coast Range of Oregon, the effects of skid roads kept soil heavily compacted 32 years after logging on 25 percent of the harvest area. An overall volume loss was 11.8 percent for the total area. (Wert & Thomas, 1981).

Recent research in progress reports statistically significant different soil bulk density, radial growth and tree height between lightly and heavily disturbed portions of harvest units. Growth was slower on heavily disturbed areas. Decreased growth relationships with increased soil bulk density is reported. (Geist & Seidel, 1984.)

Studies show that multiple entries have the potential to cumulatively reduce productivity more than single entries (Chambers, 1977).

Currently it is estimated that about 102,000 acres have been detrimentally compacted on the Forest. This is approximately 12 percent of the total acres. This value is expected to rise over the next two to four decades to between 18 and 20 percent under all alternatives. Peak flows were increased approximately 35 percent on a harvested drainage where disturbed areas, including roads, cutslopes, landings, etc., equalled 12 percent of the harvest area (Harr, et al, 1979). This situation may have an indirect cumulative effect on channel stability.

Finally, as more trees are harvested, chances are proportionately greater of removing more topsoil, cutting on colder sites, volatilizing more nitrogen through burning, and in compacting more soils, reducing tree root development. Loss of soil nutrients and organic matter through short rotations and high levels of tree utilization, plus complete slash disposal is another concern. But recent research from the Inland West (Harvey, et al,) concludes that "open grown, short rotation forests (forests with low competition, maximum soil volume per tree, using pioneer or seral species and a potential for understory symbiotic nitrogen fixers), with appropriate vegetation management seems a good biological approach to managing infertile, second growth forests with low organic matter reserves." "Guiding (our) actions with the use of a reasonable biological perspective represents an opportunity to maintain or even improve harvested sites and their soils as a firm foundation for future forestry."

Because soil productivity and growth losses from harvest activities may not always occur immediately, the effects of many of our activities must be considered as cumulative. Soil compaction created from harvesting may mean that a future stand to be regenerated in 100 years may need more time to achieve the outputs normally projected for 100 years. This has the potential of offsetting much of the gain to be expected from genetic tree improvement and silvicultural thinning. Alternatives I and C-Modified both have extended rotations on a majority of acres available for intensive timber management and exhibit the least potential for this cumulative, significant effect. Alternatives No Change, A, B-Modified, and E-Departure all have high potential for cumulative effects, because of significantly shorter rotations on a majority of harvestable acres. On the other hand, those alternatives that manage for long rotations commit the Forest to the use of large logging equipment into the future, one of the often unrecognized positive benefits associated with short rotation management is that significantly smaller yarding, skidding, and slash disposal equipment are adequate for log processing.

Mitigation Measures

Management of organic material as a source of future soil productivity is discussed in depth under Effects on Forest Residues, this chapter. In summary, specific levels of residues remaining after activities such as logging, precommercial thinning and slash treatments are prescribed for major forested species types, based on the most recent research available (Harvey, et al, 1987). Continuing research on soil management will be critical for ascertaining additional mitigation measures to be used in future forest management.

Alternatives with the most roads, especially new roads in present unroaded areas, will require the following kinds of mitigation:

> Special efforts should be made to minimize road standards by rolling the grade to conform to the topography, preferably at or near ridge crests and benches to minimize cuts and fills. On steep slopes, end hauling of excavated material will be done to prevent side cast waste which buries downslope vegetation. Eroding cut banks will be mulched, seeded and fertilized. Deep rooted species on cut banks are desired. To prevent loss of soil on cutslopes, stabilization efforts such as rounding off the upper two feet of the bank will prevent ravelling and sloughing of material into the ditch. Frequent culverts with energy dissipators on the outlets will be installed on steeper grades. Road rock should be spread before the wet season. These measures have been found to be very effective over a wide variety of situations on the Forest.

Additional mitigation measures aimed at reducing sediment yield consist of leaving unmerchantable material on the ground and limiting slash disposal to minimum levels needed to meet site preparation and slash disposal needs. Prescribed burning will often have some unavoidable effect on increased sediment if soil hydrophobic conditions occur from extremely hot burns. Much of this impact can be avoided (and is very effective) by burning when soils are moist, usually between May 15 and July 15.

Other forms of mitigation designed to offset effects of soil compaction and associated increased sedimentation follow.

For some soils, maximum compaction occurs at high soil moistures. Field operations can be done at times when soil moisture contents are lowest. Some studies have shown that compaction occurs over a wide range of soil moistures, especially on ash soils. The effectiveness of this measure will vary considerably.

Grass planting can accelerate the drying of a soil.

Equipment usage can be restricted to snow pack or frozen ground conditions.

Controlled skid trails can be designated for ground based logging vehicles, including the following skid trail planning measures and considerations:

- Keep trails as narrow as possible (eight feet).

- Use no blades on tractors during skidding.

- Construct trails where possible without blading (the mashed-down brush and reproduction will inhibit compaction and erosion).

- Match machine size to the size of material removed will lessen soil compaction.

- Skidder operators should conscientiously minimize maneuvering that causes wide disturbance areas. Directional felling of trees toward or away from a trail to herringbone patterns helps reduce skidder maneuvering and load pivoting. This reduces the amount of soil compaction and bare soil exposed.

- Limb trees before skidding to decrease the amount of bare soil exposed.

- Season and weather conditions can affect soil and crop tree damage. Wet soils will result in increased root damage from skidding. Terminal shoots are tender and easily broken in June. Logging on snow will reduce root damage but care needs to be taken under freezing conditions to reduce breakage of stems made brittle by low temperatures.

- Machine plant shrubs on road cuts.

- Restoration on rocky soils is almost impossible.

- Mitigations, such as designated controlled skid road spacing of 100 feet, leads to 11 percent of an area in skid trails. Spacing of 150 feet lead to seven percent of an area in skid trail. In combination with haul roads and fuel treatments, 30 percent to 10 percent of an area in skid trails for tractor and cable harvests, respectively, is easily foreseeable.

- Tillage of compacted soils where compaction occurs. This is not feasible on rocky soils, but is very effective on a wide variety of soils and conditions.

- Rely on natural forces such as:

  Freezing and thawing which tend to increase the porosity of compact soil through imbibition of water in soil pores during periods of freezing temperatures.

  Shrinking and swelling in clayey soils. A swelling increases porosity while shrinkage causes cracks to open allowing for root penetration and water infiltration. Soils which shrink on drying often form dense layers. An example of such soils is found in the T3, T55, T7, and T8 land types (Paulson, Ochoco Soil Resource Inventory, 1977).

  Decaying root materials increase soil porosity.

Due to compaction occurring as a result of logging and slash disposal equipment, we can summarize some timber harvest mitigation built into the analysis for all alternatives, along with the Best Management Practices:

Compaction can be reduced by limiting equipment to designated skid trails during drier seasons of the year, or by use of other methods such as cable logging or nonmechanical slash disposal (burning). Some measures have been built into the planning process by requiring designated skid trails or cable logging and nonmechanical slash disposal on areas managed at or near maximum timber production. On other areas, machine use would be limited to when potential for compaction was in an acceptable level defined as a 15 percent increase in bulk density on 20 percent or less of area on residual soils, and a 20 percent increase in bulk density on 20 percent or less of area on volcanic ash soils. Some areas of existing compaction can be reduced by scarification, but this does not return the soil to original condition.

The following mitigations and Best Management Practices are very effective if proper monitoring and administration occurs:

-Cable logging on slopes greater than 30 percent reduces site disturbance by three times over tractor logging. The result is reduced erosion and displacement. On slopes greater than 30 percent, cable logging should ensure that logs have one-end suspension.

-Dry weather logging creates less damage to productivity than wet weather logging. Restricting activities during periods of high soil moisture has worked quite well on residual soils but will not be effective on ash soils, where traffic path controls should be used. Logging on frozen or snow-covered ground may also be a good opportunity.

-Landings should be kept as small as feasible and tilled, seeded and mulched.

-Contract administration may need to be increased to comply with objectives of Best Management Practices.

-Tillage to break up soil compaction along with water flow diversion and dispersion structures (i.e. waterbars) and seeding should be done to retard erosion.

-Monitor timber growth associated with different timber practices. Monitoring will indicate if practices need to be adjusted or more mitigation added.

-Cooperate with research agencies to install long term studies into this problem. Adopt new research results in revisions of this Plan.

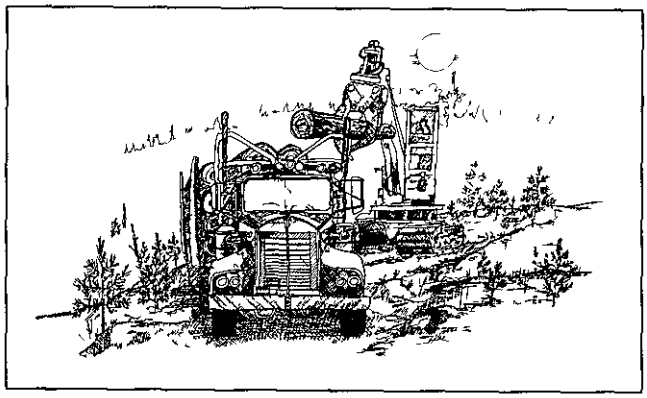
-Maintenance of trails and rehabilitation of damaged areas will help to reduce the negative impacts associated with recreational pursuits, especially Off Road Vehicle use.

All of the mitigation measures/Best Management Practices (BMP's) discussed above are highly effective (90 percent or greater) at preventing or reducing impacts to soil resource values on the Forest. However, the degree and quality of implementation is highly variable, ranging from poor to excellent. Unexpected or unusually severe climatic events, availability of funding and manpower, knowledge and understanding of the BMP's by both operators and administrators, to name but a few, are reasons why many of these BMP's are often only 60 to 80 percent effective.

Conflicts with Other Plans and Policies

The Environmental Protection Agency (EPA) has certified The Oregon Forest Practices Act rules and regulations as best management practices (BMP's). The State of Oregon has compared Forest Service practices with these state practices and concluded that Forest Service practices meet or exceed state requirements. As state practices change, comparisons are made to ascertain whether Forest Service practices meet or exceed these changes. Monitoring and evaluation will determine the need for changes in BMP's and/or state standards. Local soil conservation groups, the irrigation district and the BLM have been actively informed, during the planning process, on matters potentially affecting their programs and have had the opportunity to submit into the Final Plan. There are no expected conflicts with other agencies' plans or policies.

Timber



Timber is a major component of the affected environment in central Oregon. Alternatives for management of the Ochoco National Forest will have significant effects on current and future inventories and growth of timber for existing and future generations of users (direct effects). Even though in the technical sense these are not in themselves environmental effects, local concern for current and future supplies of timber constitutes a need to disclose adjustments in timber harvest scheduling as an "environmental consequence."

Harvest activities associated with these alternatives will also affect the structure and species composition of timber stands in the future. In turn, timber harvest and related activities (including thinning, planting, slash treatment, and other cultural treatments) have significant effects on nearly all other components of the environment (indirect effects). Alternatives No Change, B-Modified, E-Departure, I, A, and C-Modified provide significantly different levels of timber production from the Ochoco National Forest (see Chapter 2). Increases or decreases from current programmed harvest levels can have significant and cumulative effects on both the socio-economic setting in central Oregon and on long-term productivity of timber and other forest resources.

Direct effects of the alternatives on timber are provided in detail in this section. Discussions revolve primarily around public issues, concerns and opportunities (ICO's) developed during early stages of the environmental analysis process. In summary these ICO's include:

Sustained Yield/Even-Flow and Departure;

Timber Supply and Allowable Sale Quantity (ASQ);

Uneven-aged Management; and

Ponderosa Pine Supply and Tree Size.

The indirect and possibly cumulative effects associated with timber include the long term changes that will occur to the "managed forest," as well as those on other environmental components. These other components or resources are only briefly described in this section, with extensive use of cross-referencing to other discussions on effects where more detailed information can be found. Soils, Water (including riparian), Biological Diversity, Fuelwood, Old Growth, and Socio-Economic are important environmental components that are significantly affected by timber harvest and related activities.

Direct Effects

Productive timber stands that are removed from intensive management (or scheduled for reduced intensity) to meet other resource objectives reduce the supply of harvestable timber, and therefore the long term sustained yield and ASQ. There are approximately 572 thousand acres of "forested land" on the Ochoco National Forest (see Chapter 3, - Timber). Approximately 39.4 thousand acres have been withdrawn from consideration for timber production due to legislation, suitability, and regeneration difficulty, leaving a net of about 533 thousand acres as tentatively suitable. The six alternatives described in Chapter 2 allocate lands to various resource emphases (e.g. unroaded recreation, wildlife, riparian). Depending on the emphasis, intensities of timber production are adjusted down, which again reduces the long term sustained yield and ASQ from the Forest. Table 2-8, Chapter 2, displays long term sustained yield, ASQ, and other data relevant to understanding effects of the different alternatives on timber as an environmental component.

Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring

within a locale, region, or the nation as a whole. Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology. Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement, attempting to do so would underestimate the biological potential of timber producing lands and make future growth projections impossible. It is presently Forest Service Policy (FSM 1922.15) to use cubic foot volume as a measurement of long-term sustained yield, as well to regulate the amount of timber to be offered and sold as specified by the allowable timber sale quantity (ASQ), in order to respond to changing technology and product requirements projected for the future (RPA,'85).

Departures from the ASQ (in cubic feet) are allowed under certain circumstances (36 CFR 219.16), including those where implementation of the normal base sale schedule would cause a substantial adverse impact upon a community in the economic area in which a forest is located. By definition, departure requires a future decrease in the timber sale and harvest schedule to bring the ASQ in line with long-term sustained yield. Harvest levels are monitored and adjusted every ten years to insure that long-term sustained yield is not reduced. See Appendix B, Section 7 for further discussions on timber harvest projections. See Chapter 2 for discussions on "potential yield" of timber.

Local wood manufacturing facilities are currently tooled to process large diameter timber, even though some conversion to small log manufacturing has begun. Ponderosa pine is the species favored for local mills, and both primary and secondary manufacturing facilities are currently dependent on large pine (see Effects on Social and Economic, this chapter). Large, old growth ponderosa pine is a finite resource. Extremely long rotations or cutting cycles are required to grow the size and quality of wood favored by local industry and it is projected that current harvest levels of large, tight-grained ponderosa pine are not biologically sustainable for more than a few decades, especially within management requirements established for the Forest. Specific cultural techniques are available to simulate, as near as possible, both size and quality desired (see Mitigation Measures), but harvest reduction (from current levels) of large diameter pine is inevitable. This species (ponderosa pine) is also desirable for other reasons (including aesthetic), and conservation of old growth ponderosa for future generations is a public concern from both industrial and environmental perspectives (see Effects on Scenic Resources, this chapter). There will be a reduction in size and quality of timber produced with all alternatives. Large trees (18 inches in diameter or larger) are necessary for quality wood production with current technology. The alternatives presented in Chapter 2 provide varying levels of current and future quality wood, these levels are primarily a function of lands available for timber production, as well as extended rotations (or cutting cycles) designed to provide size and quality attributes.

Silvicultural systems (even- versus uneven-aged management) used on the Forest (especially ponderosa pine) affect future stand structure and species composition, forest health, harvest systems, slash disposal, productivity, forest succession, and numerous other factors associated with timber production. Silvicultural systems also affect public acceptance (or lack thereof) of intensive timber management on the Forest. Even-aged management (especially clearcutting) has been increasing on the forest over the last decade for numerous reasons (see Appendix E, Selection of Harvest Cutting Methods). Public concern has been instrumental in development of alternatives which include extensive use of uneven-aged management in stands biologically and logistically suitable.

Effects by Alternative

Alternative No Change

Alternative No Change provides the largest number of acres suitable for timber production (534 thousand acres), but has not been adjusted to reflect requirements of the National Forest Management Act of 1976. For this reason it is not directly comparable to the remaining alternatives, but instead provides a perspective for publics interested in pre-NFMA timber management on the Ochoco National Forest.

Alternative B-Modified

Alternative B-Modified allocates approximately 511 thousand acres of lands to some level of timber production (largest of remaining comparable alternatives). Intensity of timber management activities varies as follows:

484,000 acres	- Full Yield
26,800 acres	- 50 to 99 percent of Full Yield
0 acres	- 1 to 49 percent of Full Yield

Alternative B-Modified also produces the highest timber outputs including long term sustained yield, ASQ, and board feet volume in pine for the first decade. This alternative also uses uneven-aged management as a primary silvicultural system on about 67.5 thousand acres during the first decade, second only to Alternative C-Modified. Additional use of uneven-aged management for this alternative was limited because of timber yield falldowns projected through the analysis process (see Appendix B).

This alternative will provide the most quality timber volume over 18 inches. This is because of the high harvest level and the inclusion of uneven-aged management with a target diameter of 20 inches. It has less volume over 24 inches than does "I" because it has much fewer acres in visual, and management for unique features where the objective is to produce trees larger than 24 inches.

Alternative E-Departure

Alternative E-Departure allocates approximately 495 thousand acres to some level of timber production. Intensity of timber management activities varies as follows:

0 acres	- Full Yield
495,000 acres	- 50 to 99 percent of Full Yield
0 acres	- 1 to 49 percent of Full Yield

As a departure alternative, E-Departure produces timber outputs that decline from 20.6 million cubic feet per year in the first decade, to 19.7 million in the second decade, to 16.1 in the fifth decade, while maintaining a long term sustained yield of 19.3 million cubic feet. Production of ponderosa pine in the first decade is about 87 million board feet per year. Alternative E-Departure uses uneven-aged management as a primary silvicultural system on only about four thousand acres, limited mainly to high visibility recreation areas.

This alternative produces the lowest volume of large, quality material. This is partly due to the low harvest level in the fifth decade, but more important is that this alternative emphasizes economic efficiency (Present Net Value [PNV]) and all stands are harvested to maximize economic return which usually results in harvest before stands reach 18 inches in diameter. There is very little uneven-aged management planned in this alternative, and the only large material produced will be in areas planned for long rotations (recreation or other resource emphasis).

Alternative I (Preferred)

Alternative I allocates approximately 493.7 thousand acres of lands to some level of timber production (not significantly different than E-Departure). Intensity of timber management activities varies as follows:

0 acres	- Full Yield
491,900 acres	- 50 to 99 percent of Full Yield
1,800 acres	- 1 to 49 percent of Full Yield

Alternative I maintains timber harvest (ASQ) at long term sustained yield levels of 19.0 million cubic feet per year. Production of ponderosa pine in the first decade is about 85 million board feet per year. This alternative uses uneven-aged management as a primary silvicultural system on about 62.2 thousand acres during the first decade, differing from Alternative B-Modified through use of longer cutting cycles in high visibility recreation areas, where larger diameter trees are desired.

This alternative produces the most volume in quality trees over 24 inches in diameter. This is because of the large acreage in visual and other management areas with emphasis on producing large trees, plus the emphasis on large trees in the General Forest Management Area. It is second to Alternative B-Modified in total volume in trees over 18 inches in diameter.

Alternative A

Alternative A reflects current direction and allocates approximately 488.6 thousand acres of lands to some level of timber production. Intensity of timber management activities varies as follows:

0 acres	- Full Yield
488,600 acres	- 50 to 99 percent of Full Yield
0 acres	- 1 to 49 percent of Full Yield

Alternative A provides a timber harvest (ASQ) of 19.3 million cubic feet per year, or .2 million cubic feet per year below a long term sustained yield of 19.5 million cubic feet per year. About 90 million board feet per year of ponderosa pine is provided in the first decade. Only about 900 acres of uneven-aged management are used as a primary silvicultural system on the Forest, limited to campgrounds and other intensively used recreation facilities.

This alternative is third (between I and C-Modified) in terms of amount of large material available. Much of the large material would be from old growth areas, which in this alternative are managed on a rotating basis with long rotations. There is no emphasis on large material in this alternative.

Alternative C-Modified

Alternative C-Modified allocates 471.4 thousand acres of lands to some level of timber production (smallest acreage of all alternatives). Intensity of timber management activities varies as follows:

0 acres	- Full Yield
471,400 acres	- 50 to 99 percent of Full Yield
0 acres	- 1 to 49 percent of Full Yield

Alternative C-Modified provides a timber harvest (ASQ) of 15.6 million cubic feet per year, equivalent to the long term sustained yield for this alternative. About 65 million board feet of ponderosa pine is provided during the first decade. Extensive use of uneven-aged management across the Forest is provided on about 96,400 acres during the first decade; cutting cycles vary significantly in order to provide large diameter trees in most visual corridors and other recreation use areas.

This alternative is next to last in terms of total large material produced. This is due mostly to the low total harvest level.

The expected harvest volume in the fifth decade by size class and alternative is shown in Table 4-29. This is also a close approximation of sizes to expect after the fifth decade and illustrates estimates of future availability of quality wood (greater than 18 inches in diameter).

Indirect Effects

Future Timber Stand Structure, Species Composition, and Size Class Diversity

The rate at which timber is harvested (particularly mature and overmature timber), plus the level of

TABLE 4-29
EXPECTED HARVEST VOLUME BY SIZE CLASS BY ALTERNATIVE
(MMCF)

	Alternative					
SIZE CLASS (DBH)	NC	B MOD	E-DEP	I Preferred	A	C MOD
7-17	N/A	117	90	93	112	84
18-23	N/A	74	56	64	63	48
24 +	N/A	28	15	33	18	24
TOTAL		219	160	190	193	156

MMCF - Million Cubic Feet

management intensity, has significant effects on future stand structure, distribution of size/age classes, species composition, productivity, and ultimately future harvest levels on the Ochoco National Forest. In those areas of the Forest allocated for long term production of timber, it is an objective to establish a "regulated forest" in which there are reasonable assurances of a "sustained yield" of timber products over the long term. Economic and administrative reasons are the basis for this objective; as long as the forest is well protected and cared for, it makes little difference biologically whether or not it is in a regulated condition (Davis, 1966). But both overcutting and undercutting of timber under a planned regulatory condition can create future deficits of both size and volume because such cutting controls the rate of new stand formation through regeneration. A regulated forest can be maintained with either even- or uneven-aged management (or a mix of the two).

The "regulated" Ochoco National Forest of the future will contain a variety of size classes and species of timber. Modeling techniques are not currently available to portray an accurate description of the forest by alternative, but estimates of future successional stages (found in Table 2-8, Chapter 2) provide some insight into the future forest. As can be seen, both young age classes (Stage I and II) and old growth age classes (Stage VI) will comprise the lowest percentage of total forested acres in future decades for all alternatives (except No Change for which data is unavailable). Stages III through V reflect timber stands in which sites are fully occupied and timber stands are growing at near maximum rates (assuming proper stand management). These stages comprise the largest percentage of total growing stock for all alternatives in future decades. Alternatives B-Modified, I and C-Modified may exhibit higher levels of diversity of stand structure due to a mix of both even- and uneven-aged management, but may also have higher percentages of white fir and Douglas-fir in younger age classes and growing stock due to successional pressure afforded through uneven-aged management. Alternatives E-Departure and A will probably exhibit lower levels of structural diversity due to even-aged management and associated harvest levels, but species composition of even-aged, younger stands (and future growing stock) will be primarily early successional species such as ponderosa pine, western larch and lodgepole pine.

Indirect Effects on Other Environmental Components

The volume of timber harvested today has significant effects on the economic structure and social fabric of the local community. Timber provides jobs both directly (through local timber manufacturing) and indirectly (through secondary support industries and services). These effects are also cumulative in that timber produced on the Forest is used in other communities within an area referred to as the "Extended Area Of Influence." Future timber supplies will affect the ability of primary manufacturers of timber products to compete in a market plagued with uncertainties, as well as the ability of local communities to finance local school and transportation systems. See Effects on Social and Economic, this chapter for analysis of timber harvest and other Forest resources on local communities.

Timber harvest affects almost all other environmental components existing on the Forest, some positively and some negatively. Timber harvest reduces old growth as a unique and dwindling resource on the Forest and in the nation as a whole. Timber harvest also changes (but not necessarily reduces) "biological diversity" of both plants and animals existing on the Forest. Effects on these two environmental components (old growth and biological diversity) can be cumulative; effects are discussed in detail in the relevant sections of this chapter (see Effects on Old Growth and Biological Diversity).

Also see Effects on Soils, Water, Wildlife and Fish, Scenic Resources, Recreation, Air Quality, Cultural Resources, Forest Health, and Forest Residues.

Cumulative Effects

Cumulative effects of timber harvest on other environmental components are discussed under those relevant headings mentioned above (under indirect effects). In summary, the cumulative effects of the alternatives on timber relate primarily to social and economic issues and are discussed in detail under

Social and Economic Effects, this chapter. The cumulative effects on timber per se are reflected in projections of productivity and composition of future stands, which has been captured in calculations of current and future volume available for harvest (i.e. long term sustained yield and ASQ). It is assumed that application of proper silvicultural systems, including specific cultural treatments such as thinning and planting with genetically improved seedlings will increase future productivity of forest stands, and credit for this future productivity (Earned Harvest Effect [EHE]) is incorporated into harvest calculations for the various alternatives (see Appendix B, Description of the Analysis Process). Table 4-16 displays approximate adjustments to annual timber sale program quantities due to earned harvest effects for the various alternatives. It is presented in millions of board feet (rather than cubic feet) for clearer understanding by local concerned publics. These values have already been incorporated into ASQ and Timber Sale Program Quantity outputs displayed in Table 2-8, Chapter 2. Also see Socio-Economic Cumulative Effects, this chapter.

TABLE 4-30
EARNED HARVEST EFFECT
(Million Board Feet)

NC	B-MOD	E-DEP	I	A	C-MOD
34	10	4	3	7	1

Mitigation Measures

Additional intensive timber management practices that result in future increases in productivity may be initiated during plan implementation, depending on staffing and budget levels on the Forest. Adjustments to the allowable sale quantity (ASQ) can be made as added earned harvest effects (Regional Policy 36 RF 219.13) as these practices are completed for some of the alternatives. These would be in addition to the earned harvest effect already incorporated into the alternatives, as discussed in Cumulative Effects, above. Table 4-31 displays approximate added earned harvest effects potentially available for each of the alternatives (in million board feet).

TABLE 4-31
ADDITIONAL EARNED HARVEST EFFECT
(Million Board Feet)

NC	B-MOD	E-DEP	I	A	C-MOD
6	0*	**	3	0	1

* Alternatives B MOD and A already include all potential earned harvest effects

** Earned harvest effect would vary each decade in order to reduce the decline of harvest over time (resulting from departure status)

Long-term management of timber stands which have an objective of maintaining high levels of wood production require careful scheduling and monitoring of silvicultural treatments, especially on "poor" sites, where delays of activities (such as precommercial and commercial thinning) may predispose stands to attacks by forest insects and disease. Fluctuations in forest staffing levels inhibit the agency (at times) from efficiently managing timber stands. All of the alternatives assume that some base level of organization is available to prepare and administer silvicultural activities. Increased budgets for monitoring and preparation of these activities have potential for increasing future productivity of timber stands, and therefore the supply of available timber for possible harvest.

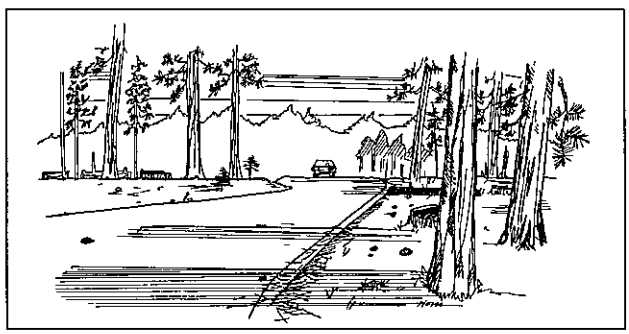
Production of quality wood from second growth stands of timber will require skills and knowledge not yet fully available. The Ochoco National Forest has entered into administrative studies and has requested assistance from the Pacific Northwest Research Station to provide research on production of quality wood from ponderosa pine. This has substantial potential for mitigating the loss of future supplies of high quality wood for local manufacturing facilities. Standards and guidelines (Appendix D) have been developed to emphasize conservation

and production of quality ponderosa pine during timber sale preparation activities. Marking guides are to provide instructions for retention of high quality timber (when conditions are biologically suited), especially in uneven-aged management prescriptions. Allowances have been made for pruning, where it can be shown to be efficient and cost effective to do so. If pruning is done on a large scale, it should provide about the same percent of the volume in grade 3 or better as is provided today, about 15 percent. But the Forest will not provide the large 36-inch and greater fine grained material as is currently produced. If pruning is not done, it is estimated that less than five percent of the volume would be in grades 3 or better.

Conflicts with Other Plans and Policies

Alternatives I (Preferred), B-Modified, A and E-Departure will all meet the Oregon Department of Forestry timber goals for the Ochoco National Forest (see Conflicts with Other Federal, Regional, State and Local Plans, Including Indian Reservation Plans, this chapter).

Transportation



Effects on the transportation system from the implementation of land management alternatives are described in this chapter. A multitude of direct, indirect, and cumulative effects on various resources are associated with roads; these are discussed at length under respective environmental components in this chapter. Once constructed, the road system itself becomes a resource that alternative implementation affects. Significant interactions and their associated effects in this discussion are limited to those that affect the road system itself and its management.

The assumptions important to the following discussion are:

-The greatest potential for public use of roads would exist in the alternatives with the greatest mileage in the completed system. However, the mileage varies depending on the extent to which roads are closed or are not available for use by passenger cars due to design and maintenance levels.

-Road management objectives identify the need to close roads, and allow maximum public use of the road system consistent with resource protection, safety, and budgetary constraints.

-Arterial roads provide access to large areas and comprise the basic access network. Collector roads serve smaller areas and are usually connected to arterial roads. Local roads provide access to site specific areas and are constructed to serve a dominant use or resource.

Direct Effects

The activities that most affect the transportation system are road construction and road closure.

Road Construction

The majority of the arterial and collector road system is already established. Further construction of arterial or collector roads would be to provide access to unroaded areas, or to upgrade existing local roads to provide a safer and more efficient transportation system. The amount of arterial or collector road construction ranges from four miles under Alternatives E-Departure and C-Modified to 14 miles under Alternative B-Modified in the first decade.

Construction of additional local roads will account for the majority of the road construction. These roads are lower standard and intended for use by high clearance vehicles. They are primarily constructed to facilitate timber harvest. Some local roads which are unsafe, are causing resource damage due to poor location, or are poorly suited to current logging methods, will be replaced. All alternatives require new local road construction. The amount of

the construction reflects the number of acres harvested. Initial entry into an area for timber harvest generates the most local road construction.

Management of big game and other wildlife habitat affects the timing of road construction by affecting the scheduling and distribution of timber harvest. Delayed harvest of forest stands managed on long rotations to provide big game cover delay local road construction as well.

Road Management

Road closures on the Forest are yearlong or seasonal. Closures and restrictions are used to protect resources (soil and water), the investment, and safety of expected users. Closures would increase over the planning period for all alternatives. Seasonal closures are employed to maintain or improve habitat for big game. The number of closures in this category is directly related to the acreage allocated to big game management.

The Ochoco National Forest has a road closure program called the Green Dot System. This system is a result of a joint agreement with the Oregon State Department of Fish and Wildlife and the U.S.D.A. Forest Service under which National Forest roads may be closed in designated areas during big game hunting season. The purpose of the program is to enhance escape habitat and to improve hunt quality. A reflective green dot on a signpost is being used to identify open roads for hunters. Areas closed under this program are assumed to continue for all alternatives.

Effects by Alternatives

New system mileage and total miles needed for all alternatives are displayed in Table 4-32.

All alternatives show a substantial decrease in the annual rate of construction after the third decade, reflecting the decrease in first-entry harvest acres. The miles of roads open to passenger cars and high clearance vehicles by alternative is displayed in Table 2-8 in Chapter 2 The following alternative discussions do not include short-term road closures due to implementation of the Green Dot System.

Alternative B-Modified

During the first decade, approximately 246 miles will be added to the system. Ultimately, 931 miles will be constructed through the fifth decade. This amounts to 83 percent (1,122 miles) of the long-

TABLE 4-32
MILES OF ROAD TO BE CONSTRUCTED
(Decades 1-5)

	ALTERNATIVE					
	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
Arterial/Collector All Areas	20	33	4	14	20	4
Local Roaded Areas Unroaded Areas	555 152	780 309	614 152	683 227	555 244	765 152
New System Total	819	1122	770	924	819	921
Total Miles	5373	5676	5324	5478	5373	5475

The total mileage figures are for the completed system which occurs beyond the fifth decade The total includes existing road mileage needed for management and approximate reductions due to the obliteration of unsafe or unneeded local roads

term road construction needs. During the first decade, approximately 904 miles of road reconstruction will be required to serve user needs and resource management objectives.

During the first decade, there will be approximately 413 additional miles of seasonal and permanent road closures (see Chapter 3). Ultimately, through the fifth decade, 1,623 additional miles over the present time will be closed.

Alternative E-Departure

During the first decade, approximately 222 miles will be added to the system. Ultimately, 699 miles will be constructed through the fifth decade. This amounts to 91 percent (770 miles) of the long-term road construction needs. During the first decade, approximately 887 miles of road reconstruction will be required to serve user needs and resource management objectives.

During the first decade, there will be approximately 390 additional miles of seasonal and permanent road closures. Ultimately, through the fifth decade, 1,582 additional miles over the present will be closed (see Chapter 3).

Alternative I (Preferred)

During the first decade, approximately 179 miles will be added to the system. Ultimately, 750 miles will be constructed through the fifth decade. This amounts to 81 percent (924 miles) of the long-term road construction needs. During the first decade, approximately 878 miles of road reconstruction will be required to serve user needs and resource management objectives (see Chapter 3).

During the first decade, there will be approximately 1,058 additional miles of seasonal and permanent road closures. Ultimately, through the fifth decade, 1,685 additional miles over the present will be closed.

Alternative A and Alternative No Change

During the first decade, approximately 220 miles will be added to the system. Ultimately, 772 miles will be constructed through the fifth decade. This amounts to 94 percent (819 miles) of the long-term road construction needs. During the first decade, approximately 790 miles of road reconstruction will be required to serve user needs and resource management objectives.

During the first decade, there will be approximately 194 additional miles of seasonal and permanent road closures. Ultimately, through the fifth decade, 1,234 additional miles over the present will be closed (see Chapter 3).

Alternative C-Modified

During the first decade, approximately 189 miles will be added to the system. Ultimately, 633 miles will be constructed through the fifth decade. This amounts to 69 percent of the long-term (921 miles) road construction needs. During the first decade, approximately 887 miles of road reconstruction will be required to serve user needs and resource management objectives.

During the first decade, there will be approximately 1,020 additional miles of seasonal and permanent road closures. Ultimately, through the fifth decade, 2,724 additional miles over the present will be closed (see Chapter 3).

Indirect Effects

For all alternatives, the indirect effects are primarily those related to road maintenance. While these effects are essentially the same by alternative, they vary by the amount of construction, reconstruction, and the total system at the specific point in time. All system roads will be maintained to at least the basic custodial care required to maintain drainage, protect the road investment, and minimize damage to adjacent land and resources. This level is the normal prescription for roads that are closed to traffic. Higher levels of maintenance may be chosen to reflect greater use or for resource protection.

Roads normally deteriorate due to use and weather impacts. Livestock may cause damage to road cut and fill slopes Timber management practices such as clearcutting increase water runoff, the increased runoff can result in the need for more extensive road drainage systems. This deterioration can be reduced through adequate maintenance or restriction of use. All alternatives have land allocations which attract vehicle use on existing roads, resulting in the need for recurring maintenance.

When excessive traffic wear resulting from deferred maintenance or storm damage has occurred, reconstruction may be required to provide a suitable facility.

User safety is an additional indirect effect. Regardless of maintenance levels, safety can be jeopardized by the volume and mix of traffic on certain roads.

Cumulative Effects

No significant adverse cumulative effects are expected to occur to the transportation system. Forest-wide standards and guidelines (Appendix D), as they apply to location, design, operation, and maintenance of the transportation system, assure that the road system will accommodate its intended use over time.

Cumulative effects of the transportation system on other resources (indirect), such as water, wildlife and soil, are possible and are discussed in detail under those respective headings of this chapter.

Mitigation Measures

The construction, reconstruction, maintenance, and management of Forest roads utilize many mitigation measures that derive from engineering requirements Cost of mitigation measures to improve open roads for public use and measures necessary for resource protection are incorporated in all alternatives. The following activities are some of the measures taken to mitigate impacts:

- Outsloping road surfaces and adding culverts on ditched roads to keep water from concentrating.

- Rocking waterbars and drain dips to reduce erosion where water leaves the road.

- Diverting water onto undisturbed ground where sediment can be filtered out.

- Adding riprap at culvert outlets to stop erosion.

- Surfacing road travelways to reduce rutting and permit their use for log and firewood hauling when wet.

- Seeding cut and fill slopes, waste areas, debris burial sites, and unsurfaced roads to reduce erosion.

- Draining spring areas adjacent to roads to protect investment and accommodate permitted uses.

- Minimizing undercutting of cut slopes during ditch cleaning operations to reduce exposing bare soil.

- Reducing overall width of roads by designing travelways, turnouts and curve widening for only the projected use.

- Obliterating local roads no longer needed for management purposes and returning the land to productivity. Obliteration will temporarily increase soil movement but benefit soil and water resources by reducing erosion and sedimentation over the long term.

- Removing culverts likely to be blocked during periods of long-term nonuse (yearlong closures) to mitigate soil and water impacts and investment loss. A short-term consequence on the water quality will occur when replacing the culverts during later entries.

The cost of many of these measures increases as roading and timber harvest occur on steep slopes and sensitive soils.

Prohibiting noncommercial traffic on weekdays and commercial traffic on weekends, gating and signing during commercial operations and rescheduling some outputs to other areas to minimize traffic are examples of traffic management techniques which can be effectively used to mitigate safety conflicts between commercial and recreational uses and eliminate the need for reconstruction.

Restrictions on use of the Forest's road system can have a strong influence on the public's perception of the Forest's management. Increasing public understanding of the selected road management strategy will increase acceptance and avert potential conflicts. Information may be posted on signs in the Forest and/or on visitor maps.

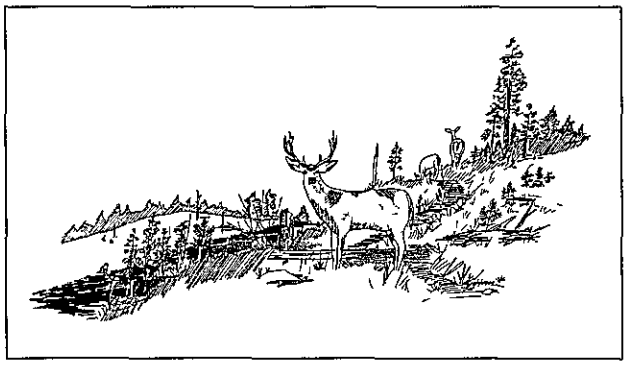
Additional mitigation measures can be found in Appendix D, this FEIS.

Conflicts with Other Plans and Policies

No conflict is seen with other plans and policies regarding the transportation system. The Forest cooperates with State, County and other Federal agencies in meeting transportation objectives. Rights-of-way and easements across Forest land for roads are granted to individuals, companies, and government agencies, subject to need and environmental restrictions.

The Forest may also negotiate with the counties to acquire jurisdiction on county roads where the proportion of Forest Service-related traffic is high. The jurisdiction will allow the Forest Service to have full responsibility for traffic operations and maintenance.

Unroaded Areas



This section discusses the effects on those unroaded areas inventoried for potential wilderness during the Congressionally mandated Roadless Area Reviews and Evaluations (RARE I and RARE II). The Oregon Wilderness Act of 1984 considered these same inventoried areas, designating three areas Wilderness, one area as "further study" and released the remaining areas for management to be determined by the Forest Plan. The effects of different management strategies on each of the unroaded areas vary by alternatives, with the exception of the Broadway area in which vegetative manipulation has occurred. Further analysis of the unroaded areas does not include the Broadway area. Those alternatives aimed at vegetative manipulation and roading eliminate future management as unroaded areas, and forgo future options of these areas being designated as Wilderness. Those alternatives that maintain undeveloped conditions provide options for evaluating Wilderness values in future planning efforts.

Direct Effects

A detailed description and analysis of the effects of the alternatives on individual unroaded areas is contained in Appendix C, Roadless Area Evaluation.

Table 4-33 displays the different management strategies for each unroaded area by alternative. Seven options are considered for the future management of the six unroaded areas.

1. SPNM -Maintain the area's unroaded character for semiprimitive, nonmotorized recreation.
2. SPM -Maintain the area's unroaded character for semiprimitive, motorized recreation.
3. W -Recommend the area, or portion thereof, for inclusion in the wilderness system.
4. BG -Manage the area to meet big-game habitat objectives. This would include some timber harvest and related road construction to create proper cover/forage ratios and improve the habitat for big game species.
5. G/F -Develop the area for timber/forage production and construct the transportation system that will facilitate the area's future management.
6. RNA -Protect the area for research purposes as a Research Natural Area.
7. WS -Manage the area consistent with Wild and Scenic River designation.

TABLE 4-33
ROADLESS AREA DESIGNATION BY MANAGEMENT PRESCRIPTION AND ACRES

	ALTERNATIVES					
Inventoried Areas	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
Cottonwood Total Roadless Criteria Acres - 9,777	BG-9,777	G/F-9,777	2/ SPNM-9,737 BG-40	3/ SPNM-6,592 G/F-3,185	BG-9,777	2/ SPNM-9,737 BG-40
Rock Creek Total Roadless Criteria Acres - 11,414	BG-11,414	G/F-11,414	2/ SPNM-9,336 BG-2,078	3/ SPNM 6,198 G/F-5,216	BG-11,414	2/ SPNM-9,336 BG-2,078
Silver Creek Total Roadless Criteria Acres - 7,459	1/ SPNM-2,510 G/F-4,949	SPNM-3,110 G/F-3,504 RNA-845	2/ SPNM-3,226 BG-3,388 RNA-845	SPNM-3,110 G/F-3,504 RNA-845	1/ SPNM-2,510 G/F-4,949	2/ SPNM-3,226 BG-3,388 RNA-845
Lookout Mountain Total Roadless Criteria Acres - 14,273	1/ SPNM-16,577	SPNM-7,550 G/F-8,110	2/ SPNM-2,950 G/F-12,713	SPNM-15,660	1/ SPNM-16,577	2/ SPNM-15,660
Green Mountain Total Roadless Criteria Acres - 6,630	2/ BG-7,000	2/ G/F-7,000	2/ SPM-7,000	2/ G/F-7,000	2/ BG-7,000	2/ SPNM-7,000
Deschutes Canyon- Steelhead Falls Total Roadless - 10,000 Criteria Acres	SPNM-10,000	SPNM-700 G/F-9,300	BG-7,500 W-2,500	SPNM5,138 BG-4,212 WS-650	SPNM-10,000	W10,000

1/ Original designation under current Ochoco National Forest and Crooked River National Grassland Plans

2/ Manageable boundary acres for SPM and SPNM

3/ Includes area to be managed under retention visual quality objective

TABLE 4-34
UNROADED ACRES BY ALTERNATIVE

Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C MOD
(Roadless Criteria Acres) Acres Remaining Unroaded	M Acres						
Decade 1		29 1	15 8	38 2	35 7	29 1	56 5
2		29 1	15 8	38 2	27 6	29 1	56 5
5		29 1	15 8	38 2	27 6	29 1	56 5

Direct Effects Common to All Alternatives

The major direct effect of developmental activities in unroaded areas is the reduction of the total area available for unroaded activities. Another consequence of management activities is the reduction of a particular quality associated with a specific unroaded area Most of the unroaded areas on the Ochoco National Forest have common characteristics; they provide semiprimitive motorized and nonmotorized recreation experiences, add to the overall scenic quality of the Forest, and provide relatively large areas of secure habitat for many wildlife species. Vegetation and plant community types are similar. The exception to this is Deschutes Canyon, which is located at lower elevations in the high desert, and contains large areas of grass and shrub dominated plant communities.

Alternative A and Alternative No Change

Timber harvest roads and other vegetative manipulation activities would reduce the unroaded acreage to 28,450 acres. Lookout Mountain, Deschutes Canyon, and a portion of Silver Creek would be managed under an unroaded prescription. The qualities associated with Cottonwood, Rock Creek, and Green Mountain would be reduced or eliminated as they would be developed and managed for big game production; entry and development into these areas will likely occur in the first and second decade. Individuals desiring a semiprimitive, nonmotorized recreation experience would use the remaining unroaded areas or wilderness areas on or outside the Forest.

Alternative B-Modified

The lower 8,110 acres of Lookout Mountain, all of Cottonwood, Rock Creek, Green Mountain and half of Silver Creek would be allocated to a timber/forage emphasis; development for these purposes would occur at a rapid rate, probably within the first decade. A portion of Deschutes Canyon, Silver Creek, and the upper 7,550 acres of Lookout Mountain will remain unroaded, a total of 15,750 acres.

Alternative C-Modified

This alternative would maintain a relatively large acreage (46,500 acres) in an unroaded, semiprimitive condition. In addition, Deschutes Canyon/Steelhead Falls Wilderness Study Area (9,350 acres) would be recommended as wilderness. The remaining portions of Cottonwood (40 acres), Rock Creek (2,080 acres), and Silver Creek (3,390 acres) would be developed and managed with a big game emphasis. Development of these areas would begin immediately upon selection of a preferred alternative and approval of the Plan. This alternative would have very little negative impact on individuals currently using the existing unroaded areas.

Alternatives E-Departure

This alternative would reduce the total Forest unroaded area by 24,800 acres. Cottonwood, most of Rock Creek, a portion of Silver Creek, and a small portion of Lookout Mountain would be retained as unroaded with a semiprimitive, nonmotorized emphasis, for a total of 27,315 acres. In addition, 2,500 acres of Deschutes Canyon would be recommended for wilderness. A portion of Silver Creek (845 acres) would be managed as a Research Natural Area; the Green Mountain area (7,000 acres) would be managed for semiprimitive, motorized recreation. Very little displacement of users would occur as a result of this alternative because the qualities of each unroaded area are retained in a semiprimitive condition. Lookout Mountain would be most affected because it is becoming increasingly popular for primitive hunting experiences, hiking, horseback riding, cross-country skiing, snowmobiling, and mountain biking. Areas allocated for purposes of development would probably be entered in the first decade.

Alternative I (Preferred)

This alternative would retain 7,550 of Lookout Mountain, 3,110 acres of Silver Creek, and 11,820 acres of Rock Creek/Cottonwood Creek as unroaded. In addition, 5,140 acres of the Deschutes Canyon/Steelhead Fall Wilderness Study Area would be allocated to Squaw Creek, a 7,840 acre Squaw Creek Management Area for SPNM recreation opportunities. A total of 35,460 acres would be maintained as unroaded. The lower Rock Creek/Cottonwood areas

would be affected by helicopter logging. The effects of harvest preclude this area from semiprimitive recreation opportunities; timber harvest would dominate the landscape. Portions of the upper Rock Creek/Cottonwood Creek Area (56,250 acres) would be harvested by conventional methods. Roads would be constructed; skyline and tractor skidding would dominate the landscape. These areas would not be available for unroaded recreation and this precludes future options for wilderness designation. The potential to disturb sensitive soils and have negative impacts on the anadromous fisheries of Rock Creek/Cottonwood Creek would be increased. Development in these areas would probably occur during the first decade.

In summary, Table 4-34 displays the total acres remaining unroaded at the end of the first, second and fifth decades. It can be assumed that entry into all of the areas reallocated to development will occur at a relatively rapid rate, probably during the first decade. The exception to this is Lookout Mountain (Alternative I only); any development to the lower section will occur at a slower rate conducive to management area objectives, in cooperation with major user groups and in coordination with the Pacific Northwest Experiment Station.

Indirect Effects

The effect of maintaining unroaded areas restricts activities such as road building, timber harvest, and summer motorized recreation. Without vegetative manipulation, including timber harvest, these areas would eventually reach climax successional conditions. Natural fuels will build up increasing the risk and severity of fires. The unmanaged timber stands will not have the vigor of managed stands, increasing susceptibility to insects and disease. Even though mining activities are not excluded from unroaded areas, the location and development of the minerals resource is hindered by lack of access and the added expense of special operation requirements The indirect effect on the economy is discussed in the Recreation section of this chapter. Alternative C-Modified, which maintains the most unroaded areas, would affect these activities the most; Alternative B-Modified would open the majority of the unroaded areas to development and have the least effect.

Alternatively, retention of unroaded areas has a positive effect on maintaining the old growth habitat for a variety of wildlife species, protecting watershed and soils resources, and providing natural scenery. These unroaded areas provide for security of big game as well as challenging hunting and viewing opportunities. Trophy game animals are associated with these areas. Alternatives C-Modified and I provide the greatest positive effect on these resources.

Cumulative Effects

Each time an unroaded area is developed on the Ochoco National Forest there is a cumulative impact, this action contributes to an overall reduction in unroaded acres from the local, regional or national perspective. It not only affects unroaded areas in terms of the amount of semiprimitive environment available, but also affects wilderness and unroaded use throughout the region. These effects result in shifts in either current or future demand for this resource to alternate areas that may create crowding. Even though unroaded and wilderness areas may provide two different kinds of experience for users, there is a common denominator; the environment is in a natural state, unaltered by human activities. Future options also remain open when unroaded areas remain unroaded.

Cumulatively, the reductions in unroaded areas would be greatest in Alternative B-Modified, followed by Alternatives No Change, A, E-Departure, I and C-Modified.

Mitigation Measures

Trail system management in remaining unroaded areas can increase the total carrying capacity by redistributing visitor use. This increase in use is brought about by opening areas that were not previously accessible. This measure has only limited value; eventually the total carrying capacity can be exceeded

Limited unscheduled timber harvest is planned in the lower portions of Lookout Mountain to improve timber stand conditions for recreational purposes. The low-standard roads that may be needed to complete these projects will be closed to summer motorized use and can be narrowed to provide access for horseback riding, hiking, and mountain biking.

Fire implementation plans and projects may be developed to lessen the potential wildfire effects, while creating some diversity within the areas.

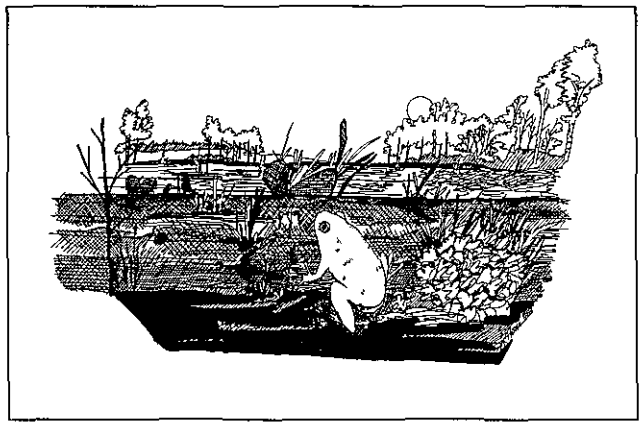
Access for mining will be limited to that necessary for the current stage of development. It will be designed to fit into the land with as little impact as possible to the unroaded character of the area. Mining activity must be justified by an economic analysis based on potential quality and quantity of the material being mined.

The only mitigation for the loss of unroaded areas is not to schedule roads or timber harvest in those areas. Alternative I mitigates development within the Rock Creek/Cottonwood areas by maintaining some of the area as unroaded and by utilizing helicopter logging. Trail systems developed through these areas will need to be protected and possibly relocated to offer viable recreation opportunities into the remaining unroaded areas.

Conflicts with Other Plans and Policies

The Jefferson County Comprehensive Plan does not support the creation of additional Wilderness within the bounds of Jefferson County. Consequently, a conflict occurs with Alternatives C-Modified and E-Departure, which allow for wilderness recommendation for all or portions of the Deschutes Canyon/ Steelhead Falls Area. No other conflicts arise with any of the proposed management strategies for the unroaded areas of the Ochoco National Forest.

Water



This section includes Riparian Areas, Wetlands and Floodplains.

The condition of riparian areas, wetlands and floodplains on the Forest reflects in large measure the condition of the whole watershed where they exist, from Class IV tributary headwaters to Class I main drainages. Water quality, quantity, and timing of runoff in this system are the product of the interaction of soils, vegetation, climate and management activities that affect each watershed Nowhere within a watershed are management activities and the water resource more closely related than in riparian areas.

Direct Effects

Timber management, the transportation system, livestock grazing, and fire may all result in significant consequences to the water resource.

Water Quality

Timber

Timber management activities, including timber harvest, slash treatments, and site preparation, affect the water resource through the alteration or destruction of vegetation, the compaction or disturbance of mineral soil (see Effects on Soils, this chapter), and changes in sediment yield and tem-

perature (Fredriksen and Harr, 1979, Hewlett and Doss, 1984). The potential for impact becomes greater on steeper slopes or on more erosive soils Removal of streamside vegetation has a direct effect on water temperature with potential for increased temperatures during summer months (Brown and Krygier, 1967), and for lower temperatures in winter. Increased ice formation can result in stream bank damage (Chamberlin, 1982; Swanson, 1980). Increased water temperatures also reduce the amount of oxygen that can be dissolved in water (Ruttner, 1963). At higher temperatures the more rapid decomposition of organic debris (needles, leaves, branches) in streams may reduce dissolved oxygen below critical levels for fish (Berry, 1975). Higher stream temperatures in combination with increased availability of nutrients and sunlight are often responsible for the formation of nuisance blooms of algae (Likens, et al, 1970). Within currently degraded stream reaches on the Forest, water temperatures will often exceed 80 degrees F. on warm sunny days.

Alternative No Change has the greatest overall effect on vegetation and soil in the first decade (see Table 2-8, Chapter 2). However, over the course of the first five decades, Alternative B-Modified treats 13 percent (100,000 acres) more than any other alternative. Alternative E-Departure treats the fewest acres over the same period of time. Alternative I treats the fewest acres in the first decade, but over five decades its effects are very similar to Alternatives No Change, A and C-Modified.

Transportation System

Although road effects are difficult to separate from timber harvest effects, it is generally agreed that roads account for the majority of severe sediment problems and are often the links between sediment source areas (skid trails, landings, cutslopes) and stream channels (Harr, 1976; Houpt, 1959; Kidd and Megahan, 1972, Ric, 1979; Stone, 1973). Roads paralleling streams may reduce shade on some sites by as much as 43 percent (Thomas, 1979; Skeesick and Steward 1981).

Roads constructed adjacent to streams produce up to twice the amount of sediment as that from midslope or ridge top roads (Anderson, 1974; Wooldridge, 1980). Substandard roads left open after logging for recreation or other use can become chronic sources of erosion and sediment (Anderson, et al. 1976). Maintenance operations themselves (clearing ditches, reshaping cutslopes, regrading road surfaces) can prolong recovery and significantly increase erosion and sedimentation (Bullard, 1963).

The major portion of the transportation system on the Forest has been completed. Approximately 5,000 miles of road have been constructed (See Chapter 3, Affected Environment). Many roads built decades ago paralleled drainages, severely degrading the character of riparian areas through compaction of soils and elimination of a large portion of the narrow band of riparian vegetation. The proposed alternatives vary by only 1.4 percent in the total miles of open and maintained roads in the first decade. By the 5th decade, the maximum difference is only six percent. Although the differences between alternatives are small, the overall impact of the road system, especially the indirect and cumulative effects of sediment and runoff, are extensive.

Livestock Grazing

Removal of vegetation and compaction (especially of moist riparian soils) by grazing animals can reduce infiltration and increase the potential for overland flow. These impacts on the riparian area can in turn lead to changes in sedimentation, peak flows, and channel morphology (Anderson et al, 1976; Blackburn, 1983; Gebheardt and Johnson, 1981; Lusby, 1970; Platts, 1981; Willott and Pullar, 1984).

Forage use by grazing animals can be 25 to 60 percent higher on streambanks in riparian areas than on adjoining uplands (Nelson and Platts 1985). This concentrated use can lead to compaction in the surface one to two inches of soil, especially in moist riparian areas (Alderfer and Robinson, 1947). Removal of streamside vegetation through overgrazing has a direct effect on stream temperature, especially on sites where coniferous shade is lacking

or is insufficient and where grasses and shrubs provide a large proportion of the effective shade. Livestock use does not vary significantly among the alternatives (Table 2-8, Chapter 2). However, new, more stringent forage utilization standards combined with structural improvements designed to draw livestock away from riparian areas should help to reduce grazing impacts in all alternatives (see Mitigation Measures, this section).

Impacts to the chemical quality of water are quite variable and difficult to monitor, but increases in organic matter and bacteria occur as a result of grazing (Francis and Schepers, 1982; Skinner, et al, 1974).

Fire

Wildfire effects on water quality come about primarily through increased sedimentation and mass soil movement following the destruction of vegetation and exposure of mineral soil to increased runoff (Helvey, 1980). The flushing of ash deposits into streams may alter the concentration of some chemical elements, but this effect on water quality is not well understood (Swanson, 1980). In addition, the loss of vegetation in riparian areas exposes the water surface to increased solar radiation which directly affects water temperature (Helvey, et al, 1976).

The negative effects of wildfire on water quality may be increased as a result of measures taken to bring a fire under control (Barney and Steels, 1983), or through salvage operations following a major fire (Bottom et al, 1985, Cornish and Mackay, 1982).

Wilderness, unroaded areas, Research Natural Areas and old growth units tend toward long term stable vegetation. In this environment, erosion and sedimentation could be expected to remain at low levels and water quality would be high. However, such areas would not be immune to disturbance by wildfire, insect attack or other natural disasters (Anderson, et al, 1976). Such catastrophic events may result in a one time major impact to water quality.

Prescribed burning has the potential to affect riparian areas and the water resource directly through the destruction of vegetation and changes in the character of some soils causing them to become water repellent or hydrophobic. Wildfires, although they have potential for great impact, are not a planned event and their effects are difficult to predict. The amount of prescribed burning planned to treat both natural fuels and activity fuels does not vary significantly among any of the alternatives.

Other Direct Effects

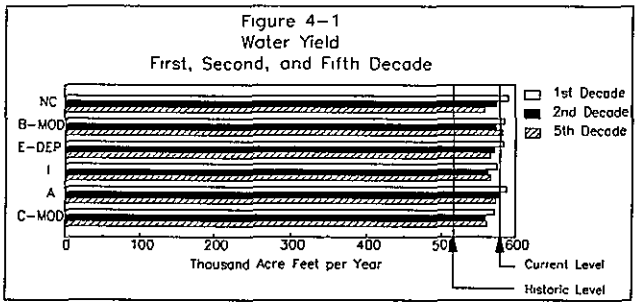
Mining activities can affect water quality by exposing spoils piles to erosion, thereby increasing the potential for sedimentation, or through the leaching of chemicals to a stream course from spoils piles or treatment processes.

Off-road vehicle (ORV) use has the potential to affect water quality primarily through the destruction of vegetation, and compaction and rutting of road surfaces. The ultimate impact on water quality is determined by such factors as season and amount of use, soil type, terrain, vegetation and the likelihood of sediment from areas reaching a watercourse (Payne et al, 1983, Sparrow and others 1978; Webb et al, 1978).

Alternatives B-Modified, I and C-Modified propose the construction of 190 miles of all terrain vehicle (ATV) trails in the first two decades.

Water Quantity and Runoff Timing

Figure 4-1 displays the effect of the various alternatives on the potential annual volume of runoff leaving the Forest for decades one, three, and five. The range is two percent above to 3.5 percent below the existing level of runoff based on a current annual harvest. This range may be exceeded on a localized basis in individual watersheds. Optimum distribution of harvest among all watersheds should serve to mitigate this potential problem (see cumulative effects discussion).



Currently there is some debate over the effects of runoff (both annual and peak flow), and the role played by sediment delivery in determining channel stability (Galbraith 1973, Megahan 1979, Rice 1980). Recent research has focused on the potential of rain-on-snow events in causing increased channel damaging peak flows (Harr 1975). Since at the present time there is no quantified relationship between annual runoff and peak flows, Figure 4-1 should be looked on as a relative indicator of potential changes in peak flow and a source of energy available to more sediment from disturbed areas into stream channels. Increases above the existing level of annual runoff could be expected to decrease stability on marginally stable stream channels, while decreases in runoff could be expected to have the opposite effect (Alternatives I and C-Modified).

Openings in the Forest accumulate more snow than contiguous forested areas (Hoover and Leab 1967; Smith 1974; Golding and Swanson 1978; Haupt 1979). Spring melt rates in these openings are higher and begin two to four weeks sooner (Houpt 1979, Chamberlin 1982; Kattelmann, et al, 1983, Troendle 1983). Snow melt and runoff generally progress from lower elevations to higher elevations as sun angle and temperatures increase. Creating additional openings at higher elevations will increase the melt rate at these elevations. If these flows become synchronized with runoff from lower elevations the potential for increased downstream peak flow is increased (Christner 1981). Increased peak flows have the potential to destabilize stream channels and slow recovery of streams that are moving toward a more stable condition. Natural attenuation of flows as they move downstream works to mask this effect. Research studies have not detected significant changes in peak flows where logging has been conducted without severe soil disturbance (Ellison, 1981; Harr 1976). See Effects on Soil, this Chapter.

Evaluation of the proposed Forest alternatives based on their effects on timing of runoff is difficult. The potential for synchronization of flows in conjunction with soil disturbance increases with increasing rates of timber harvest. Late season low flows will not likely be affected by any of the alternatives because of shallow soils and low summer rainfall.

No accurate estimate of the effects of grazing by alternative on water quantity or timing is possible. Measurable impacts would most likely be site specific and as such could be addressed through mitigation.

Indirect Effects

Indirect effects are often difficult to separate from direct effects; they interact with almost every aspect of the water/riparian resource, and they are some of the most important impacts to be dealt with by land managers.

The ultimate effect on water quality is determined by how much sediment reaches a watercourse and the value placed on the use of that water, e.g. fish production, irrigation, recreational or domestic use (Forest Service Policy 2526-1). Sediment can smother fish eggs and fry, smother and scour stream bottom plants and aquatic organisms that anchor the food chain, cloud water, abrade fish gills, and reduce visual appeal of waters used for recreation. Sedimentation also increases the cost of treating water destined for human use. Filling in of reservoirs is another cost of sedimentation. In this case, estimates of the amount of sediment contributed by each of the alternatives is less than seven percent above natural or background levels (see Effects on Soils, and Wildlife and Fish, this Chapter).

Cumulative Effects

Cumulative effects are the sum total of individually minor but collectively significant actions taking place over a period of time. Approximately half of the over 800 miles of Class I and II streams and adjacent

riparian areas (on the Forest) are in an unacceptable condition in that they do not meet management requirements for temperature and turbidity. This provides strong evidence that these drainages have suffered the cumulative effects of past road construction, timber harvest, and grazing.

Research indicates that measurable changes in runoff occur when 20-30 percent of a drainage is in a cutover condition (Brown, et al, 1974; Rich and Thompson 1984; and Troendle and Leaf 1980). Water quality, water quantity, and runoff timing may all be affected. These changes may be negative and often are cumulative.

Preliminary analysis of FORPLAN runs indicated that if unconstrained, over 90 percent of the timber harvest in the first decade of the Plan would be scheduled on the high value, extensively roaded ponderosa pine stands located in drainages with predominantly south and southwest aspects.

Further analysis showed that up to 70 percent of the acres in some drainages would be treated in the first decade. This would result in over 40 percent of a drainage being in an equivalent harvest (EHA) condition, a situation judged to have potentially unacceptable impacts on water quality. In addition, in the second decade, the harvest would shift to the steeper, mixed conifer drainages characterized by more erosive soils and high value anadromous fishery streams, further exacerbating potential watershed damage.

The Forest Service Manual directs that where prescribed cutting methods may be detrimental to watershed conditions, including water quality, limits be set on the timing of operations and the percent of watershed coverage per entry (FSM 2405.13, 3b).

To assess the effect of proposed rates of harvest by alternative, threshold values were established for each of the 24 major watersheds on the Forest. These threshold values were chosen to reflect the ability of each drainage to absorb disturbance, both natural and human-caused and to recover in a reasonable period of time without long-term damage to channel stability or water quality. Threshold values range from 25 to 35 percent and take into consideration channel condition, soils, roads, livestock use, fishery values etc. The weighted acreage for all watersheds on the Forest is 30.1 percent. In other words, up to 30.1 percent of the Forest can be in an equivalent harvest area (EHA) condition without exceeding the natural ability of a watershed to absorb impacts without unacceptable damage.

An analysis of the proposed alternatives for potential cumulative effects indicates that only Alternative No Change (which exhibits an EHA of 32.2 percent) has a high risk of causing long-term impacts to watersheds (Table 2-8, Table 4-35). The degree of risk is determined by the probability of experiencing a major storm event (10 to 25 year) during that period when a watershed is hydrologically sensitive. In the case of Alternative No Change, there is a

TABLE 4-35
EQUIVALENT HARVEST AREA BY ALTERNATIVE
(Percent)

	ALTERNATIVE					
Decade	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
1	* 32 2	29 6	29 2	25 6	27 8	24 2
2	25 5	25 2	24 3	20 1	25 9	18 9
3	18 5	21 6	17 2	20 6	19 3	18 7
4	24 6	23 0	18 3	17 6	20 7	16 9
5	26 7	28 5	21 7	21 8	24 3	19 1

* The Forest EHA Threshold (30 1) will be exceeded

likely chance that a 10 percent chance storm event will occur on one or more watersheds on the Forest in the next decade with long term effects on channel stability, the riparian zone, and water quality.

A ten percent chance storm event is a ten percent chance of flooding in any given year.

Mitigation Measures

The National Forest Management Act (NFMA) of 1976 requires that timber will be harvested from National Forest System lands only where watershed conditions will not be irreversibly damaged by changes in water temperature and deposits of sediment. The following mitigation measures are proposed to meet this direction.

Mitigation includes a range of actions aimed at reducing the impacts of management activities, and includes: best management practices (BMP's), structural and nonstructural improvements, dispersion, and monitoring. Other relevant mitigation measures can be found in Effects on Soils, this chapter.

Best Management Practices (BMP'S)

BMP's encompass a broad range of measures designed to mitigate on-site or site-specific impacts by correcting a recognized problem. Mitigation measures common to all alternatives are contained in Appendix G. These measures, including buffer strips along streams, use of designated skid trails, specific criteria for stream crossings, etc., are designed to achieve a high rate of success (90 percent or greater). However, the degree and quality of implementation is highly variable, ranging from poor to excellent. Unexpected or unusually severe climatic events, availability of funding and staffing, knowledge and understanding of the BMP's by operators and administrators are reasons why many of these BMP's are often only 60 to 80 percent effective.

Improvements in the degree and quality of BMP implementation would be the most effective measure for mitigating some of the potential risk/impact of managing above Forest threshold value as in Alternative NC.

Mitigation after the fact is often not as effective in reducing impacts to the water resource as reducing or controlling the initial amount of impact. Examples include: mitigation of soil compaction through ripping and tillage is seldom as effective in maintaining the hydrologic properties of a soil as is the use of designated skid trails to control the amount of an area impacted during management activities. Development of self maintaining roads, though more costly in the initial design and construction stages, often provide significant advantages over time in reducing overall impacts on water quality and runoff. With this in mind, every effort should be made to select BMP's which avoid or prevent a problem rather than attempting to correct a problem after the damage has occurred.

Structural and Nonstructural Improvements

Structural and nonstructural improvements are more site specific than BMP's. They are designed to improve productivity, stability or diversity of an area in order to increase its ability to absorb impacts. Examples include: water developments, salt block placement and grass seeding designed to draw grazing animals away from riparian areas, fencing or herding to reduce pressure on sensitive areas; altering the grazing system or changing from cattle to sheep to achieve specific end results. Structural and nonstructural improvement measures also include installing log weirs for improved fish passage, planting willow and alder to improve streamside shade or managing beaver populations to rehabilitate degraded watersheds.

A detailed watershed improvement schedule will be applied to all alternatives. Alternatives B-Modified, I and C-Modified will contain improvements designed to bring all streams/riparian areas to an excellent condition. Alternative E-Departure has a fairly aggressive improvement schedule although only 19 of the 24 watersheds on the Forest will be managed for excellent conditions. A less aggressive schedule is proposed in Alternatives A and C-Modified with 7 of 24 and 22 of 24 watersheds respectively, managed for excellent conditions, but at a slower pace (see Table 2-8, Chapter 2).

Dispersion of Timber Harvest and Grazing Activities

Each of the alternatives includes constraints on the amount and location of timber harvest over time. The goal of this harvest dispersion is to desynchronize the arrival of individual effects of activities at some critical point downstream (Rice 1981). The farther downstream the effects of logging or road construction occur, the more the effects of that synchronization will be reduced, so long as channel sensitivity is constant. The extent of these effects, such as increased runoff or sediment from disturbed sites, will vary in seriousness, predictability and controllability.

More stringent forage utilization standards, combined with structural improvements designed to draw livestock away from riparian areas, should help to reduce grazing impacts in all alternatives.

Monitoring

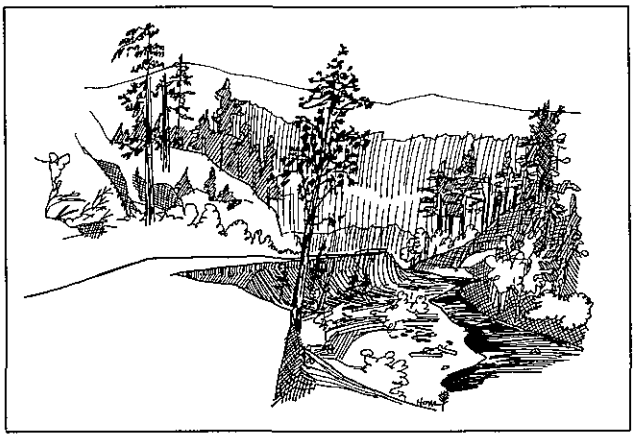
Monitoring serves as a check on the effectiveness of mitigation measures. It identifies necessary adjustments in the level and type of mitigation required to meet management requirements.

The cumulative effects process described above will be employed at the project/watershed level to assess risk and to assure optimum distribution of harvest affects among watersheds.

Conflicts with Other Plans and Policies

There are no known conflicts with the management plans of adjacent landowners or agencies. Throughout the planning process, the Forest has been in contact with the Oregon State Forestry Department, Oregon Department of Fish and Wildlife, local soil conservation agencies, county planners and the Bureau of Land Management.

Wild and Scenic Rivers



The Oregon Omnibus Wild and Scenic Rivers Act of 1988 designated the Deschutes River, the Crooked River, and the North Fork of the Crooked River as Wild and Scenic. The Wild and Scenic Rivers Act defines three classes of rivers: wild, scenic, and recreational. Wild river areas are those rivers, or sections of rivers, that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America. Scenic river areas are those rivers, or sections of rivers, that are free of impoundments, with shorelines or watersheds still largely primitive and natural appearing. Limited access by roads may occur in places. Recreational river areas retain natural, free flowing characteristics, but shorelines may show evidence of some agricultural or forestry uses, past water diversions, or existing minor improvements or diversions. The river segments that have been designated are further described as follows:

Deschutes River - The portion of the Deschutes River that flows through the Crooked River National Grassland has been designated as scenic. This wild and scenic river area is to be managed by the Bureau of Land Management.

Crooked River - The portion of the Crooked River that flows through the Crooked River National Grassland has been designated as recreational. This wild and scenic river area is to be managed by the Bureau of Land Management.

North Fork of the Crooked River - The portion of the North Fork of the Crooked River that flows through the Ochoco National Forest has been designated in three segments. The first segment, from the river source to where the river enters the Big Summit Prairie has been designated as recreational. The second segment, from where the river exits the Big Summit Prairie to the confluence of Deep Creek, has been designated as recreational. The third segment, from the confluence of Deep Creek to the Ochoco National Forest boundary, has been designated as scenic. The portion of this river, between segments one and two, that flows through the Big Summit Prairie (private land), has no official designation under the Oregon Wild and Scenic Rivers Bill.

Lower Squaw Creek has been determined to be eligible and suitable for designation as a "scenic river" in the Wild and Scenic River system. A 7.5 mile segment of the creek, 1370 acres, from the Grassland boundary to its confluence with the Deshutes River, would be recommended for designation. This recommendation would be a preliminary recommendation that would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the Wild and Scenic Rivers System.

Direct Effects

The corridors of designated Wild and Scenic Rivers are protected in all alternatives. The effects of the alternative on Wild and Scenic Rivers will not change. Lower Squaw Creek, which would be recommended for designation in Alternatives B-Modified and I would be protected for its scenic river qualities in those alternatives. Protection is afforded through inclusion in the Squaw Creek Management Area.

Livestock grazing along the segments of rivers designated for Wild and Scenic Status affects water quality as well as the presence and quality of the riparian vegetation.

Timber harvest within the corridor would be planned to protect and enhance the qualities of these river corridors. Harvest adjacent to the corridor could affect the quality, timing and quantity of water in the rivers. Harvest might also temporarily disrupt the access to and serenity of the area. This could vary by alternatives based on the intensity of harvest. Uneven-aged management would be emphasized over even-aged management practices and the impacts of harvest over time would be reduced.

Indirect Effects

Legislative designation of areas to the Wild and Scenic River System does establish management emphasis and precludes other alternative land uses or allocations not in harmony with the management objectives for wild, scenic or recreation rivers.

Cumulative Effects

The "outstanding/remarkable" attributes of the designated Wild and Scenic Rivers are not expected to significantly change as a result of management activities programmed within any of the alternatives.

Both timber harvest and recreation use can have a cumulative effect on the Wild and Scenic River resource. The Forest and Grassland seek to implement management practices designed to protect the character of the Wild and Scenic River corridors for all the alternatives.

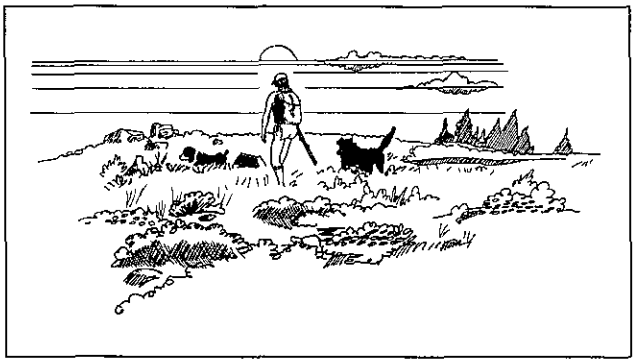
Mitigation Measures

The management of the designated sections of Wild and Scenic Rivers will be developed in management plans by 1991, which will be tiered to the Forest and Grassland Plans. All outstanding/remarkable features will be protected through mitigation of other resource projects. The Lower Squaw Creek area which would be recommended for inclusion in the Wild and Scenic River System, in Alternatives B-Modified and I, would be managed to protect those values key to the recommendation.

Conflicts with Other Plans and Policies

No conflicts are anticipated with the plans and policies of other agencies. Management of those Wild and Scenic River segments which transgress Forest, Grassland and BLM administered lands will be coordinated between agencies.

Wilderness



The Oregon Wilderness Act of 1984 designated Black Canyon, Bridge Creek, and Mill Creek as Wilderness Areas on the Ochoco National Forest. The fate of the Deschutes Canyon/Steelhead Falls unroaded area was left to be determined through Forest Planning. This section discusses the effects that are incident on these areas and how the effects vary by alternative.

Direct Effects

There are a number of activities that have a direct effect on wilderness but these effects do not vary between alternatives. Valid mining activities will continue to affect the wilderness by the use of motorized vehicles and equipment, access routes and associated ground disturbances. Livestock grazing and associated approved improvements and approved use of mechanized and motorized equipment to maintain the improvements can detract from the wilderness experience.

Recreation use in wilderness could vary by alternative depending on how much of the unroaded areas outside wilderness becomes developed for other resource concerns. In alternatives B-Modified and A, as the unroaded areas become developed and no longer available for the semiprimitive nonmotorized recreation experience, more people will be displaced into wilderness for the more primitive recreation opportunities. The sites and sounds of forest industrial operations may detract from the user's wilderness experience along access routes to a wilderness area. This effect would be most extreme under Alternatives B-Modified and E-Departure. These effects could detract from the experience of those seeking the wilderness experience.

The amounts of wilderness acres vary by alternative due to the different management strategies for the Deschutes River/Steelhead Falls Wilderness Study Area. The wilderness qualities of this study area are protected in all alternatives, but to different degrees. Degree of protection depends on where motorized activities in conjunction with grazing are allowed. Alternative C-Modified recommends all of the areas (10,000 acres) that minimally meet wilderness standards for wilderness designation. This area contains some nonconforming features, such as roads and powerlines. Alternative E-Departure recommended only the pristine canyon area of 2,500 acres of Grassland and 2,660 acres of BLM be recommended for wilderness. Alternatives A and No Change protect the full study area as a semiprimitive nonmotorized recreation area but do not recommend wilderness. Alternative I manages over 5,100 acres of the study area as part of the 7,840 acre Squaw Creek Management Area. This area will be managed for unroaded semiprimitive nonmotorized recreation opportunities. The main access road dividing the area will be closed seasonally to protect wintering deer herds, and should have little impact on summer canyon use except at the ford of Squaw Creek.

Indirect Effects

Alternative C-Modified, which recommends acres of the Deschutes Canyon/Steelhead Falls roadless area to wilderness, will limit grazing and cause a decrease in livestock use due to the inability to transport water daily by motor vehicle. None of the other alternatives would affect grazing in the area recommended. E-Departure recommended excluded areas needing motorized water transportation.

Mining is affected by wilderness; no new claims will be allowed and existing claims are closely monitored. Only motorized and mechanized equipment that is absolutely necessary for the mining will be allowed.

Recreation is affected by wilderness since no facilities other than those needed to access trails will be developed. Limits of acceptable change are established to monitor the effects of use in the wilderness and to change recreation use patterns when limits are exceeded. No mountain biking, hang gliding, or other mechanized-motorized recreation can occur.

A fire management plan will be developed for each wilderness area that establishes prescription criteria for managing fires as a natural part of the environment. Some natural ignitions may be allowed to burn unless significant resource damage is expected, in which case the fire will be declared a wildfire and suppression action will go into effect. Suppression actions will be designed to minimize human impacts on wilderness.

Fire management strategy in wilderness is designed to protect or enhance wilderness resource values. Where analysis has shown that the wilderness ecosystem has been significantly altered from its natural state due to fire exclusion and that the probability of lightning ignition returning it to its natural state is low, scheduled ignitions will be considered.

Additionally, the timber resource may be affected by wilderness designation. Because wilderness vegetation remains unmanaged, tree vigor will decline and forest pests such as the spruce budworm may reach outbreak levels. Infestations may then spread beyond wilderness boundaries into forest zones dedicated to multiple use management. This effect would be minimal in the Deschutes Canyon/Steelhead Falls area where grass and shrub vegetation comprise the dominant plant communities.

Cumulative Effects

Some nonconforming features, improvements, and conditions currently exist in the wilderness. Additional nonconforming conditions may legally be necessary for the development of prior existing valid mining claims. These developments create additional unnatural conditions that cumulatively may be detrimental to the wilderness resource. In addition, progressive trail development may have cumulative effects on the supply of primitive recreation experiences.

As unroaded areas outside wilderness become developed for other resource management objectives, recreational use of the wilderness will increase. The increased number of wilderness users could exceed the capacity to provide a primitive experience and conditions could occur that exceed the limits of acceptable change.

Mitigation Measures

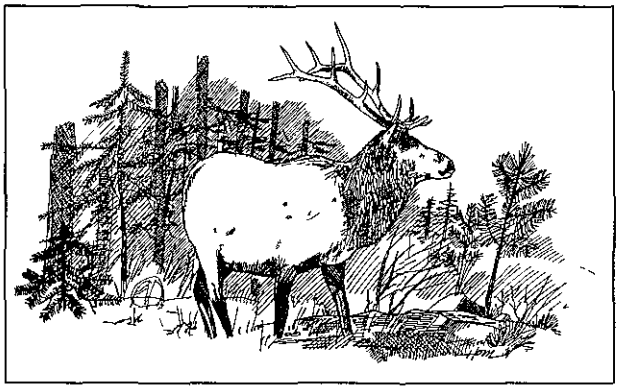
All management of wilderness is guided by the Wilderness Act of 1964 which strongly directs management toward pure untrammeled wilderness. The Act also allows some prior existing rights to continue. Such operations will be permitted with provisions to protect wilderness values as much as practical. The use of motorized and/or mechanized vehicles for these excepted activities will be scheduled to minimize conflicts with wilderness values and wilderness users as much as possible. Ground disturbing activities will be bonded to ensure restoration/reclamation of the area will be completed in a timely manner. Nonconforming features will be removed when feasible.

Conflicts with Other Plans and Policies

The Jefferson County Comprehensive Plan does not support the creation of additional Wilderness within the bounds of Jefferson County. Consequently, a conflict occurs with Alternatives C-Modified and E-Departure which allows for wilderness recommendation for all or portions of the Deschutes Canyon/

Steelhead Falls Area. No other conflicts arise with any of the proposed management strategies for the unroaded areas of the Ochoco National Forest.

Wildlife and Fish



Direct Effects

Management indicator species were selected to simplify the evaluation of impacts on terrestrial vertebrate species with different habitat requirements. Theoretically, the effects on the selected species represent the effects on other wildlife species with similar habitat requirements. Under no alternative would management indicator species populations and their habitats be adversely effected to the point where minimum viable populations could not be maintained (see Appendix F, Management Requirements).

Effects by Alternative on Elk Populations and Habitat

Timber harvest affects the spatial relationships of cover and foraging areas as well as the ratio and juxtapositioning of each that occurs over an area. The amount, type, and interspersion of forage, water, and cover (habitat components) can result in effects on big game and other wildlife habitat and use.

Cover is an important component of elk habitat. It is utilized by big game in part to modify climatic effects on body temperatures, which results in increased metabolic efficiency (Beall, 1974; Edgerton and McConnell, 1976; Leckenby, 1984), and for security. Timber management and applied silviculture practices can influence habitat through changes in cover quality and quantity (cover/forage ratio) and associated road densities.

Timber harvest utilizing clearcutting and shelterwood temporarily eliminates or alters cover. Thinning practices may reduce the quality of the cover. Timber management may also have positive effects on the quality and quantity of cover; e.g., harvesting of stands that do not provide cover and reforesting the sites with stands adequate to provide improved tree stocking and canopy closures; and in some cases managing to defer or reduce harvests in stands recognized to be important for providing cover.

All alternatives have an effect on cover from timber harvest and management. Standards and guidelines have been developed (Appendix D) that control the cover requirements and amounts in various management areas to meet habitat effectiveness objectives for elk.

Roads affect elk habitat by directly removing habitat area. Vehicular traffic also decreases the effectiveness of adjacent roaded habitat (Pederson, 1978). Studies have demonstrated that elk use increases proportionately as distance from roads increases (Hershey and Leege, 1976; Perry and Overly, 1977; Pederson, 1978, Long, 1980), and increased road densities reduce habitat effectiveness (Hershey and Leege, 1976; Lyon, 1979). Generally it is the associated traffic, not the roads themselves which discourage use by big game (Hershey and Leege, 1976; Perry and Overly, 1977).

A model was used to predict the influence of forest management on elk and habitat effectiveness. Table 2-8, Chapter 2, shows the model results/elk numbers for each alternative. It is a biologically based model dealing with habitat effectiveness for elk. It was designed to estimate effectiveness on a scale of 0 to 180, with 180 representing the highest potential and 0 representing the least desirable situation. It is a relative measure of effectiveness only and does not consider all factors that could influence the actual population. Some of the additional factors may include: effects of hunting, predators, disease, yearly changes in weather, forage production, competition with other animals, and reproductive rates.

To make the results of the model easier to interpret, the effectiveness index was translated into number of animals. This was done by estimating the density of animals that could be supported on an area if the habitat were maintained at optimum effectiveness. For the Ochoco National Forest this was an average of nine elk per square mile. The habitat effectiveness value of 180 translated to this possible density of elk. Lower values translate to proportionally lower densities. The numbers are not necessarily projections of actual elk populations but provide basis for relative comparisons between alternatives. As noted above, many additional factors would have to be considered in order to predict actual populations.

It is also important to note that present elk populations may not be the direct result of factors that are used in the habitat effectiveness model. The current population in an area can be limited by availability of winter range on private land, by hunting pressure, or by any of the other factors discussed above. In this case, habitat effectiveness may change, but still have no influence on the number of elk. Thus, the numbers shown in tables and graphs represent modeled projections only and cannot account for factors outside the model. It is important to understand this in order to relate how the effect of forest management on the elk population was predicted (see Table 4-36).

habitat is capable of supporting higher deer populations during this time frame, the Oregon Department of Fish and Wildlife intentions are to keep the population at current levels. They feel deer winter range carrying capacities, which are mostly outside the Forest, have been reached. In the third decade, it is predicted deer populations may begin to decline for Alternative B-Modified. This is a result of reduced habitat caused by intensive timber management activities. All other alternatives remain constant through the fifth decade (see Table 2-8, Chapter 2).

Effects of Livestock Grazing on Big Game

Livestock grazing can affect big game habitat through competition for forage. An analysis was made to determine the amount of forage produced on the Forest and identify if significant competition for forage potentially existed Forest-wide. The model showed that, theoretically, an abundance of forage remained in all alternatives after the needs of both big game and livestock had been met. This assumed, however, that animals were evenly distributed throughout the Forest. Localized conflict could occur in areas of high animal concentrations or in particular habitats. Conflicts between elk and cattle were not quantifiable at the Forest planning level, but will be considered and evaluated on an allotment plan basis when each plan is updated.

Carefully controlled livestock use can improve quality of winter forage for big game on grass ranges if it is properly timed. Removing plant growth or using it

TABLE 4-36
ELK POPULATION

	ALTERNATIVE					
Decade	NC	B-MOD	E-DEP	I Preferred	A	C-MOD
1	*	3,210	3,170	3,000	3,370	3,740
2	*	2,950	3,030	2,870	3,160	3,660
5	*	1,700	2,780	2,620	2,690	3,700

* Although the NC Alternative was not actually evaluated for elk production using the model, elk numbers are expected to be quite similar to those shown for B MOD The reasons for the similarity are due to the similar effects that both alternatives would have on habitat effectiveness

Effects on Deer Populations

Deer numbers have been projected to remain constant at an estimated 22,600 animals during the first two decades for all alternatives. Even though the

before it has a chance to get old and coarse, then leaving the regrowth for big game, increases quality of winter forage. Livestock browsing on shrub winter ranges, however, decreases the value of these areas for wintering big game, as does heavy use on grass ranges, thus resulting in displacement of winter big game and/or reduction in carrying capacity of big game winter ranges.

Effects of Alternatives on Threatened, Endangered, and Sensitive Species

The bald eagle and peregrine falcon are the only two Federally listed threatened and endangered species known to occur on the Forest. The bald eagle uses parts of the Forest for winter roosting and feeding. Infrequent sightings of the peregrine indicate migrating individuals; no nest sites have been found. Under each alternative, their habitats, either known or when found in the future, will be managed to meet the intent of the recovery plans for both species. Conservation measures for the bald eagle include road closures in and around their roosting sites, supplemental feeding stations near winter roosting areas, and allocations for protection of known roosting sites. Consultation procedures with the U. S. Fish and Wildlife Service for threatened and endangered species will be carried out as required under the Endangered Species Act. All alternatives equally protect eagle and falcon habitat as required by law.

Sensitive wildlife species, listed in "Rare, Threatened and Endangered Plants and Animals of Oregon," 1985, and the Regional Forester's list (FSM 2670), that are known or suspected to occur on the Forest or Grassland are Swainson's hawk and the wolverine. The Swainson's hawk is known to use primarily juniper for nesting purposes. Juniper is located along the Forest fringes and on the Grassland. None of the alternatives are anticipated to reduce nesting habitat below existing levels.

The wolverine, classified by the State of Oregon as a threatened species, has had sightings reported in recent years (Utzinger, 1985). Because of their large home range and habitat requirements, alternatives such as C-Modified, with less roading and less intensively managed acres, would favor wolverine more than commodity-oriented alternatives.

Three additional species (Cooper's hawk, golden eagle, and prairie falcon) are considered species that require special consideration because of their nesting habitat requirements. The Cooper's hawk utilizes young, dense stands of ponderosa pine. Alternatives which include precommercial thinning on these stands could have effect on nesting opportunities for this species. The prairie falcon and golden eagle are primarily cliff nesters. All alternatives will control management activities that might disrupt the nesting cycle.

Effects by Alternatives on Pileated Woodpeckers

The pileated woodpecker is a management indicator species for old growth habitat. It serves as the surrogate for a guild of species which require old growth forest for habitat. There are constraints on management activities in areas allocated to old growth (see Appendix D). The major consequence of the alternatives on old growth dependent wildlife species will be the amount of old growth allocated in any alternative. Acreage currently in an old growth habitat condition, estimated to be 93,800 acres, declines in all alternatives as stands are entered for timber harvest. Alternative C-Modified would retain the most old growth, whereas No Change and B-Modified have the least remaining after five decades. See the Old Growth section of this chapter for more detail on effects by alternative on old growth dependent species, and Appendix F.

Effects by Alternative on Primary Cavity Excavators

The alternatives and their objectives, as described in Chapter 2, provide different levels of snags for primary cavity excavator habitat. Table 2-8, Chapter 2, displays the estimated percent of maximum potential population by alternative. The 100-percent level occurs when the number, size, and spatial distribution of snags are not limiting to the population. The habitat levels depicted represent an average for all the management areas in each alternative. However, for each alternative, snag levels vary by management area, generally ranging from 40 to 80 percent, except wilderness, unroaded areas, and other less intensively timber managed lands, which provide 100-percent levels.

Snag levels are unknown for Alternative No Change because data is unavailable for it. However, it is estimated to be about the same as Alternative A (46-52 percent of potential). This is a moderate level of habitat.

Snag levels for alternatives E-Departure and I are also both moderate (E-Departure 46-55 percent; and I 47-54 percent).

Alternative C-Modified has a potentially higher level of habitat, at 51-69 percent of the potential population.

Alternative B-Modified provides a low level of habitat starting at 43 percent and dropping to 33 percent of potential by the fifth decade. This is above the NFMA management requirement level of 20 percent of the potential population, as such it should maintain a viable populations of primary cavity excavators, but at much lower population levels than the other alternatives above.

The common flicker was identified as a specific primary cavity excavator (indicator species) to represent juniper old growth habitat. It is probably the only avian species capable of creating cavities in juniper (Thomas, 1979). It is not anticipated that juniper habitat will become a limiting factor in any alternative. However, due to the fact that juniper cutting and burning will be done for deer habitat, range improvement, and fuelwood cutting, Alternatives I and B-Modified have identified stands of juniper on the Grassland to be retained undisturbed for old growth juniper characteristics. Fifteen stands of juniper, for a total of 740 acres, are identified in both of those alternatives. No juniper stands are protected in the other alternatives, nor on the National Forest in any alternative.

Effects by Alternative on Rainbow and Brook Trout

Rainbow and brook trout are treated as indicator species for riparian habitat. It is assumed that if requirements for rainbow trout are adequately met, the aquatic system will also be suitable for steelhead spawning.

Timber harvest, road construction, livestock grazing, recreation, fire, and watershed structural improvements all affect riparian habitat, which affects fisheries. Discussion of the effects of alternatives on riparian condition are given under the water section of this chapter.

In this respect, resident trout numbers would vary somewhat by alternative (see Chapter 2, Table 2-8). Alternatives No Change and A have two riparian prescriptions (see Chapter 2 and Appendix D for a discussion of riparian prescriptions) with 17 watersheds going to a fair condition class and seven watersheds going to an excellent condition class. Fish numbers are lower in these two alternatives because of the seventeen watersheds being maintained in fair condition.

Alternative E-Departure has 17 watersheds going to excellent prescription and seven going to a fair prescription. Fish numbers are higher than in alternatives NC and A because of fewer watersheds being maintained in fair condition. Cottonwood Creek and Rock Creek unroaded tributaries of the John Day are planned for development.

Alternatives B-Modified, C-Modified and I have all watersheds being managed under an excellent riparian prescription and, therefore, are predicted to provide the highest resident trout numbers.

Effects by Alternative on Andromous Fish

All alternatives are assumed to have the same effect on steelhead populations (see Chapter 2, Table 2-8). This is because in all alternatives, the watersheds with anadromous fish are all priority streams for riparian improvement to excellent condition. It is recognized, however, that alternatives which have greater levels of industrial and commodity management activity pose greater risk and higher cost for maintaining or improving anadromous fish spawning habitat. Therefore, Alternatives No Change, A, B-Modified, and E-Departure favor fisheries the least, Alternative I is better relatively speaking, and C-Modified, the best in respect to the six alternatives treated.

Indirect Effects

Increases or decreases in wildlife and fish populations have indirect effects on activities and businesses related to hunting, fishing and wildlife viewing recreation opportunities. See Table 2-8, Chapter 2 for estimations of recreation use by alternative. Also see the Recreation section of this chapter.

Wildlife and fish populations affect social and economic considerations. The requirements incorporated into alternatives to produce higher levels of wildlife populations can limit timber management which decreases jobs in that sector. At the same time, recreation related jobs and services may be increased. Central Oregon lifestyles relate indirectly to fish and wildlife populations. For further discussion of social and economic considerations, see the Social and Economic section, this Chapter and Appendix B.

Providing habitat that results in large populations of free-ranging big game animals results in conflicts with farms and ranches, damaging crops and fences, and competing with domestic stock when animals drift or migrate off public lands onto private lands in winter.

Cumulative Effects

Continuing and widespread management activities, timber management practices applied uniformly over the Forest, improved access and increased human presence contribute to reduced habitat effectiveness for wildlife, increase stress at critical periods, and increase hunter access. When considered in total over time these effects can be cumulative and impact wildland resources through reductions in certain wildlife populations, habitat loss and reduced diversity. Alternatives such as E-Departure, B-Modified, A and No Change, which promote intensive development and utilization of resources, are thought to be more likely follow a scenario of this kind.

Conversely, large acreages of undeveloped and inaccessible land increase the risk of epidemic insect outbreaks, wildfire or other natural catastrophe which may result in significant long term economic and habitat loss. The utilization argument is to manage wildland resources to prevent this kind of catastrophic loss of resource and impacts, and thus better maintain a sustained level and of fish and wildlife production over time. Alternative C-Modified would represent the least intensive management (for commodity resources) over time.

Other practices on the Forest can have cumulative effects, e.g. salvage and firewood cutting have impacted the snag habitat over time on the Forest; clearing of vegetation, silviculture activities and roads alter timing, flows and sediment for streams, thus potentially affecting fish habitat over time; and, cumulative effects of past management practices are reflected in condition of riparian areas in places.

Mitigation Measures

Mitigation measures are intended to minimize or eliminate potential conflicts or adverse effects of implementation. Mitigation measures have been developed through interdisciplinary efforts and incorporated into the Plans at different levels in several different ways.

The standards and guidelines (Appendix D) and management area prescriptions in Chapter 2, are a fundamental and integral part of these measures, and as such they are a basic and essential part of the analysis. These apply to such things as road closures which are utilized to reduce harassment of big game, especially during critical periods. Road closures have been found to be very effective for mitigating loss of other big game habitat components, and are accomplished by either physically restricting access or by the "green-dot system," which provides for seasonal road closures during the hunting season. In addition to benefitting big game, road closures can be employed to restrict access for firewood cutters, which helps insure planned snag density levels are maintained. Practices which may be employed to improve or maintain wildlife habitat and timing of activities can be a way to mitigate adverse effects, such as during raptor nesting and big game calving/fawning periods. Restoration practices such as woody debris placement, channel and erosion structures, planting, seeding and fencing, and improved grazing systems and road design are also mitigation measures which have been found to be very effective.

The allocations (see Chapter 2) play an important role in mitigation by the separation of incompatible uses, impacts and conflicts. Allocations relate to protection of riparian areas, old growth, unroaded areas, wildernesses and others which, when viewed in total across the Forest or Grassland, contribute to the habitat mosaic and diversity. This is probably the most effective method for mitigating forest-wide impacts to wildlife and fish resources.

National Forest Management Act (NFMA) requirements were incorporated into the planning process and are reflected in the allocations and standards and guidelines (see Appendix B and Appendix F). These requirements assure that in all cases adequate habitat is provided to maintain viable populations of wildlife.

"General Water Quality Best Management Practices" (USDA Forest Service, Pacific Northwest Region, November 1988. 86p) are incorporated by reference under requirements of Section 319 of the Clean Water Act. The BMP's assure water quality requirements, and hence fish habitat, are protected.

Mitigation measures are developed at the site specific project level of planning, and projects are "tiered" to other planning levels above. Project level application controls what actually occurs on the ground.

Conflicts with Other Plans and Policies

None are known to exist.

The Relationship Between Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

From the perspective that each generation is trustee of the environment for succeeding generations, an objective of this plan is to provide for the proper and continued development of resources in a manner that maintains economic stability, yet retains local natural heritages, such as wildlife habitat, outdoor recreation opportunities, water quality, scenic qualities and open range. The preferred alternative emphasizes a balanced mix of uses and also attempts to provide for the protection of other resources (soil, water, wildlife habitat, aesthetics) over the long term.

While the plan proposes short term harvest of timber, sustaining or improving long term productivity is planned through intensive forest management practices (e.g. reforestation, thinnings). Lands identified as unsuitable for sustained timber yield management have been allocated for soil, watershed or wildlife habitat protection. Dispersion of timber harvest activity, retention of old growth and protection of riparian areas have all been planned in order to prevent impairment of long term land and resource productivity.

Construction of roads, mechanical slash piling, and log skidding are examples of activities that are short-term uses, but can reduce long term vegetation productivity on specific places where they occur.

Increases in road densities, improvements in access, subsequent increases in human presence and continuing and ongoing expansion of management activities proposed herein have the potential in the short term to create effects that could cumulatively affect long term productivity of wildlife habitats, aquatic systems and local socio-economic developments.

The allocation of land to uses other than timber production may affect timber supply in the short term, but it retains future management options and does not rule out the possibility of future harvest in the event of emergency or change.

Irreversible and Irretrievable Committments of Resources Associated with the Preferred Alternative (I)

This plan deals with both developed and undeveloped (roadless) lands. Lands where road systems, plantations, thinnings and structures are established represent an economic commitment. These investments represent "sunk funds" from an economic standpoint, and are not retrievable; nor do they necessarily have any liquidity over the planning period.

The specific acres, estimated to be one percent of the total Forest and Grassland area, on which permanent roads and facilities are constructed constitute an irretrievable, and for all practical purposes irreversible, loss of soil vegetation productivity and unaltered landscape.

Continued avoidance of cultural resource sites (as opposed to evaluation/mitigation/clearance) tends to undermine efforts to acquire data which would expedite future site evaluations. Data recovery projects ultimately enhance the Forest's ability to manage its cultural resources. Data recovery efforts represent, in essence, the scientific and controlled destruction of a cultural resource site. Once undertaken, the effects of data recovery are irreversible; this mitigation measure represents an irretrievable commitment to the resource.

Use of rock for road surfacing and construction purposes, estimated to be 147,850 cubic yards annually on the Forest and Grassland, is an irreversible commitment of a resource, but is not considered critical because of the abundant availability of good quality rock in this locale.

Undeveloped or unroaded areas once allocated for development will, in a relatively short time, no longer be suitable for wilderness classification. Wilderness designation is considered a permanent commitment. Congress could reverse this designation but this is extremely unlikely.

In the case of lands already intensively developed by roading, a high degree of irreversibility exists. With undeveloped lands, frequently a wide range of management options exists.

Dasmann, et. al., in *Ecological Principles for Economic Development,* 1973, (pp. 22-23), recognized six broad development levels for lands, each representing a progressively greater commitment of resources. The development levels are:

1) The land can be left in a completely natural state and reserved for scientific study, educational use, wilderness, watershed protection and its contribution to landscape stability.

2) It may be used as a park, refuge or reserve with the natural scene remaining largely undisturbed to serve as a setting for outdoor recreation and attraction of tourism.

3) It might be used for limited harvest of its wild vegetation or animal life, but maintained for the most part in a wild state, serving to maintain landscape stability, support certain kinds of scientific or educational uses, provide for some recreation and tourism and yield certain commodities from its wild populations.

4) It can be used for more intensive utilization of its wild products as in forest production, pasture for domestic stock, recreation, or intensive wildlife production. In this case, its value as a wild area for scientific study diminishes, but it gains usefulness for other kinds of scientific and educational uses. Its value for some tourism and outdoor recreation diminishes, but is not necessarily lost. Its role in landscape and watershed stability is changed, but may be maintained at a relatively high level.

5) The wild vegetation and animal life having been removed in part, it can be intensively utilized for the cultivation of planted tree crops, pastures or farming crops.

6) The wild vegetation and animal life having been almost completely removed, it can be used for intensive urban, industrial or transportation purposes.

Using these development levels, Tables 4-37, 4-38 and 4-39 display the extent of irreversibility proposed by the preferred alternative (I).

So long as the first three choices are taken, the option remains open to change to any of the others In the fourth choice, the options for restoring the land to any of the first three levels are reduced, but not eliminated. Lands allocated to development are likely to approach the fifth level. This would largely prohibit any shift to the lower level on those acres.

With the resource allocations proposed in the preferred alternative, 19 percent of the lands will be managed in categories of "low or moderate" irreversibility, 80 percent will be managed for intensive timber and range production or "moderately high" irreversibility, and one percent will be committed to roads and administrative sites which represent "high" irreversibility.

Unavoidable Environmental Effects Associated with the Preferred Alternative (I)

Air Quality

Prescribed fire use will contribute to total suspended particulates (TSP) in the atmosphere, and will result in a temporary increase in haze and localized impairment of visibility. The FEIS on Managing Competing and Unwanted Vegetation (U.S.D.A. Forest Service, 1988) provides a detailed investigation into the effects of smoke on human health. The following is a summary of that investigation pertinent to this FEIS.

Short term effects due to high level exposures immediately adjacent to prescribed fires or wildfires include "...eye irritation, coughing, and shortness of breath in moderate-to-heavy smoke..." This type of exposure is generally experienced only by forest workers since the general public is not normally involved in such activities.

Documentation of adverse effects from long-term exposure to wildland fire smoke is virtually nonexistent. Forest workers are at some risk of such low-level exposure contributing to such health effects as emphysema or lung cancer. Long-term effects from even lower levels of smoke experienced by the public-at-large are less well known. Individuals with chronic lung disease or other respiratory ailments may experience additional irritation from the infrequent episodes of stagnated smoky airmasses.

There are a number of potentially toxic components known to exist in wildland smoke. However, the levels experienced under normal conditions and exposures are well below any levels known to cause harmful effects on humans. Some of the more common are carbon monox-

TABLE 4-37
Acreage by Levels of Irreversibility in Alternative I
(The Preferred Final for the National Forest)

	Irreversibility					
Management Areas	Low 1	2	3	4	5	High 6
MA-F1	13,400					
MA-F2	5,400					
MA-F3	17,400					
MA-F4	1,125					
MA-F5	4,400					
MA-F6	19,250					
MA-F7		170	9,390			
MA-F8		11,820				
MA-F9			2,480			
MA-F10		3,110				
MA-F11		7,750	7,910			
MA-F12			570			
MA-F13				1,810		
MA-F14			1,970			
MA-F15			18,130			
MA-F16			1,580			
MA-F17			1,070			
MA-F18			2,560			
MA-F19			770			
MA-F20				64,130		
MA-F21				107,360		
MA-F22				496,850		
MA-F23			1,830			
MA-F24		830				
MA-F25			6,850			
MA-F26			33,260			
MA-F27			1,000			
MA-F28						460
TOTAL ACRES	60,975	23,680	89,370	670,150	0	460
Minus Roads	60,750	23,680	88,340	661,700	0	460
						+9,720 *
Net Acres	60,750	23,680	88,340	661,700	0	10,180
Percent of Forest	7	3	10	79	0	1

* Acres included in roads

TABLE 4-38
Acreage by Levels of Irreversibility in Alternative I
(The Preferred Final for the Forest and Grassland)

	Irreversibility					
Management Areas	Low 1	2	3	4	5	High 6
MA-G1				22,700		
MA-G2				12,740		
MA-G3				59,440		
MA-G4	110					
MA-G5		740				
MA-G6		720				
MA-G7		650				
MA-G8		7,840				
MA-G9			2,110			
MA-G10		430				
MA-G11				150		
MA-G12				2,690		
MA-G13		560				
MA-G14			90			
MA-G15						80
MA-G16						460
TOTAL ACRES	61,085	34,620	91,570	767,870	0	1,000
Minus Roads	110	10,800	2,090	96,600	0	540
						+1,280 *
Net Acres	110	10,800	2,090	96,600	0	1,820
Percent of Grassland	<1	10	2	86	0<2	

* Acres included in roads

TABLE 4-39
FOREST AND GRASSLAND TOTALS BY LEVELS OF IRREVERSIBILITY

	Irreversibility					
	Low 1	2	3	4	5	High 6
Net Acres - Forest and Grassland 1/	60,860	34,480	90,430	766,750	0	12,000
Percent Total Acres Forest and Grassland	6	4	9	80	0	1

1/ Total acres less roads

ide, carbon dioxide, carbon particles, and trace amounts of a number of chemicals that may enter the lungs on the surface of particulate matter. Close to 90 percent of the particulate matter is small enough (less than 2.5 microns diameter) to penetrate deeply into the lungs.

Some of the components (polycyclic aromatic hydrocarbons) are known carcinogens under exposures much higher than that documented from wildland smoke. Other components, such as the aldehydes, are acute irritants. These are most likely to affect forest workers who receive high exposures at burn sites.

Because of the regional scope of visibility effects and problems, Region 6 of the Forest Service has been conducting cumulative effects analysis on TSP production through subregional analysis of emissions (for example, Eastern Oregon). The FEIS for Managing Competing and Unwanted Vegetation (U.S.D.A. Forest Service, 1988) contains the latest information on this continuing analysis. In that analysis, the Ochoco National Forest contributed approximately 15 percent of the emissions from Forest Service sources in Eastern Oregon. The Eastern Oregon subregion is projected to reduce emissions by 23 percent under the selected alternative in the Vegetation Management Plan. The Ochoco National Forest and Crooked River National Grasslands will contribute to that reduction in all of the Alternatives in this FEIS.

The projected reductions in emissions for the preferred alternative should continue to widen the gap between probable exposures and any possible health effects; chronic or acute.

Biological Diversity

Forest vegetation will be altered in respect to species composition, stand structure and age. With the exception of about 10 percent retained in old growth, RNA's and wilderness, existing mature forest on suitable lands will be subject to management treatments, including harvesting of mixed conifer timber stands and, where feasible, replacement with more economically or silviculturally desirable species (primarily ponderosa pine). Other management treatments include overstory removal of old-growth ponderosa pine from multi-storied stands, resulting in reduction in basal area, and removal of less desirable species in densely forested areas by thinnings. Intensively managed or regulated forests may provide less habitat for species dependent on old growth forest, snags and down material; less species diversity and habitat diversity; and fewer scenic settings.

Cultural Resources

Current procedures cannot insure that all cultural resource sites will be located. Some sites could be inadvertently destroyed or damaged. Such impacts are unavoidable pending advances in inventory techniques.

Forage and Livestock Use

The direction in the Plans to improve riparian conditions may initially result in increased costs in grazing management; e.g., in installation of improvements (fencing and water developments), herding and transport to control stock distribution and use and possible slight reductions in stocking levels.

Recreation

With the exception of the areas designated wilderness (4 percent), or allocated to roadless management (4 percent), opportunities for primitive recreation, solitude, and recreation in natural settings unaltered by man will decrease over time.

Social and Economic

Levels of commodity and amenity resources provided by the Forest and Grassland may decrease over time in response to changing conditions and legal requirements. Decreases in timber harvest levels

or amenity resources may have direct socio-economic effects on local communities, governments and businesses in terms of socio-economic variables such as occupational lifestyles, leisure, attitudes, beliefs, values and community institutions.

Forest users will encounter more controls and restrictions as management intensity, resource competition and human population continue to increase over time.

Soil

Soil displacement or erosion can be expected to result from planned management activities, such as vegetation removal, slash disposal, log skidding, prescribed fire, construction and maintenance of roads, trails, transmission facilities, recreation sites and others. Soil productivity will be maintained, except for sites dedicated to roads, skid trails, log landings, recreation sites and other facilities or uses that may compact the soil, alter soil profiles or deplete nutrients. An estimated one percent of the Forest and Grassland area will be occupied by permanent roads or facilities. Experience has shown that temporary road surfaces can be revegetated, but the productivity is reduced. Forest-wide an estimated ten percent of cable-logged areas and thirty percent of tractor logged areas will experience increases in soil bulk densities or compaction. These factors, in turn, have indirect effects relating to reduced wildlife habitat, vegetation productivity, incidence and spread of noxious weeds, and increases in stream sedimentation over time.

Scenic Resources

The overall natural appearance of the Forest will change over time, giving way to more dominance by management activities and effects of management.

Wildlife and Fish

Increased road densities (and access), and ongoing expansion of management activities can result in reduction of wildlife security. Physiological stress in wildlife species may therefore result in altered behavior and productivity. This is likely to change attitudes and experiences of hunters over time.

Other Specifically Required Disclosures

Effects on Consumers, Civil Rights, Minority Groups, and Women

Federal and State Human Resource Programs, Civil Rights and Minorities

The Forest and Grassland will continue to participate in these programs in accordance with laws, administrative opportunities and economic availability of programs. Minorities or economically disadvantaged groups should not be adversely affected by the preferred alternative (I).

Alternatives involving reduced recreational attractions and fewer government jobs could have an effect on employment of women. Fewer recreation opportunities may mean local merchants benefit less, and are less apt to hire people for low wage jobs traditionally held by women in this locale.

Effects on Prime Farmland, Rangeland, and Forest Land

All the proposed actions in alternatives are consistent with the intent of the Secretary of Agriculture direction (FSH 1909.15) for protecting and managing prime lands.

Effects on Prime Farmland, Rangeland, and Forest Land

All the proposed actions in alternatives are consistent with the intent of the Secretary of Agriculture direction (FSH 1909.15) for protecting and managing prime lands.

Effects on Wetlands and Floodplains

Consideration for floodplain management, as required by Executive Order 11988, and protection of wetlands, Executive Order 11990, are incorporated into all alternatives by virtue of the respective executive orders.

Effects on Threatened and Endangered Species, and Critical Habitat

The only Federally listed species which occasionally are observed on the Forest and Grassland are the peregrine falcon and bald eagle. Neither is a known permanent resident in the area, even though roosting sites for both bald and golden eagles are known to exist and have received legally required protection under all of the alternatives.

All Federally listed species are protected in all alternatives regardless of the management direction that may apply to the area where they are found (see Effects on Wildlife and Fish, this chapter, for more thorough discussion on threatened and endangered species).

Natural or Depletable Resource Requirements (including energy), and Conservation Potential of the Alternatives and Mitigation Measures.

Methods to estimate the impacts of various management activities on energy resources have been outlined by Schwarzbart and Schmitz (1982). Prestructured energy coefficients in terms of British Thermal Units (BTU's) applicable to resource management activities in the Pacific Northwest are provided in the above source.

Analyses conducted on other National Forests in the course of environmental impact assessment and forest planning indicate, without exception, that the energy required to implement alternatives is more than the energy produced. The range that planned National Forest activities' energy consumption exceeds energy yields has been shown to be in the magnitude of two to six billion BTU's/decade. The amount of energy deficit per alternative as a general rule is directly proportional to timber harvest volumes projected. Alternatives providing maximum timber yields generally require intensified timber cultural activities and more road construction and maintenance, both being spread across a greater land area. Therefore, efforts to maximize timber production or commodity production under current states of technology lead to proportionally greater amounts of energy consumption.

Activities on the Forest and Grassland which may have a positive net energy balance are firewood gathering and forage production. Generally, all other activities consume more energy than they produce.

Effects of the Alternatives on Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment Including the Re-use and Conservation Potential of Various Alternatives and Mitigation Measures

This FEIS deals with wildland resources and as such does not directly affect urban quality, or historic or cultural resources within an urban environment.

Conflicts with other Federal, Regional, State, and Local Plans (including Indian Reservation Plans)

County Plans

Regulations require Forests to coordinate with other public planning efforts (36 CFR 219.7) during the planning process. Accordingly, comprehensive plans for the six counties and the Warm Springs Reservation were reviewed.

The Crook County - Prineville Area Comprehensive Plan, issued in 1978, sets forth many objectives. Protection of the current timber industry is a primary topic, but concerns about grazing for livestock and wildlife, recreational opportunities, and environmental needs (especially protection of water and soil) are all mentioned. As an overall goal, the county plan states:

> "It shall be the policy of the county to support forest land use and management decisions which maximize the present level of benefitting uses; specific emphasis shall be on timber production to sustain the existing forest products industry, forage production to maintain at least the existing levels of livestock and wildlife habitat, protection of water quantities and quality and to maintain existing dispersed recreation level 5 in coordination with the USFS planning and management programs" (p. 53).

If Alternative C-Modified was selected, it might be perceived as conflicting with the goal "to sustain the county forest products industry." Conversely, Alternative B-Modified might be judged as not being entirely compatible with the goal to protect wildlife, soil and water. Alternative I (Preferred) would appear to be consistent with the county's overall goal.

The Deschutes County Year 2000 Comprehensive Plan, issued in 1979, makes no mention of the Ochoco National Forest or the Crooked River National Grassland. Its general emphasis on the importance of timber, or tourism, and of multiple resource management is similar to the concerns of the other counties. No conflict is anticipated with the Deschutes County plan.

The 1969 Grant County plan expresses concern about the timber harvest level from Federally-owned lands, but makes no policy statement regarding desirable harvest levels. Other concerns include the quantity and quality of forage, the quantity of water, the desirability of increasing recreation, and the importance of multiple use. No conflict is foreseen with the objectives of this 1969 plan.

The Harney County Comprehensive Plan (1979) discusses the importance of National Forest land (the Ochoco and the Malheur) as sources of timber, grazing, recreation, fish and wildlife, and water. The plan supports the adoption of the preferred alternative in the Forest Service "Silvies-Malheur Unit Plan." This implies support for a mixture of uses similar to the Forest's present management.

The Jefferson County Comprehensive Plan, adopted in 1981, refers to the Crooked River National Grassland, but not to the Ochoco National Forest. The present management of the Grassland is supported. Except for the statement, "The County does not support the creation of additional Wilderness Areas inside Jefferson County" (p. 145), there do not appear to be conflicts with the Jefferson County plan.

A Wheeler County Comprehensive Plan was adopted in 1980. It examines concerns such as the supply of timber, forage, recreation, and water, but sets no official objectives. No conflicts are foreseen between Wheeler County policies and the effects of any alternative.

Warm Springs Indian Reservation Comprehensive Plan

The Warm Springs Indian Reservation Comprehensive Plan contains no references to the Forest or the Grassland. In the planning process, a number of meetings were held with representatives of the Confederated Tribes of the Warm Springs Reservation. Concerns expressed included availability of access to the Forest and Grassland, being able to gather plant materials, support of prescribed burning, protection of archaeological sites, and the general availability of Forest and Grassland resources. Except for the level of prescribed burning, none of these concerns vary among alternatives, and no conflict is currently anticipated between these desires and the preferred alternatives.

Oregon State Forestry Program Projections

The Oregon State Forestry Department has developed a Forestry Program for Oregon (FPFO). This program is the guiding policy for the State Board of Forestry in reviewing forestry matters in the State of Oregon. Key to this program for the Ochoco National Forest are the output levels assigned to the various land "owners" (state, private, industrial, federal) required to accomplish the coordinated programs envisioned.

The State Board of Forestry Forest Program for Oregon target levels related to timber production must not be confused with the State of Oregon objectives reflected in the Governor's response nor the State Alternative prepared for the Forest Plan Objectives guiding the Governor's response include concerns for Oregon's forest environment, wildlife protection, jobs, and timber production. An equitable balance among these often conflicting resources is the principal goal.

Table 4-40 displays a comparison of timber outputs from the preferred alternative (I) with the FPFO objectives, sales, harvest, and alternatives.

Other Resource Plan Comparisons

Oregon State Air Quality Implementation Plan

Depending on cumulative effects in conjunction with neighboring prescribed burning, the smoke particulate emissions from the Forest may conflict with the Oregon State Implementation Plan (SIP) concerning air quality.

TABLE 4-40
COMPARISON OF TIMBER OUTPUTS

	MMBF/YEAR	MMCF/YEAR
FPFO - State Forestry Department Recommended	115	19 0
Actual Sales (Average 1980-84)	129 4	----
Actual Harvest (Average 1980-84)	85 4	----
Actual Sales (Average 1985-88)	145 4	----
Actual Harvest (Average 1985-88)	146 1	----
Forest Preferred Alternative I	115 TSPQ	19 0
Alternative A (1st Decade)	115 TSPQ	19 3
TM Plan (potential yield) 1/	136 5	----

1/ The potential yield is the net chargeable volume from the current Timber Management Plan and is not directly comparable to Forest Plan TSPQ (Timber Sale Program Quantity) TSPQ includes volume that will be up for sale but which is chargeable against the allowable sale quantity

Emissions from prescribed burning can have significant short-term adverse effects on visibility in and around wilderness areas. There are legal requirements to preserve or enhance visibility quality in designated Class I Areas (Clean Air Act, 1977). The closest Class I Area downwind of the Forest is the Strawberry Wilderness on the Malheur NF. Under certain weather conditions, smoke from the Forest and Grassland may affect visibility in the Strawberry Wilderness.

Oregon Outdoor Recreation Plans

Alternatives not including the East-West Trail as a part of the Forest-wide trail system are in conflict with Oregon Outdoor Recreation plans and the State of Oregon Trail Advisory Group plans. All final alternatives except the No Change include the Summit Historic Trail, which also may serve as an East-West cross state trail.

Establishment of Pacific Northwest System of Research Natural Areas

The proposed RNA's provide some of the plant associations and conditions identified in *Research Natural Area Needs in the Pacific Northwest* (Dyrness et al. 1975). The five areas represent a portion of many areas reviewed and are the ones identified as best representing the needed cells (basic units in a natural area system). The preferred alternative (I) recommends all five of the areas for RNA designation.

Oregon State Water Quality Standards

Analysis of the effects of the various alternatives on dispersion of harvest activities indicates that potential conflicts may occur between final Alternative NC in the first decade and the ability of the Forest to meet State water quality guidelines for turbidity and temperature (DEQ. 1980).

Oregon Department of Fish and Game Objectives

There has been little conflict regarding projected deer population levels because populations in all alternatives are maintained at the levels presently desired by Oregon Department of Fish and Wildlife (ODFW) through the fifth decade.

Based on the Habitat Capability Index predictive model, population numbers for elk may, depending on the alternative, exceed or fall below the proposed ODFW planning benchmarks. The preferred Alternative I, however, is in accord with ODFW's recent benchmark of 2,600 for elk. ODFW's population benchmark for elk has been in flux. The benchmark for elk when planning was originally initiated in the early 1980's was 1,250, as compared to 2,600 now. There have been ongoing discussions between ODFW, the Forest Service, local land owners, and sportsmen's groups on the appropriate elk population objective; the population objective has yet to be determined.

Federal Regulations Governing Toxic and Hazardous Materials

Activities that may occur on the Forest or Grassland involving the use or disposal of hazardous or toxic materials are required in all alternatives to meet all State and Federal laws and provisions.

Utility and Transportation Corridors

All alternatives recognize State and County road corridors. The Western Region Corridor Study (1986) information has been consulted and appropriate utility corridors recognized. No alternatives result in any conflict with movement of power throughout the area.

List of Preparers

List of Preparers

The following is a list of Forest Interdisciplinary Team (IDT) and Forest Planning core team members who developed the Ochoco National Forest Plan, Crooked River National Grassland Plan, and Final Environmental Impact Statement. Their qualifications (position, education, and experience) are provided.

Numerous other Forest Service employees contributed to the completion of these documents through assignments to the Forest Supervisor's Office, by providing needed information, or by assuming the duties of co-workers who were deeply involved in the planning effort.

Anderson, Bruce P.

Forest Hydrologist

Education:M.S. in Water Resources Management; University of Wisconsin.

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Experience:Worked in Timber Management on several Ranger Districts on the Modoc and Plumas National Forests in California and the Chequamegan National Forest in Wisconsin for 5 years. Held positions in Recreation and Lands on several Ranger Districts on the Plumas and Sierra National Forests in California and the Wasatch National Forest in Utah for 5 years. Served as Forest Human Resource Officer on the Siuslaw National Forest for 3 years. Held the position of District Resource Assistant on the Helena National Forest in Montana and served as the Recreation Element I.D. team leader for the Helena National Forest Planning Team for 4 years.

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M.S. Plant Ecology/Botany College of Forestry, Syracuse, N.Y, 1969. Additional Graduate Work, Biosystematics, Washington State University, Pullman 1970.

Experience:Fifteen years USDA Forest Service on two Ranger Districts, four National Forests, and five Regions - Forester, Forest Staff, Regional Staff, and District Ranger. Two years USDI BLM - Plant Ecologist/Resources Specialist, 3 years Private consultant - NEPA, Permit Acquisition, Minerals development, Natural Resources Management.

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Natural Resources Defense Council	USDI BLM Oregon and Washington
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District Court Judge	Oregon State Forestry Resource Planning
Grant County Commissioners	Oregon State Forestry Unit Forester
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Grant County Judge	Redmond Chamber of Commerce
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The Citizen Newspaper	WSU, Envirn Science & Reg. Plan	Hume Library of Fed. Doc
The Nugget Newspaper	Central Oregon Community College	Jefferson County Library
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BUSINESSES AND ORGANIZATIONS	BUSINESSES AND ORGANIZATIONS (Continued)
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American Rivers, Inc.	Ochoco Bowhunters Club
Argonne National Laboratory	Ochoco Chapter Oregon Nordic Club
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Brooks Res Investment Corp	Ochoco Nordic Club
Burns Paiute Tribal Council	Ochoco Resource and Recreation Association
Center for Environmental Health	OJI Paper Company, Limited
Central Oregon Audubon Chapter	Oregon Chapter American Fisheries Soc.
Central Oregon Flyfishers	Oregon Historical Society
Chaps	Oregon Hunter's Association
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Confederated Warm Springs Tribes	Oregon State Snowmobile Assoc., Inc
Consolidated Pine	Oregon Trout
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Crown Pacific, Limited	Pacific Marine Tech Research Library
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Friends of the Earth Northwest Office	Prineville Sawmill Co
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Gray Butte Grazing Association	Rural Electrification Administration
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Bibliography

BIBLIOGRAPHY

Adams, Darius M , Haynes, Richard W., "Changing Perspectives on the Outlook for Timber in the United States." *Journal of Forestry*, 1985.

Advisory Council on Historic Preservation, *Treatment of Archaeological Properties - A Handbook*. Part II, Section X, Washington, DC; 1980.

Aho, Paul E., "Decay of Grand Fir in the Blue Mountains of Oregon and Washington Pacific Northwest Forest and Range Experiment Station." USDA Forest Service PNW-229, Portland, OR; 1977.

Alderfer, R. B.; Robinson, R. R., "Runoff from pastures in relation to grazing intensity and soil compaction." *J Am Soc Agron* 39·948-58; 1947.

American Geological Institute, *Dictionary of Geological Terms*. Anchor Press. Garden City, NY; 1960.

Amman, Gene D.; et al , "Guidelines for Reducing Losses of Lodgepole Pine to the Mountain Pine Beetle in Unmanaged Stands in the Rocky Mountains " Intermountain Forest and Range Technical Report INT-36; 1977.

Anderson, Henry W , "Sediment Deposition in Reservoirs Associated With Rural Roads, Forest Fires and Catchment Attributes." In Proc Symp Man's effects on erosion and sedimentation. UNESCO. International Association of Hydrology Science Publication 113, 1974. pp. 87-95.

Anderson, Henry W., et al , "Forests and Water Effects of Forest Management on Floods, Sedimentation, and Water Supply " USDA Forest Service General Technical Report PSW-18, 1976.

Anderson, R G., et al , "Snags," pp. 60-77, in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington* Edited by J. W. Thomas USDA Forest Service Agriculture Handbook No 553, 1979 512 p

Anon , "Water Quality Management for National Forest System Lands in California." FSH 2509.22 Region 5, USDA Forest Service, 1985.

Ashwill, Melvin, "An Exposure of Limestone at Gray Butte, Jefferson County, OR " in *Oregon Geology*, Vol. 41, #7, July; 1979.

Bacon, Warren R., Dell, John "National Forest Landscape Management " Vol 2, Ch. 6, Ag. *Handbook No 608, USDA Forest Service; 1985*

Bailey, Robert G , "Proceedings of the Workshop on Lessons from Using FORPLAN." Washington DC; USDA Forest Service; 1986.

Baker, D. L., et al , "Energy - and Nitrogen-based Estimates of Elk Winter-Range Carrying Capacity." *Journal of Wildlife Management* 46(1): 12-21; 1982

Balda, Russell; Brown, Jeffery, "Use of Nest Boxes in Ponderosa Pine Forests " Dept Bio. Sciences, N Ariz Univ, Flagstaff, AZ; 1984

Balda, Cunningham; & Gaud, "Selection and Use of Snags by Secondary Cavity-nesting Birds of the Ponderosa Pine Forest " USDA Forest Service Research Paper RM-222; 1980.

Baldwin. E M *Geology of Oregon* Kendall/Hunt Publishing Co, Dubuque, Iowa; 1981.

Barrett, James W., "Silviculture of Ponderosa Pine in the Pacific Northwest· The state of our knowledge" Pacific Northwest Forest and Range Experiment Station, USDA Forest Service PNW-97 Portland, OR; 1979.

Barrett, James W ; et al , "Northwestern Ponderosa Pine and Associated Species " In· Burns, Russell M , tech. comp Silvicultural Systems for Major Forest Types of the United States. Agriculture Handbook No. 445 Washington, D C , USDA Forest Service, 1983; pp 16-18

Barrett, James, Roth, Lewis P , "Response of Dwarf Mistletoe Infested Ponderosa Pine to Thinning " Pacific Forest and Range Experiment Station Research Paper PNW-330, 1985.

Bates, Robert L , *Geology of the Industrial Rocks and Minerals* Dover Publication, Inc, NY; 1969

Beall, R C., "Winter habitat selection and use by a western Montana elk herd " Ph D Diss., Univ Mont , Missoula; 1974 197 p

Beaulieu, John D , "Geologic Formations of Eastern Oregon." Oregon Dept of Geology and Mineral Industries Bulletin 73, 1972.

Behan, Ph. D., Mark J., "The Cycle of Minerals in Forest Ecosystems " In· combined business meeting, Intermountain Fire Research Council and Symp , 1970

Behrens, Norm, "Personal Communication " Oregon Department of Fish and Wildlife, 1985

Bergstrom, Dorothy, "Trees Help Keep a Forest Fertile." Forest Research West, USDA Forest Service May, 1979

Berry, J. A , "Modeling the impact of logging debris in streams." In Watershed Management ASCE - 1975 Proc Watershed Mgt Symp ; 1975, pp. 676-680

Beschta, Robert L., Johnson, Michael G , "Logging, Infiltration Capacity and Surface Erodibility in Western Oregon " *Jour. of For* Vol 78 No 6; June, 1980

Blackburn, W H , "Livestock Grazing Impacts on Watersheds " Rangelands 5(3) 123-125; 1983

Borden, John H., Doliner, Laura H , "Pest Terms: A Glossary of Forest Pest Management Terms." Center for Pest Management, Dept. of Biological Sciences, Simon Fraser Univ. Burnady, B C. V5A156; 1984.

Bottom, D. L ; et al., "The Effects of Stream Alterations on Salmon and Trout Habitat in Oregon " Oregon Department of Fish and Wildlife, Portland, OR; 1985

Bowen, R G., et al , "Low-to-Intermediate-Temperature Thermal Springs and Wells in Oregon " Oregon Department of Geology and Mineral Industries, GMS-10; 1978

Boyer, Donald E , Dell, John D , "Fire effects on Pacific Northwest Forest Soils " USDA Forest Service, Pacific Northwest Region, Watershed Management, and Aviation and Fire Management, Portland, OR , 1980

Brody, S , *Bioenergetics and Growth*. Hafner Publishing Co. Inc., New York, 1945 1023 p.

Brooks, H C , "Quicksilver in Oregon." Oregon Department of Geology and Mineral Industries, Bulletin 55; 1963.

Brooks, H.C., "Quicksilver Deposits in Oregon." Oregon Department of Geology and Mineral Industries, Miscellaneous Paper 15; 1971.

Brooks, H.C., "Ochoco National Forest Geology." Oregon Department of Geology and Mineral Industries, unpublished report, 1976

Brooks, H.C, and Ramp, L , "Gold and Silver in Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 61; 1968.

Brooks, H.C. and Ferns, M.L., "Geology and Mineral Industries of the Ochoco National Forest " Excerpts from a Report in Preparation USFS unpublished report; 1968.

Brown, C.E. and Thayer, T P , "Geologic Map of the Canyon City Quadrangle, Northeastern Oregon." USGS Miscellaneous Geologic Investigations, Map I-447, 1.250,000, 1966

Brown, George W., Krygier, James T , "Changing water temperatures in small mountain streams." Journal of Soil & Water Conservation 22 242-244; 1967.

Brown, H.E.; et al., "Opportunities for Increasing Water Yield and Other Multiple Use Values on Ponderosa Pine Forest Lands " Rocky Mountain Forest and Range Experiment Station USDA Forest Service, Research Paper RM-129 36 p.; 1974

Bruns, Herbert, "The Economic Importance of Birds in Forests." Bird Study, Vol 7(4): 193-208, 1960

Bryant, L. D., "Response of Livestock to Riparian Zone Inclusion " Journal of Range Management. 35(6). 11-82, 1982

Bryant, Richard; et al , "The Effects of Yarding Operations on Archaeological Sites." Volume II. A report prepared by professional analysts for the Pacific Northwest Region, USDA, Forest Service, Portland, OR; 1982.

Bull, Evelyn, "Habitat utilization of the pileated woodpecker, Blue Mountains of Oregon." Thesis, Oregon State University; 1975.

Bull & Meslow, "*Habitat requirements of the pileated woodpecker in northeastern Oregon* " Journal of Forestry, Vol 75(6)· 335-337, 1977

Bullard, W E , "Effect of Highway Construction and Maintenance on Stream Sediment Loads " USDA Miscellaneous Publication 970 Symposium 1. - Land erosion and control, 1963

Bureau of Mines, U S Department of the Interior. "Mineral Commodity Summaries, 1987 " Bureau of Mines, 1987

Campbell, R W, et al , "Predation by birds and ant affects aggregation of the western spruce budworm " From *The Role of the Host in the Population Dynamics*, L Safranyik editor, Pacific Forest Center of the Canadian Forest Service, Victoria, B C , 1983

Campbell, T M , "Short-term Effects of Timber Harvest on Pine Marten Ecology " M S Thesis, Colorado State University Fort Collins, Colorado, 71 p , 1979

Canyon Creek Youth Conservation Corps , "Mines of the Ochoco Mountains " unpublished report, Ochoco National Forest, 1974.

Carlson, Clinton E., et al., "The Western Spruce Budworm in Northern Rocky Mountain Forests A Review of Ecology, Past Insecticidal Treatments and Silvicultural Practices." Forest Science Laboratory, Missoula, MT; 1983.

Carlson, Clinton E.; et al , "Alternatives to Chemical Insecticides in Budworm - Susceptible Forests Western Wildlands " Forest Science Laboratory, Missoula, MT; 1983.

Central Oregonian, Jan 17:1 (col. 3). "Moulding Plant County's Top Employer." 1984

Chamberlin, T. W., "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. Timber Harvest." USDA Forest Service, General Technical Report PNW-136; 1982

Chambers, C. T., "A Second Look at Thinning: The Effect of Thinning on Allowable Cut - The State Position." DNR No 17, State of Washington; January 1977.

Christner, J., "Changes in Peak Streamflows from Managed Areas of the Willamette National Forest " USDA Forest Service, Pacific NW Region.

Cleary, Brian D., et al , "Regenerating Oregon's Forests· A Guide for the Regeneration Forester." Oregon State University School of Forestry, Corvallis, OR, 1978.

Cochran, P. H ; Seidel, K W , "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " Pacific Northwest Forest and Range Experiment Station USDA Forest Service PNW-121 Portland, OR, 1981.

Confederated Tribes of the Warm Springs Reservation, "Warm Springs Reservation Comprehensive Plan (Draft)." [Place of publication unknown], [Date unknown]. 429 p

Cole, David N., Schriner, Edward G S , "Impacts of Backcountry Recreation Site Management and Rehabilitation--An Annotated Bibliography." USDA Intermountain Forage and Range Exp. Sta , General Technical Report INT-121; 1981.

Cole, Walter E ; McGregor, Mark D., "Reducing or Preventing Mountain Pine Beetle Outbreaks in Lodgepole Pine Stands by Selective Cutting " [Proceedings of IUFRO Banff Centre Sept. 1983 L. Safranyik (Editor)]. Pacific Fy Res. Centre of Can. Fy Service, Victoria BC, 1983

Cornish, P. M.; MacKay, S. M , "Effects of Wildlife and Logging on the Hydrology of Small Catchments Near Eden, N S.W." In· The First National Symposium on Forest Hydrology, Melbourne, Australia; 1982

Corono, Julie M.; Wilcox, William R , "Western Wood Heating Value Calculator, Colorado State Forest Service " Colorado State Univ., Fort Collins, CO, Sept 1980

Cox, D P. et al , "Mineral Deposit Models " USGS Bulletin 1693; 1987

Crawford, Hewlette S , et al., "Effects of Fire on Fauna " A state-of-knowledge review-- USDA Forest Service General Technical Report WO-6, US Government Printing Office Washington, D.C ; 1978, 22 p

Cromack, Jr , et al , "A Comparison of Harvesting Methods and their Impact on Soils & Environment in the Pacific Northwest " From. Forest Soils & Land Use, Proc. Fifth N A For. Soils Conf ; Aug. 6-9, 1978

Crook, County of. "Crook County--Prineville Area Comprehensive Plan." Prineville, OR, 1978; 209 p.

Crouch, Glenn L., "Wild Animal Damage to Forests in the United States and Canada." Pac. N.W. Reg. & Expt. Sta. USDA. Olympia, WA; 1976.

Crow, James F., Kimuna; Matoo "The Measurement of Effective Population Numbers." Evaluation 17(13); 1963; pp 279-288.

Curtis, Robert O., "Growth and Yield in Uneven-Aged Stands." [Combined proceedings of two in-service workshops, Uneven-Aged Silviculture and Management in the U.S.] Timber Mgt. Reg. F.S. USDA. Washington, D.C.; 1976.

Dasmann, et al., "Ecological Principles for Economic Development." 1973; pp 22-23.

Davis; Goodwin, et al., "Snag Habitat Management: Proceedings of the Symposium." USDA Forest Service General Technical Report RM-99; 1983.

Deschutes, County of. "Deschutes County Year 2000 Comprehensive Plan." Bend, OR; 1979; p. 272.

Doliner, Laura H; Borden, John H. "PESTERMS: A Glossary of Forest Pest Management Terms." Center for Pest Management, Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A156; 1984.

Dolph, Robert E. "How to Hazard Rate Lodgepole Pine or Second-growth Ponderosa Pine Stands and Develop Management Guidelines to Prevent Future Mountain Pine Beetle Losses." Pacific Northwest Region V.S.E.S. Department of Agriculture, Portland, OR; 1983.

Dolph, Robert E.; Filip, Gregory M., "Forest Insect and Disease Activity on the Ochoco National Forest and Guidelines for Preventing/Reducing their Losses." Pacific Northwest Region of Forest Service, Department of Agriculture, Portland, OR; 1980.

Dolph, R. E.; Sartwell, Charles., "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine." Pacific Northwest Forest and Range Experiment Station USDA Forest Service. Research Note PNW-268; 1976.

Dryden, M., "Interim Cultural Resource Inventory Design for the Ochoco National Forest and Crooked River National Grassland." Working Paper edited by Thomas L. Burge, Prineville, Oregon: Ochoco National Forest ; 1988.

Dyrland, Richard D., "Resource Capability System, a User's Guide." Part VI. *Basic Economic Concepts and Procedures*. San Francisco, CA: USDA Forest Service, Region 5, Division of Soils and Watershed Management; 1973.

Dyrness, C. T.; et al., "Research Natural Area Needs in the Pacific Northwest." General Technical Report PNW-38. Portland, OR: USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1975; 231 p.

Edgerton, P J.; McConnel, B. R. "Diuvnal temperature regimes of logged and unlogged mixed conifer stands on elk summer range." USDA Forest Service Pacific Northwest Forest and Range Experiment Station La Grande, OR Res Note PNW-277; 1976; 6 p.

Ellison, A C , "Changes in Peak Streamflow." In. a letter to R-6 Forest Supervisors; March 6, 1981.

Ferns, M L , "Mining Activity and Exploration in Oregon, 1988 " *Oregon Geology*, Oregon Department of Geology and Mineral Industries, Vol. 51, #2; March 1989.

Ferns, M.L. and Brooks, H C., "Geochemical Survey of the Western Part of the Ochoco National Forest, Crook and Wheeler Counties, OR " Oregon Department of Geology and Mineral Industries, Open-File Report 0-83-4, 1983.

Ferns, M.L. and Huber, D F., "Mineral Resources Map of Oregon " Oregon Department of Geology and Mineral Industries, GMS-36, 1:500,000, 1984.

Filip, Gregory M., "Forest Pest Survey of the Ochillee Stand " Prineville R D., Ochoco National Forest, Pacific Northwest Region Forest Service USDA,Portland, OR; 1983.

Fischer, et al , "Habitat management for hole-nesting birds in forests of western larch and Douglas-fir." *Journal of Forestry*, Vol 77(8). 480-483; 1979

Fouch, T D., "Petroleum Potential of Wilderness Lands in Oregon " USGS Miscellaneous Investigation Series Map I-1544; 1983.

Francis, D D., Schepers, J S , "Chemical Water Quality of Runoff from Grazing Land in Nebraska: I. Influence of Grazing Livestock " Journal of Environmental Quality Vol 11 No. 3, 1982, pp. 351-354.

Frankel, Goheen; et al , "Effects of Management Activities and Dominant Species Type on Pest-caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests " Pacific Northwest Region Forest Service - USDA. Portland, OR, 1984.

Franklin, Jerry F et al , "Ecological Characteristics of Old-Growth Douglas-fir Forests." Gen Tech. Rep. PNW-118 USDA Forest Service, Pacific Northwest Region. 382 pp.; 1981

Franklin, Jerry F., Dyrness, C T , "Natural Vegetation of Oregon and Washington General Technical Report PNW-8 " Portland, OR: U.S Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1973.

Fredriksen, R L , Harr, R A , "Soil, Vegetation and Watershed Management of the Douglas-Fir Region In Forest Soils of the Douglas-fir Region " Washington State University, Pullmann, WA; 1979

Froehlich, Henry A , "Predicting Soil Compaction on Forest Land." Oregon State Univ Forest Eng. Dept; Dec 1980

Froehlich, H. A , "Soil Compaction From Logging Equipment: Effects on Growth of Young Ponderosa Pine " Journal of Soil & Water Conservation, pp 276 - 278, 1979

Galbraith, A. F., "A Water Yield and Channel Stability Analysis Procedure " Kootenai National Forest, U S Forest Service, Libby, MT; 1973; 38 p

Gara, Robert I , "Insect Pests of Tree Firs in the Pacific Northwest " U. of Wash Proceedings of the Biology and Mgmt. of Tree Firs Seattle, WA, Feb. 1981

Gardner, R B., et al , "Road Design Guidelines for the Idaho Batholith, Based on the China Glenn Road Study " USDA Forest Service, Research Paper INT-204; 1978

Garton, et al , "Effects of Stand Characteristics on Avian Predators of Western Spruce Budworm " From *The role of the host in the population dynamics of forest insects* L. Safranyik - Editor Pacific Research Centre of the Canadian Forest Service, Victoria B C ; 1983.

Gebhardt, K A.; Johnson, C. W "Predicting Sediment Yields from Sagebrush Rangelands " Agriculture Experiment Station University of Idaho, Moscow, ID; 1981

Geist, Michael, J.; et al , Research Progress Report; 1984.

Gibbs, Carter B., "Uneven-aged Silviculture and Management? Even-aged Silviculture and Management? Definitions and Differences." [Combined Proceedings Redding, Calif. Oct. 1976]. Timber Management Research, Forest Service USDA Washington, D C., 1976.

Glass, Jr , G. G., "The effects From Root Raking on an Upland Piedmont Loblolly Pine Site." Technical Report 56, School of For. Res. NC State U , Raleigh, NC, 1976; 44 p

Godwin, L H, et al., "Lands Valuable for Geothermal Resources." USGS, 1:500,000; 1974

Graham, Donald P., "A Training Aid on Dwarf Mistletoe and Its Control " Portland, OR USDA Forest Service, Pacific Northwest Region; 1967, 49 p.

Grant County, "Comprehensive Plan for Grant County, Oregon, John Day, OR " 1969, 24 p.

Gray, J J , et al., "Mineral Assessment of the Southwest Quarter of the Stevenson Mountain 30- by 60-Minute Quadrangle, Jefferson and Crook Counties, Oregon " Oregon Department of Geology and Mineral Industries, Open-File Report 0-86-4; 1986

Greene, R C., et al , "Geologic Map of the Burns Quadrangle, Oregon." USGS Miscellaneous Geologic Investigations, Map I-680, 1 250,000, 1972

Guenther, K., Kucera, T., "Wildlife of the Pacific Northwest " USDA Forest Service, Pacific Northwest Region, 1978

Haase, William R., "Mitigation of Chaining Impacts to Archaeological Sites " *Journal of Range Management* 36(2) 158-160; 1983

Haines, Sr., L. W , et al., "The Effect of Mechanical Site Preparation Treatments on Soil Productivity and Tree Growth," Forest Soils and Forest Land Management by Bernie E Weinget. Proc. 4th N4G. Soil Conf , Lawal, Quebec, 1975; pp 379-395.

Hall, Frederick C , "Growth Basal Area. A Field Method for Appraising Forest Site Potential for Stockability " Can. Fr of Fy Res. Vol 13 No 1, 1983.

Hall, Frederick C., "Fire and Vegetation in the Blue Mountains: Implications for Land Managers." Proc. Annual Tall Timbers Fire Biology Conference No 15· 155-170, 1976

Hall, Frederick C., "Plant Communities of the Blue Mountain Area in Eastern Oregon and Southeastern Washington " USDA Forest Service. Pacific NW Region-Area Guide 3-1; 1973.

Harney, County of, "Comprehensive Plan, Oregon." (Place of publication unknown), (Date unknown). 140 p

Harr, R D , "Movement of Subsurface Water on a Steep, Forested Slope " Trans Am Geogphys Union 56(8):532, 1975

Harr, R D , "Forest Practices and Streamflow in Western Oregon." Gen Tech Rep PNW-49, 18 p. USDA Forest Service, 1976.

Harr, Dennis R.; et al., "Changes in Streamflow Following Timber Harvest in Southwestern Oregon." USDA Forest Service Research Paper PNW-249, 22 p , illus. Pacific Northwest Forest and Range Experiment Station, Portland, OR; 1979.

Harvey, Alan E., et al., "Decaying Organic Materials and Soil Quality in the Inland Northwest: A Management Opportunity." Gen. Tech. Rep INT-225, USDA Forest Service; 1987.

Hayes, H. H.; et al., "*Temperature Effects on Physiological Traits of White-tailed Deer.*" Can. J. of Ecology 53: 679-685; 1975.

Helvey, J. D., "Effects of a North Central Washington Wildfire on Runoff and Sediment Production." Water Resources Bulletin, Amer. Water. Res. Assn. Vol. 16 No. 4; 1980; pp 627-634.

Helvey, J. D.; et al., "Climate and Hydrology of the Entiat Experimental Forest Watersheds Under Virgin Forest Cover." General Technical Report PNW-42. Portland, OR: USDA Forest Service Pacific Northwest Forest and Range Experiment Station; 1976; 18 p.

Henjum; et al., "Habitat Effectiveness Index Model: Elk on Blue Mountain Winter Ranges." Ore. Dept. Fish and Wildlife, LaGrande, OR, 1985.

Hershey, T. J ; Leege, T. A , "Influence of logging on elk summer range in north-central Idaho." pp 73-80, in Proc Elk - Logging - Roads Symposium, Univ. Idaho, Moscow; 1976.

Hewlett, J. D.; Doss, R., "Forests, Floods, and Erosion· A Watershed Experiment in the Southeastern Piedmont." 1984; 433 p.

Hibbs, C.H., "Mayflower Claims Group (Ochoco Mining District) Preliminary Cultural Resource Evaluation and Recommended Management Direction." Unpublished report, Ochoco National Forest; 1979.

Hinschberger M., et al., "Gros Ventre cooperative elk study final report " 1974-1979. Wyoming Game and Fish Department, Cheyenne, and USDA Forest Service; 1980; 192 p.

Hodgson, Allen H , "A History of the Ochoco National Forest " USDA, Forest Service, 1913

Hopkins; et al., "Sensitive Plant and Animal Field Guide for Area IV." USDA, Forest Service, R6-ECOL pp 1-131; 1983.

Hopkins, William E.; Kovalchik, Bernard L., "Plant Associations of the Crooked River National Grassland." R6 Ecol. pp. 133-198. USDA Forest Service, Pacific Northwest Region, 1983.

Houpt, H. F., "Road and slope characteristics affecting sediment movement from logging roads." *Journal of Forestry* 57:327-332; 1959.

Iverson, David C.; Richard M. Alston, "The Senesis of FORPLAN: Region 6 Training," USDA Forest Service, IMRS; 1986.

Jackman, Siri M.; Scott, Dr. J Michael, "Literature Review of Twenty-three Selected Forest Birds of the Pacific Northwest." USDA Forest Service, Pacific Northwest Region. 382 pp ; 1975

Jefferson County, "Comprehensive Plan." Madras, OR; 1981; 210 p

Jenson, M.L. and A.M. Bateman, *Economic Mineral Deposits*. John Wiley and Sons, NY; 1981

Johnson, K , "Westside Coordination Meeting Notes." USDA Forest Service Memo, September 21, 1983

Justus, D.L., "Geothermal Energy in Oregon: Site Data Base and Developmental Status." US Dept. of Energy (Draft); 1979.

Keegan, Charles E. III, et al., "Changes in Production Efficiency in Montana's Forest Products Industry, 1976-1987." Montana Business Quarterly 25(4)·8-12; 1987.

Keegan, Charles E. III; Polzin, Paul, "Trends in the Wood and Paper Products Industry and Their Impact on the Economy in the Pacific Northwest." Montana Business Quarterly 25(4).2-7; 1987.

Keen, F. P.; Miller, J. M., "Biology and Control of the Western Pine Beetle." USDA; March 1960.

Kelly, James W.; et al., "FORPLAN Version I: User's Guide." USDA Forest Service, Washington DC, LMP Systems Sections; 1986.

Kent, Brian M.; et al., "FORPLAN," Version I: Mathematical Programmers' Guide. USDA Forest Service, Washington DC, LMP Systems Sections; 1985.

Keyser, James D.; et. al., "Editors Management Strategy for the Treatment of Lithic Scatter Sites." Studies in Cultural Resource Management No 7. Portland, Or: USDA Forest Service. Pacific Northwest Region, 1988.

Kidd, W. J.; Megahan, W. F., "Effects of Logging and Logging roads on Erosion and Sediment Deposition from Steep Terrain." In Journal of Forestry, Vol. 70, No. 3, March 1972.

Kimball, J.; Savage, F., "Diamond Fork Aquatic and Range Habitat Improvement " Ogden, Utah: USDA Forest Service, Intermountain Region; 1977; 19 p.

Klock, G. O.; Lopushinsky, W., "Soil Water Trends after Clearcutting in the Blue Mountains of Oregon." USDA Forest Service, PNW - 361; May 1980.

Koplin, James R., "Measuring predator impact of woodpeckers on spruce beetles." *Journal of Wildlife Management*, Vol. 36(2). 308-320; 1972.

Kovalchik, Bernard L., "Preliminary Riparian Community Type Classification of Central Oregon." USDA Forest Service. Region 6 Ecology Program. June 1986.

Leckenby, D. A., "Elk use and availability of cover and forage habitat components in the Blue Mountains, Northeast Oregon, 1976-1982." Oregon Department of Fish and Wildlife, Report No. 14. Portland, OR; 1984.

Leckenby, D. A., "Management of mule deer and their habitat: applying concepts of behavior, physiology, and microclimate." West. Proc. Ann. Conf. West. Assoc. State Game and Fish Comm. 57: 206-217; 1977.

Lewis, Robert C., "Policy Formation and Planning for Outdoor Recreation Facilities." Outdoor Recreation - Advances in Application of Economics, by Hughes and Lloyd, USDA Forest Service, General Tech. Report WO-2.

Leege; Nelson, J. R , "Nutritional requirements and feed habits." Chapter 8, *Elk of North America*. Edited by J. W. Thomas and D. E. Towell Stackpole Books; 1982, 698 p.

Likens, G. E.; et al , "Effects of Forest Cutting and Herbicide Treatment on Nutrient Budgets in the Hubbard Brook Watershed Ecosystem." Ecological Management 40 24-46; 1970

"Lithic Scatter Programmatic Memorandum of Agreement," Advisory Council on Historic Preservation, USDA Forest Service (Central and Eastern Oregon Forests) and Oregon State Historic Preservation Office; 1984.

Long, B., et al., "Gros Ventre Cooperative Elk Study -Final Report, 1974-1979." Cheyenne, Wyoming, Wyoming Game and Fish Department and USDA Forest Service; 1980, 192 p

Loomis, John; Sorg, Cindy, "A Critical Summary of Empirical Estimates of the Values of Wildlife, Wilderness, and General Recreation Related to National Forest Regions Rock Mountain Forest and Range Exp Stn , USDA Forest Service, 1982

Lull, Howard W ; Reifsnyder, William E., "Radiant Energy in Relation to Forests " Tech Bull. No 1344, U S Dept Agriculture; 1965.

Lusby, G , "Hydrologic and biotic effects of grazing vs nongrazing near Grand Junction, Colorado." *J Range Mgmt.* 23(4).256-260, 1970

Lynch. J. A.; et al , "Best Management Practices for Controlling Nonpoint-source Pollution on Forested Watershed." *Journal of Soil and Water Conservation* Vol. 40, No 1, 1985; pp 164-167.

Lyon, Jack L ; et al , "Effects of Fire on Fauna " General Technical Report WO-6 Washington, D D.: USDA Forest Service, 1978, 22 p

Lyon, Jack, J., "Field Test of Elk/Timber Coordination Guidelines " USDA, Research Paper INT - 325, Ogden, UT, 1983

Lyon, L. J., Ward, A L , "Elk and Land Management." pp. 443-477, in *Elk of North America - Ecology and Management*, ed J W. Thomas and D E Towell, 1982, 698 p

Lyon, L J , "Habitat effectiveness for elk as influenced by roads and cover." *Journal of Forestry* 77 658-660, 1979.

MacCracken, J. G , Hansen, R M , "Diets of domestic sheep and other large herbivores in south-central Colorado " *Journal of Range Management*, 34 242-243; 1981.

MacMellon, C. R., "Woodpeckers as predators of the codling moth in Nova Scotia." *The Canadian Entomologist*, Vol. XCI(11). 673-680, 1959

MacMellon, C. R., "Role of woodpeckers in control of the codling moth in Nova Scotia " *The Canadian Entomologist*, Jan 1958; pp 18-22.

Mackie, R J , "Impacts of livestock grazing on wild ungulates " Trans. N. Amer Wildl and Nat. Res Conf 43 462-475, [Date Unknown].

Mahan, Mike, "Economic Survey Analysis " JTPA District 10 Salem, OR, State of Oregon, Employment Division, Department of Human Resources, 1984, 120 p

Maley, T S , "Mining Law from Location to Patent " Mineral Lands Publications, Boise, ID 1985.

Mannan, R.W., "Territory Size and Habitat Preferences of Pileated Woodpeckers in Western Oregon " OSU Corvallis Ag. Exp. Stat Tech , 1982

Manning, K J., "Reconnaissance Geologic Report on a Portion of the Western Ochoco Mountains, Ochoco National Forest, Oregon, with an Emphasis on Rockhound Deposits " Ochoco National Forest, unpublished report; 1971

Martin, R E , "Prescribed Burning for Site Preparation in the Inland Northwest " PNW Forest and Range Exp. Station, USDA Forest Service, 1976.

Martin, Robert E , "Fire history and its Role in Succession." In Means, Joseph E , ed Forest succession and stand development research in the Northwest. Proceedings of a symposium, 1981, Corvallis, OR. Forest Research Laboratory, Oregon State University, 1982.

Mason, Richard R., et al., "Douglas-fir Tussock Moth." USDA Pacific Northwest Region Forest Service; Forest Insect & Disease Leaflet #86; 1981.

McIntire, Tim, "Forest Health Through Silviculture and Integrated Pest Management - A Strategic Plan." USDA Forest Service; 1988, 26 p.

Megahan, W., "Channel stability and channel erosion processes." In: Proceedings, workshop on scheduling timber harvest for hydrologic concerns, Portland, OR; 1979

Meyer, Walter H , "Yield of even-aged stands of ponderosa pine." USDA Technical Bulletin No. 630. Washington, D.C., 1938.

Minor, R.; et. al., "Prehistory and History of the Ochoco National Forest, Central Oregon " Part I and Overview, and Part II Site Inventory. Cultural Resource Report No.3 Prineville, Oregon: Ochoco National Forest, 1987.

Minore, Don. "Comparative Autecological Characteristics of Northwestern Tree Species - A Literature Review " Pacific Northwest Forest and Range Experiment Station, USDA Forest Service General Technical Report, PNW 87; 1979

Mitchell, R. G.; et al , "Thinning Lodgepole Pine Increases Tree Vigor and Resistance to Mountain Pine Beetle." Forest Service, Vol. 29 No. 1, 1983; pp 204-211.

Moehring, D M , et al., "Clearcutting vs Alternative Timber Harvesting Regeneration Systems. Effects on Soils and Environment of the South." 1979; pp 447-515.

Moen, A. M., "Wildlife Ecology " San Francisco· W H Freeman and Co , 1963, 458 p

Nelson, J. R., Thomas, Jaqck Ward, "Relationship of Elk and Other Large Herbivores in Elk and North America Ecology and Management." ed J W Thomas and D E Towell. Stockpole Books, Harrisburg, PA, 1982; 698 p

Nelson R. L.; Platts, W. S , "Streamside and Upland Vegetation Use by Cattle." Rangelands 7(1); 1985.

Newton, V.C., "Oil and Gas Exploration in Oregon " Oregon Department of Geology and Mineral Resources, Miscellaneous Paper #6, 1965.

Obermiller, W.A , "Geologic, Structural and Geochemical Features of Basaltic and Rhyolitic Volcanic Rocks of the Smith Rock/Gray Butte Area, Central Oregon " MS Thesis, Dept. of Geology, University of Oregon, Eugene, OR, 1987.

Oregon Dept. of Geology and Mineral Industries "Bibliography of the Geology and Mineral Industries " Bulletin 103, 1987.

Oregon Dept of Geology and Mineral Industries "Geothermal Resources of Oregon " map, scale 1.500,000; 1982

Oregon, State of "Economic Development Department " County Economic Indicators, Salem, OR; 1984, 22 p

Oregon, State of. Employment Division, Department of Human Resources. "Data for 1984 Affirmative Action Programs (Crook County)." Salem, OR; [Date unknown], 18 p

Oregon, State of. Employment Division, Department of Human Resources. "Data for 1984 Affirmative Action Program (Harney County)." Salem, OR; [Date unknown]; 18 p.

Pacha, R. E., "Effects of Dispersed Recreation on Water Quality." In Interior West *Watershed Management symposium, April 1980, Spokane, WA. Edited by Baumgartner, Washington* State University, Pullman. p. 161-168.

Parmeter, Jr, J. R., "Forest Stand Dynamics and Ecological Factors in Relation to Dwarf Mistletoe Spread, Impact, 2nd Control Symposium on Dwarf Mistletoe Control through Forest Management." April 11-13, 1978. Berkely, CA. Pacific Southwest Forest and Range Experiment Station, USDA Forest Service General Technical Report PSW - 31; 1978.

Paulson, Dale J., "Ochoco National Forest Soil Resource Inventory." USDA Forest Service, Pacific Northwest Region; 1977; 289 p.

Payne, G. F.; et al., "Vehicle Impacts on Northern Great Plains Range Vegetation." Journal of Range Management 36(3)·327-331; 1983.

Peck, D.L., "Geologic Map of Oregon West of the 121st Meridian." USGS Miscellaneous Investigation Series, Map I-325, 1.500,000, 1983.

Pedersen, R. H., "Management and impacts of roads in relation to elk populations." Pages 169-173 in Proc Rec. Impact on Wildlands Conf., Univ. Wash., Seattle; 1978.

Pedersen, Richard, Biologist. "Personal Communication." USDA, Forest Service, Regional Office; 1983.

Perry, C.; Overly, R., "Impacts of roads on big game distribution in portions of the Blue Mountains of Washington 1972-1973." Washington Game Department Applied Research Section, Olympia; 1977, Bull 11 39 p.

Philipek, Frances M , "Over-Snow Logging: Analysis of Impacts to Lithic Scatters. Studies in Cultural Resource Management." No. 5. Pacific Northwest Region. USDA, Forest Service, Portland, OR; 1985.

Phillips, C.A., Roberts, R. "Documentation of Wildlife Management Requirements." USDA Forest Service Memo; June 4, 1985.

Phillips, et al., Wildlife Habitats and Species Management Relationship Program. 1981.

Picton, H. D., "Land use impacts on elk in the Gallatin Valley." J. Soil and Water Conserv. 35(2): 93-95; 1980.

Platts, W. S.; Meehan, W. R., "Livestock grazing and the aquatic environment." *Journal of Soil & Water Conservation* 1978; pp. 274-278

Platts, William S , "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. effects of livestock grazing." William R Meehan Ed. USDA Forest Service GTR-PNW-124, 1981; pp 9-12.

Power, W. E., "Effects & Observations of Soil Compaction in the Salem District." USDI, BLM, Technical Note; 1974.

Programmatic Memorandum of Agreement for Management of Depression-Era Administrative Structures on National Forest Lands in Oregon and Washington. USDA Forest Service, Pacific Northwest Region, Oregon and Washington State Historic Preservation Offices, and the Advisory Council on Historic Preservation; 1983.

Raphael, Martin G ; White, Marshal, "Use of Snags by cavity nesting birds in the Sierra-Nevada." Supplement to Journal of Wildlife Management, Vol. (48)10· 1-66, 1984

Ream, Catherine H. "The Effects of Fire and other Disturbances on Small Mammals and their Predators: An Annotated Bibliography." Intermountain Forest and Range Exp. Station; 1981.

Rice, R M., "A Perspective on The Cumulative Effects of Logging on Streamflow and Sedimentation In: Proceedings " Edgebrook Conference. Standiford, R.B.; S I Ramacher, ed. Berkely, CA; 1980.

Rice, R. M.; et al , "A watershed's response to logging and roads: South Fork of Casper Creek California." 1967-1976. Research Paper PSW-146, 12 p. Southwest Forest and Range Experiment Station, 1979.

Rich, L. R.; Thompson, J.R., "Watershed Management in Arizona's Mixed Conifer Forests: The Status of Our Knowledge." Rocky Mountain Forest and Range Experiment Station. USDA Forest Service Research Paper RM-130, 15 pp ; 1974.

Rimal, D. et. al., "Sediment, Rock Chip and Drill Core Geochemical Analytical Data, Gray Butte Area, Crooked River National Grassland, Jefferson County, Oregon " USDI Bureau of Land Management, Oregon State Office, Portland, OR; 1987

Robison, P.T. and Stensland, D H., "Geologic Map of the Smith Rock Area, Jefferson, Deschutes and Crook Counties, OR " USGS Miscellaneous Geologic Investigation Series Map I-1142, 1:48,000, 1979.

Rosenthal, Donald H ; Brown, Thomas C., "Comparability of Market Prices and Consumer Surplus for Resource Allocation Decisions " Journal of Forestry, pp 105-109, 1985.

Robson, Thomas P.; Stanford, Richard B , "Management of the Eastside Pine Type in Northeastern California Proceedings of Symposium." June 1982 Northern California School of American Foresters SAF 83-06, 1983.

Roth, Lewis F.; et al , "Marking Ponderosa Pine to Combine Commercial Thinning and Control of Armillaria Root Rot." *Journal of Forestry*, Vol. 75 No 10, Oct. 1977

Rothwell, R L., "Watershed Management Guidelines for Logging and Road Construction in Alberta." Information Report NOR-X-208. Northern Forest Research Center, Edmonton, Alberta, Canada, 1978.

Rothwell, R. L , "Erosion and Sediment Control at Road-Stream Crossings." The Forestry Chronicle 4:83; 1983, pp 62-66

Row, Clark H., et al , "Discount Rate for Long-Term Forest Service Investments." 1981

"Runoff from pastures in relation to grazing intensity and soil compaction." *J Am Soc.* Agron. 39:948-58.

Russell, Kenelm W , "Precommercial Thinning in Dwarf Mistletoe Control " Washington State Department of Natural Resource, Olympia, WA, [No date].

Ruttner, Franz, "Fundamentals of Limnology " 3rd University of Toronto Press, 1963, 295 p.

Sartwell, Charles; Dolph, R E , "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine." Research Note PNW-268. Portland, OR: USDA Forest Service Pacific Northwest Forest and Range Experiment Station, 1976.

Schmitt, Craig, L ; et al., "Effects of Management Activities and Dominant Species Type on Pest Caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests." Portland, OR· USDA Forest Service, Pacific Northwest Region, 1984.

Schuster, Ervin G.; et al , "Provisions for Protecting and Enhancing Nontimber Resources in Northern Region Timber Sales." Intermountain Forest and Range Experiment Station, USDA Forest Service, Ogden, UT, 1984

Schwavzbart, Gideon; Schmitz, Patrick L., "Methods for Evaluating Energy Effects of Forest Management Alternatives." Volume 1 Berkeley, CA USDA - Forest Service, Management Sciences Staff; 1982.

Seidel, K. W., "Natural regeneration after shelterwood cutting in a grand fir - Shasta red fir stand in central Oregon " USDA Forest Service, Research Paper PNW - 259; 1979.

Seidel, K. W , Cochran, P. H , "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " General Technical Report PNW-121 Portland, OR USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1981

Shirley, R F , "Area Recommended for a Recreation Withdrawal from Mineral Entry for all Non-Metalliferous Minerals, Including, but Not Limited to, Agate, Jasper, Thundereggs, Limb Casts and Related Minerals Under the Authority of the Act of June 25, 1918 " 43 USC 141, 142 unpublished report, Ochoco National Forest, 1970

Shirley, R F., "Mineral Report, Rockhound Areas, Ochoco National Forest, and Crooked River National Grasslands " Unpublished report, Ochoco National Forest, 1966.

Sidle, R. C., "Impacts of Forest Practices on Surface Erosion." PNW 195, 1980; pp 5-9.

Skeesick D. G ; Stewart, K.S., "Stream Rehabilitation Needs Associated with Timber Harvest Units and Roads " USDA Forest Service, Willamette National Forest; 1981.

Skinner, Q , et al , "Effects of summer use of a mountain watershed on bacterial water quality. Journal of Environmental Quality 3(4) 329-325; 1974

Smith, B , "Lands Valuable for Oil and Gas " Oregon USGS Map, 1 500,000, 1976

Soule, M E , Thresholds for survival maintaining fitness and evolutionary potential " In M. E Soule and B. A Wilcox (ed.). *Conservation biology; an evolutionary-ecological perspective.*" Sinauer Assoc , Inc , Sunderland, MA 345, 1980

Sparrow, S D ; et al., "Effects of off-road vehicle traffic on soils and vegetation in the Denali Highway region of Alaska " Journal of Soil and Water Conservation Vol 33(1), 1978; pp 20-27

Spitz, Jim, "Socio-Economic Overview of the Ochoco National Forest and Crooked River National Grassland." Prineville, OR, Ochoco National Forest; 1982, 137 p

Steele, R. W.; Barney, R J , "Bulldozers in Fire Management Current Designs and Uses." USDA Forest Service Intermountain Forest and Range Experiment Station, Research Note INT-328, 1983

Stone, E , "The impact of timber harvest on soils and water." In Rep. President's Advisory Panel on Timber and The Environment, 1973; pp 427-467.

Stoszek, Karel J., "Protection Concerns in Plantation Establishment." [Proceedings of tree planting in the inland northwest] - D. Baumgartner editor, Feb 1976; Washington State University, Pullmen, WA, 1976

Street, Bill, "Economic Survey Analysis, JTPA District 12 " Salem, OR, State of Oregon, Employment Division, Department of Human Resources; 1985; 120 p.

Street, Bill, "Economic Survey Analysis, JTPA District 14 " Salem, OR, State of Oregon, Employment Division, Department of Human Resources; 1985; 120 p.

Styskel, E. W., "Problems in snag management implementations - a case study " pp. 24-27 in Proc. Snag Habitat Mgt. Symposium USDA Forest Service Rocky Mountain Range and Experiment Station, General Technical Department RM-99 Ft Collins, CO, 1983.

Swanson, D.A , "Reconnaissance Geologic Map of the East Half of the Bend Quadrangle, Crook, Wheeler, Jefferson, Wasco and Deschutes Counties, OR." USGS Miscellaneous Investigation Map I-568, 1:250,000; 1969.

Swanston, D N., "Impact of Natural Events " In. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America, USDA Forest Service, GTR PNW-104; 1980.

Swinney, C M, et al , "Reconnaissance Geologic Map of the Lookout Mountain Quadrangle, Crook and Wheeler Counties, Oregon." USGS Miscellaneous Geologic Investigations, Map I-543, 1:62,500; 1968,

Teply, John, "Ochoco National Forest - Summary Tables for Timber Resource Inventory." Pacific Northwest Region F S USDA Portland, OR, 1982

Theisen, Peter A., "Gains and Benefits from Tree Improvement " Pacific Northwest Region USFS Department of Agriculture Tree Improvement Training Packet No. 1; Aug 26, 1980

Thomas, Jack Ward, "Wildlife Habitats in Managed Forests. The Blue Mountains of Oregon and Washington." Agriculture Handbook No. 553, USDA Forest Service; 1979.

Tout, Deborah S , "Mineral Potential Report." Crooked River National Grassland, 1988

Troendle, C A., Leaf, C.F., "An Approach to Water Resources Evaluation of Non-point Silvicultural Sources " Chapter 3, Hydrology EPA 60018-80-012, 173 pp Env. Research Lab. Athens, GA, 1980

USDA Forest Service. "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region." June 1986.

USDA Forest Service, Pacific Northwest Region. "Regional Guide for the Pacific Northwest Region." Covering Forest programs that affect the States of Oregon, Washington, and portions of California and Idaho; 1984.

Utzinger, Don, M S Graduate Student. "Personal communication " Portland State University; 1985.

Volland, Leonard A.; Dell, John D., "Fire Effects on Pacific Northwest Forest and Range Vegetation." USDA Forest Service, Pacific Northwest Region, Portland, OR, July 1981.

Walker, G.W , "Geologic Map of Oregon East of the 121st Meridian " USGS Miscellaneous Investigations Series, Map I-902, 1:500,000; 1977.

Ward, L A., "Elk behavior in relation to multiple uses on the Medicine Bow National Forest." Proc West Assoc. State Game & Fish Comm. 53:125-141; 1973.

Waters, A C., "Reconnaissance Geologic Map of the Post Quadrangle, Crook County, Oregon." USGS Miscellaneous Geologic Investigations, Map I-542,1.62,500; 1968.

Waters, A.C, and R.H. Vaughan, "Reconnaissance Geologic Map of the Eagle Rock Quadrangle, Crook County, Oregon." USGS Miscellaneous Geologic Investigations, Map I-540, 1:62,500; 1968

Waters, A.C, and R.H Vaughan, "Reconnaissance Geologic Map of the Ochoco Reservoir Quadrangle, Crook County, Oregon." USGS Miscellaneous Geologic Investigations, Map I-541, 1:62,500; 1968

Waters, A.C., "Reconnaissance Geologic Map of the Bend Quadrangle, Jefferson and Wasco Counties, OR.." USGS Miscellaneous Geologic Investigations Map I-555, 1.125,000, 1968

Webb, R. H ; et al., "Environmental Effects of Soil Property Changes with Off-Road Vehicle Use " Environmental Management Vol. 2, No 3; 1978; pp 219-233

Wert, S., Thomas, B R., "Effects of Skid Roads on Diameter, Height & Volume Growth in Douglas-Fir." Soil Sciences of America Journal, Vol 45, 1981, pp 629-632

Wessenborn, A.E , "Mineral and Water Resources of Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 64; 1969

Wheeler County and the Cities of Fossil, Mitchell, and Spray. Comprehensive Plan *Technical Report (Draft) Pendleton, OR, East Central Oregon Association of Counties; 1980, 260 p.*

Wick, H L.; Canutt, P R , "Impacts on wood production." Pages 148-161 in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington* ed J W. Thomas. USDA Forest Service Agriculture Handbook No. 553, 1979, 512 p.

Wickman, Boyd E ; et al , "Douglas-fir Tussock Moth " Forest Insect and Disease Leaflet #86. Portland, OR. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, 1981.

Williams, H., "A Geological Map of the Bend Quadrangle, OR " Oregon Dept of Geology and Mineral Industries, Map, Scale 1 125,000; 1957.

Winters, R A., "Mineral Investigation of the Deschutes Canyon, RARE II Area (No. 6321), Jefferson and Deschutes Counties, OR " USDI Bureau of Land Management, Portland State Office, Portland, OR; 1983

Wollott, S. T ; Pullar, D M., "Changes in Soil Physical Properties under Grazed Pastures " Journal of Soil Resource, 22: 342-348; 1984

Wooldridge, D D , "Suspended Sediment from Truck Traffic on Forest Roads, Meadow and Local Creeks." Water Quality Planning, Office of Water Programs, Department of Ecology, Olympia, WA; 1979

Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

* Term is defined in the Glossary

Acronym	Definition
"8A"	Contracts set aside for Minority Contractors
A	Alternative A
A.	Acres
ACF	Acre Foot *
ACHP	Advisory Council on Historic Preservation *
ADRV	Air Quality Related Values
AFDC	Aid for Dependent Children
AIRFA	American Indian Religious Freedom Act
AMP	Allotment Management Plan
AMS	Analysis of the Management Situation *
ASQ	Allowable Sale Quantity *
ATV	All-Terrain Vehicle *
AU	Animal Unit *
AUM	Animal Unit Month *
B-MOD	B-Modified Alternative
BD	Brush Disposal
BG	Big Game Habitat (Area Management Objective) *
BLM	Bureau of Land Management
BMP	Best Management Practices *
BOR	Bureau of Reclamation
B.t.	*Bacillus thuringiensis* *
BTU	British Thermal Units
C-MOD	C-Modified Alternative
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFL	Commercial Forest Land *
CFR	Code of Federal Regulations
CMAI	Culmination of Mean Annual Increment *
CRITFC	Columbia River Inter-Tribal Fish Commission
CRNG	Crooked River National Grassland
DBH	Diameter Breast Height *
DC/SF	Deschutes Canyon/Steelhead Falls
DEIS	Draft Environmental Impact Statement *
DEP	Departure *
DEQ	Oregon Department of Environmental Quality
DF	Douglas Fir
DIB	Diameter Inside Bark
DOGAMI	Oregon Department of Geology and Mineral Industries
E-DEP	E-Departure Alternative
EA	Environmental Assessment *
EA	Euro-American (Cultural Resources)
ECA	Equivalent Clearcut Area *
EEO	Equal Employment Opportunity
EFSA	Escaped Fire Situation Analysis
EHA	Equivalent Harvest Area *
EHE	Earned Harvest Effect *
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FDR	Forest Development Road *
FEIS	Final Environmental Impact Statement *

FIA	Forest Influence Area
FMEI	Fire Management Effectiveness Index *
FORPLAN	Forest Planning Model
FPFO	Forestry Program for Oregon *
FRES	Forest and Range Environment Study
FS	Forest Service
FS	Forest Supervisor
FSH	Forest Service Handbook
FSM	Forest Service Manual
FUD	Fishing User Days
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year *
HE	Habitat Effectiveness *
HEI	Habitat Effectiveness Index
HCI	Habitat Capability Index *
I	Alternative I
ICO	Issues, Concerns, and Opportunities
ID	Interdisciplinary
IDT	Interdisciplinary Team (ID Team) *
IMPLAN	Forest Service Input-Output Economic Model *
IPM	Integrated Pest Management *
K-V	Knutson - Vandenberg Act of 1924 *
KV	Kilovolt
LIDES	Local Interactive Digitizing and Editing System
LMP	Land Management Planning
LP	Lodgepole Pine
LP	Linear Programming
LRMP	Land and Resource Management Plan
LTSYC	Long Term Sustained Yield Capacity *
M	Roman Numeral for 1000 *
MA	Management Area *
MA-D1-14	Management Area-Draft Plan, Areas 1-14
MA-F1-28	Management Area-Forest Plan, Areas 1-28
MA-G1-16	Management Area-Grassland Plan, Areas 1-16
MAI	Mean Annual Increment *
MAR	Management Attainment Report
MAX	Maximum Viable Population
MBF	Thousand Board Feet *
MC	Mixed Conifer *
MCF	Thousand Cubic Feet
MIS	Management Indicator Species *
MM	Million *
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MO	Management Objective
MOA	Memorandum of Agreement *
MOU	Memorandum of Understanding
MR	Management Requirement *
MRVD	Thousand Recreation Visitor Days
MVP	Minimum Viable Population *
NA	Native American
NC	No Change Alternative
NEPA	National Environmental Policy Act *
NFCR	North Fork Crooked River
NFDRS	National Fire Danger Rating System
NFF	National Forest Fund *
NFMA	National Forest Management Act *
NFS	National Forest System Land *

NIRP	National Information Requirements Project
NWPS	National Wilderness Preservation System
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle *
ONF	Ochoco National Forest
ORV	Off-Road Vehicle •
OSWC	Oregon State Wildlife Commission (Now ODFW)
PAMARS	Program Accounting Management Attainment Reporting System
PAOT	Persons at One Time *
PL	Public Law (also P.L.)
PMOA	Programmatic Memorandum of Agreement
PNV	Present Net Value *
PNW	Pacific Northwest
PP	Ponderosa Pine
PSD	Prevention of Significant Deterioration
R	Rural (ROS Classification) •
R-6	Forest Service, Northwest Region
RAMIS	Range and Management Information System
RARE II	Roadless Area Review and Evaluation *
RIM	Recreation Information Management *
RMO	Road Management Objective
RN	Roaded Natural (ROS Classification) *
RNA	Research Natural Area *
RO	Regional Office
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum *
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974
RVD	Recreation Visitor Days *
RWS	Recreation Wilderness Spectrum *
SCORP	State-wide Comprehensive Outdoor Recreation Plan
SEV	Soil Expectation Value
SHPO	State Historic Preservation Officer (or Office) *
SIP	State Implementation Plan (for Air Quality)
SMU	Streamside Management Units
SPM	Semiprimitive motorized (ROS Classification) *
SPNM	Semiprimitive Nonmotorized (ROS Classification) *
SRI	Soil Resource Inventory *
STARS	Sale Tracking and Reporting System
S&G	Standards and Guidelines
T&E	Threatened and Endangered Species
T/R	Area to be developed for Timber/Forage Production
TIS	Transportation Inventory System
TRP	Timber Resource Plan
TSI	Timber Stand Improvement *
TSP	Total Suspended Particulates
TSPIRS	Timber Sale Program Information Reporting System
USDA	United States Department of Agriculture
USFS	United States Forest Service
VAC	Visual Absorption Capability
VIS	Visitor Information Service
VMS	National Forest Visual Management System
VQO	Visual Quality Objective
WFUD	Wildlife/Fish User Day *
WRS	Wilderness Resource Spectrum •
WS	Wild and Scenic Designation
WSA	Wilderness Study Area
WUD	Wildlife User Day

Glossary

GLOSSARY

These definitions apply to Forest Service land management and planning Meanings may differ when used in another context. Some definitions were shortened, paraphrased or adapted to fit local conditions. Definitions of other terms used in resource management but not included in this glossary may be found in the following publications:

* American Geological Institute; *Dictionary of Geological Terms* Doubleday & Company Inc., New York; 1962.

* Kothman M M.; *A Glossary of Terms Used in Range Management* Society for Range Management, 1974.

* Mifflin, Ronald W and Hiton H. Lysons. *Glossary of Forest Engineering Terms* USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1979.

* Schwarz, Charles F.; Thor, Edward C.; Elsner, Gary H. *Wildland Planning Glossary* USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, General Technical Report PSW-13; 1976.

A

ACCEPTABLE RIPARIAN CONDITION - A shady, brushy riparian condition with frequent amounts of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen; the site has the potential to produce conifers and/or hardwood species. Moderately gentle bank slopes containing moderate to high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas. Frequent channel scouring and deposition will largely be replaced by mossy aquatic growth on assorted sizes of tightly packed rocks.

ACRE EQUIVALENT - Used to adjust actual acres of habitat improvement or improvement structures to reflect overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species For example, a single water development for upland game birds has an acre equivalent of 160, whereas a single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals.

ACRE FOOT (ACF) - A unit for measuring a volume of water. Quantity of water required to cover 1 acre (43,560 square feet) to a depth of 1 foot.

ACRES OF DEGRADED WATERSHED CONDITION - represents existing soil/watershed areas which are degraded and contributing to loss in site productivity and/or creating water quality deterioration when hazardous events occur. The Soil/Water Restoration Inventory (1979) for the Ochoco National Forest (located at the Ranger District Offices) delineates these areas.

ACTIVITY - Actions, measures, or treatments that are undertaken that directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309.11.).

ADVISORY COUNCIL ON HISTORIC PRESERVATION (ACHP) - An independent advisory body established by the National Historic Preservation Act of 1966 The mission of the Council is to advise the President and Congress on national historic preservation policies, to encourage private and public interest in historic preservation, and to review and comment on Federal undertakings that might have an effect on properties listed on or eligible for the National Register of Historic Places.

ALL-TERRAIN VEHICLE (ATV) - An abbreviation whose initials stand for All-Terrain Vehicle, which is any motorized off-highway vehicle 50 inches or less in width ATV's usually have a dry weight of 600 pounds or less, traveling on three or more low pressure tires and having a seat designed to be straddled by the operator.

AIRSHED - A geographical area that, because of topography, meteorology, and climate, shares the same air

ALLOTMENT - see Range Allotment

ALLOWABLE SALE QUANTITY (ASQ) - (Comparable to programmed allowable harvest used in previous plans). The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This allowable sale quantity (ASQ) is usually expressed on an annual basis as the "average annual allowable sale quantity " (FSM 1900).

ALL-TERRAIN VEHICLE (ATV) - Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low pressure tires with a seat designed to be straddled by the operator. Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less *as recommended by the vehicle manufacturer.*

ALTERNATIVE - One of several policies, plans, or projects proposed for decision making

AMENITY - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land-use planning to describe those resource properties for which market values (or noncash values) are not or cannot be established, such as hiking or scenic viewing.

ANADROMOUS FISH - Those species of fish that mature in the sea and migrate into streams to spawn Salmon, steelhead, and searun cutthroat trout are examples

ANALYSIS AREA - An area of land (not necessarily contiguous) which for FORPLAN analysis purposes has homogeneous timber management costs and vegetative responses to timber management activities

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - A step required under the National Forest Management Act in which the Forest determines its ability to supply goods and services to meet society's demand for them.

ANIMAL UNIT (AU) - An animal unit is a 1,000 pound mature cow, or its equivalent based on an average daily forage consumption of 26 pounds dry matter per day.

ANIMAL UNIT MONTH (AUM) - The amount of forage required by an animal unit for one month

ANNUAL PROGRAMMED HARVEST - That part of the potential timber yield that is scheduled for harvest in a specific year.

APPROPRIATE SUPPRESSION RESPONSE - The kind, amount, and timing of suppression action on a wildfire which most efficiently meets fire management direction under current and expected burning conditions. The action may be from prompt control to confinement (See definitions for confine, contain, and control.)

AQUEOUS - *Of, relating to, or resembling water.*

ARCHAEOLOGY - The scientific study of the physical characteristics of cultural resources in order to describe and explain former ways of life.

ARTERIAL ROAD - Roads comprising the basic access network for National Forest System administrative and management activities These roads serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. They provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary

travel routes The location and standards are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually they are developed and operated for long-term land and resource management purposes and constant service.

B

***Bacillus thuringiensis* (*B.t.*)** - A biological agent used to initiate insecticidal treatments of the western spruce budworm populations

BACKGROUND - The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand (See "Foreground" and "Middleground.")

BASALT - A dark gray to black, fine-grained igneous rock.

BENCHMARK - An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints.

BENEFIT COST RATIO - An economic indicator of efficiency, computed by dividing total priced benefits by priced costs Usually both benefits and costs are discounted so that the ratio reflects efficiency in terms of the present value of future benefits and costs.

BEST MANAGEMENT PRACTICES (BMP) - A specific activity, measure, course of action, or treatment.

BIG GAME (BG) - Those species of large mammals normally managed for sport hunting, generally elk, deer, and antelope

BIOLOGICAL DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

BIOLOGICAL POTENTIAL - The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

BOARD FOOT - A unit of timber measurement equaling the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

*Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement, attempting to do so would underestimate the biological potential of timber producing lands and make future growth estimates impossible See cubic foot

BRECCIA - A rock made up of highly angular coarse fragments.

BROADCAST BURN - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as silvicultural treatment, or both.

C

CANOPY CLOSURE - The progressive reduction of space between crowns as they spread laterally, increasing the canopy density.

CAPABILITY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as on the application of management practices, such as silviculture or protection from fire, insects, and disease.

CAPITAL INVESTMENT COST - Costs generally associated with construction such as trails, roads, and physical structures for range, recreation, and fish and wildlife. Other major functions include reforestation, timber stand improvement and prescribed burning

CAVITY - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals.

CINNABAR - A mineral (HgS) which is the principal ore of mercury.

CLEARCUTTING - The harvesting in one cut of all trees on an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield.

COLLECTOR ROAD - Roads that serve smaller land areas than a Forest arterial road, and usually connected to a Forest arterial or public highway. Collect traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs, as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

COMMERCIAL FOREST LAND (CFL) - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

COMMERCIAL THINNING - A cut in a stand under rotation age designed to remove excess merchantable trees The objective is to place the growth capability of the site on the remaining leave trees.

COMMODITY - A transportable resource product with commercial value; all resource products that are articles of commerce.

COMMON VARIETY MINERAL - Saleable minerals.

COMMUNITY COHESION - The degree of unity and cooperation evident in a community as it defines problems and attempts to resolve them.

COMMUNITY STABILITY - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change.

COMPACTION, SOIL - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

CONCERN - A point, matter, or question raised by management that must be addressed in the planning process.

CONFINE - To limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions Suppression action may be minimal and limited to surveillance under appropriate conditions.

CONSTANT SERVICE - A road developed and operated for continuous or annual recurrent service

CONTAIN - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions

CONTROL - To complete the control line around a fire, any spot fires therfrom, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control line; and cool down all hot spots that are immediate threats to the contol line, until the line can reasonably be expected to hold under foreseeable conditions

CONVERSION PERIOD - A transition period during which an unregulated forest structure is converted to a regulated one. When regulated, the forest will have a distribution of stand age and size classes, providing approximately equal periodic harvests.

CORD - A unit of volume measurement containing 128 cubic feet of solid wood. Generally a stack of round or split wood measuring 4 feet wide by 4 feet high by 8 feet long.

CORRIDOR - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

COST EFFICIENCY - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

COVER/FORAGE RATIO - The ratio, in percent, of the amount of area in cover condition to that area in non-cover or forage condition; the criteria by which potential deer and elk use of an area is judged.

COVER - Vegetation used by wildlife for protection from predators, to ameliorate conditions of weather, or in which to reproduce.

CUBIC FOOT - In timber management a volume measured as a 1 foot cube of solid wood

*Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring within a locale, region, or the nation as a whole.

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - The age at which a stand of trees no longer increases in average annual growth.

CULTURAL RESOURCES - The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

CULTURAL RESOURCES - Physical remains of districts, sites, structures, buildings, networks, or objects used by humans in the past. They may be historic, prehistoric, archaeological, or architectural in nature Cultural resources are land based and are nonrenewable.

CUMULATIVE EFFECTS - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time

CURRENT DIRECTION - The direction contained within the following plans that has guided the recent management of the Forest and Grassland:

1. Ochoco-Crooked River Planning Unit Land Management Plan, 1979
2. Silvies-Malheur Planning Unit Land Management Plan, 1978
3. Crooked River National Grassland Land Management Plan, 1980

4. South Fork Planning Unit Land Management Plan, 1978
5. Timber Resource Plan Ochoco National Forest, 1979

D

DATA - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer forms.

DATA RECOVERY - Collection of information through any of a variety of techniques (e g , photography, mapping, archaeological excavation) conducted for purposes of No Adverse Effect or mitigating Adverse Effect. Data collection is designed to recover representative data from a cultural resource prior to its disturbance or destruction.

DBH - *D*iameter at *b*reast *h*eight. Diameter of a tree 4 feet 6 inches above the ground.

DECISION CRITERIA - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker in identifying a preferred choice from an array of possible alternatives.

DECISION VARIABLE - A component of an alternative in which input costs, outputs and benefits are identified and used for analysis and decision making.

DEMAND - The amount of goods or services that will be consumed if offered over a given range of prices at a particular point in time.

DEMOGRAPHIC - Pertaining to the study of the characteristics of human populations, such as size, growth, density, distribution, and vital statistics.

DEPARTURE (DEP) - Timber harvest schedule which deviates from the principle of nondeclining even flow by exhibiting a planned decrease in the timber sale and harvest schedule in the future. A departure is characterized as a temporary increase over the base sale schedule without impairing the Forest's long-term sustained-yield.

DETERMINATION OF ELIGIBILITY - Formal determination by the Keeper of the National Register, Department of Interior, as to whether or not a cultural resource is eligible for listing on the National Register of Historic Places.

DETERMINATION OF EFFECT - Determination of the effect (No Effect, No Adverse Effect, Adverse Effect) a proposed undertaking will have on cultural resources listed on or eligible for the National Register of Historic Places. Requires consultation with the State Historic Preservation Officer and may require review by or consultation with the Advisory Council on Historic Preservation

DEVELOPED RECREATION - Recreation that requires facilities that, in turn, result in concentrated use of an area Examples of recreation areas are campgrounds and ski areas; facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

DISCOUNT RATE - The interest rate used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits to a common time basis

DISPERSED RECREATION - A general term referring to recreation use outside a developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments

DISPERSION - To disperse the effects of timber harvest by distributing harvest units more or less uniformly throughout a drainage so that increased runoff and sediment from disturbed sites will be buffered by lower levels of runoff and sediment production from surrounding undisturbed lands

DISTRICT - See Ranger District.

DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) - The version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for review and comment. It is a formal document which must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) Guidelines, and directives of the agency responsible for the project proposal.

E

EARNED HARVEST EFFECT (EHE) - An increase in the present harvest based on the expectation of increased yields in the future resulting from management practices such as planting genetically-improved stock and thinning.

ECONOMIC EFFICIENCY - See cost efficiency.

ECOSYSTEM - The interacting system of a biological community and its nonliving environment.

EDGE - The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together. It often contains organisms from both communities as well as those restricted to the interface area The number of species present is often greater than the surrounding communities.

EFFECTS - Environmental consequences as a result of a proposed action Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in the FEIS are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508 8).

ELIGIBLE - Cultural properties that meet the criteria for listing on the National Register of Historic Places.

EMPIRICAL YIELD TABLE - A table reflecting the existing standing timber volumes today and how they would grow in the future, under various timber management regimes.

ENDANGERED SPECIES - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

ENDEMIC - A taxonomic category (e.g , genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

ENDEMIC ORGANISM - A taxonomic category (e.g., genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

ENHANCE - To improve, reinforce, enrich or strengthen the existing condition, value, or beauty of a resource.

ENHANCEMENT - Interpret cultural resources for the public benefit Cooperate with museums, universities, and other recognized institutions, agencies, and knowledgeable persons in planning and constructing cultural resource exhibits involving National Forest System cultural resources Coordinate these efforts with

interpretive Services people (FSM 2390). Enhancement efforts may include the full range of interpretive techniques. Because enhancement may affect the resource, comply with regulations set forth in FSM 2366. In all cases consider a determination of beneficial effect (FSM 2366.26).

ENVIRONMENT - The sum of all external conditions and influence affecting the life, development, and survival of an organism.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short- and long-term environmental effects, incorporating the physical, biological, economic, social, and environmental design arts and their interactions

ENVIRONMENTAL ASSESSMENT (EA) - A concise public document required by the regulations implementing the National Environmental Policy Act.

EPIDEMIC - An outbreak of sudden rapid spread, growth, or development.

EPITHERMAL MINERAL DEPOSIT - A deposit formed in rocks of shallow depth from low-temperature hydrothermal solutions.

EQUIVALENT CLEARCUT AREA (ECA) - That area which when harvested under any of the various silvicultural regimes produces hydrological effects similar to one acre of clearcut

EQUIVALENT HARVEST AREA (EHA) - The same as Equivalent Clearcut Area (ECA).

EROSION - The processes whereby earthy or rocky material is worn away, loosened, dissolved and removed from any part of the earth's surface

EVAPOTRANSPIRATION - Process by which water moves from the soil to the atmosphere by evaporation from the soil or transpiration through plants.

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

EXCELLENT RIPARIAN CONDITIONS - An extremely shady and brushy riparian condition with an abundance of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen will be present; the site has the potential to produce conifer and/or hardwood species. Gentle bank slopes, high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas. Channel scouring will be minimized with deposition replaced by mossy aquatic growth on assorted sizes of tightly packed rocks

F

FAULT A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

FAWNING AREAS - areas used regularly by female deer for fawning (and maintaining fawns for their first few days or weeks); optimum fawning habitat includes low shrubs or small trees under a tree overstory of about 50-percent closure, usually located on slopes of less than 15 percent where vegetation is succulent and plentiful in June and potable water is available within 183 meters (600 feet).

FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS) - The final version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA). It is a revision of the Draft Environmental Impact Statement to include public and agency responses to the

draft. It is a formal document which must meet legal requirements and is the document used as a basis for judicial decisions concerning compliance with NEPA.

FIRE HAZARD REDUCTION - The treatment of fuels and residues, which reduces the potential fire's rate of spread or intensity.

FIRE MANAGEMENT EFFECTIVENESS INDEX (FMEI) - A number derived by totaling the cost of a fire protection organization and fire suppression cost with the net value change and dividing that figure by 1000 acres.

FIREWOOD - Wood, either round, split or sawn, and burned primarily for heating purposes.

FISCAL YEAR (FY) - October 1st to September 30th.

FLOODPLAIN - The lowland and relatively flat areas adjoining inland and coastal waters (including debris cones and floodprone areas of offshore islands) including, at a minimum, those areas subject to a one-percent or greater chance of flooding in any given year (100-year recurrence).

FORAGE (LIVESTOCK) - All grass and grass-like plants.

FORAGE (WILDLIFE) - All browse and herbacious food that is available to wildlife for grazing.

FORBS

1. Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges) and Juncaceae (rushes) families - i.e., any nongrass-like plant having little or no woody material on it.

2 A palatable, broad-leaved, flowering herb whose stem (above ground) does not become woody and persistent.

FOREGROUND - A term used in scenic management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (See "Background" or "Middleground.")

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT OF 1974 (RPA) - An Act requiring the preparation of a program for the management of the National Forests' renewable resources and of Land and Resource Management Plans for units of the National Forest System. It also requires a continuing inventory of all forest, rangelands, and renewable resources nation-wide.

FOREST DEVELOPMENT ROADS (FDR) - Roads that are part of the Forest transportation system,which includes all existing and planned roads, as well as other special and terminal facilities designed as Forest development transportation facilities.

FOREST HEALTH - A condition where biotic and abiotic influences on the Forest (i.e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives either now or in the future.

FOREST INVENTORY PLAN - A plan, based on known cultural and environmental information, that delineates areas of varying degrees of suspected cultural resource potential.

FOREST PLAN - The National Forest Land and Resource Management Plan (Forest Plan) guides all natural resource management activities and establishes management standards and guidelines for the Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. It is prepared under the implementing regulations and requirements of NFMA.

FORESTRY PROGRAM FOR OREGON (FPFO) - A comprehensive forest management program developed by the State of Oregon for all forest lands in the state regardless of ownership.

FOREST STANDARD - A performance criterion indicating acceptable norms or specifications that actions must meet to maintain the minimum conditions for a particular resource This type of standard applies to all areas of the Forest regardless of the other management area direction applied.

FOREST SUPERVISOR - The official responsible for administering the National Forest System lands in a Forest Service administrative unit. He or she reports to the Regional Forester.

FORPLAN - The forest planning model. A linear programming software package used to analyze planning decisions regarding land use patterns, capital investment, and timber harvest scheduling.

FUEL BREAK - A strategically located strip of land, usually 100 to 500 feet wide, that has been altered by removal of flammable vegetation so that fires burning into it can be more readily extinguished.

FUELS - Anything within the Forest that will burn Usually live and dead woody vegetation (e.g., grass, shrubs, trees).

FUEL TREATMENT - The rearrangement or disposal of fuels to reduce the fire hazard.

G

GEOMORPHIC - Of, or pertaining to, the form of the earth, or its solid surface features

GEOTHERMAL - Of, or pertaining to, the heat of the earth's interior.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

GOODS AND SERVICES - The various outputs, including on-site uses, produced from forest and rangeland resources.

GRAZING - Consumption of range or pasture forage by animals

GRAZING SEASON - 1. A period of grazing to obtain optimum use of the forage resource 2. On public lands an established period for which grazing permits are issued.

GREEN DOT SYSTEM - A seasonal vehicular management program which visually indicates travel routes open to public use; roads not identified by the green dot, and cross-country travel, are closed to public use during the designated time period.

GROUND WATER - Water in a saturated zone of a geologic stratum

GROUP SELECTION - A modification of the selection system in which trees are removed in small groups at a time.

GUIDELINE - An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to a standard, which is mandatory).

H

HABITAT - The sum total of environmental conditions of a specific place occupied by a wildlife or plant species or a population of such species.

HABITAT CAPABILITY INDEX (HCI) - A process used to determine habitat capability for big game by evaluating thermal cover and road density.

HABITAT DIVERSITY INDEX - A number that indicates the relative degree of diversity in habitat forest wide.

HABITAT EFFECTIVENESS (HE) - A combination of both quantity and quality of habitat, including both natural and introduced factors, which produces a specific habitat condition that either limits or generates habitat use by a wildlife species.

HARVEST CUTTING METHOD - The combination of management practices used to manipulate forest vegetation resulting in forests of distinctive form and character Harvest cutting methods are classified as even-aged and uneven-aged.

HEAP LEACH - A mineral extraction process in which a solution (commonly cyanide solution) percolates through a pile (heap) of ore, dissolving the metal being extracted. The solution is collected after it percolates through the heap, and the metal is recovered from the solution This is a common extraction process for low-grade deposits of gold, copper and silver

HERBACEOUS - Having little or no woody tissue and persisting usually for a single growing season.

HIGH CLEARANCE VEHICLES - Motorized vehicles that can drive over minor obstacles because of their elevated frame.

HISTORIC - Refers to the period of time for which there are written records (after European contact). In Region 6, the historic era begins at roughly 1800 A.D., with the first explorers who kept journals

HYDROLOGIC - Pertaining to the quantity, quality, and timing of water yield from forested lands

HYDROPHOBIC - Lacking affinity for water.

HYDROTHERMAL - An adjective applied to heated or hot aqueous-rich solutions, to the process in which they are concerned, and to the rocks, ore deposits, and alteration products produced by them.

I

IGNEOUS ROCK - Rock formed by the crystallization of once molten material called lava or magma.

IMPLAN - A Forest Service input-output model that is an economic model which predicts the behavior of an economy as certain portions of the economy are altered.

IMPROVED ROAD - A constructed or maintained vehicle way for the use of highway-type vehicles having more than two wheels.

INDICATOR SPECIES - A plant or animal species so highly adapted to a particular kind of environment that its mere presence is sufficient indication that specific conditions are also present. (W-W DEIS).

INTEGRATED PEST MANAGEMENT (IMP) - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

INTENSIVE FOREST MANAGEMENT - A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, pre-commercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest.

INTERDISCIPLINARY TEAM - A group of individuals with different training assembled to solve a problem or perform a task.

INTERMINGLED OWNERSHIPS - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies Because of early land grants, these lands frequently are in checkerboard ownership patterns.

INTERMITTENT SERVICE - A road developed and operated for periodic service and closed between periods of use.

INTERPRETATION - *Educational activity which aims to reveal meaning and relationships of the natural and* cultural environment through first-hand experience

IRRETRIEVABLE - Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

IRREVERSIBLE - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods Irreversible also includes loss of future options.

ISSUE - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

J

JASPEROID - Agate, jasper, or thundereggs

K

KNUTSON - VANDENBERG ACT OF 1924 (K-V) - An act that allows for the use of receipts for National Forest timber to reforest, to conduct stand improvement work or to perform improvement projects for other resources on the area where timber was harvested.

L

LAND ALLOCATION - The decision to use land for various resource management objectives in order to best satisfy the planning process issues, concerns, and opportunities, and meet assigned forest output targets

LAND EXCHANGE - The conveyance of non-Federal land or interest in the land to the United States in exchange for National Forest System land or interest in the land.

LANDLINE LOCATION - Location of Forest property boundaries.

LIFESTYLE - A characteristic way of living which may be an individual variant within the cultural mainstream or may be an individual expression of a subculture.

LEASABLE MINERALS - Generally include minerals such as oil, gas, oil shale, coal, potassium, sodium, phosphates, sulphur, and geothermal

LOCAL ROADS - Local roads are usually one-lane roads constructed to serve a dominant use or resource. Local roads do not access large land areas since they are more site specific than arterial and collector roads

LOCATABLE MINERALS - These resources include gold, silver, lead, copper, and mercury, which are mined and processed for metals, and some uncommon nonmetallics.

LOGGING SYSTEMS -

Tractor Logging - A system of log transportation in which logs are pulled from the woods to a landing by means of a crawler tractor, skidder, or similar ground-based equipment.

High-Lead Logging - A system of cable logging in which the working lines are elevated at the landing area by a rigged wooden tree or portable steel spar.

Skyline Logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

Balloon Logging - A system of cable logging in which the weight of the logs is counteracted by the lift provided by a lighter-than-air balloon.

Helicopter Logging - A system of transporting logs from the woods to a landing as an external load on a helicopter.

LONG-TERM EFFECTS - Those effects which will be significant beyond the RPA planning horizon of 50 years.

LONG-TERM SUSTAINED-YIELD TIMBER CAPACITY (LTSYC) - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives

M

M - The Roman numeral for 1000.

MBF - One thousand board feet. Lumber or timber measurement.

MM - Million

MANAGED STAND - A stand of trees in which stocking level control is applied to achieve maximum growth.

MANAGED YIELD TABLE - A table showing, for a given species (or species mix) on a given site, the progressive development of a managed stand at periodic intervals covering the greater part of its useful life It usually includes average diameter, basal area, number of trees, standing volume, and harvest volumes for a specific timber management regime.

MANAGEMENT AREA (MA) - A unit of land allocated to emphasize a particular resource, based on the capability of the area

MANAGEMENT CONCERN - An issue, problem or a condition which constrains the range of management practices identified by the Forest Service in the planning process

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

MANAGEMENT INDICATOR SPECIES (MIS) - A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other wildlife species

MANAGEMENT INTENSITY - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.

MANAGEMENT PRESCRIPTION - Management practices selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

MANAGEMENT REQUIREMENT (MR) - Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives. (See 36 CFR 219.27)

MARGINAL COMPONENT - The portion of the commercial forest land on which it is presently not feasible (economically or technologically) to manage for timber crops but on which it may be possible in the future.

MASS-WASTING - A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. (Dictionary of Geological Terms). Also *mass movement.*

MAXIMUM MODIFICATION - See "Scenic quality Objectives."

MEAN ANNUAL INCREMENT (MAI) - The total increment up to a given age divided by that age.

MEMORANDUM OF AGREEMENT (MOA) - A three-party agreement (responsible Forest Service Official, State Historic Preservation Officer, Executive Director of the Advisory Council on Historic Preservation) which documents an agreed-upon plan to mitigate a proposed project's adverse effect upon cultural resources listed on or eligible for the National Register of Historic Places.

METAMORPHIC ROCK - Rocks changed by heat and pressure causing recrystallization and loss of original characteristics

MIDDLEGROUND - *The visible terrain beyond the foreground where individual trees are still visible, but do* not stand out distinctly from the stand (See "Foreground" and "Background.")

MINERAL DEVELOPMENT - The activities and facilities associated with extracting a proven mineral deposit

MINERAL ENTRY - Filing a mining claim on public land to obtain the right to any minerals it may contain.

MINERAL EXPLORATION - The search for valuable minerals on lands open to mineral entry.

MINERAL RESERVE - That portion of a mineral resource from which a mineral commodity can be economically and legally extracted.

MINERAL RESOURCE - A concentration of naturally occurring solid, liquid, or gaseous materials in or on the Earth's crust in such a form that economic extraction of a mineral resource is currently or potentially feasible (*BLM Manual 3031).*

MINIMUM VIABLE POPULATION (MVP) - The low end of the viable population range

MITIGATION - To moderate the force or intensity of environmental effects To lessen or minimize an Adverse Effect upon a cultural resource listed on or eligible for the National Register of Historic Places The two categories of mitigation most often used are project modification and data recovery.

MIXED CONIFER (MC) - A stand of coniferous trees with a mixture of species. Ponderosa pine will usually make up 25 percent to 75 percent of the species composition.

MODIFICATION - See "Scenic Quality Objectives."

MONITORING - A process of collecting significant data from defined sources to identify departures or deviations from expected plan outputs

MOUNTAIN PINE BEETLE - A small insect (1/8 - 5/8 inch) that bores into the tree's cambium and deposits its eggs. Larvae emerge from the eggs and feed upon the cambiel layer and thus disrupt the tree's translocation of food Frequent attacks on the host tree result in the tree's mortality

MORTALITY - The volume of sound wood dying from natural causes during a specified period.

MULTIPLE-AGED STANDS - An intermediate form of stand structure between even-/ and uneven-aged stands These stands generally have two or three distinct tree canopy levels occurring within a single stand

MULTIPLE USE - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions, that some lands will be used for less than all of the resources, and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output

N

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) - An act declaring a National policy to encourage productive harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

NATIONAL FOREST FUND (NFF) - An account that includes all receipts (to the U.S. Treasury) from proclaimed National Forests for timber, grazing, land use, power, minerals, and user fees.

NATIONAL FOREST MANAGEMENT ACT (NFMA) - A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

NATIONAL FOREST SYSTEM (NFS) LAND - Federal lands that have been designated by Executive order or statute as National Forests, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands.

NATIONAL RECREATION TRAILS - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by the National Trails System Act. National Recreation Trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas.

NATIONAL REGISTER OF HISTORIC PLACES - A register of cultural resources of national, state, or local significance, maintained by the Department of the Interior.

NATIONAL WILD AND SCENIC RIVER SYSTEM - Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designed by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition

NET PUBLIC BENEFIT - An expression used to signify the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index.

NO ACTION ALTERNATIVE (Alternative A) - The most likely condition expected to exist in the future if current management direction were to continue unchanged.

NONCOMMERCIAL SPECIES - Species that have no economic values at this time nor anticipated timber value within the near future

NONDECLINING EVEN FLOW - A policy governing the volume of timber removed from a National Forest, which states that the volume planned for removal in each succeeding decade will equal or exceed that volume planned for removal in the previous decade.

NONFOREST LAND - Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

NONMARKET - (Noncash economic benefits). Products derived from National Forest resources that do not have a well-established market value, for example, wilderness, wildlife

NONPRICED OUTPUTS - Outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs.

NONSTRUCTURAL RANGE IMPROVEMENT - Practices and treatments undertaken to improve range not involving construction of improvements (e.g., seeding, fertilizing, or prescribed burning).

O

OBJECTIVE - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

OBLITERATE - The action needed to close an unneeded road and return the land to production.

OFF-HIGHWAY TRAVEL MANAGEMENT OBJECTIVES - These objectives relate to the recreation opportunities for off-highway use on areas and trails on National Forest lands. The objectives, which include off-highway travel criteria, are developed from management area direction and access management objectives.

OFF-ROAD or OFF-HIGHWAY VEHICLES (ORV's or OHV's) - Any vehicle, including ATV's, which is restricted by law from operating on public roads reserved for general motor vehicle traffic.

OLD GROWTH STAND - An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage, 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

OPERATION AND MAINTENANCE COSTS - Costs associated with operating and maintaining facilities, program management, and support costs associated with management of other resources

ORE - A mineral deposit which can be extracted at a profit.

ORV CLOSURE - An administration order closing a land area to specified types of off-road vehicle travel yearlong.

ORV RESTRICTION - An administrative order restricting a land area to specified types of off-road vehicle travel during specific seasons or conditions.

OUTPUT - The goods, end products, or services that are purchased, consumed, or used directly by people Goods, services, products, and concerns produced by activities that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. A broad term for describing any result, product, or service that a process or activity actually produces

OVERMATURE - The stage at which a tree declines in vigor and soundness, for example, height growth has usually stopped and probability of mortality is high

OVERSTORY - The portion of trees in a forest which forms the upper most layer of foliage.

OVERSTORY REMOVAL - A type of harvest which is designed to remove all of the trees in the overstory The objective is to release the acceptably stocked understory

OVERVIEW - A report, based primarily on archival research, that organizes and summarizes cultural resource information from a particular National Forest or geographic area.

P

PACIFIC NORTHWEST REGION - A Forest Service organizational unit consisting of all the National Forests in Oregon and Washington.

PARTIAL CUT - Any cutting other than a clearcut. This may include thinning, selection shelterwood or an overstory removal.

PARTIAL RETENTION - See "Scenic Quality Objectives."

PERMITTED GRAZING - Use of a National Forest range allotment under the terms of a grazing permit.

PERSONS-AT-ONE-TIME (PAOT) - The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate the capacity of an area or facility to support peak usage within established user density standards and without degradation to biophysical resources.

PHYSIOGRAPHIC - Pertaining to physical geography.

PHYSIOGRAPHIC PROVINCE - Region of similar structure and climate that has had a unified geomorphic cycle.

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions.

PLANNING PERIOD - Generally one decade. The time interval within the planning horizon that is used to show incremental changes to yields, costs, effects, and benefits

PLANNING RECORDS - A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

PLANT ASSOCIATION - Climax plant community type

PLANT COMMUNITIES - A homogeneous unit in respect to the number and relationship of plants in the tree, shrub, and ground cover strata.

POTENTIAL YIELD - The maximum, perpetual, sustained-yield harvest attainable through intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment

PRECOMMERCIAL THINNING - The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

PREHISTORIC - Relating to the period of time before written records (prior to European contact). In Region 6, before 1800 A.D., or before the advent of written records.

PRESCRIBED BURNING - Use of fire in forest management for hazard reduction and vegetative manipulation.

PRESCRIBED FIRE - A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester.

PRESENT NET VALUE (PNV) - The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area.

PRESERVATION - See "Scenic Quality Objectives."

PRIMARY CAVITY EXCAVATOR - An animal that excavates a cavity in wood for nesting or roosting.

PRIME FARMLAND - All land which qualifies for rating as Class I or as Class II in the U S Soil Conservation Service land use capability classification.

PRIMITIVE ROADS - Roads constructed with no regard for grade control or designed drainage, sometimes by merely repeated driving over an area. These roads are single lane, usually with native surfacing and sometimes passable with 4-wheel drive vehicles only, especially in wet weather

PROGRAMMED ALLOWABLE HARVEST - That part of the potential yield scheduled for harvest in a specific year. It is based on demand, funding, management needs and multiple use considerations and, as a consequence, may vary over time

PUMICE - A volcanic glass full of cavities and very light in weight

PYROCLASTIC ROCK - A rock consisting of unreworked solid material explosively or aerially ejected from a volcanic vent.

PUBLIC ISSUE - A subject or question of widespread public interest relating to management of National Forest System.

PUBLIC PARTICIPATION - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

PURCHASER CREDIT - Credit earned by the purchaser of a National Forest timber sale by construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed

R

RANGE ALLOTMENT - A designated area available for livestock grazing upon which a specified number, kind of livestock and season of use may be grazed under a term grazing permit. The basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

RANGE CONDITION - The state or health of the range vegetation and soil to produce a stable biotic community based on the composition, density, and vigor of the vegetation and the physical characteristics of the soil Condition is expressed as satisfactory or unsatisfactory.

RANGE IMPROVEMENT - Any structure or nonstructural improvement to facilitate management of rangelands or livestock.

RANGELAND - Land where the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for livestock grazing and browsing

RANGE MANAGEMENT - The art and science of planning and directing range use to obtain sustained maximum animal production, consistent with perpetuation of the natural resource.

RANGER DISTRICT - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

RARE II - See Roadless Area Review and Evaluation II.

REAL DOLLAR VALUE - A monetary value which compensates for the effects of inflation.

RECONSTRUCTION - Road or trail construction activities which take place on an existing road or trail and raise the standard of the road or trail. This can include relocation of the facility in a completely new location.

RECREATION CAPACITY - The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience of the biophysical resources.

RECREATION INFORMATION MANAGEMENT (RIM) - A computer oriented system for the organization and management of information concerning recreation use, occupancy, and management of National Forest land.

RECREATION OPPORTUNITY SPECTRUM (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. *Primitive* - Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.

2. *Semiprimitive Nonmotorized* (SPNM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other uses. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis Use of such roads is restricted to minimize impacts on recreational experience opportunities.

3. *Semiprimitive Motorized* (SPM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

4. *Roaded Natural* (RN) - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment Interaction between users may be moderate to high, with evidence of other users prevalent Resource modification and utilization practices are evident, but harmonize with the natural environment Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

5 *Rural* (R) - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil Sights and sounds of humans are readily

evident, and the interaction between users is often moderate to high A considerable number of facilities are designed for use by a large number of people Facilities are often provided for special activities Moderate user densities are present away from developed sites Facilities for intensified motorized use and parking are available

6. *Urban* - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site. Large numbers of users can be expected both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site

RECREATION VISITOR DAY (RVD) - A *measure of recreational use of an area One recreation visitor day* consists of 12 hours of recreation use of a site or area. Recreation visitor days are used as a recreation production or output capacity measure.

RECREATION WILDERNESS SPECTRUM (RWS) - This is associated with the recreation opportunity spectrum (ROS), a system used to classify or differentiate areas within wilderness to provide for a variety of management possibilities and wilderness opportunities. The objective of *all* classifications is to provide wilderness opportunities but to different degrees; from pristine to the semiprimitive transition

REFORESTATION - The natural or artificial restocking of an area usually to produce timber and other wood products, but also to protect watersheds, prevent soil erosion, and improve wildlife, recreation and other natural resources Natural reforestation includes site preparation to reduce competing vegetation and provide a mineral seed bed for seed provided by seed trees Artificial reforestation is the planting of seedlings, cuttings or seeds by hand or mechanical means and may include site preparation

REGENERATION CUT - The removal of trees intended for the purpose of assisting regeneration already present or to make regeneration of the stand possible.

REGION - The standard administrative unit of the Forest Service administered by a Regional Forester.

REGIONAL FORESTER - The official responsible for administering a single Region and preparing a Regional Guide.

REGIONAL GUIDE - The plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given region. It also disaggregates the RPA objectives assigned to the Region and to the Forest within that region

REGULATIONS - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers *management of the Forest Service.*

REHABILITATION - Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.

RESEARCH NATURAL AREAS (RNA's) - An area set aside by the Forest Service to preserve a representative sample of an ecological community; primarily for scientific and educational purposes Commercial exploitation is not allowed and general public use is discouraged.

RESOURCE - An aspect of human environment which renders possible or facilitates the satisfaction of human wants and the attainment of social objectives

RESOURCE VALUES - The tangible and intangible worth of forest resources

RESPONSIBLE LINE OFFICER - The Forest Service employee who has the authority to select and/or carry out a specific planning action

RESTORATION - The long-term placement of land back into its natural condition or state of productivity.

RETENTION - A scenic quality objective which means human activities are not evident to the casual forest visitor.

REVEGETATION - The re-establishment and development of a plant cover This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of man - reforestation or range reseeding.

RIGHT-OF-WAY - The right to pass through another person's land as obtained by condemnation or purchase

RIM - See Recreation Information Management.

RIPARIAN AREAS - The riparian ecosystem (area) is that land, next to water, where plants that are dependent on a perpetual source of water occur. Riparian sites include fluvial surfaces such as streambanks, active channel shelves, active floodplains, and overflow channels.

RIPRAP - A structure built of broken rock or other material used for protecting exposed soil from erosion along stream channels or road ditches.

ROAD DENSITY - The number of road miles per square mile of land area.

ROADLESS AREA - An area of undeveloped Federal land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

ROADLESS AREA REVIEW AND EVALUATION (RARE II) - A comprehensive process directed by the Secretary of Agriculture to identify roadless and undeveloped land areas in the National Forest system and to determine their uses for either wilderness or other resource management and development and to determine areas that would require further planning to make such a decision.

ROADLESS ISLANDS - A roadless area that is surrounded by permanent waters, or that is markedly distinguished from surrounding lands by topographical or ecological factors such as precipices, canyons, thickets, or swamps.

ROAD MANAGEMENT OBJECTIVES - Road management objectives establish the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria.

ROS - See Recreation Opportunity Spectrum.

ROTATION AGE - The age of a stand when regeneration harvest occurs

RPA - Forest and Rangeland Renewable Resources Planning Act of 1974.

ROCKHOUND - An amateur rock and mineral collector.

RVD - See Recreation Visitor Day.

S

SALEABLE MINERALS - Saleable minerals include common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. In general, these minerals are of wide-spread occurrence and are of relatively low unit value. They are generally used for construction materials and for road building purposes. Saleable minerals, which have some property giving them distinct and special value, remain locatable. Before a deposit can be sold, a determination of "common variety" must be made by minerals staff and legal counsel

SALVAGE HARVEST - Removal of dead or dying trees resulting from insect and disease epidemics or wildfire

SANITATION HARVEST - Removal of dead or dying trees to prevent spread of insects or disease.

SAWTIMBER - Trees that will yield logs suitable in size and quality for the production of dimension lumber.

SCENIC QUALITY OBJECTIVES - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

1. *Preservation* - Ecological change only.

2. *Retention* - Human activities are not evident to the casual Forest visitor.

3 *Partial Retention* - Human activity may be evident, but must remain subordinate to the characteristic landscape.

4. *Modification* - Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture It should appear as a natural occurrence when viewed in foreground or middleground.

5. *Maximum Modification* - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

SCENIC RESOURCE - The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors

SCOPING - Determination of the significant issues to be addressed in an EIS.

SEDIMENT - Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level

SEDIMENTARY ROCK - A rock made up of sediment.

SEED CUT - Removal of mature trees near rotation age in a shelterwood harvest to permanently open the stand and prepare the site for regeneration from the seed trees left for that purpose.

SEEDLING/SAPLING - A forest successional stage in which trees less than five inches in diameter are the predominant vegetation.

SELECTION CUTTING - The annual or periodic removal of trees (particularly the mature), individually or in small groups from an uneven-aged forest to achieve the balance among diameter classes needed for sustained yields, and in order to realize the yield, and establish a new crop of irregular constitution. NOTE: The improvement of the Forest is a primary consideration.

SELECTION SYSTEM - A silviculture system in which trees in an uneven-aged stand are removed individually, here and there, from a large area each year in order to achieve a balance among diameter classes needed for sustained yield by selection cutting - ideally over a whole forest or working circle, but from practical considerations almost always over the annual coupes of cutting series; regeneration mainly natural and crop ideally all-aged

SENSITIVE SPECIES - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists

SERAL - A plant and animal community which is transitional in stage of succession, being either short- or long-term. If left alone, the seral stage will pass, and another plant and animal community will replace it

SHELTERWOOD HARVEST - Silvicultural system used to harvest mature trees at rotation age in a series of preparatory, seed and removal cuts designed to regenerate a new even-aged crop under the shelter of the old crop.

SHORT-TERM EFFECTS - For timber management planning, those effects which will not be significant beyond the RPA planning horizon of 50 years; for DEQ water quality, short-term effects are defined as two days or less. Generally, short-term effects are within the planning period

SIGNIFICANT - Meeting the criteria for inclusion on the National Register of Historic Places (same as eligible).

SILVICULTURAL SYSTEM - A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced

SILVICULTURE - The science and art of growing and tending crops of forest trees to attain the desired level of marketable and unmarketable products.

SITE INDEX - A measure of the relative productive capacity of an area for growing wood Measurement of site index is based on height of the dominant trees in a stand at a given age.

SITE PREPARATION - Removing unwanted vegetation and debris from a site and preparing the soil before reforestation

SITE PRODUCTIVITY - Production capability of specific areas of land

SKYLINE LOGGING - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

SLASH - Debris left after logging, pruning, thinning, or brush cutting, and large accumulations of debris resulting from windstorms. It includes logs, bark, branches, and stumps.

SMOLT HABITAT CAPABILITY INDEX (SHCI) - Smolt refers to the life history stage of anadromous salmonids in which physiological changes are taking place to adapt them for ocean survival and they are either migrating or will shortly migrate seaward. The three levels associated with this index are.

1. Existing SHC - The number of smolt being produced at the present time with existing escapement levels in existing freshwater habitat.

2. Potential SHC - The number of smolt that are capable of being produced assuming there is sufficient adult escapement to fully seed existing freshwater habitat.

3 Potential SHC with Full Enhancement - The number of smolt that are capable of being produced, assuming sufficient capital investments have been made to maximize the freshwater habitats and there is sufficient adult escapement to fully seed the existing and enhanced habitat.

SNAG - A nonliving standing tree. The interior of the snag may be sound or rotted

SNAG LEVEL - The number of snags per unit of area by d b.h. class selected as a management goal; the level is predicted on the theoretical number of snags per unit of area by diameter class needed to support nesting populations of woodpeckers at a selected density.

SOCIOECONOMIC - Pertaining to, or signifying the combination or interaction of, social and economic factors.

SOIL EROSION - The detachment and movement of soil from the land surface by wind, water, or gravity.

SOIL COMPACTION - Increase in soil bulk density

SOIL PRODUCTIVITY - The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

SOIL RESOURCE INVENTORY (SRI) - An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials

SPECIAL COMPONENT - The portion of the commercial forest land that needs special treatment of the timber resource to achieve other resource objectives (e.g., old growth, streamside protection, or visual corridors)

SPECIAL USE PERMITS - Permits and granting of easements (excluding road permits and highway easements) authorizing the occupancy and use of land.

STAND - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

STANDARD - Performance criteria indicating acceptable norms or specifications that actions must meet. A principle requiring a specific level of attainment, a rule to measure against

STANDARD COMPONENT - The portion of the commercial forest land on which crops of industrial wood can be grown and harvested with adequate protection of the forest resources under the usual provisions of the timber sale contract.

STATE HISTORIC PRESERVATION OFFICER (SHPO) - An official appointed by the Governor of each State to direct implementation of the National Historic Preservation Act of 1966 and subsequent regulations and Executive Order. Responsibilities include: State-wide cultural resource inventory, development of a State Historic Preservation Plan, review of National Register of Historic Places nominations, administration of Federal historic preservation grants, and review of Federal undertakings which might affect cultural resources listed on or eligible for the National Register of Historic Places.

STOCKING - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

STOCKING LEVEL CONTROL - The process of maintaining the desirable number of trees to achieve optimum growth and management.

STREAMFLOW - The discharge of water from a watershed that occurs in a natural stream channel

STRUCTURAL RANGE IMPROVEMENT - Improvement requiring construction or installation to improve the range, facilitate management, or control distribution and movement of livestock

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

SUITABLE TIMBER LAND - Forested lands that are available for timber management because they have not been withdrawn because of Law or Regulation, where irreversible damage would not occur, and where regeneration can be assured.

SUMMER RANGE - A portion of the total range on which big game animals normally find food and cover during summer months.

SUNK FUNDS - Monies already invested.

SUPPRESSION - The action of extinguishing or confining a fire.

SUSTAINED YIELD - The achievement and maintenance in perpetuity of a periodic output of the renewable resources without impairment of the productivity of the land.

T

TARGETS - Objectives assigned to the Forest by the Regional Plan.

TECTONIC - Of, pertaining to, or designating the rock structure and external forms resulting from the deformation of the earth's crust.

TEMPORARY ROADS - Temporary roads are low-level roads constructed for a single purpose and short-term use. Once use of the road has been completed, it is obliterated, and the land it occupied is returned to production.

THERMAL COVER - Cover used by animals to lessen the effects of weather; for elk the types of cover are:

Summer Range - A stand of coniferous trees at least 40 feet tall with an average crown closure of 40 percent or more.

Winter Range - A stand of coniferous trees 10 feet or more tall with an average crown closure of 40 percent or more.

THINNING - The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may be done at two different stages:

1. *Commercial thinning* - Removing trees that have reached sufficient size to be manufactured into a product.

2. *Precommercial thinning* - Removing trees that are too small to make a merchantable product

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species.

THRESHOLD - The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

TIERING - Refers to the coverage of general matters in broad environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basin wide program statements or ultimately site-specified statements), incorporating by reference the general discussions and concentrating solely on the issues specific to the statement in question.

TIMBER - A general term for the major woody growth of vegetation in a forest area.

TIMBER CLASSIFICATION - Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1. *Nonforest* - Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

2. *Forest* - Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use

3 *Suitable* - Land to be managed for timber production on a regulated basis

4 *Unsuitable* - Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process

5 *Commercial Forest* - Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn

TIMBER PRODUCTION - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use. The term "timber production" does not include production of fuelwood.

TIMBER SALE PROGRAM QUANTITY - This includes all volume expected to be offered for sale This includes "green" material, salvage, firewood and miscellaneous products. This is used to measure attainment of RPA budgeted target.

TIMBER STAND IMPROVEMENT (TSI) - Management activities conducted in an immature stand to accelerate diameter growth and improve the form of the trees that remain

TOLERANCE - The ability of a tree to grow satisfactorily in the shade of, and in competition with, other trees.

TONS OF SUSPENDED PARTICULATES - A measure of the amount of solid material contributed to the airshed by smoke.

TRAILHEAD - The parking, signing, and other facilities available at the terminus of a trail

TRAIL VEHICLE - Vehicles designed for trail use that are 40 inches wide or less, such as bicycles, snowmobiles, trail bikes, trail scooters, and all-terrain vehicles

TRANSITORY RANGE - Land that is suitable for grazing use of a nonenduring or temporary nature over a period of time. For example, on particular disturbed lands, grass may remain in the area for a period of time before being replaced by trees or shrubs not suitable for forage

TRANSPORTATION SYSTEM - All existing and planned roads and trails needed to access the Forest.

TUFF - A rock formed of compacted volcanic fragments, generally smaller than 4mm in diameter.

U

UNDERSTORY VEGETATION - Grass, small trees, shrubs, and other plants found beneath the overstory (the trees comprising the forest).

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

UNIT PLANS - Land management plans prepared for multiple use management of land and resources on portions(units) of the National Forests, which do not necessarily fully incorporate NFMA requirements "Units" do not always follow National Forest boundaries and, in some cases, include parts of two or more National Forests.

UNPLANNED IGNITION - A fire started at random by either natural or human causes, or a deliberate incendiary fire

UNREGULATED - Timber land not managed on a sustained yield basis, such as administrative sites, campgrounds, and experimental forests.

UTILITY AND TRANSMISSION CORRIDOR - A strip of land designated for the transportation of energy, commodities, and communications by railroad, State highway, electrical power transmission (69 KV or above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.

UTILIZATION STANDARDS - Standards guiding the use and removal of timber, which is measured in terms of diameter at breast height (d.b h.), top diameter inside the bark (top d i.b.), and percent "soundness" of the wood.

V

VIABLE POPULATION - The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

VIEWSHED - The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

W

WATERSHED - The area that contributes water to a drainage or stream.

WETLANDS - Areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990).

WILD AND SCENIC RIVERS - Those rivers or sections of rivers designated as such by congressional actions under the 1968 Wild and Scenic Rivers Act, as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. *Wild River Areas* - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

2 *Scenic River Areas* - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

3. *Recreational River Areas* - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

WILDERNESS - Areas designated by congressional action under the 1964 Wilderness Act Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition, and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

WILDERNESS ACT - Establishes a National Wilderness Preservation System to be composed of Federally-owned areas designated by Congress, administered for use and enjoyment as Wilderness, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as Wilderness

WILDERNESS RESOURCE SPECTRUM (WRS) - Classification used to further divide a wilderness into zones based on degrees of primitiveness Areas of the Ochoco Wilderness will be managed under two classes of the WRS system:

1. *Primitive* - characterized by an essentially unmodified environment. Concentration of users is low and evidence of human use is minimal The area is managed to be essentially free from *evidence of human-induced restrictions and controls*

2. *Semiprimitive* - characterized by a predominately unmodified natural environment of moderate size. The concentration of users is low, but there is often evidence of other users. The area is *managed in such a way that minimuM on-site controls and restrictions may be present, but are* subtle.

WILDFIRE - Any wildland fire that is not a prescribed fire. All wildfires require suppression

WILDLIFE - All nondomesticated mammals, birds, reptiles, and amphibians living in a natural environment, including both game species and nongame species. Animals or their progeny, which once were domesticated but escaped captivity and are running wild (i.e., feral animals), such as horses, burros, and hogs, are not considered wildlife.

WILDLIFE AND FISH USER DAY (WFUD) - One WFUD consists of 12 hours of recreation that is the result of fish or wildlife.

WILDLIFE HABITAT DIVERSITY - The distribution and abundance of different plant and animal communities and species within a specific area.

WINTER RANGE - A range, usually at lower elevation, used by big game during the winter months; usually smaller and better-defined than summer ranges.

WITHDRAWAL - The withholding of an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area.

WORKING GROUP - Comprises those parts of a forest that have generally the same growth potential and management opportunities.

Y

YARDING - The moving of logs from the stump where cut to a central concentration area or landing.

Z

ZONE OF INFLUENCE - The geographic area where most, but not all, of the direct social and economic effects of the Forest and Grassland's management occur.

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☆ U S GOVERNMENT PRINTING OFFICE 1989—691-059/01,206 REGION NO 10

United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1989

Appendices - Volume I A and I - Response to Public Comment

Final Environmental Impact Statement

Land and Resource Management Plan

Ochoco National Forest and Crooked River National Grassland

Caring for the Land...

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Appendix A

Issues, Concerns, and Opportunities

Appendix A

Issues, Concerns, and Opportunities

Introduction

This appendix covers the major steps taken to identify public issues, management concerns and resource opportunities considered during the planning process. The appendix is organized into five sections: 1) the process used to identify the issues, concerns and opportunities, 2) contacts and consultations with others, 3) the criteria used to screen the issues down to the few selected to be addressed in the Environmental Impact Statement (EIS), 4) changes in the issues between the Draft and Final EIS, and 5) a discussion of the issues and how they were used to formulate alternatives.

Issue Identification

During the Fall of 1980, the Forest began to identify the principal issues to be addressed in the Draft Forest Plan. The Forest Management Team (Forest Supervisor, District Rangers, and Forest Staff Officers) decided to try a fresh approach, without a rehash of old issues from former Unit Plans. The previous issues were reviewed but not established as a base.

The Management Team agreed to utilize interest groups as a starting point. Individuals representing key interests of conservationists, recreationists, sportsmen, ranchers, timber industry, and government agencies were invited to identify preliminary issues that could be expanded or refined by a broader audience. These key interest groups met with the Forest Interdisciplinary Planning Team (ID Team) at six meetings held during the period of September 27 to October 2, 1980. A total of 56 people attended these meetings.

From the meetings, 125 preliminary issues, concerns, and opportunities (ICO's) were identified. The ID Team then consolidated these ICO's into 60 issues and submitted this list to the public along with a request for response. A total of 338 copies were mailed to addresses on the Forest's mailing list, 450 copies were distributed from our offices, and another 2,000 were distributed through bulk mailings to the rural areas around Burns and Prineville, Oregon.

In addition, public involvement was requested through various news media. Newspapers, radio, and television participated as listed below:

Media	*Title*	*Origin*
Newspapers	The Newspaper	Prineville
	The Central Oregonian	Prineville
	The Burns Herald	Burns
	The Madras Pioneer	Madras
	The Bulletin	Bend
	The Redmond Spokesman	Redmond
Radio	KRCO	Prineville
	KBND	Bend
	KICE	Bend
	KZZR	Burns
Television	KTVZ	Bend

The ID Team also conducted six public meetings to gather additional public comment. These meetings were in Prineville (two meetings) 11/12/80, Dayville 11/13/80, Paulina 11/13/80, and Burns (two meetings) 11/24/80. Five other meetings were held for Forest Service employees.

Response from mailings and attendance at the meetings was as follows:

Mailing Responses - 164

Attendance at Public Meetings - 52

Attendance at Forest Service Employee Meetings - 121

The ID Team used the information that was gathered to consolidate the issues into resource or land use topics. Seventeen issues were developed from this exercise. Comments that were not clearly represented in these 17 issues were also evaluated by the ID Team.

In January 1981, these 17 issues were submitted to the public for verification and ranking by intensity. Ranking the issues was useful initially, however, the rankings were later dropped when they no longer proved meaningful in developing the alternatives. The 17 issues were condensed to 14 as a result of the analysis of the public responses. These 14 issues are listed below.

1. What should be the level of timber production?
2. How can activities on the Forest and Grassland benefit social and economic wants and needs of local communities?
3. What is the appropriate level of livestock grazing and intensity of range management?
4. How should riparian areas be managed to meet various resource needs?
5. What road system should be provided to meet public, commercial and administrative access needs?
6. Should habitat be provided for increased populations of big game?
7. How much roadless recreation opportunity should be provided?
8. Should the Forest and Grassland limit the emphasis placed on visual resources to those areas of high scenic value?
9. How much old growth habitat should be provided?
10. To what extend should off-road vehicle use be controlled?
11. To what extent should firewood be provided to meet demand?
12. How much habitat should be provided for wildlife species dependent on dead trees?
13. To what extent should the Forest and Grassland provide for an expanded trail system?
14. To what extent should the Forest provide for winter sports activities?

The interdisciplinary team developed alternative management strategies based on these issues. As the alternatives were developed two of these issues were removed from the preceding list. They were the off-road vehicle use issue and the trail issue (numbers 10 and 13).

The off-road vehicle use issue, as initially identified in the public involvement process, was primarily an issue on the Crooked River National Grassland. It appeared at the time that the issue could be negotiated at the local level, outside the Forest and Grassland Plans. During the validation effort between the Draft and the Final, the public and agency interest in ORV use has increased. The Henderson Flat area on the Grassland continues to a controversial area. In addition, some of the local citizenry has voiced concern over resource damage by ORV's on other areas of the Forest and Grassland.

The trail issue was also dropped as a separate issue. As the proposed trail system is closely tied with the allocation of roadless areas, the two issues were closely related. On those trails (existing or proposed) not part of the roadless area allocation issue, only minor resource interactions were identified, with little affect to the overall management of the Forest and Grassland.

In April 1984, three public meetings were held to update the issues and acquire additional information on unroaded areas. The meetings were held in Prineville (on April 2, 3, and 4) with 29 people attending.

After those meetings, the Forest continued to use a variety of activities to keep its employees and the local communities informed of the planning process. We published periodic articles and special editions in our Forest and Grassland report. We prepared and distributed a Forest Plan Report. During the summer and fall of 1985 we had multi-resource media coverage, providing information and education on Forest management. Through a networking process, each Management Team member has been contacting key individuals in our local communities and informally discussing Forest management and the planning effort.

The Proposed Land and Resource Management Plan and the Draft Environmental Impact Statement were published in September, 1986. Notice was published in the Federal Register on September 12, 1986. During the 90-day public review period, 1,125 copies of the Draft Plan and EIS were distributed. The Forest announced the availability of these documents through seven news releases and three Forest Plan reports. Office hours were extended at the Supervisor's Office in Prineville. The Forest held six public meetings and 25 organizational, individual or agency meetings. Radio and television interviews, fliers, newspaper articles, and displays at the Jefferson, Harney and Crook County Fairs were also used to inform the public of publication.

A number of interest groups were active during the DEIS comment period. Of particular note was the level of activity by timber industry, the Central Oregon Economic Development Council and a coalition of eight environmental groups. Two additional groups were actively involved in expressing opinions about the management of Lookout Mountain: snowmobile organizations and the retirement community. The activities of these groups appeared to play a significant role in soliciting additional public comment, and in many cases, appear to have been a major source of information from which these comments were generated.

During the 90-day public review period, 2,154 comments were received. The results of the public comment period for the DEIS are thoroughly discussed in Appendix I of this FEIS. The substantive comments received on the DEIS did result in the development of a new alternative, Alternative I. In addition, Alternatives B and C were modified.

A Supplement to the DEIS was prepared in response to two appeals that took issue with some of the methods used in Forest planning by the National Forest in the Pacific Northwest. The appellant was concerned with how the "No Action" Alternative was described, and the methods used to address Forest planning management requirements. The Supplement described a new alternative, Alternative NC (no change), and analyzed alternative levels of management requirements. The SEIS was published in October, 1988, and the 90-day public review period ended January 17,1989. The Forest received nearly 200 letters in response to the Supplement. The results of the public response period for the Supplement are also discussed in Appendix I of this FEIS.

Significant steps were employed during the last 3 months of final document preparation to insure that direction in the Final Plan responded accurately to comments received on the Draft. Meetings were held, and contacts made with selected groups, individuals, agencies and political leaders in order to:

Validate public responses received during the process.

Insure that we correctly interpreted what was said.

Insure that we did not miss something or overlook stumbling blocks towards successful implementation.

Set the stage for implementation of the Plan.

This networking followed our efforts in seeking broad public review of our draft documents. During this time, 39 meetings have been held with more than 289 citizens, and 69 interest groups or agencies.

In response to this effort, when appropriate, adjustments were made to the final planning documents. This was intended to strengthen the Plan and build a base of support for effective implementation.

During public review of the Draft Plan, the issues of uneven age management and growing large diameter ponderosa pine trees were brought to the forefront. To promote public information and education on these issues in a contemporary fashion, a video entitled "Ponderosa Pine Management in Central Oregon" was developed. Presentations were given to local civic clubs, interest group meetings, and the media.

Consultation with Others

Several agencies and Native American Tribes were involved in the initial issue development process. The most active of these agencies were the Oregon Department of Forestry, Oregon Department of Fish and Wildlife, and the Bureau of Land Management. These contacts provided the identification of agency concerns that could be dealt with in the plan, provided information useful in the analysis, and allowed the coordination of management and planning efforts.

Reviews of other agency plans, which could affect the Forest and Grassland Plans, were undertaken by the Forest. The following plans were examined:

County Plans from Crook County, Deschutes County, Grant County, Harney County, Jefferson County, and Wheeler County.

State Plans from the Oregon Forestry Department, Parks and Recreation Division, State Comprehensive Outdoor Recreation Plan, Department of Fish and Wildlife, and the Oregon Recreation Trail System.

Bureau of Land Management Plans, including the Brothers Grazing Management Program, Wilderness Study Proposals, and the John Day Area Plan were studied.

Also reviewed were plans for the Warm Springs Reservation and the Central Oregon Economic Development Plan for fiscal years 1984 and 1985.

The review of these plans did not identify any unknown issues. The goals of those agency plans were included in at least one of the alternatives developed by the Ochoco National Forest.

Interest groups involved in the development of issues, concerns, and opportunities were assembled periodically to keep them appraised of progress and to acquire additional information or feedback from them. The groups are:

Conservationists - Local members of the Oregon Natural Resource Council were contacted. These contacts included, as a principal contact, the Central Oregon Conservationists. This group also included the Blue Mountain Resource Alliance, the Grant County Conservationists, and the Central Oregon Chapter of the Sierra Club.

Recreationists & Sportsmen - Included are the Ochoco Snow Sports Club, the Oregon State Snowmobile Association, the Nordic Club, the Oregon Hunter's Association, and the Ochoco Elk Hunters.

Ranchers - The Crook County Stockmen's Association was the organization most frequently contacted. The Grey Butte Grazing Association, in their link to the management of the Grassland, was the only organized adjacent landowner group frequently involved in plan development.

Industry - Industry representatives from the local mills often participated. They were joined by representatives from the Northwest Pine Association and the Western Forest Industry Association. The Association of Oregon Loggers also was involved.

Government Agencies - The Forest contacted Crook, Harney and Jefferson Counties, the Governor's Office, Congressman Smith and Senator Packwood.

The Screening Process

The preliminary issue, concern and opportunity comments were screened and consolidated in two separate operations. The first process involved the 125 comments received from the interest groups previously identified. These ICO's were run through a set of screens. First, it was determined if the ICO could be immediately resolved by either the Forest Supervisor or District Rangers. Second, the determination was made whether or not the Forest could and should address each of the ICO's through the planning process. Some suggestions were beyond the scope of this planning effort and comments of this nature were screened out of the potential issues, but were shared with the Forest Management Team. The third screen was the resolvability of the ICO. If the suggested issue was not considered resolvable in the forest planning process, it was referred to the management team for action outside the forest planning process, and dropped as a planning issue. Next, issue statements that were potentially part of a larger issue were identified. For example, the amount of timber available to the local mills could be considered a part of the larger issue of the level of timber harvest which should be provided from the Forest. These issue components were retained and dealt with throughout the planning process.

The second process was to take the tentative issues that passed through the screening process and consolidate them into like comments by resource groupings. These consolidations were then written by the ID Team into terms that would best reflect the contents of those groups. These steps reduced the 125 comments to 60 comments which were submitted to the general public for their comments.

This second set of categorized comments was then evaluated using the following steps:

1. Evaluate Issues and Concerns

   Is it already required in the planning regulations?

   Can it be dealt with by the responsible official without going through the planning process?

   Is it a prior decision which can't be reversed?

   Is it outside of Forest Service jurisdiction?

   Should it be dealt with at some other planning level?

   Does it involve land use allocation?

   Is it operational in nature, a standard, guideline, or budgetary?

   What is the source? From public or management?

   Are there common or similar aspects?

   Categorize comments by 1) production of outputs, 2) use of resources, 3) a management practice or prescription, and 4) management performance or policy.

2. Determine Action to be Taken on Issues and Concerns

   Consider in the planning process.

   Transfer to management for action outside the Forest planning process.

   Determine to be irrelevant.

   Each action was justified and documented.

3. Take Action

   Consider in planning process: develop as an issue or concern, or deal with as a planning or process criteria.

   Refer to management for appropriate action or response.

   Determine to be irrelevant.

The management concerns were then compared with the public issues and incorporated with the issues, or classified into various non-issue categories, such as: administrative decisions, planning criteria, opinions, items required by Federal regulation, items outside the scope of the planning process, items outside of Forest jurisdiction, statements, practices to be shown in prescriptions, and items that are part of the planning process.

The results of the screening process are on the following pages. Three categories are used to identify how the issues and concerns were screened after categorization by resource. The list represents those issues and concerns that were not eliminated, referred, or resolved through the interdisciplinary team's screening process. Many of the issues were similar; an issue statement may be representative of many comments.

How Were the Issues Developed in the Public Involvement Process Handled?

Disposition of Issues by Category [1]

[1]The initials I, C, or O denote whether an issue evolved from a public issue (I), a management concern (C), or an opportunity (O)

Issue #1, Timber Supply and Forest Management

Deferred outside of Plan

Consider re-use of tomahawk in treating thinning slash for firewood availability. (O)

Administer timber sales so as to insure fences will be left intact or repaired promptly. (I)

Treated Same in all Alternatives

Sophisticated logging methods are not always needed. Analyze entire process to ensure continuity of implementation, end product, and follow-through. (I)

Make reforestation a high priority. (C)

Do not conduct precommercial thinning except for mistletoe and insect control. (I)

Stop wasting natural resources, such as wood products. (I)

Protect tree seedlings from animal damage. (C)

Treated Differently by Alternatives

Make more land available for timber production and harvest. (I)

Utilize all available timber mortality in a timely manner. (I)

Depart from non-declining even-flow timber harvest. (I)

Use silviculture practices, such as fertilization and planting of different species, to produce greater timber volume. (I)

Provide more timber products. (I)

Reduce the acreage of forest land available for timber harvest allocated to old growth. (I)

Eliminate burning as a slash treatment method. (I)

Need more intensive timber management (enhance timber and other resources in balanced silviculture practices). (I)

Launch an intensive reforestation program for future needs. (I)

Should clearcutting be practiced on the Ochoco? (I)

Do not create management areas with no programmed harvest. (I)

Clean up logging slash. This would soften the impact and create less animosity toward timber harvesting. (I/O)

We need some intermediate types of harvest and roadless combinations. (I/C)

We are getting good regrowth, but we're cutting trees down faster than regrowth is occurring. (I)

Issue #2, Social and Economic Wants and Needs of Local Communities

Deferred Outside of Plan

People too far from Central Oregon may set plan priorities. (I)

Treated Same in All Alternatives

Analyze cost/benefit of producing timber and quantify effects on habitat and dispersed recreation. (I)

Treated Differently by Alternatives

Correct the disparity between economic considerations given one resource vs. another. (C)

Improve the social and economic condition of the local communities. (C)

Maximize economic and social benefits to locally dependent communities. (I)

Recognize community development needs and opportunities: a) increase employment, b) recognize social impacts of decision made, c) increase National Forest receipts to the County in real dollars, d) provide equitable distribution in employment increases or decreases, e) display impacts of actions on other lands and resources in the community. (C)

Too many dollars are taken out of the system by unroaded allocations. We need the payments to counties generated by returns from receipts for use on local roads and for schools. (I)

Emphasize uses that produce a dollar return vs. those that do not. (I)

Issue #3, Livestock Grazing and Allotment Management

Deferred Outside of Plan

Livestock grazing should not be allowed on the Forest. (I)

More knowledge and information is needed regarding grazing seasons and distribution with associated effects on resources. (I)

Larch should be more available to permittees for fence posts. (I)

Don't use Special Use permits that create an economic impact on the grazing permittees. (I)

Skid trails supporting adequate grass should not be re-used for new entries. (I)

Treated Same in All Alternatives

None

Treated Differently by Alternatives

Provide both a maximum and consistent supply of forage. (I)

Stop repeated timber harvest entries in the same specific areas which result in adverse economic impacts on the grazing permittee. (I)

Visual and riparian management objectives are too restrictive on grazing livestock. (I)

Reduce grazing restrictions to improve utilization and palatability of forage for livestock and wildlife. (I)

Utilize more range improvement practices to obtain better range conditions. (C)

Reduce the use of grazing systems which cause economic impacts on the rancher. (I)

Provide more range improvements to manage the range, to meet resource management directions for all resources (riparian, etc.), and still maintain stock numbers. (I/C)

Develop more water systems. (I)

Overgrazing is creating erosion. (I)

Reduce cattle grazing (I)

Whenever range improvements are carried out, commensurate animal unit months (AUM's) should be made available. (I)

Assignment of other areas to wilderness would reduce forage production over the long haul. (I)

Issue #4, Riparian Area Management

Deferred Outside of Plan

Livestock enclosures of creeks (e.g. Silver Creek) have not encouraged riparian recovery. (I)

Repair damage to rockhound sites to prevent erosion. (I)

Treated Same in All Alternatives

All soils on slopes over 30 percent should not be lumped into one category of being highly erodible. (C)

Treated Differently by Alternatives

Provide the greatest balance of water quality and quantity. (I)

Maintain riparian habitat which is healthy and improve current degraded riparian habitat associated with streams, springs, intermittent streams, etc. (I)

Accomplish recovery of riparian communities by 1990. (I)

Harvest timber in a manner to reduce stream channel damage from high spring runoff and to increase summer flows. (C)

Do not use fences to restrict cattle grazing in riparian areas. (I)

Place more emphasis on enforcing existing regulations pertaining to soil, water, and wildlife resources. (I)

Allow no more enclosures of riparian areas until results of riparian recovery are proven in existing closures. (I)

Do not construct any more riparian enclosures. (I)

More restrictions are needed concerning tractor and rubber tired skidder logging on wet soils. (C)

Keep logging disturbance to a minimum, such as reusing same skid roads. (C)

Issue #5, Transportation System

Deferred Outside of Plan

Do not construct any roads across private land without permanent public access. (I)

Close roads which connect Forest lands with deeded land. (I)

Bicycling could be a significant recreational activity on the Ochoco. Consideration should be given to this potential in road design, construction and reconstruction. (I/O)

Private owners should not close access to roads built with public money. (I)

Involve public in decision to close roads, and inform public before roads are closed. (I)

Off-road vehicle use should be stopped when it creates erosion or occurs on fragile terrain. (I)

Treated Same in All Alternatives

Roads should be constructed to the lowest standard (length and width) which allows protection of other resources. (I)

Do not pave roads. (I)

Off-road vehicles should be permitted for resource administration only. (I)

Treated Differently by Alternatives

More roads are needed to provide intensive use of all resources (C)

Too much money is being spent on high standard road construction (I)

Too many roads (I)

Well-known established roads should not be closed to vehicular access; roads which have been closed should be reopened. (I)

Keep existing roads and rockhounding areas open for access by motor vehicles and the public. (I)

Whenever possible, use gates for closing roads instead of tearing up roads. (I)

species. Others note that grazing increases are dependent upon new water developments away from existing riparian areas which help to disperse use and reduce riparian damage. The public felt the Forest needed to show site potentials for willows and cottonwoods and to implement activities for the protection of various plant communities. Some stated that the Ochoco National Forest needs to stop planting "tough" poor nutrient grass for riparian protection.

The Oregon Department of Fish and Wildlife stated that the information on livestock grazing was not sufficient in the EIS. They wanted more information on the management systems, condition and trend, actual use and improvement programs to evaluate effects of the grazing program.

The Columbia River Inter-Tribal Fish Commission felt that when management strategies and integrity fail to protect riparian areas, fencing will be used. They ask how many miles of fence will be needed to protect riparian areas. The Commission also questioned the record of compliance of cattlemen in moving their herds as frequently as is required.

The U.S. Environmental Protection Agency stated that in prioritizing the development of Forest level plans, it would encourage making the allotment management plan one of the first. This is because it will have a direct bearing on riparian areas, water quality, and the protection of beneficial uses.

Response:

The Draft EIS did not do a good job of covering the environmental consequences of livestock use on the Forest and Grassland. This area has received much more attention in Chapter 4 of the FEIS. Additional work has been done on identifying needed improvements in riparian areas in Chapter 4. Watersheds have been prioritized for improvement and allotment management plans scheduled for updating. Schedules are included in the Final Plan to show these priorities, as well as schedules to show the projects and work necessary to meet riparian prescriptions.

An evaluation was done for the final plan to estimate total miles of fence and water developments to implement the riparian prescription. These figures are included in Chapter 2 of the FEIS, Table 2-8, Range Improvements. Potential for individual stream reaches to support willows, cottonwoods and other deciduous shrub and tree species will be determined on a site-specific basis in individual allotment management plans using riparian plant community guides published by the Pacific Northwest Forest and Range Experiment Station.

Erosion control seed mixes used on road cut and fill slopes commonly contain several species of grasses. Often one or two of these species are not as palatable as others to wildlife and livestock. The emphasis in these instances is on using species that establish quickly to hold the soil in place and which won't be immediately consumed by livestock and wildlife.

Standards and Guidelines have been developed in the Preferred Alternative I to identify and protect threatened and endangered species and sensitive plants.

0500-02.3 Grazing Effects

Two letters discussed the issue of threatened and endangered plants affected by grazing. Some comments were that affected threatened, endangered or unique plants need to be addressed better by the Ochoco National Forest, or that the Forest should plant grass so it will be available during peak season use. This, according to respondents, would allow natural threatened and endangered species to develop and remain strong and disease resistant.

Response:

Chapter 4 of the FEIS evaluates the effects of grazing by domestic livestock on threatened, endangered and sensitive plant species.

Standards and Guidelines have been developed in the FEIS alternatives to identify and protect sensitive plant species. Forage utilization standards in the Final LRMP will allow good plant vigor and high levels of plant species diversity.

@0500-03 Raise Grazing Fees

Eighty-four responses, including those of the EPA and the CRITFC, commented on the fee aspect of the grazing program.

Some stated that the Ochoco National Forest is operating a cattle grazing give-away program and that it is undercharging cattlemen for the use of publicly owned land. Some also remarked that the Forest Service is operating a program which costs more than it returns to the Treasury. These respondents felt that the permittees should pay the full costs of administration of the grazing program.

The Environmental Protection Agency felt that the increased costs in grazing management area should not be included in "environmental" effects, but that these costs should be discussed as an economic issue.

The Columbia River Inter-Tribal Fish Commission stated that the Ochoco National Forest should consider the factors that are involved in the trade-off between Range and Timber management. The Commission also asked why the most productive lands were allocated solely to range.

Response:

The issue of grazing fees is outside the scope of the Forest planning process. The grazing fee formula was set by Congress, and in 1985 the base level was set by executive order. Legislation would be required to change the grazing fees. Even though the returns the Forest Service gets in the form of grazing fees do not cover the cost of administration of the range program, the economic benefits of the program are realized in the local economy.

The allocation of management areas in the DEIS and Draft Plan was misunderstood. Timber/range emphasis was not intended to be exclusive use The FEIS and Final LRMP have changed this Management Area to General Forest (Ochoco National Forest) and General Forage (Crooked River National Grassland); these are both multiple use areas.

@0500-04 Management

Six comments dealt with the issue of specific grazing management systems.

Some comments were that the Ochoco National Forest failed to fully disclose specific grazing management systems, and that issues and concerns need to be discussed on an allotment-by-allotment basis. One reviewer felt the Rock Creek allotment was not covered adequately in the proposed plan. In addition, some stated that the Forest Service needs to include ranchers in the management picture and display present and future grazing conditions.

Response:

Specific grazing management systems will not be outlined in the FEIS or Plan. Those decisions are made in the individual allotment management plans in consultation with the affected permittee. They are site-specific and require on-the-ground analysis. No matter what grazing system is employed, each allotment will be monitored to make sure it is meeting all resource objectives such as riparian area recovery and wildlife habitat objectives.

@0500-05 Utilization Rates and AUM's

There were 18 comments that discussed implementation of the plan and utilization levels for grazing.

Some felt that the Ochoco National Forest needs to show the effects of implementation of and utilization levels for the proposed plan in regard to the range land. Others stated that the Ochoco should include maps showing allotment AUMs and a discussion of the implementation process.

In addition, some felt that the Ochoco National Forest should manage all areas with 40-80% utilization levels and that the Forest should adhere to the AMP schedule Many felt all fences should be shown on allotment maps and cattle should be removed from the Forest by October 15, 1989.

Response:

Increases and reductions in permitted AUMs are generally handled through the allotment management planning (AMP) process. This is an allotment-specific planning process involving interdisciplinary team approval and directly involving the affected livestock permittee(s). Resource objectives are outlined, a grazing system designed, various range improvements planned, and a monitoring plan developed. This is all done through the NEPA process. A schedule for updating allotment management plans will be in Appendix A of the Final Plans.

Forage utilization standards are in Chapters 4 of the Final Plans and are separated for riparian areas and upland areas. Utilization standards are set to allow prescribed use of forage but prevent overuse that would degrade the forage resource or other resources. Utilization is measured in areas preferred by livestock because those are the areas where overuse and resultant resource damage would occur if livestock were not removed after prescribed use.

Utilization standards are incorporated into allotment management plans which become a part of the grazing permit. Compliances with the grazing permit is normally handled by close coordination between the permittee and Forest Officer, but if violations occur, action is taken against the permitee. Forage use by domestic livestock is a legitimate use of National Forest Lands as mandated in the Multiple Use Sustained Yield Act and will continue.

0500-05.1 Utilization Rates and AUM's

There were 21 letters, including one from the Columbia River Inter-Tribal Fish Commission, which had comments on the range of alternatives and AUM's. Some of the comments were that the Ochoco National Forest needs to show an adequate range of alternatives and range of AUMs in alternatives. Some requested information on the availability of range to livestock, as well as data on increase or decrease on an allotment-by-allotment basis. Some recommended that the Forest consider using sealed bids and enlarging alternatives for foraging.

The Columbia River Inter-Tribal Fish Commission stated that as the overstory is removed and the understory thinned, the forested rangelands will be found more frequently in fair and good forage condition class. The Commission questioned whether it is necessary to thin old growth timber stands to thinned tree farms just to provide grazing. CRITFC also noted that the Forest Service stated that range utilization standards will not exceed an average of 50% on meadows, and less than 30% on slopes and asked if this is a new standard or if it has been used before. They also question why, if it has been used before, the ranges are still in predominantly poor to fair condition.

Response:

The FEIS contains alternatives that show a range of AUMs from approximately 73,000 to 80,000. These estimates were based on timber harvest levels with resultant availability of transitory forage and on investments in structural and non-structured range improvements that make previously unusable areas available for forage use. Allotment-specific analyses were done to determine riparian improvement needs and estimates on what range improvements would be necessary to make those improvements. The Ochoco's analysis indicates it can meet the resource objectives of each alternative and produce the AUM outputs indicated. It was not considered necessary to arbitrarily reduce AUMs to show a broader range of outputs in AUMs.

Forage utilization standards have been changed in the Final Plan and EIS and are now based on whether range is in satisfactory or unsatisfactory condition and on management intensity levels. Old growth timber stands are not proposed to be thinned to improve forage condition classes under the stands. New plant community guides and forage condition guides are due to be published for the Ochoco National Forest in 1990.

@0500-06 Wild Horses

Fourteen letters commented on the issue of wild horses on rangeland.

Many thought that the Ochoco National Forest should not promote or allocate rangeland for the management of wild horses. Many felt that horses compete for rangeland with big game and that they are adversely affecting the environment. In addition, some stated that the cost of controlling wild horses is wasted funds, or that there are no "true" wild horses on the ONF or CRNG.

One respondent felt the holding pen at Big Summit is inadequate, that the horses were improperly fed straw, and that at least one had died while held there.

Response:

The Wild Horses and Burros Protection Act was passed by Congress in 1971. The law spells out very specific requirements for dealing with wild horses. The horses on the Ochoco National Forest meet the definition of wild horses in the 1971 Act, and as such are managed as required by the law. The Wild Horse Management Plan (Forest Plan, Appendix G) sets the herd size based on the carrying capacity of the area.

The corral used to hold wild horses between the time they are captured and the time they are transported to the wild horse facility near Burns, Oregon, is of pole construction and has been built with the safety of the horses in mind Horses are fed while being kept in the facility, and to the agency's knowledge, no horse has ever died while in the facility.

@0500-07 Decrease Grazing

One hundred twenty-eight public responses, including the one from the Oregon Department of Fish and Wildlife, commented on the current levels of grazing.

Some felt the Ochoco National Forest should consider reducing or maintaining current levels of grazing as a viable issue. Some felt that since the overgrazing of the 40's and 50's, the land has been trying to heal, and perhaps the Forest needs to justify the appropriateness of grazing by analyzing the adverse environmental impacts. These impacts need to be justified by NEPA standards, according to some.

Also, some felt that by reducing grazing, the Forest will improve water quality and quantity. They felt that, by reducing AUM's, taking fences down and phasing grazing out in 10-15 years, the Forest Service would improve riparian areas immensely.

The Oregon Department of Fish and Wildlife (ODFW) stated that they cannot support any increase in the Forest grazing program. ODFW stated that it is difficult to justify continuation of the Forest grazing program, considering the standards and guidelines in the proposed plan.

Response:

Domestic livestock grazing on the Ochoco National Forest is and has been an important part of the local grazing economy. It can also be a means for managing vegetation, e g. reduction of vegetative competition in tree plantations and fuels reduction to reduce wildfire hazard.

Overuse of many riparian areas and some upland sites has occurred in the past and is dealt with in the Final Plans by specific utilization standards (see Utilization Standards, Chapter 4, Section 2 and 3). Monitoring (Plans, Chapter 5) will assure utilization standards are being met.

AUM levels by alternatives in the FEIS vary due to the amount of investment in structural range improvements and the level of timber harvest. Some structural range improvements are designed to make forage available in areas where it is presently not available, due to distance from water sources or livestock distribution patterns. This can increase the overall level of AUM's available while still not exceeding utilization guidelines Other structural range improvements are designed to control livestock use, such as many riparian areas. This will allow forage use to acceptable levels and restrict any further use. This kind of intensive grazing management, when properly done, can increase the amount of AUM's available, while at the same time not rehabilitating degraded riparian areas

Timber harvest opens the tree canopy, allowing more sun to reach the forest floor, which may in some cases produce more forage. This potential increase in forage production is termed "transitory"

because it will be available for a period of time and then will decrease as the forest canopy closes. The level of timber harvest in an alternative determines how much transitory forage may be available over time. Transitory forage can increase the overall amount of AUM's potentially available.

Alternative C in the FEIS shows fewer AUM's than are presently permitted (FEIS, Chapter II). This is because Alternative C invests very little money in structural range improvements and has a reduced timber harvest level, which doesn't provide much transitory forage. Also, the emphasis of this alternative is for less grazing. All the other alternatives in the FEIS show either more AUM's than are presently permitted or the same level as at present due to investments in structural range improvements and timber harvest levels with resulting transitory forage production.

@0500-08 Stop Grazing on the Forest

There were 52 letters that supported stopping livestock grazing on the Ochoco National Forest.

Many felt that livestock grazing should not be permitted on the Forest, and that grazing is destructive to native plant species. Also, they felt that livestock use compacts the soil and reduces plant diversity. Some claim that a decrease in livestock grazing would reduce undesirable and exotic plants, upland degradation and noxious weed invasion. Therefore, many felt, there should be a no grazing alternative and/or a ten-year ban on livestock grazing.

Response:

The alternatives displayed in the FEIS have a range of AUM outputs. There is not, however, an alternative that eliminates livestock grazing from the Ochoco National Forest and Crooked River National Grassland, nor were there alternatives that eliminated other uses from the Forest or Grassland. Livestock grazing has been a traditional and important use of the Forest and Grassland, and is one of the uses specifically mentioned in the Multiple Use Act of 1960. When properly administered, livestock use can be compatible with other resource values and uses. The environmental consequences of grazing are outlined in Chapter 4 of the FEIS; livestock use of the Forest and Grassland contribute to the social and economic well being of local communities.

@0500-09 Prohibit Grazing in Certain Areas

Ten letters commented on grazing in sensitive areas.

The public respondents indicated that they feel the Forest Service should manage the Forest for the public, not just for livestock owners who use it for grazing. Some felt that the Forest Service should remove all livestock from the Forest. If this is not possible, some stated, then the Forest should keep cattle on grasslands, and keep cattle away from poor/fair condition areas for at least five years. Additionally, some respondents recommended removing cattle from wildlife winter range, riparian and shallow soil areas, and recreational areas.

Response:

The riparian prescription in the preferred Alternative I is designed to improve riparian areas. Individual allotment management plans will outline whether this will require livestock exclusion (short term or long term) or whether more intensive management systems and additional range improvements will be needed to meet the riparian improvement objectives.

Utilization standards in Chapter 4 of the Final Plans have utilization levels that vary depending on whether or not the area is in satisfactory condition. Areas that are not in satisfactory condition will have use levels adjusted down so they can recuperate. In some cases, there will be total exclusion for enough time to allow recuperation of areas in less than satisfactory condition

Almost all of the developed recreation sites on the Forest and Grassland are fenced to exclude livestock. Those that are not fenced will be if conflicts arise between recreationists and livestock.

Section 4(d) (4) (2) of the Wilderness Act states that grazing in wilderness areas, if established prior to designation of the area as wilderness, "shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture." It was stressed that there would be no curtailment of grazing permits or privileges in an area simply because it is designated as wilderness. As stated in Forest Service regulations (36 CFR 293.7), grazing in wildernesses ordinarily will be controlled under the general regulations governing grazing of livestock on National Forests. This includes the establishment of normal range allotments and allotment management plans. Under the direction of Preferred Alternative I, livestock grazing in Wilderness will continue.

Livestock use of big game winter range will be controlled in the individual allotment management plans. Monitoring of use will be done and spring and fall green-up will be reserved for big game in some cases. Grazing systems will be developed that leave adequate forage for wintering big game

Subject Area 550 Native/ Introduced Plants

@0550-01 Introduced Plants

Two comments were received from respondents who were concerned that the Forest Service plants introduced grass species for erosion control and some range improvement projects. It was felt that the introduced grass species grow tall and tough and are not good forage species.

Response:

Species of grass that are not native to the immediate area are sometimes used for erosion control purposes on road cut and fill slopes and other disturbed areas. The reasons are two-fold: some introduced species are easier to establish, and species that are not highly palatable are not grazed heavily. There is no more large scale range improvement seeding using non-native grass species planned on the Ochoco National Forest or Crooked River National Grassland.

The Forest conducts a program in cooperation with local extension agencies to control noxious weeds.

@0550-02 Management

One comment was received from a respondent who feels that while the Ochoco N.F. has not a single botanist on its staff and has had only one major botanical study conducted, it continues to destroy natural plant communities and to propose further destruction.

Response:

The Ochoco N.F. does not employ a botanist per se, but does employ on a shared basis a forest ecologist who is an expert on plant communities and species In addition, the Forest employs range conservationists, foresters, and wildlife biologists who are versed in basic plant taxonomy and botany. The Forest also consults with the Native Plant Society and other local interest groups in these matters. Chapter 4 of the FEIS analyzes the effects of various programs on plant communities.

0550-02.1 Management

One comment was received from a respondent who was concerned that grazing may often destroy beneficial and increasingly rare plants in favor of other species.

Response:

Proper grazing and management practices generally should not result in this. Some of the impacts of grazing in the Blue Mountains seen today are a result of practices that took place at the turn of the century. Chapter 4 of the FEIS analyzes the effects of grazing on sensitive plant species.

0550-02.2 Management

One comment was received from a respondent who felt that Forest Service management was increasing brush and juniper to the detriment of grass, which causes deer and antelope to go to private land to feed.

Response:

The alternatives in the FEIS provide different allocations of land for big game emphasis. Big game winter range is to be managed to provide a cover forage ratio for wildlife needs. This will not, however, change the fact that some traditional big game winter range is off the National Forest and Grassland; and under winter conditions, big game may end up on the private lands at lower elevations.

Subject Area 600 Research Natural Areas

@0600-01 Silver Creek

A letter was received from the Department of the Interior suggesting that it would be helpful to include a description of the features of proposed RNA's. The USDI also noted that Silver Creek RNA is a name already used by the BLM and that the RNA cell need may have already been met.

Response:

Appendix E of the DEIS had a description of each proposed RNA and the plant communities they represent. An establishment report is scheduled to be prepared for each Research Natural Area and will give additional detailed information on plant communities and features.

The BLM in Burns does have an existing RNA called Silver Creek RNA. It is on the same creek as the one proposed in the FEIS but further downstream. The two areas represent different "cells" (plant communities). The FEIS describes Silver Creek RNA in FEIS Chapter 3, and Forest Plan Chapter 4

@0600-02 Management

Twenty-nine comments were received from respondents who felt that RNA's should be open to ORV/ATV use and all forms of winter and summer recreation.

Response:

For some areas ORV/ATV use is incompatible, for example, Research Natural Areas (RNA's) are sites on which natural features and processes are preserved in as nearly an undisturbed state as possible for scientific and educational purposes. RNA's serve as a standard or baseline for comparison with areas influenced by man, as tracts for ecological and environmental study, and as reserves to protect typical as well as rare and endangered organisms. Motorized recreation is incompatible with these goals and objectives. Non-motorized recreation use is not generally prohibited but it is also not encouraged. If non-motorized recreation use increased to a level where it negatively affected the value of the area as a RNA, it could be restricted.

0600-02.1 Management

Forty-six comments were received from respondents who were not in favor of designating any new RNA's. Some felt they were totally unnecessary or were just on excuse for more mini-wildernesses. Others felt the ONF had proposed too many acres as RNA's.

Response:

Research Natural Areas are a nation-wide, multi-governmental agency program designed to preserve representative samples of a wide spectrum of ecosystems They are preserved in as nearly an undisturbed state as possible for scientific and educational purposes. They are also important for preserving genetic pools, biological diversity, and as baseline areas for monitoring Forest Plans. They are not tied to the Wilderness Act in any way and their purposes are different from those of Wilderness.

The size of RNA's can vary considerably. They can be only a few acres but the average minimum size is usually 300 acres. It all depends on how many acres of undisturbed site are available and how many acres it takes to encompass the target vegetation types. All the proposals in the DEIS were field inventoried and the boundaries recommended by Forest Service ecologists trained in the RNA program.

0600-02.2 Management

One comment was received stating that over-the-snow- machines should be specifically prohibited in the RNA's and that the only new trails that should be built in RNA's should be to conduct research.

Response:

Snowmobiles are not allowed in RNA's. These two concerns are covered in the management area prescriptions in FEIS Appendix D, and Chapters 4 of the Plans.

0600-02.3 Management

Two comments were received from respondents who felt that RNA's should be fenced to exclude livestock.

Response:

Livestock grazing is generally not allowed in RNA's unless it is part of the particular RNA's charter or research purpose. Therefore, RNA's will be fenced to exclude livestock where necessary. Exceptions would be those areas like the Island on the Grassland which is inaccessible to livestock due to topography, or as mentioned above.

0600-02.4 Management

A comment was received from one respondent stating that he was aware of another potential RNA that has not been designated.

Response:

The RNA program is dynamic. Other RNA's can be added at a later date. Forest ecologists will be made aware of this additional potential RNA and will review its chances for addition to the program if it meets the needs of an unfilled cell.

@0600-03 Plan Comments

Twenty-nine comments were received from respondents who were in favor of the RNA's as proposed in the Preferred Alternative of the DEIS.

Response:

The alternatives in the FEIS contain a range of acres proposed for RNA's including the proposal in the DEIS Preferred Alternative. Preferred Alternative I's proposal for RNA's is the same as Alternative E-Departure.

0600-03.1 Plan Comments

Three comments were received from respondents who felt there should be more RNA's. One respondent stated that additional RNA's, including The Island, should be added.

Response:

The idea behind the RNA program is to have one for each ecosystem or unique flora, fauna, or geology system represented on the Forest and Grassland. Forest Service ecologists as well as other scientists have inventoried the Ochoco N.F. and CRNG and identified the potential RNA's as outlined in the various alternatives in the FEIS. These are the areas that meet the needs of the RNA program. If other areas are found in the future that meet the need of a cell in the program they can be added.

0600-03.2 Plan Comments

A comment was received from one respondent stating that the plant community description for option A of Haystack Butte RNA proposal was left out in Appendix E of the DEIS.

Response:

The plant communities for option A were inadvertently left out. Major vegetation types for the Haystack Butte proposal are described in FEIS Chapter 3.

0600-03.3 Plan Comments

The Pacific Northwest Research Station noted that in the description for the Island, mention was made of 39 acres of CRNG and 160 acres of BLM land, and that this was the first place the EIS/Plan distinguished between the two acreages; elsewhere, it appeared that the 199 acres is all National Grassland.

Response:

The above statement is correct. We have attempted to clarify this in the FEIS. In the interim, the Island has also been designated as a national landmark by the Department of the Interior.

Subject Area 700 Timber Resource

@0700-01 Harvest Levels (General), Alternatives B,B+,C,E

There were 670 letters with comments on the timber harvest level. These comments ranged from "don't cut anything" through "maintain existing harvest levels" to "increase ASQ." There were comments requesting higher levels of old growth, visual resources, recreation, and firewood on the Forest.

Many of the comments related to the available timber base requesting either a decrease or an increase in the amount of land available for harvest.

Sixty-four respondents indicated a preference for the harvest level prescribed in a specific alternative

The Harney County Farm Bureau recommended that harvest should not be increased even temporarily unless such an increase could be sustained.

The Crook County Courthouse desires that the ONF maintain or increase the amount of land managed for timber.

Some commented that timber harvest levels above the established sustained yield are in conflict with NFMA regulations.

The Columbia River Inter-Tribal Fish Commission noted that the timber base has declined 14 percent from 1973 to 1982 and asks how harvest levels can be maintained.

Many comments related to the harvest level were from those who preferred a specific alternative. Fifty respondents preferred the harvest level of Alternative B or B-plus (a modification of "B" proposed by industry). Thirteen indicated a preference for the levels in Alternative C. One person Preferred Alternative E.

Response:

The analysis in the FEIS explored a range of timber harvest levels from 13.9 to 24.4 MMCF (82-144 MMBF). The major factors affecting this level are: land allocations (described as Management Areas), the existing timber inventory and expected growth rates. In the long run growth is much more important than inventory. Since the forest is a dynamic system, the scheduling model is also dynamic and considers both growth and mortality by timber types to take advantage of both existing inventory and potential growth to make the best use of forest potential.

The Forest cannot maintain its current harvest level and still provide the other values (wildlife, scenic value, recreation use, etc.) that many people expect from the forest. In fact, any timber harvest level has both positive and negative effects on other resources. The economy was an important issue but was weighed against other values in selecting a final alternative.

These comments were carefully considered in developing the new Alternative. Some changes that have taken place since the DEIS to help address these concerns are:

1. The application of uneven-aged management on about 100-120 thousand acres of the ONF. This will make areas more acceptable visually for recreationists and still provide a moderate level of timber production.
2. Increased emphasis on a quality product (larger pine). This reduces the frequency of regeneration cutting and leaves more big trees in the forest.
3. Addition of the Summit Trail Corridor and other management areas, which will be managed to maintain unique qualities.

4. Parts of Lookout Mountain and the Rock Creek/ Cottonwood Roadless area will be managed for recreation and wildlife. This may involve some timber harvesting to maintain forest health.

Other changes are described in the summary and elsewhere in the FEIS. These changes should help maintain a sustained timber supply, reduce some of the negative impacts, and provide an equitable balance of uses.

See Chapters 4 of the Plans for more information on Old Growth, Firewood, Recreation, etc. Also see response to board foot/cubic foot issue in the Record of Decision and FEIS Chapter 4.

The harvest level at Snow Mountain stays much more constant with uneven-aged management than it did with the alternatives displayed in the DEIS. The ONF is also working with the Malheur National Forest to develop a combined schedule for the Burns Area that will avoid abrupt changes in harvest levels in this area .

0700-01.1 Departure

Four letters were received with comments favoring departure harvest. The common feeling was that the lowest level of timber harvest could be increased with more intensive management.

There were 304 letters containing comments opposed to a departure alternative, favoring sustained yield instead. Some felt that departure is shortsighted and that future drastic reductions in the harvest would disrupt the economy. Others believed that departure harvest would result in an irretrievable loss of resources and cause severe ecological damage due to erosion.

Still others noted that departure violates NFMA regulations.

The Office of the State Economist pointed out that the short-term gain will not outweigh long-term costs of departure.

Response:

A new alternative, Alternative I (see FEIS Chapter 2), has been developed. The proposed harvest has been changed from the Departure in the DEIS to a sustained yield even-flow harvest schedule. Reasons for changing were based on response to the DEIS, which favored the long term good of the forest and local community stability. With increased intensity of management or by decreasing the level of departure, there is some opportunity to make a departure more acceptable. However, a sustained yield even-flow timber harvest schedule was selected based on public input and a further review of the consequences. The ONF has explored ways of maintaining the harvest closer to the present level and will use a gradual transition within the first decade of the plan to reduce ASQ to the planned level of 19.3 MMCF (115 MMBF). See FEIS Chapters 2 and 4 for further discussion. The major negative impact of this decision will be to reduce the dollar returns to the U.S. treasury in the first few decades.

Alternative I calls for even-flow for the ONF on a decade by decade basis. There will be fluctuations in timber sale from year to year based on budget and economic conditions. Harvest by district will be determined administratively considering biological, administrative, and social impacts. Sustained yield by species is not intended nor is it practical. Harvest levels will consider local economies as discussed under the reply to the ponderosa pine issue in this appendix, but timber condition and Forest Health (Chapter 4 of Forest Plan) will be the primary consideration in determining the species mix.

@0700-02 Species Mix

0700-02.1 Ponderosa Pine Management

Many respondents were concerned about the volume of ponderosa pine sold in the timber sale program. There were also concerns for management of other species.

The inherent value of ponderosa pine was one such concern. Enhanced harvest and regeneration of pine were desired by many respondents. There was also concern regarding substitution for ponderosa pine by inferior species. In addition, some respondents brought up the need for studies as to replacement of pine stands after harvest by juniper and sagebrush

The Oregon State Forester comments that a steady supply of ponderosa is critical to the economy of central Oregon and is opposed to any proposition of large changes in the species mix, especially a reduction in ponderosa pine.

A related concern is the display of outputs in terms of cubic feet instead of board feet. The discrepancy between the Resource Protection Act document, which displays timber outputs in board feet, and the DEIS, which uses cubic feet, is questioned.

Response:

The Ochoco considered a range of ponderosa pine harvest levels in the first decade from 65 MMBF in Alternative C to 95 MMBF in Alternative B-Modified. The harvest level of ponderosa pine is a critical item to the local economy and also is currently the major contributor to forest receipts from timber sales. Short term (next 5 decades) harvest level of pine depends on land allocation, harvest schedule, and existing volume. The existing volume of pine is based on the 1982 inventory adjusted for harvesting to the end of FY88. Sampling error was less than five percent for the inventory. See FEIS Chapter 3 for volume by species group. Chapter 4 of the Draft Plan shows a reduction of 14 percent in total volume and 18 percent in pine volume between 1973 and 1982. The long term level (beyond five decades) depends mostly on management strategy. The existing volume does not allow a continued sale of historical levels (FEIS Chapters 2 and 4) of ponderosa pine. The addition of uneven-aged management helps to even out the sale of ponderosa pine over the next five decades but at a level below that of the previous decade. To maintain future harvest levels of ponderosa pine requires the harvest of stands with other species now so that they can be regenerated with new stands of pine. The Forest strategy is to manage future stands with a larger component of pine than occurs on most existing stands, with the intent of creating a species mix closer to what was here before fire protection (prior to 1930). This is particularly true in the mixed conifer types. There is no plan to remove pine overstory when the only understory is Douglas-fir or white fir. See Standard and Guidelines in Chapter 4 of Plan - Timber for specific direction. Reforestation efforts have been very successful and encroachment of juniper and sage brush has not been a problem. See FEIS Chapter 2 for proposed harvest level in ponderosa pine by decade.

For the Plan, the volume growth of trees and annual harvest level has been calculated in cubic feet. This is a measure of sound wood volume in a tree.

Much confusion is created when attempting to convert cubic feet to board feet, or when estimating long term growth in terms of board feet. Board feet, when referring to standing trees, is not a measurement but an estimate of an end product. There are several rules for doing this and different rules can result in considerably different estimates. In addition there can be large differences in estimated volume of a tree based on the length of logs it is bucked into. There is also considerable difference in the ratio of sound wood to estimated board foot volume for different size trees. For these and other reasons most research is done in cubic feet as are all yield tables for forest plans. For these reasons, cubic feet has been used to control or project timber harvest levels. Harvest can drop on a board foot basis while remaining stable on a cubic foot basis. An estimate of board foot volume is shown for the first decade only.

The inventory reduction of 14 percent (shown in FEIS Appendix E) is what was expected from the previous plan. The standing inventory in expected to decrease for the next five to ten decades as overmature stands are replaced by younger stands. This will be accompanied by an increase in growth until an equilibrium is reached. See "Timber" in FEIS Chapter 4 for more discussion of this.

0700-02.2 Genetic Diversity

Six respondents expressed the need to maintain old growth as a reservoir for genetic diversity.

Response:

Diversity is a major concern of the forest. There were several new management areas added since the draft to recognize more unique situations on the forest. The direction for management on the general forest has been changed to favor more uneven-aged management and longer rotations. Even-aged harvest units will be limited in size and distribution, resulting in greater diversity in stand age and structure than proposed in the DEIS. There are also about 60,000 acres in riparian and recreation areas that will have stands with extended rotation (150 to 300 years), and about 85,000 acres with no timber harvesting in designated old growth, RNA's, wilderness, and roadless areas. See Chapter 4 of the Forest Plan for exact acres and description of each area. These areas serve as genetic reservoirs.

The Forest has about 2,800 trees in the tree improvement program. Each major tree species is represented in this program. Progeny from these trees have been planted in seed orchards and evaluation plantations. This is intended to improve the genetic base as well as preserve a wide genetic base for future plantations. There is a significant number of natural trees in regenerated areas to further expand the genetic base. The genetic base on future timber stands will be at least as diverse as existing stands and in many areas more diverse.

@0700-03 Timber/Livestock Issues

Twenty-four letters were received with comments concerning the relationship between timber and grazing.

Some felt that both timber and grazing should be deemphasized in the interests of wildlife, recreation and scenic values. Others were of the opinion that proper grazing and timber practices were compatible and acceptable uses of the forest. Still others felt that grazing and timber should be dealt with separately (e.g. timber should be favored over grazing, or slash if harvest prohibits cattle use).

There were also several comments urging the seeding of domestic grasses after harvest to control erosion and provide grazing.

Response:

There is a generally favorable relationship between timber harvesting and grazing as any removal of trees tends to increase forage production. Generally it was conflicts with other values such as water quality, old growth, and recreation experience that limited timber harvesting or grazing. The forest attempted to create a proper balance among uses as described in Chapter 4 of the Forest Plan. Emphasis has been given to water quality (enhance prescription used for all riparian areas) and unique scenic values, such as Stein's Pillar, in Alternative I. Areas available for timber production and grazing will be managed as intensively as is economically feasible.

Areas of conflict between timber and grazing are in slash disposal, grass seeding, and protection. See the Timber section of FEIS Chapter 4 for more discussion Slash disposal guidelines were developed to provide protection from wildfires, and provide down woody material to insure future productivity. See Chapter 4, Forest Plan, Standards and Guidelines for Woody Biomass for details. This should allow cattle access to most harvest areas but there will be some slash and large down material left on the site Grass seeding will generally not be done except for erosion control as it competes with tree seedlings and prevents the return of native species. Tree seedlings will be protected from livestock where necessary by temporary exclusion or individual tree barriers

@0700-04 Data Analysis

Seven letters, including the responses from the Oregon State Forester, the Oregon Director of Economic Development, and the Columbia River Inter-Tribal Fish Commission, had comments dealing with yield tables as used in the DEIS.

There were some questions as to the reliability of current inventories and harvest levels compared to levels on previous tables.

Some respondents felt that the plans for genetic gains are not practical on low sites on the Ochoco National Forest.

Growth rates of mature pine vs. second growth were also questioned. The CRITFC felt that the drop in potential yields is due mostly to a change in the managed yield tables. They also stated that the South-Central Oregon/Northern California variant prognosis model may have been more appropriate to reassess the accuracy of the Ochoco managed yield tables for stands similar to those on the Deschutes.

The Oregon Director of Economic Development does not support reducing the acreage available for full yield management.

Response:

Yield tables were developed as described in Appendix B, with more detail available in "Existing and Managed Yield Tables for the Ochoco N.F.," an unpublished document available at the Ochoco National Forest Supervisor's Office in Planning Records. The 1982 inventory was done to an accuracy standard of more than ninty-five percent. Volumes for each model component were projected forward to 1994 (midpoint of first decade) and acres by model component have been adjusted for timber sold since the inventory. This inventory was within one percent of the projected inventory, based on 1972 inventory, with adjustments for growth and cutting. The ONF has a very high degree of confidence in the inventory volume and the existing yield tables which were developed from inventory information. The inventory data was also used to calibrate the growth model used for developing managed yields. The Blue Mountain variant was used to develop the basic yield tables as SORNEC was not available at that time. Uneven-aged yield tables were developed later and SORNEC was used. Some standard tables were compared between the two variants and there was little net difference so basic tables were not redone. Since growth rates for yield tables are based on existing stands, the effects of mortality from insects and disease, and growth effects of compaction are included in the tables, but the final impact of each cannot be separated.

These yield tables show less net growth than does research or the previous yield tables. That is because these are Forest specific yield tables that show the best estimate of what can actually be produced on given sites with technologies available. This makes allowance for islands of nonproductive land within timber stands, trees left for snags, and local site productivity. Research that was done on Pringle Falls and in the Cascades was done on higher or better sites and uniform stands where there were no inclusions of low or nonforest sites. Consequently research yields are higher than what would be expected on the average site on the Ochoco N.F. A common set of yield tables developed for the Blue Mtn. Forests was used for the 1980 Plan. The ONF is on the drier end of this group so sites and expected yields are lower than the average for the four Forests Informal comparison between existing stands and projected growth was compared and results were similar. A separate inventory of managed stands is planned with the next inventory which should give a better basis to compare and adjust yields. A sensitivity analysis has been completed since the draft was prepared. In that analysis, all managed yields were increased by 20 percent, and this resulted in less than a two percent increase in ASQ. This shows that existing volume and S&G, such as watershed constraints, are the primary controlling factors and a major change in managed yield tables have little effect on ASQ. Growth on immature stands (Forest Plan Appendix G) is less than mature stands at present because most of the immature trees are not yet merchantable but projected growth of immature stands is several times that of the mature stand. See Table 4-3 (Annual Growth by Age and Timber Type) for more details.

Genetics gain is incorporated into the managed yield tables that call for planting (note: planting is not planned on low site pine types). The genetics program is already in place and forest has been using plantings from selected trees for several years so this is not a new level of investment to be made. The Tree Improvement Plan is available at the Supervisor's office for more information.

0700-04.1 Data and Table Errors

Seven respondents pointed out inaccuracies, inadequacies, or discrepancies in the documents. Among the respondents were the Environmental Protection Agency, the Oregon Department of Fish and Wildlife, and the Oregon State Forester.

The following errors were commented on:

Table 2-8 of the DEIS shows incorrect value for current ASQ.

Graphs on pages 35 and 39 do not agree.

Table 2-8 should show volume for each decade.

Table 3-25 on Page 89 of DEIS is in error.

Table 3-25 of DEIS does not agree with Table 4-1 of Proposed Plan.

Sale program data incorrect in appendix A of Proposed Plan.

Table S-2 and harvest level of 89 MMBF for E-Departure in year 2030 is in error.

Response:

Tables have been corrected in the final documents. The graph on Page 35 was changed so MMBF is no longer shown. The long-term Sustained Yield Capacity was not calculated in board feet, nor can it be calculated with the current data in the model The Crooked River Grassland acres are no longer included in these tables which should also improve readability. Table 2-8 did not show volume by decade as it would have complicated the table. This information by selected decades is available on Table S-8 of the FEIS Summary. A new sale schedule is shown in Appendix A of the Forest Plan. Contact the Supervisor's or District office for more details on specific timber sales.

Table S-2 (now Table S-8) has been revised to display the new alternatives and Alternative I shows a much higher harvest level in the fifth decade than did alternative E-Departure. This change is due mostly to maintaining an even-flow and the emphasis on producing larger trees in Alternative I.

@0700-05 Reforestation

Thirty-seven letters contained comments on reforestation, among them the responses from CRITFC, ODFW, the Oregon State Forester, and Crook County.

Most comments, including those of Crook County, favored placing a growing emphasis on reforestation in the future. Some respondents recommended planting species most adaptable to a particular area and increased research on super trees.

Others suggested mechanical site preparation to favor naturals. A preference was indicated for auger planting over slit planting, and for protecting snags from fire during site preparation. There were also concerns that burned areas are not being reforested

While many respondents have been impressed by reforestation efforts, some felt that recent favorable growing conditions have made silviculturists overly optimistic. Others were opposed to intensive practices such as fertilization or spraying. Concerns about nutrient cycles and gene pool reserve were not adequately addressed for some respondents.

To some, planting and maintaining tree plantations did not seem economically justified.

The Oregon State Forester noted that the stocking standard of 50 to 75 trees is lower than State of Oregon standards.

ODFW recommends that standards for reforestation in big game management areas should be driven by cover needs rather than harvest needs.

CRITFC stated that the certification process appears to take six years instead of the mandatory five (site preparation within two years of harvest; planting within one year after site preparation; certification three years after planting). The council also questioned the status of a stand if it cannot be certified as revegetated.

Response:

Most of these concerns are covered in the Forest Wide Standards and Guidelines in Chapter 4 of the Plan for Timber, Diversity, and Forest Residue. Site

specific decisions on planting method, spacing, planting tools, etc. ,are made to comply with the Standards and Guidelines and objectives for each Management Area. These are project level decisions. Some projects such as fertilization, spraying, pruning, etc. will require additional environmental analysis and documentation. The minimum stocking standard was designed to meet the requirements of NFMA Sec. 4. This is not the recommended level that is normally obtained. It should also be noted that this standard is for trees 4.5 feet tall, not two-year-old seedlings as is the case with State of Oregon's requirements. Planting may be done if stocking exceeds the minimum level and if the expense is justified to meet the management objective for a particular Management Area. The planting program on the ONF has been very successful with an average survival after three years of about seventy percent. The areas requiring replanting have been less than five percent. Survival is generally better in clearcuts than in areas with residual overstory.

@0700-06 Below Cost Sales

Three letters, including one from the Columbia River Inter-Tribal Fish Commission, had comments regarding deficit or below cost timber sales. All the respondents were opposed to deficit sales. It was urged that every timber sale make a profit, or at the very least recover costs.

CRITFC voiced concerns that the Forest Service will respond to the below-cost sale controversy by shortchanging mitigation needs to artificially improve its timber sale balance sheet. The council also noted that high-value ponderosa pine old growth has kept most timber sales out of the deficit category, but questions sales in the next decade or two if the old growth is removed.

Response:

The current timber sale program has a positive return, and is expected to in the future. See Table 3-30 of the FEIS. Also, the Timber Sale Program Information System (TSPIRS) reports are available at the Forest Supervisor's office It is not the intent of this Plan or Forest Regulations that all sales produce a net return to the government. Examples where sales may be deficit, or below cost, are: beetle killed lodgepole, where remaining merchantable trees are removed and slash is disposed of, and the area is reforested; or sales in campgrounds to remove hazard trees. In each case the sale may be deficit but it is the least-cost way of meeting the management objectives for an area. Economics were considered in developing harvest schedule and selecting intensity of management. It was also considered in determining boundaries of management areas such as Rock Creek/Cottonwood Unroaded and Helicopter.

@0700-07 Land Suitability/ Allocations

Nineteen comments dealt with management and identification of land unsuitable for timber production. Most had questions concerning methods and guidelines used to classify land as unsuitable. A map and analysis of unsuitable lands was not included in the DEIS, and some desired one.

There were also questions regarding present management of unsuitable land. Some, including the Columbia River Inter-Tribal Fish Commission, questioned the amount of land classified as unsuitable -- only 0.47 percent of the forest.

One reviewer suggested that timber land which becomes unsuitable be traded for lands reserved for recreation.

Response:

The NFMA provides direction for identifying lands to be classed as unsuitable for timber production. The reasons for being classed unsuitable are described in Chapter 3 of the FEIS. No timber harvesting is planned on unsuitable land. Unsuitable land was identified on areas as small as two and one half acres if they could be identified on aerial photos. These were ground sampled and other areas identified based on field experience and soil inventory.

About 11,130 acres have been identified as unsuitable because of regeneration difficulty. Much of the most arid land has been classified as non-forest.

The reforestation first-time success has been greater than 90 percent, and the lower sites have not been the most difficult to reforest. There are several examples of successful plantations on burns on low sites. So there is very high probability that lands identified as suitable can be reforested within five years.

The economics of timber harvesting and the ability to reforest is discussed under timber suitability in Chapter 4 of the FEIS. The Ochoco has one of the most economically efficient timber programs in the nation, based on recent Timber Sale Reporting System reports. Thus, while the cost of timber management and harvesting was not a limitation on timber harvest throughout most of the forest, it was a major consideration in developing management direction for the unroaded areas.

0700-07.1 Allocations

Four letters, including those from ODFW, the Oregon State Economist, and the Director of Economic Development, had comments concerning acres available for timber harvest and in full productivity.

The Oregon Department of Fish and Wildlife pointed out that the proposed plan allocated 547,072 acres to General Forest, which is 52,000 more than the suitable timber base.

Other reviewers, including the Oregon State Economist and the Director for Economic Development, question the implications of the reduction in land in full productivity from 423,000 to 262,500 acres.

Response:

There is some confusion concerning acres of general forest. When this refers to land allocation as in Table 2-2 in DEIS, it refers to gross acres which include nonforest land such as meadows, water, etc. within the general allocation Other places, such as DEIS Table S-2, "Lands with Timber Yield Reduction," refer to suitable timber acres only. This is made more clear in the new Plan which displays both gross acres in a management area and the net acres of forest land.

The acres in full productivity are based on land allocations and the management intensity from the selected FORPLAN run. All lands allocated to General Forest are available for full productivity, but there are a variety of yield tables and related cultural practices available. A maximum economic return function (See Appendix B for more explanation) was used for Alternative I and also the Plan. This selects the combination of treatments that is most cost effective such as some natural regeneration and not thinning every available acre. This results in about one MMCF (4 to 5 MMBF) less ASQ than would a maximum timber function.

0700-07.2 Lowsite Pine Lands

Two letters were received with comments concerning management of low site pine lands. The Columbia River Inter-Tribal Fish Commission questioned the Ochoco plan to harvest on sites producing 20 cubic feet or less, pointing out that other forests prohibit this practice.

Others requested a map of unsuitable areas and a summary by district of plant community types for pine stands.

Response:

There are about 21,000 acres typed as low site pine and about 12,000 of these are classified as suitable. (Note: NFMA does not include productivity as a criteria for suitability.) These are generally nearly flat ground with good access and high value pine species. The management as shown in the Standards and Guidelines will insure continued productivity and a positive economic return. Mature trees will only be removed where there is existing regeneration. Type mapping was done at a four-inch-to-the-mile scale and producing maps at this scale is not practical. Maps are available at forest offices. See FEIS Chapter 3 for acres of low site land by district. The ONF does not have a summary of land class by community type. Also see response to suitability.

@0700-08 Harvest Methods

Fourteen letters had comments concerning logging systems. Most respondents were concerned about environmental impacts and suggested helicopter logging, balloon logging, or the use of large rubber-tired skidders to reduce compaction. Some recommended that no logging occur in riparian zones or near trails.

Others felt that the timber companies should do a better job of cleanup after harvest operations.

Response:

Providing areas for specific logging systems was not identified as a specific concern. However, the logging system does play an important part in many of the other issues such as riparian areas, recreation, and protection of the soil and water resource. Generally, the selection of the logging system is a project-level decision based on the Standards and Guidelines for the specific Management Area. The Plan has been revised since the Draft Plan to include Management Areas that emphasize logging systems that require little or no roading such as helicopter or skyline logging. See Chapter 4 of the Plan for specific direction for each management area.

Timber purchasers are required to remove all equipment and debris from any site of operations. Disposal of woody debris from logging is disposed of based on contract requirements. These requirements vary from site to site depending upon such factors as fire hazard, disposal costs, and the need for down woody material for soil productivity or wildlife needs.

See responses to biological diversity and forest residues comments for more information.

@0700-09 Thinning Practices

There were 18 letters with comments on silvicultural practices, among them letters from the Oregon Department of Fish and Wildlife, the Columbia River Inter-Tribal Fish Commission, and Grant County.

Many respondents, including Grant County, felt that thinning was not sufficiently emphasized. They believe that thinning will increase the growth rate and that thinning along roads will decrease vehicle/big game accidents.

Others believe that thinning defeats its own purpose and that unthinned islands should be left to provide cover. Some felt that a percentage of each sale should be left in an unaltered state.

Some felt that intensive management and new technologies should be utilized to raise the harvest level to the maximum, while others believe the Ochoco is a fragile desert unsuited to tree farming.

ODFW suggests that, under Standards and Guidelines, a screen of understory vegetation should be left along the edge of natural openings and along roads.

CRITFC asks how much projected yield depends on precommercial thinning.

Response:

Chapter 4 of the Forest Plan describes management activities appropriate to each management area. All cost-effective silviculture treatments are planned that are compatible with a specific area's management objectives There is a section in Chapter 4 - Forest Health that describes appropriate action to be taken in each Management Area to protect it from insect and disease. This recognizes that high levels of damage are acceptable in some areas such as old growth. The selection of specific treatments will be based on project level analyses along with direction from the Plan and may also include an Environmental Analysis. See Chapter 4 of the Forest Plan for planned treatment by decade.

@0700-10 Even- and Uneven-Aged Management

Five-hundred thirty-four letters were received with comments regarding harvest methods, particularly the impacts of clearcutting on harvest levels and other resources.

Some respondents, including Crook County, were opposed to clearcutting and felt that selective logging would result in a healthier forest ecosystem. Soil integrity and wildlife habitat were mentioned as possibly being harmed by even-aged management.

Others were opposed to clearcutting for aesthetic reasons, or because they felt recreation suffers from clearcutting practices.

Some respondents favored clearcutting for diseased or defective trees, or for a certain species of tree such as white fir, but not ponderosa pine.

Still others favored clearcutting everywhere, expressing a desire to see the forest shift toward even-aged management.

The Oregon State Forester stated that frequency of entry is greater with selective logging and that this may contribute to more soil damage than clearcutting, depending on soil characteristics.

Response:

The Forest has reviewed the policy on even-aged management including clearcutting, and has provided standards and guidelines to encourage uneven-aged management where appropriate (see FEIS Chapter 4, Environmental Impacts, FEIS Appendix D, Standards and Guidelines, and FEIS Appendix E, Selection of Harvest Cutting Methods). New yield tables were also developed that include more intensive uneven-aged management than was used in the draft. The planned acres of clearcutting per decade have been reduced from 14,400 in E-dep alternative to 8,700 in Alternative I, and no clearcutting is planned in pine types unless no other alternative exists due to the presence of mistletoe or disease.

There are many situations where clearcutting or some form of even-aged management is the only reasonable way to continue to grow timber. Some of these are areas with root rots, dwarf mistletoe, excessive fuel buildups and areas with white fir as the major species The on-site decision of cutting method will be made by qualified district personnel based on the Standards and Guidelines in Chapter 4 of the Plan (see Timber and Forest Health). Clearcutting and other types of even-aged management are acceptable cutting methods under NFMA. See Appendix E for discussion of selection of harvest methods. For impacts of harvesting on a specific resource, see Chapter 4 of FEIS.

A further review was done of management in existing roadless areas, and some areas will have timber harvesting with little or no roading and uneven-aged management will be emphasized where appropriate. See specific direction in Chapter 4 of the Plan. Harvest unit size and shape will meet direction in Chapter 4.

There is very little intermingling of National Forest land with other federal agencies so harvesting policy on the ONF should not have major impacts on other agencies.

@0700-11 Salvage Program

Forty-five letters were received with comments related to the timber salvage program. Among the respondents commenting on this subject were the Oregon State Forester, Crook County Courthouse, Prineville City Council, CRITFC, and ODFW.

CRITFC stated that salvage should be counted toward satisfying long-term sustained yield (LTSY) volume.

Crook County Courthouse recommended development of a creditable system for salvage of bug-killed or blown-down trees.

Prineville City Council suggested management of the salvage program for maximum timber production.

The Oregon State Forester urged aggressive harvest of scattered ponderosa pine.

ODFW noted that impacts of salvage are extensive on snag levels and large woody debris.

Other reviewers requested more firewood be made available through the salvage program. Some recommended small sales as a more efficient method of salvage. Still others felt that salvage should be limited to catastrophic events.

Response:

Salvage is part of the timber resource issue. The salvage program can conflict with snag needs (Chapter 4 FEIS). All material not required for snags is generally available for harvest. See Forest Standards and Guidelines under the Timber and the Wildlife sections for specific direction. The size of sale and whether it should be used for firewood or sawlogs is an administrative decision to be made on a site-specific basis. See appropriate District Ranger for specific concerns.

@0700-12 Multiple Use Management

0700-12.1 Timber and Recreation

Six individuals expressed concerns about conflicts between timber harvest levels or practices and recreation. Most respondents felt that recreation and harvest are compatible, but that harvest should be considered more important than recreation. Some felt that scenic qualities can be enhanced by proper harvest procedures.

There was apparently some confusion over acres available for timber harvest. Some commented that 780,000 acres was not acceptable.

Response:

Alternative I was designed to balance uses between timber harvest level and recreation use as directed in the Multiple Use Act and NFMA. A change to more selective cutting and large diameter stands at final harvest are two changes that were made in response to public comment to help resolve this issue.

There were not 780,000 acres planned for timber harvesting in the draft plan. The general forest terminology may have been confusing as the management area "General Forest" included both timber and non-timber lands on both the ONF and the Crooked River Grasslands. In most instances the acres are gross acres (timber and non-timber). The planned distribution of timber land is displayed in Chapter 4 of the Proposed Forest Plan which shows a total of 495,006 acres available for some timber harvesting and 314,738 acres in general forest. See Chapter 4 of the Plan, for acres planned for timber harvesting in the proposed action.

0700-12.2 Timber and Wildlife

There were nine letters with comments concerning possible conflicts between timber management and wildlife.

Opinions on this subject were unusually polarized. Some respondents felt that logging destroys wildlife habitat, that all old-growth harvest should be stopped, and snags should be maintained at the 100 percent level

Others expressed a desire for less big-game allocation. They felt that harvest enhances the availability of forage for deer and elk, and that roadless areas should all be open to harvest. These respondents felt that protected old growth stands should not exceed three percent of the total, or that a certain amount of old growth needs to be harvested to sustain harvest levels.

Response:

The land allocations in the Forest Plan were developed according to NFMA standards and multiple use and sustained yield principles. The location and total acres in big game emphasis has also been changed as a result of comments and coordination with the State Fish and Game Department. A mix of timber and wildlife emphases have been provided to maximize net public benefit for both timber harvest and wildlife. Specific management goals, objectives, standards and guidelines can be found in Chapter 4 of the Forest Plan.

The NFMA (Sec. 6, g) requires the forest to "provide for diversity of plant and animal communities..." The preservation of old growth is intended to help meet this requirement. Areas have been designated as old growth to meet the needs of old growth

dependent species. Attempts have been made to limit the impact on timber harvest levels by designating old growth which occurs in areas which would have high levels resource protection in any case instead of designating areas that could be in General Forest. The Old Growth designated acreage in each alternative is shown in FEIS Table 2-8.

Areas planned for old growth have also been reviewed and are described in Chapter 4 of the Plan and areas are shown on map. The relationship between the timber program and wildlife is very complex. See Chapter 4 of the FEIS for effects of timber program on wildlife.

@0700-13 Timber Production

0700-13.1 Rotation Length

There were nine comments concerning rotation length and the methods used to decide when to harvest a tree or stand.

Some feel the forest is a crop, to be harvested when ready. For some this meant "mature or diseased." For others, a more tangible figure, such as 12 inches in diameter, was the indicator to cut.

Response:

There is not a common agreement as to when a tree or stand is "mature." A definition of maturity in "Terminology of Forest Science, Technology, Practice, & Products" is: "The stage at which a tree or stand best fulfills the purpose for which it was maintained." NFMA limits final harvest to stands that have culminated in average annual growth This usually occurs on the Ochoco National Forest after a stand age of 70 years. It was recognized that there is a local demand for larger material, and further analysis was done to compare economics, timber yields and effects on other resources if longer rotations were used (see appendix B, sections 2 and 7). In Alternative I, the General Forest Management Area provides for an average merchantable stand size of 18" DBH before final harvest for ponderosa pine stands rather than the minimum rotation age from culmination of mean annual increment which could occur on trees as small as 12" DBH. The exceptions to this are when earlier harvesting is needed to meet some resource need other than timber, or where stands are threatened by insect or disease damage.

Stands with trees smaller than 18 inches DBH may be harvested during commercial thinnings. On the Ochoco National Forest, stands which are not thinned are vulnerable to insect attack because individual trees in a fully stocked stand grow very slowly. Thinning redistributes the growth potential of the site so the remaining trees grow faster and are generally healthier.

With uneven-aged management, both regeneration cutting and thinning take place on a stand during the same harvest operation.

0700-13.1 Growth

Eight letters were received with comments on growth rates. Most felt that harvest should not exceed growth but should remain at a level slightly less than the growth rate.

Response:

The current growth on all timber lands is 14.6 MMCF or 79.7 MMBF from Appendix E of the Proposed Plan. This will change in the future depending on alternative as shown on Table 2-8 of the FEIS. Growth in cubic feet is displayed here by alternative for year 2030 and the Long Term Sustained Yield Capacity. Similar values are shown for Alternative I. The FORPLAN model is used as a tool to help schedule harvest so that the maximum level of harvest can be maintained within limits set by the standards and guidelines. As a general rule, the younger the trees in a stand, the faster the growth, so as volume accumulates on a stand the rate of growth decreases. A mature stand therefore will have high

volume but little growth, and a very young stand will a have high rate of growth but little volume. Part of the scheduling problem in managing the forest is to bring these into a proper balance. On the Ochoco N.F. growth rates will increase through time as mature trees are replaced with younger trees. See Chapter 4, of the FEIS. During this time the inventory will decrease.

0700-13.2 Fiber vs. Sawlogs

Ten letters were received with comments concerning fiber or quality sawlogs.

Some reviewers felt that rotation length is too short. They believe that increasing rotation length will enhance the quality of timber products.

Others request that the Ochoco National Forest be managed for mature ponderosa pine only.

Still others want the value evaluated by species rather than by total wood fiber.

Response:

The analysis process that was used to determine harvest levels and product size considered size and species (ponderosa pine and others). Alternative I had an objective of maximizing PNV while meeting management objectives. Longer rotations were considered and are required in many management areas, but to require 200 year or longer rotation ages would result in a 40 to 50 percent reduction in harvest level. As a result of responses to the draft, the objective on General Forest has been revised to include an emphasis on the production of quality pine on General Forest. See Standards and Guidelines for General Forest in Chapter 4 of the Plan. This results in longer rotations and larger trees at final harvest. Pine and other seral species will be emphasized on most of the Management Areas where timber harvesting is permitted. Mixed conifer along with all other sites will be managed as intensively as is economically practical.

@0700-14 Specifics

0700-14.1 Catastrophic Conditions

CRITFC asked what constitutes a catastrophic condition and how the ONF will compensate if a high level of catastrophic damage occurs each decade.

Response:

A catastrophic condition is when the mortality or damage in a decade exceeds the level planned. It is possible, but not likely, that the salvage level would be near but not over ten percent for several decades. Whenever a catastrophic event occurs that has the potential of effecting future harvest levels, then new FORPLAN runs would be made and a new harvest schedule developed. It is also planned to reinventory at ten-year intervals and recalculate the harvest schedule based on current information. This would ensure corrections for changes in tree mortality or damage.

0700-14.2 Idlewood Burn

There was one comment about the growth rate of an area reforested on the Malheur National Forest in the late 1940's or early 1950's. The area was the Idlewood burn, and the respondent stated that the trees are now only eight or nine inches in diameter.

Response:

Your observation of eight to nine inch trees in 50 years is similar to the managed yield table which predicts nine to 10 inch trees in 50 years, and 18 inch trees in 120 years.

0700-14.3 Sold Sales

One respondent mentioned commitments to timber sales made prior to the DEIS that are incompatible with the Land Management Plan. The person asked

for direction in the EIS addressing mitigation of prior commitments.

Response:

The Plan does not change history. Each situation will be reviewed based on direction for each Management Area (M.A.). If the existing condition is not compatible with goals for a M.A, than corrective action may be taken depending on feasibility and funding.

@0700-15 Timber Economics

0700-15.1 Budget

Fourteen letters were received which had comments concerning the budgeting and financing of forest operations.

Some respondents stated that the ONF budget is too commodity-oriented, and that the allowable cut was set by Congress based on economic and political pressures.

Others were opposed to public-subsidized harvest operations and felt that the timber industry should bear the full cost of logging, or that the ONF should charge more for timber sales.

The Columbia River Inter-Tribal Fish Commission asked if the forest reduced prices as an incentive for harvesting old growth.

Some respondents expressed the feeling that the forest should favor local remanufactures when allocating timber sales, or that cutting circles should be established.

Other concerns included: the desire for set-price salvage sales without bidding, more coordination between the Forest Service and BLM, and the need for more qualified personnel to mark and lay out timber sales.

Response:

The Forest, through the Regional and Washington Offices, provides information to Congress as to the harvest potential from the Forest based on the current Forest Plan, but decisions made in this plan do not constrain or restrict Congress' ability to set budget or outputs Congress may vary harvest levels from year to year but historically this has been based on the planned harvest level. Congress is influenced by many factors in making its decision, as is the ONF in developing its proposed action. Congress also establishes the laws governing sale of timber and other products so, this is not an issue to be decided by this FEIS.

The Forest attempts to hire well qualified people and see that they have proper training and supervision to do their jobs, but the regulations governing these decisions are outside the scope of this Plan.

All timber is appraised using standard appraisal procedures (see Forest Service Manual 2430, available at Forest Offices). No arbitrary adjustments are made. However, the appraisal process does consider logging and other costs, so areas with high costs (such as cable logging or very small volumes) will have lower stumpage than a typical sale.

0700-15.2 Demand and Supply

Twelve letters were received with comments dealing with demand and supply of timber. The letter from the Oregon State Forester questioned the statements in the draft that claim local supply affects stumpage price. He also feels that more analysis of assumptions used in demand curves (Appendix B) is needed.

The Oregon State Economic Development Department disagrees with the prediction that demand will drop after the first decade.

Other respondents expressed the need for a model to forecast stumpage values and for better analysis of timber volume available from state, private, and other forest sources.

Still others pointed out that no reference was made to volume under contract.

The equation between local installed mill capacity and demand was labelled inaccurate by some.

Finally, some respondents believed the last-five-year average cut is the best measure of demand.

Response:

The harvest level as shown in Table III-29 of DEIS is not a good indicator of local demand as this was during the worst recession in the timber industry in recent history. The current harvest level (1986-88) is much higher than the 1975-1984 level and is probably a closer reflection of demand. The harvest level from "The Forest Program For Oregon," shown in FEIS Chapter 4, is lower than the planned harvest level in Alternative I (see FEIS Summary).

Volume under contract has been removed from the inventory by the acres adjustment for sold sales so it is no longer considered in calculating future harvest. This does supply an important source of guaranteed supply of timber for the purchaser. Currently the volume under contract is about two years worth of sales.

See Chapter 3 of FEIS for further details.

@0700-16 Management Practices

0700-16.1 Utilization

There were two letters with concerns about the effects of utilization standards on outputs One concern is that projected outputs in the DEIS do not reflect the practices which actually take place. It was felt that the amount of timber actually taken out as usable products is much smaller than that in the EIS.

Another respondent indicated that better utilization of logging residue would reduce the demand for old growth timber.

Response:

A utilization standard of a four inch DIB top and a seven inch DBH was projected for future decades. This is two inches smaller than is presently required. This amounts to about one percent more volume for an 18 inch DBH tree than with a six inch DIB. The Ochoco believes having larger quantities of small material available will be a reasonable utilization standard.

For more information concerning utilization standards, refer to the Pacific Northwest Region Plan, available at the Ochoco National Forest Supervisor's Office.

Subject Area 750 Firewood

@0750-01 Firewood

Two-hundred forty-seven respondents felt that firewood is a desirable by-product that should not go unused or be burned up in slash piles. They also felt it helps to clean up the Forest and provides income to local communities.

Some of the reviewers, among them the Crook County Soil and Water Conservation District, felt that the allotments should at least stay the same if not increase. They also wanted the Forest to allow more time for woodcutting and to make the wood more available.

Many people indicated that the general public should be allowed to cut larch for firewood. They also felt that the Forest should stop loggers from selling logging truck loads as fuelwood.

Some noted that there was a problem with the way fuelwood demand is displayed. They felt that the amount sold probably exceeds what is cut.

A few respondents felt that selective cutting would be more beneficial for firewood. They also felt that the Forest needs to educate the public on how to use smaller green fuelwood material.

One person indicated that the amount of firewood available should be reduced.

Response:

Availability of fuelwood is an issue that concerned many people. However, what is acceptable fuelwood has not been defined so it has not been inventoried. Estimates of fuelwood that will be available by alternative (Table 2-8 of FEIS) were based on typical volume of cull material left after logging and the normal mortality that would occur in the vicinity of roads. There is also a small amount from juniper and precommercial thinning. So, the level of timber harvest has the greatest influence on availability and quality of fuelwood. Demand is equally hard to determine as it is based on accessibility and quality of available wood compared to cost of alternative sources of wood or other forms of heat.

Chapter 4 of the Plan has been rewritten to provide standards and guidelines for managing fuelwood. This attempts to make all wood that is not utilized for commercial sawlogs available for fuelwood cutting except were it conflicts with the management direction of a specific Management Area. Some items that have precedence over fuelwood cutting are snag requirements and road closures for big game habitat. Also, a timber purchaser has the right to all timber included in a contract and can process or sell those logs as desired, except for export restrictions, so a purchaser can sell logs for fuelwood It is very possible that as demand and price for fuelwood increases, more logs will be sold for fuelwood.

The free use of fuelwood was under enabling legislation that allowed giving wood to settlers who were dependent on National Forests for fuel. There are several other legislatitive acts concerning disposal of forest products. The Region and Forest has considerable discretion on how this will be done. This policy is in the 2400 section of the Manual which is available at the Supervisor's or District offices. With the current demand for fuelwood, most is sold. This allows the recovery of some administrative costs plus collection of money for slash disposal, reforestation, and erosion control. But some free use material is still available. See local district for availability.

Subject Area 800 Water

@0800-01 Watershed

Four letters, among them the responses from the EPA and the Oregon State Forester, had comments on watershed management.

One respondent stated that in Table 4-6 and on page 43 of the Draft Plan, the water yield values have no real purpose. The reviewer states that this line should reflect a measured output of the Plan's objectives, such as number of restored miles of fish habitat or riparian areas resulting from changes in the timing, quantity, or quality of runoff due to improved watershed conditions. In addition, this person suggested that the Mountain Creek Watershed and Bear, Badger, and Willow Creeks should all be considered highly sensitive due to the presence of anadromous fish.

Another respondent asked how goals and objectives for watershed management are being met.

EPA noted that DEIS Table II-11 is apparently missing two watersheds; the agency stated that they understand there are 24 major watersheds on the Forest and Grassland (22 on the Forest and two on the Grassland), but that two seem to be missing from the table.

The EPA also stated that the streams on the Ochoco range in condition from poor to good in relation to their natural potential, and that the Forest should practice management on a stream-by-stream basis to address individual problems or concerns. The Environmental Protection Agency also noted that Cottonwood, Black Canyon, and Wind Creek drainages are not mapped in the DEIS, and asked if these drainages are part of larger drainages; and if so, which ones EPA further stated that an area analysis would be appropriate for all watersheds in which development is planned near important aquatic resources.

And finally, the EPA requested a statement in the FEIS concerning the one existing instance of domestic use of surface water occurring on the Forest.

To ensure protection of current and future drinking water supplies, the agency requested information on location, size, source, and municipality served, as well as any instances of waterborne disease occurrences and pertinent water quality monitoring information.

The Oregon State Forester noted an apparent discrepancy in the documents. The Forester noted that Appendix B states that watershed harvest dispersion constraints will be between 17 and 23 percent, but that Appendix H lists these figures at 25 and 35 percent, respectively. The Forester asked which set of figures is correct, and what the rationale is supporting these constraints when the Deschutes National Forest satisfied this minimum management requirement with a 58 percent constraint.

Response:

Project level analysis is currently being used on the Forest at the project level, and is part of the NEPA process.

The Final Plan displays a corrected watershed map showing 26 watershed divisions, 24 on the Forest and 2 on the Grassland. The Ochoco regrets any confusion this error may have caused.

Cottonwood, Black Canyon and Wind Creek drainages are included within the watershed identified as John Day tributaries (see FEIS Chapter 3).

Management of the uplands in a watershed will be addressed chiefly through application of a cumulative effects model which measures the rate of harvest activity against a threshold based on watershed sensitivity.

Watershed harvest dispersion constraints (FEIS Appendix B) refer to regeneration (clearcut) harvest limitations (17-23 percent) and overstory removal limitations (50-67 percent) which were employed in FORPLAN modeling to address the concern of the model planning unusually high levels of harvest in certain drainages (see Chapters 3 and 4, FEIS). The values given in Appendix H of the Draft LRMP are watershed threshold values employed to assure a more optimum dispersion of harvest activity/effect over space and time. These threshold values are also employed in risk analysis at the project level.

A further discussion of watershed threshold values and their use can be found in the Supplement to the Draft Environmental Impact Statement for the Ochoco National Forest in the discussion of Management Requirements for Water Quality, and Appendix F.

The watershed threshold values given in Appendix H of the DEIS and Appendix F of the FEIS are specific for each watershed and range from 25 to 35 percent. The Forest weighted average threshold value is 30.1 percent, which means that 30.1 percent of the Forest could be in a harvested condition at any point in time without exceeding the ability of streams on the Forest to absorb and recover from the effects of management activities and natural storm events without long-term impact.

The harvest dispersion constraints and watershed threshold values referred to above could be expected to differ considerably from those used on other Forests (e.g. the Deschutes NF) due to differences in soils, watershed condition, and management practices that have affected the landscape over the past several decades.

The Forest Plan is built around a process designed to assure that goals and conditions are being met. See chapter 5, Implementation, of the Final LRMP.

The FEIS will include the information on domestic water supply use in Chapter 3.

@0800-02 Upstream Impoundments

Four reviewers commented on upstream impoundments Three of the participants felt that upstream impoundments could and should be used to improve water quality, game habitat, riparian areas and recreation. They recommended the program be expanded and stated that the Forest would benefit from approximately 200,000 acre-feet of usable water.

The other respondent felt that nature should be allowed to take its course along streams but stated

that upstream impoundments seemed to be beneficial from all aspects.

Response:

Forest experience with upstream or headwater impoundments has not been encouraging. They are expensive to construct and maintain and to provide an increased streamflow of just one cubic ft /sec. requires the storage and release of nearly two acre ft./day. More effective from a cost efficiency standpoint as well as providing better fish and wildlife habitat is the improvement of riparian areas which is a key element of the proposed Forest Plan.

@0800-03 Timber/Grazing Effects

Two letters were received with comments on timber and grazing effects on runoff The reviewers expressed concern that, once the overstory vegetation is removed, whether by timber harvest or livestock grazing, water flow patterns are likely to change, adversely affecting watercourses both on and downstream from the Forest. The respondents were particularly concerned about spring runoff, and felt the DEIS inadequately dealt with this aspect of water management.

Those responding suggested that grazing practices will have to be drastically altered to protect the Forest from heavy snowpack runoffs.

Response:

It is recognized that timber harvest has the potential to affect the quality, quantity and timing of runoff (see Chapter 4, FEIS). However, analysis of the various alternatives indicates they would affect the amount of runoff by less than 5 percent; in fact, several alternatives would actually decrease total runoff. One area of concern remains - the distribution or dispersion of harvest by watershed across the Forest. In order to assure an optimum dispersion of harvest effects, a model was developed to track harvest activities (cumulative effects) over time and area. Watershed thresholds were established to reflect the natural ability of each watershed to absorb impacts (both natural and human caused) without suffering long term loss of resource values (or causing downstream problems). This model will be utilized to monitor harvest effects and changes in watershed (including riparian areas) condition over time.

For more information on the use of this model please refer to Chapter 3 and Appendix F of the FEIS.

@0800-04 Data/Analysis

One reviewer stated that the water yield values in Table IV-6 of the DEIS have no real value, and that the line should reflect a measured output of the Plan's objectives.

The U.S. Fish and Wildlife Service suggested that the statement in the Draft should address the range of yields from water wells and estimate the usage of ground water on the Forest.

Response:

Water yield values given in DEIS Table IV-6 were developed during the planning process as a possible tool in the development and evaluation of alternatives. Ultimately it was found that total water yield was not significantly affected by the alternatives developed. The values are presented in Table 2-8 of the FEIS, as it was felt this information might be of value to some members of the public. The information requested on yields from wells has been included in WATER, Chapter 3, FEIS.

@0800-05 Monitoring

The EPA stated that Water Management Practices should refer to the Monitoring Plan so as to describe the methods used for the attainment of goals and objectives.

Response:

The FEIS refers to the monitoring plan to show how goals will be reached. See Chapters 5 of the Final Plans.

@0800-06 Flood

One respondent commented on the hazards of flood erosion. The comment was made that the ONF is already at the maximum runoff allowed by the state, and that Federal Regulation 36 CFR 219.27 directs the Forest to minimize hazards from flood erosion and similar impacts to streams and wetlands.

Response:

State regulations do not cover maximum water runoff. However, Federal regulations (36 CFR 219.27) do require the Forest Service to minimize hazards from flood erosion and Forest Service policy (FSM 2520 Amend. 48 and FSM R-6 Supp. 37) reflects this shared concern.

The wording "36 CFR 219.27--minimize hazards from flood erosion and similar impacts to streams and wetlands" is now included in the FEIS Forestwide Standards and Guidelines (see Appendix D).

@0800-07 Water Quality

There were sixteen comments on water quality.

The majority of the respondents were concerned that the Ochoco National Forest's DEIS failed to acknowledge and comply with State of Oregon and Federal water quality standards. Among those with this comment were the Oregon DEQ, the Environmental Protection Agency, the Columbia River Inter-Tribal Fish Commission, ODFW, and the Oregon Water Resource Department.

The DEQ further stated that there are no state water quality standards for riparian zone condition, as stated in the DEIS Table V-3.

ODFW asked, in addition to the above comment, what was meant in the DEIS by "significant degradation of water quality."

The CRITFC asked whether the Forest anticipates continuing management practices on those drainages where standards are being violated, and if so, on what legal basis the Forest justifies those activities that increase or perpetuate those violations.

The EPA also stated that the Plan and DEIS should have referenced the Oregon Forest Practices Act and Rules and indicated how they would be complied with.

Some respondents noted that violations of water quality standards are mentioned in the DEIS, but that only general guidelines are given for their correction. The reviewers requested more specific standards be given for the areas with seasonal violations.

Several participants in the public review process stated that reduction in shade has caused a rise in sedimentation and temperature, causing some streams to fall below water quality standards. Others felt that Forest management activities have had a negligible effect compared to natural processes.

Some stated that since there are very few areas where 50-75 percent shade is obtainable on the Ochoco, and shade appears to be increasing slightly, the Forest should keep the shade standards as they are at present.

One respondent stated that the standard for stream temperature in the DEIS fails to describe what temperature is to be maintained. Another reviewer asked what state water quality standards for temperature refer to--average daily values, daily highs, etc.

Response:

Concerns focusing on the water resource issue (quality, quantity and timing) are shared by the Forest. Of primary importance are temperature and sedimentation (turbidity). The Watershed Improvement Schedule is designed to correct a large measure of problems dealing with water temperature and sedimentation by bringing all riparian areas up to an excellent condition (see response to Riparian comments, 0450-02). Sedimentation problems of the upland watershed level will be mitigated by dispersing harvest activities optimally over the entire Forest, by applying appropriate Standards and Guidelines, and by applying best management practices (BMP's) to deal with site specific situations and problems. Forest Service policy makes allowances for short term deviations from water quality standards (FSM 2526-6). However, it is ultimately the

task of Forest Service personnel, through project planning and administration, to keep any short-term impacts from becoming long-term cumulative effects in violation of state standards. Future activities with the potential to affect the water resource will be monitored and problem areas or activities identified and brought into compliance.

With regard to shade requirements for Forest streams, please refer to Chapter 4 of the FEIS. The pertinent section states; "The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this is unattainable, 100 percent of the potential for shade is the standard."

These shade requirements are necessary in order for the Forest to comply with State Water Quality Standards as directed by the Clean Water Act (Public Law 95-217).

The State of Oregon Water Quality Standards with which the Forest must comply under regulations of The Clean Water Act, are maximum values; though "management activities will include objectives for reducing temperatures to levels that will improve fish habitat capability" (DEIS Appendix D-59).

The Forest Plan FEIS makes reference to the Memorandum of Understanding between the Department of Environmental Quality, State of Oregon, and the Forest Service, United States Department of Agriculture. Under this agreement, the Forest Service recognizes the State's lead in water quality management, cooperates with and gives assistance to State or designated area wide planning agencies, acts in compliance with the Forest Practices Act, and coordinates with EPA (see 208 of the Federal Water Pollution Control Act).

The fact that approximately 50 percent of the streams on the Forest do not meet state water quality standards for temperature and turbidity is an indication to some that many of the watersheds are suffering the cumulative effects of past management activities including: road construction, timber harvest, and grazing. While it is recognized that our understanding of how management activities affect watershed outputs (including sediment) is only just becoming clear, it is wise policy to proceed with caution in situations where risks of long term resource values are high.

As a matter of explanation, harvest threshold values serve as benchmarks reflecting watershed condition or sensitivity (see FEIS Chapter 4, and Appendix F) against which the Forest is able to monitor the rate of harvest activity to determine the level of risk of incurring long term impacts to watershed condition and water quality. "Exceeding a threshold value does not, in itself, limit management options on the Forest. It does, however, indicate the need to undertake other specific mitigation measures to offset potential reduction in site productivity or long-term impairment of water quality" (DEIS p. 133). In order to meet management requirements for water quality, the Forest must assure optimum harvest dispersion, initiate the rigorous application of Best Management Practices, schedule an extensive program of Riparian Improvements, and monitor activities carefully to assure resource objectives are met. All of these elements are key factors in the FEIS.

Finally, it should be pointed out that increased timber harvest (or even harvest at current levels) does not produce the highest present net value, due in part to overall higher mitigation costs. Identifying the level at which the Forest is able to produce a wide range of resource outputs (timber, water, recreation, etc.) and still maintain a viable, functional ecosystem is the basis of multiple resource management.

Two nonpoint source pollution parameters, water temperature and suspended sediment, are the major determinants of water quality on the Forest. Higher water temperatures encourage the growth of certain nuisance organisms such as bacteria, algae and fungi, that in turn affect the levels of dissolved oxygen, pH, and turbidity, while producing undesirable tastes and odors. The amount of shading in riparian areas determines the extent streams are warmed by solar radiation. The riparian prescription (Final Land and Resource Management Plan, Chapter 4) contains the water temperature standards and the amount of shade necessary to meet those stan-

dards. Special riparian area alternatives for meeting shade requirements were not examined individually because their effect on PNV would be less than one percent.

Sediment yield is largely determined by the amount and erodibility of exposed soil in a watershed. Timber harvest activities, including road construction, slash treatment and site preparation, not only affect the amount of exposed soil, but also alter the timing and quantity of water leaving a watershed. Following harvest activities, watersheds become more hydrologically sensitive for a period of time, with storm events producing more rapid and extreme responses. This greater sensitivity to storm events results in more energy being available to transport sediment to stream channels. Thus the primary effort in maintaining water quality is directed at the timber harvest program and its effect on sediment production in a watershed over time. Other water quality parameters will be monitored on a project basis as needed.

Table 5-3 (Plans Chapters 5) has been changed to reflect new wording: "Any degraded riparian areas found to be adversely affecting water quality will be improved to assure that the water quality meets state water quality standards."

"Significant degradation of water quality" is taken to mean any water quality parameter that does not meet stated Oregon water quality standards.

On the Forest, there are two primary water quality parameters: temperature (as it is affected by shade) and sediment (both in transport as suspended sediment or turbidity, as well as entrained in streambed gravels).

State of Oregon Water Quality Standards for temperature refer to point-in-time maximum values.

@0800-08 Best Management Practices

Three respondents commented on best management practices (BMP's).

One reviewer stated that BMP's are not used for a number of reasons, and that the DEIS should address how implementation of a new Management Plan will "magically" change actual practices into "best" practices.

Another suggested that the Forest attempt to meet "optimal" management requirements rather than minimum management requirements.

The EPA stated that the DEIS should have more fully explained selection of BMP's for a particular activity, and how uncertainty was factored into those selections.

Response:

The element that has the potential to bring about the actual implementation of effective Best Management Practices is the monitoring plan. Monitoring closes the circle between the Environmental Assessment process and project implementation. Monitoring tells the Forest how well it is doing and is vital in bringing about change in how the Forest Service plans and carries out management activities.

Best Management Practices (BMP's) used on the Forest are contained in the report "General Water Quality Best Management Practices," USDA-FS, PHR Nov. 1988. A copy of this report is on file in the Supervisor's Office, Prineville, Oregon.

@0800-09 Equivalent Clearcut Area

Nine reviewers commented on equivalent clearcut area (ECA) or equivalent harvest area (EHA) (the two are used interchageably in the Plan/FEIS documents).

Some remarked that they had serious concerns about watershed ECA and its use; they stated that they were not aware of any research on how reliable ECA calculations used in the DEIS were

Several respondents stated that Table 3-II in the DEIS was suspect because it implied that some watersheds are capable of withstanding abuse while others are not. Others felt that "watershed sensitivities" in the table were poorly defined and should have been included in the glossary.

Some felt discussion of ECA was double-talk to justify cutting more than the threshold value of 30.1 percent. They asked if the ECA includes the present system of roads, extent of compacted sites, grazing, mining, or the orientation of a clearcut, commenting that a clearcut on a slope into a stream is more destructive than one on a flat area.

CRITFC and the Oregon DEQ asked what criteria are used to derive ECA values, and how ECA values are determined and implemented for a specific watershed.

One person said that the meaning of Table 4-16 (ECA) was not clear. The reviewer asked that labels or legends be added to the text to explain the values in the table.

Some respondents felt that the limitations on the amount of area harvested in watersheds should be reduced or the Forest Service should get the legal authority to control harvest schedules. These reviewers pointed out that two or more sales within a single watershed, each harvesting near maximum ECA, could cut out in one year, adversely affecting water quality. They stated that the Forest Service is gambling with soil and water resources.

Response:

The concept of watershed sensitivity is discussed in Chapter 4 of the FEIS and in Appendices E and G. Watershed sensitivity ratings are based on a number of factors including: soil type, channel condition and fishery values. These ratings reflect the existing physical condition of the watershed and its susceptibility to damage from human activities and/or natural events. Sensitivity levels were established to work within the natural ability of a watershed to recover from the impacts of human activities and natural events with no long-term resource damage. These sensitivity ratings will be evaluated over the life of the Forest Plan and will be readjusted as necessary in the future.

The fact that two or more timber sales, sold at different times, could cut out within a short period of time with possible negative impacts to the watershed is a recognized problem. However, new timber sale contract regulations shorten the period in which harvest must take place and require a higher bond to encourage earlier harvest. Also, the cumulative effect model used by the Forest has the ability to evaluate this situation and its effect on ECA for various alternatives during the planning process, in time for corrective action to be taken to mitigate or avoid potentially damaging situations.

Equivalent Clearcut Area (ECA) calculations are a method of keeping track of a range of harvest activities, including: clearcut, overstory removal, thinnings and uneven-aged management. As part of the cumulative effects (CE) model, ECA yields a picture of the rate of timber harvest or vegetative management over time. Other more static elements, e.g. roads, grazing, stream channel condition, soils, fishery values, and slope, figure into the development of watershed sensitivity levels reflecting the physical condition of a particular watershed (see chapter 3, FEIS, and Appendix E and G). Watersheds have a natural ability to absorb impacts, natural or human caused, up to a certain level or threshold. Above this threshold, longer term damage to watershed resources may occur.

For each sensitivity level assigned to a watershed on the Forest, a harvest threshold value was established. When ECA is plotted against this threshold value a cumulative effects analysis of the rate of harvest activity against watershed conditions is made possible. Should a condition arise when the ECA exceeds the threshold value, it is an indication that watershed values may be at risk and that steps should be taken to reduce this risk either through mitigation or rescheduling of harvest activities (FSM 2405.13).

Additional uses for this cumulative effects analysis include assuring an optimum dispersion of harvest effects on watersheds on a District or the whole Forest. Also, cumulative effects analysis provides a benchmark, management activities versus watershed condition, which can be evaluated against in the future for purposes of monitoring the effectiveness of management prescriptions and best management practices.

Reference to Table IV-16 is made on page 133 of the DEIS. The table has been corrected in the FEIS to make it more readable.

Subject Area 820 Soil

@0820-01 Compaction

Three letters were received with comments on soil compaction. CRITFC remarked on the DEIS statements that no more than twenty percent of an activity area can be compacted to a degree which degrades vegetative productivity, that cable logging is estimated to increase soil bulk density on ten percent of an activity area and tractor logging on thirty percent; and that it was previously stated that a Forest-wide average of twenty percent soil compaction would be allowed for activities. From this, CRITFC infers that, if this degree of compaction constitutes the predicted compaction level, then with a twenty percent threshold of variability from the predicted level, compaction would have to affect twenty-four percent of the activity area before action would be taken.

One reviewer asked whether compaction caused by partial cutting can't be largely offset by equipment modification, and how much has been done in this area such as requiring the use of large-rubber-tired skidding devices, managing placement of skid roads, etc.

The other respondent suggested that soil effects should receive the highest priority throughout project planning and implementation, and that emphasis should be placed on prevention of compaction and displacement in relatively undisturbed areas.

Response:

The soil management guideline (Plan, Chapter 4) which states that, "no more than 20 percent of an activity area can be compacted or displaced to a degree which degrades vegetative productivity," refers to a point in time one year after the activity has taken place; and may include mitigation such as ripping and tilling to bring compaction levels with the 20 percent guideline. This is an average value and includes a 20 percent variability factor meaning some sites may be at 16 percent while others will be at 24 percent.

Equipment modification along with use of designated skid trails or logging on snow, are all techniques that are being explored to reduce soil compaction damage. However, each method has its drawbacks and limitations.

The Forest agrees that soil should receive high priority during project planning and implementation. See Chapter 4 of the FEIS for the discussion on evnironmental consequences.

@0820-02 Productivity

One respondent stated that, until such time as better information becomes available on lost soil productivity, the following ECA thresholds should be used: high, ten percent, medium, twenty percent, and; low, twenty-five percent.

Response:

At this point in time the watershed threshold (EHA or ECA) values provide the Forest with a benchmark against which it can evaluate the risk or effects of harvest and management activities. These threshold values will be monitored against effects on the ground, and can be raised or lowered in the future to assure resource values are protected.

@0820-03 Sedimentation

Eight letters, among them the response of CRITFC, had comments on sedimentation.

One person stated that the Transportation section of Riparian Management, PLRMP ("Road drainage will be designed and maintained to eliminate any influx of road sediment runoff directly into riparian areas"), is not realistic. The comment is made that many roads are located in draw bottoms, and the only place the roads can drain is into the riparian zone.

Another respondent stated that the low soil/water values in DEIS Table B-VIII-7 and elsewhere do not reflect the true value of the Forest's soil resource.

Another reviewer requested that a value be assigned to potable water with relatively steady seasonal flow and low suspended sediments. This person felt the entire Forest Plan showed a bias by not recognizing that water may be as valuable an output as timber.

One participant stated that the value of sedimentation should be based on how much money must be spent to remove it from spawning beds.

CRITFC asked what the effects of different amounts of road building, cattle grazing, and mining on sedimentation are. The Council also requested that the methodology for calculations of sediment production and delivery to stream channels be made more clear in the final documents, and should include formulas and references.

Response:

The wording in the Final LRMP has been changed to read "directly into stream channels."

The Forest shares a strong concern for maintaining soil productivity and water quality values. Forestwide Standards and Guidelines contain a number of criteria designed to protect soil and water. The best management practices (BMP's) described in Chapters 2 and 4 of the FEIS (also Appendix G) have also been developed to assure soil and water resources are maintained.

The soil and water values used in the economic analysis of the various alternatives were taken directly from the 1985 RPA program assessment, and have been designated for use in the planning process. The value assigned to sediment reduction (i.e reduced soil erosion) of $6.00/metric ton and maintaining water quality of $0.20/acre ft. (FEIS Appendix B, Section 4) are considered by many to be unrealistically low.

Any land management plan is a blend of resource values and outputs involving tradeoffs between a range of objectives. It is felt that by adhering to the standards and guidelines and management prescriptions that resource values will be adequately protected.

Sediment production is closely tied to timber harvest, since it is the only real variable from among the range of alternatives. Roads, generally recognized as the major source of sediment, change little from alternative to alternative. More stringent grazing utilization standards will be applied to all alternatives for riparian areas. The Forest has no data from which to make estimates on sediment production from grazing or mining. The process for calculating sediment production and delivery to stream channels is available in the Planning Record, which is on file in the Supervisor's Office.

@0820-04 Specifics

Two letters had specific comments on soils. The EPA asked where on the Forest the high-clay soils are located. The other respondent stated that if logging could benefit a particular site, balloon or helicopter logging might be used to protect fragile soils.

Response:

The FEIS contains a description of the location of the high-clay soils (see FEIS Chapter 3). For the most part, they are located on southern exposures as buried soils on north and east exposures. For a detailed description of the location of clay soils, there are copies of the Forest Soil Resource Inventory available at the Supervisor's Office.

Alternative logging methods, including the use of helicopters, are viable options and have been used in the past to protect and minimize effects on other resources (see also Plan, Chapter 4, mitigation measures for soil).

@0820-05 Plan Comments

One respondent asked why soil loss is considered an output (Table IV-6 and elsewhere in the DEIS and PLRMP).

Response:

The soil loss values given in FEIS Table 2-8 provide relative comparisons of erosion levels. They are not looked upon as a positive output.

@0820-06 Erosion

Eight responses were received containing remarks on erosion. Among the letters were those from ODFW and CRITFC.

Several of the respondents registered opposition to clearcutting, stating that this practice is very conducive to erosion and destructive to the environment. Some commented that the Forest Service is directed by Federal regulations to minimize erosion impacts. Others said there is nothing wrong with clearcutting as long as it does no harm to the environment, and that in fact the practice creates wildlife and livestock forage, however, they agreed that clearcutting in the wrong areas can harm streams through erosion.

Most of the comments pertained to ground cover and its relationship to erosion prevention. ODFW stated that the standard for ground cover in riparian areas should be 80 percent. CRITFC asked how it was established that 40 to 60 percent ground cover will be sufficient to prevent significant erosion, and on which streams flowing through grazing allotments does ground cover exceed 60 percent.

Others stated that 60 percent should be specified in the FEIS as the minimum basal ground cover area to effect proper infiltration of precipitation. One reviewer mentioned the requirement in the 1897 Organic Act to provide favorable conditions of streamflow, and stated that the amount of vegetation needed for precipitation infiltration was not alluded to anywhere in the Plan.

One respondent blamed neither logging nor livestock for erosion. This person stated that the vast majority of erosion occurring on the Ochoco in the past 23 years took place in February of 1979 as a result of storms and runoff.

Response:

The Forest has reviewed ground cover standards and feels the range given (FEIS Appendix D) is adequate to maintain soil productivity in riparian areas (see FSM 9/83 R-6 Supp 45--effective ground cover by erosion hazard class).

Standards for maintaining soil and vegetation in a condition which promotes infiltration of precipitation (i.e. reduced compaction and surface erosion) are contained in the Final Plan, Chapter 4 (soil management in riparian areas).

The wording "36 CFR 219.27--minimize hazards from flood erosion and similar impacts to streams and wetlands" has been included in the FEIS Forest-wide Standards and Guidelines

Removal of vegetation from the Forest, namely timber harvest, reduces evaporation transpiration. As a result, soil moisture values are higher in clearcuts than under adjacent stands of mature timber. This is the reasoning that is used to calculate the changes in runoff predicted in FEIS Chapter 4. Increased timber harvest yields greater runoff; though overall differences are less than five percent.

Although clearcutting appears more destructive, soil damage is concentrated and because of this is often easier to correct; e.g. reducing the compaction damage from heavy equipment through tilling. On the other hand, partial cuts or salvage logging must cover large areas of land with many miles of skid trails. The choice is between concentrated impact (with clearcutting) or extensive impact to the land with other forms of harvest. Which method is better or worse overall often depends on site characteristics and stand condition.

The majority of degraded stream reaches on the Forest are the result of the cumulative effects of a number of activities (including road construction, timber harvest, grazing, etc.) that have taken place over the last several decades, and are seldom the result of a single activity. The cumulative effects model in use on the Forest analyzes the risk of entering watersheds at various levels of management in conjunction with a major storm event.

Subject Area 830 Air

@0830-01 Air

Eleven letters, among them the responses of the Environmental Protection Agency, the Oregon Department of Environmental Quality, and the Oregon State Forester, had comments on air quality. Most, including the agencies mentioned above, were concerned about the detrimental effects of prescribed fire and slash burning on air quality. The agencies all referred to the Oregon State Implementation Plan (SIP) and asked if the Ochoco was in compliance with it.

DEQ and others expressed concerns over the amount of Total Suspended Particulates (TSP) from prescribed fire. Most respondents expressed a desire to see prescribed fire used less frequently. Some suggested that all slash and debris be ground back into the soil.

Long-term effects of air pollution, such as acid rain and health effects, were addressed by some. The EPA stated that smoke from woodstoves causes serious winter air pollution.

The State Forester noted that the DEIS failed to state that prescribed fire reduces fuels buildup and the risk of wildfire. The letter from the Forester also made the statement that forest smoke will originate in the Ochoco whether prescribed fire occurs or not.

The DEQ commented that if projected annual and daily air pollution emissions do not exceed those of the baseline period (1977-78), then this issue should not be analyzed further.

Response:

The Forest is concerned about the health and discomfort impacts of smoke. Prescribed fire is conducted in accordance with State Smoke and Visibility Plans to avoid and minimize these impacts on the public. Although currently outside the jurisdiction of State Smoke and Visibility Plans, this Forest abides by the spirit of these plans in continuing to reduce emissions from our activities. The recently completed Environmental Impact Statement (EIS) on Managing Competing and Unwanted Vegetation emphasizes human health issues. The Forest incorporates this more comprehensive guidance on public health concerns in the FEIS and Forest Plan. Improvements in smoke abatement technology will be utilized as they develop.

Since the adoption of the Oregon SIP, the Forest has been in full compliance with the regulations on protection of visibility and the goals of reducing smoke emissions. The FEIS Appendix D and Forest Plan Chapter 4 have been updated to reflect the newly approved SIP.

During the 1977-78 baseline period, the Ochoco National Forest's share of the Bend-Madras Basin TSP load was 9,200 tons. From current levels of around 13,000 tons it should continue to drop to approximately 9,000 tons by the fifth decade. For this reason it was decided that further analysis of this issue was not needed.

While most of the draft alternatives did in fact show an increase in TSP in the first couple of decades due to increased harvest levels, none of the alternatives proposed a level out of line from that of the baseline period. The range of expected TSP production is well within the range of error of the estimates.

Statewide, TSP emissions from Forest Service prescribed burning are being reduced. This reduction occurs because many Forests are burning fewer acres and most Forests are burning a smaller percentage of forest residues by employing tested and proven techniques to reduce emissions. See Chapter 4 of the Forest Plan for details on mitigation techniques employed on this Forest.

The DEIS did fail to mention that prescribed fire is one tool used to assist in preventing uncontrollable wildfire. That oversight has been corrected in Chapter 4 of the FEIS.

Subject Area 900 Land Status

@0900-01 Land Ownership Adjustment and Exchange

There were four comments concerning Land Status.

One respondent stated that the Forest Service should recommend the acquisition of lands by exchange or purchase with willing private landowners to produce a consolidated block of Federal land.

Another felt that the Forest Service should not use condemnation or exert pressure on landowners to acquire private inholdings.

Still another opinion was that land ownership adjustments should give a high priority to riparian areas, lands adjacent to wilderness, and lands along inventoried Wild and Scenic Rivers.

Finally, one reviewer stated that the lands designated for exchange in the proposed Steelhead Falls Wilderness Area should be identified for acquisition.

Response:

The Ochoco National Forest and Crooked River National Grassland goal is to achieve the land ownership pattern that best supports resource needs and reduces administrative costs. The Ochoco will acquire or dispose of lands only when it is clearly in the public interest. Changes in land ownership should reduce administration and protection costs or improve resource conservation and production.

Land exchanges are the most common method of land ownership adjustment, and most land exchanges in which the Ochoco participates are actually initiated by the private landowner. The purchase of a piece of property will be considered only when the possibilities of exchange, donation, or the acquisition of a partial interest have been exhausted. Condemnation will be used only when all other methods of acquisition fail and the property is required for the protection, administration or utilization of National Forest land.

The Ochoco has not identified any lands for possible purchase or condemnation.

Lands within the Ochoco National Forest have been grouped into the following ownership categories:

1. Areas where Congress has directed the Forest Service to retain Federal lands and to acquire non-Federal lands for a designated purpose. Scenic Rivers fall into this category.
2. Areas where National Forest ownership is necessary to meet management objectives. Federally owned lands will be retained, and non-Federal lands will be acquired as the opportunity or need arises. Riparian areas and lands with wilderness values fall into this category.
3. Lands allocated for commodity production, where the lands would be managed to provide similar types of output regardless of ownership. Federal lands may be retained, or they may be used to acquire lands in Categories 1 and 2. However, lands in this category will not be disposed of if that would result in a breach in a solid block of Federally owned land. Private lands within this category may be acquired in order to consolidate Federal ownership.
4. Small, isolated blocks of National Forest land which do not contain special features, and which are expensive and difficult to manage. These lands will be used to acquire lands in Categories 1, 2 and 3. Disposal of Category 4 lands will have priority over the disposal of lands in Category 3.
5. Areas where more intensive study and planning are necessary to determine the optimum land ownership patterns. Federal lands in Cove-Palisades State Park are included in this category.

Refer to the Standards and Guidelines Section of Chapters 4 of the Final Plans, to FEIS Chapter 4, to Appendix G of the Grassland Plan, and Appendix D of the Forest Plan for more detailed information.

Subject Area 920 Special Land Uses

@0920-01 Utility Corridors

There were four letters with comments on Special Land Uses. Among them were the responses of the US Department of the Interior, the Oregon Department of Energy, and the Bonneville Power Administration of the US Department of Energy.

One respondent stated that the DEIS failed to address the environmental consequences of visual impacts resulting from transmission systems. The Oregon Department of Energy commented that the DEIS should address the effects by alternative on siting of transmission lines and pipelines.

The US Department of the Interior and BPA recommended that existing and planned utility corridors be designated and addressed as required by Section 503 of the Federal Land Policy and Management Act of 1976.

Response:

The Proposed Land and Resource Management Plan has been modified to identify an allocation for utility corridors (Utility Corridors Management Area, Chapter 4, Grassland Plan) This management area will provide for limited additional facilities. No further corridors are planned. This is true in all alternatives.

A proposed transmission line would cross private land only within the Forest boundary. Because the National Forest would have no legal jurisdiction over this corridor, it is not designated as a management area.

Electric transmission lines involve large, negative visual impacts. For technical reasons, these lines cannot be buried. The natural gas transmission line is buried.

Refer to Chapters 3 and 4 of the FEIS for more information.

@0920-02 Guides

One person noted that the Plan allows for a commercial guiding and outfitting concern in the Black Canyon Wilderness, and requested information on setting up such a venture.

Another stated that commercial outfitters and their attendant stock animals should be carefully regulated and monitored on Forest lands, particularly in Wilderness Areas. This respondent felt that preservation of natural resources should take precedence over commercial uses of the forest.

Response:

Outfitter/guide permits will be awarded in the Black Canyon Wilderness only when the permitted activity will meet the management objective of providing a wilderness experience. If an application for an outfitter/guide is received, the activity will be analyzed through the NEPA process to determine whether a permit should be issued.

If a permit is issued, the outfitter/guide will be required to comply with certain restrictions, as identified in the analysis to maintain wilderness qualities and objectives. Refer to Chapter 4 of the Plan, Standards and Guidelines, for use restrictions.

Subject Area 930 Energy

@0930-01 Leasing

Four letters were received with comments on energy leasing.

One respondent suggested that all National Forest lands be withdrawn from appropriation under the energy leasing laws.

Another wanted leasing prohibited in areas allocated to old growth, SPNM recreation, or areas considered for Wild and Scenic River or Wilderness classification.

Still another respondent was unhappy that 80 percent of the Forest was proposed for oil and gas lease availability, stating that many areas not in wilderness have uses incompatible with oil and gas leasing.

Finally, one respondent suggested that a general overview of constraints on oil and gas leasing would prepare the public and managers for issues which activation of the leases will initiate.

Response:

The Forest Service recognizes the importance of responsible energy development to the nation's economy and security. The Ochoco National Forest seeks to facilitate the environmentally sound development of oil and gas resources.

On the Ochoco National Forest, wilderness areas are the only areas withdrawn from mineral leasing. In other areas, stipulations are attached to leases to assure that development will be compatible with other resource values.

The most restrictive stipulation requires "no surface occupancy." When a lease is issued with this stipulation, no road building, seismic testing, drilling, pipeline construction, or any other use of the surface is allowed. However, oil, gas or geothermal deposits below an area leased with a "no surface occupancy" stipulation may be tapped by directional drilling from outside the restricted area. The management areas on the Ochoco where the "no surface occupancy" stipulation will be attached to all leases include old growth, roadless areas, Scenic Rivers and the North Fork Crooked River Wilderness Study Area.

Other, less restrictive, stipulations are also attached to mineral leases. For example, a seasonal use stipulation may be used to protect wildlife during critical times of the year. A setback stipulation may be used to keep operations and facilities away from roosting or nesting sites.

In addition, lessees and operators are responsible for the proper rehabilitation of disturbed lands. Even after a lease has been issued, operations will not be allowed until a surface use plan has been approved. The surface use plan must describe in detail the technical aspects of the proposed activity, the location and magnitude of any potential surface disturbance, and the rehabilitation measures that will follow the activity. To insure that rehabilitation work is performed, a bond based on the cost of that work will be required before any surface-disturbing activities are approved.

The Standards and Guidelines Section of Chapter 4 in the Final Plan lists the lease stipulations required for each management area. Chapter 4 of the FEIS, Environmental Consequences, also discusses the effects of oil and gas development.

@0930-02 Data Incorrect

The Oregon Department of Energy and DOGAMI commented on energy potential on the Ochoco.

The Department of Energy disagreed with the conclusion in the DEIS that 90 percent of Ochoco lands are prospectively valuable for oil and gas resources, citing what that agency calls a lack of conclusive data in the draft.

DOGAMI contradicted the statement in the draft that the Forest and Grassland have no known geothermal resources The letter stated that DOGAMI's geothermal maps show a warm water spring on the Forest.

Response:

A mineral potential report was prepared for the Final Plan. This report classifies approximately 54 percent of the Grassland and 92 percent of the Forest as prospectively valuable for oil and gas, based on USGS information.

The report also classifies all of the Grassland and Forest as favorable for the discovery of thermal water suitable for direct heat applications. This classification is based on a Oregon Department of Geology and Mineral Resources report which shows a warm water spring on the Snow Mountain District.

Subject Area 940 Minerals

@0940-01 Plan Comments

Letters from the U.S. Department of the Interior, the EPA, the Oregon Department of Geology and Mineral Industries (DOGAMI), and the U.S. Bureau of Mines were received with requests for more information to be included in the EIS.

The EPA requested that a list of mining claims classified as lode or placer mines be added.

The Department of the Interior wanted information concerning mineral development and production, the value of past production, and projected mineral demand. USDI and the Bureau of Mines recommended the following information be added to the documents: a discussion of how minerals are affected by each alternative; a list of current mineral withdrawals and acres involved; definitions of access restrictions for locatable minerals; and mineral potential for locatable and leasable minerals, including a detailed discussion of the mineral potential of each roadless area. Along with DOGAMI, USDI recommended that a mineral potential map and mineral inventory be added. DOGAMI also noted that jasperoid being mined may be an indicator of a hot spring gold mine

DOGAMI and the EPA stated that the potential environmental impacts of mining on water quality and cultural resources should be discussed under mineral exploration.

The EPA also commented that the process through which operating plans are approved or disapproved in sensitive areas should be described.

Response:

Two mineral potential reports, one covering the Grassland and one covering the Forest, were written to be used as input to the final Plans. The presence of jasperoids (agate, jasper or thundereggs) was one of the criteria used to determine mineral potential.

A computerized list of mining claims is maintained and updated quarterly at the Regional Office. This list classifies each claim as lode, placer, tunnel or mill site. The reports and list of claims are available for review at the Supervisor's Office.

Mineral development and production, mineral potential, past production, current mineral withdrawals, access restrictions, and the process used to approve or modify operating plans are discussed in Chapter 3, "Affected Environment" of the FEIS. The mineral potential of each roadless area is discussed in Appendix C of the FEIS. The environmental effects of mining on water quality and cultural resources are discussed in the minerals section of Chapter 4, "Environmental Consequences" of the FEIS.

The FEIS does not identify new sources of mineral resources or predict future demand for minerals. Rather, it defines broad areas favorable for the occurrence of mineral deposits. Ultimately, the exact nature, extent and location of any new resources will be determined by industry through self-initiation under the 1872 Mining Laws.

0940-01.1 Plan Comments

The USDI stated that Federal law gives claimants the statutory right to develop their mining claims, and that the Forest Service has the responsibility to accommodate mineral development on lands open to mineral development.

DOGAMI felt that a bias against mineral production was evident in the draft Plan. The agency stated that a different set of standards was used for minerals than for other resources. The example given was the fact that dollar values were placed on campers using the forest, but none was given for mineral exploration.

DOGAMI also felt that the planning team had a minimal background in geology and mineral resources, because there were no geologists or minerals personnel listed as preparers in the draft.

Response:

It is true that Federal law gives claimants the statutory right to develop their mining claims. The Forest's goal for minerals and energy is to "provide for and facilitate the exploration, development and production of mineral and energy resources in coordination with other resource objectives, environmental considerations and mining and leasing laws." The Forest will respect the rights of mining claimants and will accommodate mineral development on the Forest.

The evident bias against mining in the Proposed Plan and DEIS is unfortunate. A geologist was included on the interdisciplinary team which prepared the Final Plan and FEIS. The geologist used available references to prepare two mineral reports which were used as input to the Plan. These reports are listed in the references and are available for review at the Supervisor's Office.

In the Final Plan, a dollar value was placed on mineral leasing. A value was not placed on locatable mineral exploration and development. It was decided that such values cannot be accurately predicted because the discovery and development of mineral resources will be initiated by industry under the 1872 Mining Laws. A value was not placed on mineral materials because almost all mineral material produced is used on Forest Service roads or provided free of charge to other government agencies.

0940-01.2 Plan Comments

The EPA letter contained the comment that mining will be allowed on 80-90 percent of the Forest and questioned the statement in the draft that mining would have a "minor effect on the water resource." The EPA stated that many small mines could have a large cumulative effect, particularly if road building increased due to mining projects.

Another respondent commented on the statement in Chapter IV of the DEIS which says, "The level of control (of mining activities) depends on the mineral potential of the scenic and riparian areas." The reviewer asked if this indicated that ecological balance can be purchased if the mineral potential is great enough.

Response:

Mining can have a negative impact on the environment. Reasonable and practical measures aimed at minimizing or mitigating these impacts are included in operating plans. In addition, when it is appropriate to do so, operating plans are used to limit impacts until it is certain that valuable minerals are present at a site. However, this is not meant as an indication that ecological balance can be purchased if the mineral potential is great enough, but rather as recognition of the balance between the statutory rights of a mining claimant and the need to protect the environment.

Although mining is allowed on 95 percent of the Forest, it is concentrated on approximately 10 percent of the land (the areas with moderate or high mineral potential). Most mining on the Ochoco National Forest is lode (hard rock) mining, which generally has less effect on water quality than placer mining. Any predicted impact on water quality is addressed in the operating plan. At present levels of activity, mining has a minor cumulative effect. Increased levels of activity would require a new analysis of environmental effects.

Refer to Chapter 3 of the FEIS, "Affected Environment," for a discussion of operating plans and to Chapter 4 of the FEIS, "Environmental Consequences," for a discussion of the environmental impacts of mining.

@0940-02 Monitoring Requirements

The EPA recommended that the plan include water quality monitoring requirements for sites with the potential to affect water quality

The Columbia River Inter-Tribal Fish Commission noted that management plans for mineral development include reclamation requirements, but stated there is no indication of monitoring required of the

mining company, and asked if monitoring is the sole responsibility of the Ochoco. CRITFC also asked what the Forest-wide goal for reclamation consists of, and whether it implies restoration to natural appearance.

Response:

The Plan requires that water quality be monitored before, during and after selected projects. As appropriate, mining activities will be selected for this water quality monitoring. In addition, water quality will be monitored as part of minerals activities monitoring. Refer to Chapter 5 of the Plans, "Implementation of the Plan," for monitoring requirements.

The degree to which reclamation can restore the landscape to its original appearance depends on the type and size of development. For this reason, reclamation is addressed on a case-by-case basis in the operating plans. Monitoring required of the mining company will be addressed on a case-by-case basis in the operating plan.

@0940-03 Prohibited Areas

Four letters had comments on mineral extraction in general. Some respondents wanted all mineral extraction and processing prohibited in riparian zones. Others suggested it should be prohibited everywhere on the forest.

Response:

The Forest Service recognizes the importance of mineral resources to the nation's economy and security. The Mining Law of 1872, as amended, grants the right to locate and develop mining claims on public lands. The Ochoco National Forest seeks to facilitate the environmentally sound development of mineral resources.

On the Ochoco National Forest, wilderness areas, the Ochoco Divide Research Natural Area, Delintment Lake and Walton Lake Campgrounds, Ochoco and Rager Ranger Stations, and a strip of land along Highway 26 are withdrawn from mineral location. In other areas, measures are included in operating plans to assure that development will be as compatible as possible with other resource values.

Operating plans are developed and approved on a case-by-case basis. The operating plan must describe in detail the technical aspects of the proposed activity, the location and magnitude of any potential surface disturbance, and the rehabilitation measures that will follow the activity. To insure that rehabilitation work is performed, a bond based on the cost of that work will be required before any surface-disturbing activities are approved

Chapter 3 of the FEIS, Affected Environment, discusses the mining law and operating plans.

The development of common variety materials (for example, gravel and sand) is governed by the Materials Act of 1947, as amended. The Forest Service has the authority to develop these sources, and mining claims may not be located for these materials. As stated in Chapter 4 of the Plans, these sources will not be developed in riparian areas.

@0940-04 Withdrawals

The U.S. Department of the Interior stated that the definition of withdrawals needs to be reviewed. The agency noted that staking of new claims and establishment of new leases may be prohibited depending on the individual withdrawal, but that development of leases and claims established prior to the date of withdrawal is not necessarily prohibited.

DOGAMI stated that, in cooperation with the BLM, that agency has identified a potential gold mineralized area just to the south of Haystack Butte, and that this area should not be withdrawn from mineral location or leasing.

DOGAMI also said that a mineral inventory should be completed before areas are chosen to be Research Natural Areas.

Response:

Withdrawal is defined as the withholding of an area of Federal land from settlement, sale, location, or

entry under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area. Most of the withdrawn areas on the Ochoco National Forest are withdrawn from the mining laws, but not the mineral leasing laws. Wilderness areas are withdrawn from both the mining and mineral leasing laws. In either case, valid existing rights (leases and claims established prior to the date of withdrawal) are respected.

The Department of the Interior has the authority to make, modify or revoke withdrawals. The Chief of the Forest Service reserves the right to concur or not concur on all withdrawals involving leasable minerals. The Forest Service makes recommendations to the Department of the Interior (Bureau of Land Management) on withdrawals involving locatable minerals. Before an area is withdrawn, both the Forest Service and the Bureau of Land Management assess the mineral potential and analyze alternatives to withdrawal.

Refer to Chapter 3 of the FEIS, "Affected Environment," for a discussion on withdrawals.

@0940-05 Rockhounding

There were two letters with comments on rockhounding. One respondent stated that more lands should be held open for rockhounding. The other expressed concern that incidental non-commercial rockhounding is considered a mining activity. It was suggested that the Ochoco take action to make sure non-commercial rockhounding and mineral collection remain as such.

Response:

Rockhounding on National Forest lands does not require a permit or mining claim as long as the activity does not conflict with existing rights, and the specimens are collected for personal, noncommercial use. If the specimens are sold commercially, the activity is considered mining, not rockhounding, and the mining laws or mineral sales laws apply.

Individuals have the statutory right to locate and develop thunderegg and gemstone deposits on public lands. This prevents recreational rockhounders from digging in these areas without the claimant's permission. To prevent this problem, two rockhound clubs have located claims which are open for free public use This option is open to any club interested in maintaining claims

Subject Area 1000 Transportation System

@1000-01 Road Closures (Permanent and Seasonal), Road Density

Ninety-five letters were received with comments concerning road closures. The majority of the respondents recommended that the Ochoco undertake an aggressive road closure plan to protect the environment, improve conditions for wildlife, and insure cost-effectiveness of the transportation plan. Most felt that the Forest has built too many roads in the past and that any new roads built for timber harvest should be closed immediately upon completion of harvest activity.

Some suggested a system of temporary or limited road closures, with harvest access allowed but other access denied. Others wanted roads closed only during hunting season. Still others indicated that roads closed and replanted could add to the timber base.

One respondent recommended closing feeder roads on a rotating basis to provide areas for non-motorized recreation and big game habitat.

Many other respondents disagreed with road closure Some felt that public land should be open to all members of the public at all times Others stated that the elderly and handicapped would have no access to the National Forest if road closures took effect.

Some stated that they would agree to road closures only in certain areas and in very wet seasons. A few reviewers supported the road construction plans in Alternative B-Plus or E-Departure.

Several respondents, among them the EPA and ODFW, commented on road density.

Varying opinions were voiced concerning road density. Recommendations ranged from less than one mile per square mile to more than the four miles per square mile proposed in the draft Plan. Most felt that current road density is too high and is having adverse effects on wildlife and recreation.

A few respondents stated that road densities are especially high in sensitive areas such as draw bottoms.

ODFW noted that the Plan stated 4.1 miles of road exist for each square mile of developed area, but that since most of the road mileage is in the southern two-thirds of the Forest, the road density there is probably as high as 5-7 miles per section.

The EPA said that, as the phrases "short term" and "long term" are defined in the glossary, increases in road density could create impacts in a period of time shorter than "short term."

One respondent stated that the amount of mileage in the proposed plan would not allow Forest recreation to keep up, let alone to grow.

Response:

The Forest and Grassland recognizes the need to balance access with the needs of other resources. The Standards and Guidelines in Chapter 4 of the Forest and Grassland Plans will provide direction on how on- and off-road access would be managed. A Travel Map has been developed for the Forest and Grassland which incorporates the direction from the plans. It clearly displays how and where access to the Forest and Grassland could be gained. The discussion of access in the Plans and the FEIS is supplemented by Appendix D which provides further information on how the travel map was developed and how access management for the Forest and Grassland will be implemented.

The access closures and restrictions, provided in the Standards and Guidelines and Travel Map, provide a range of road densities to meet a variety of management area prescriptions and user needs. In some areas, such as big game winter range, most of the roads will be closed (1 mile/section) during the winter months when the area is critical to big game. During hunting seasons a number of roads in several areas within the Forest and Grassland are closed, under the green dot system. Other seasonal and limited closures will occur to reduce resource damage, to provide for public safety, and/or to reduce maintenance costs. The road density objective under the Preferred Alternative for general forest/general forage areas will be three miles per section.

New local roads will be managed to meet identified objectives and will be closed or deactivated if there are no defined objectives for use after the initial purpose is served. Roads closed for future intermittent use (Maintenance Level 1) will be blocked to eliminate unwanted use and will receive the minimum maintenance treatment to prevent erosion. Roads with no foreseeable use will be rehabilitated to meet the prescription for the management area.

The environmental consequences of the road management direction by alternative is discussed in Chapter 4 of the FEIS and the miles of roads by category and closures are displayed in Table 2-8 in Chapter 2.

@1000-02 New Roads and Road Standards

There were 59 comments concerning new roads and road standards.

Most, including the Crook County Soil and Water Conservation District, recommended no new road construction unless absolutely necessary. The County suggested the Ochoco limit permanent road building and put more emphasis on temporary roads.

Many respondents were displeased with what they perceived to be the economic loss occurring through

the road construction program. They felt the timber companies should bear the full cost of road construction.

Some encouraged searching for new harvest methods that would not require road building.

Those that did not recommend a halt to road construction for the most part suggested that the Forest lower its road standards to lessen the impacts on wildlife of high-standard roads. Some, on the other hand, wanted a greater degree of maintenance on existing roads and higher standards for new roads.

One person noted that in the draft Plan and EIS, *forest access did not decrease significantly even in* those alternatives with lower harvest levels.

Response:

The amount of new construction and reconstruction of existing roads is closely related to timber harvest. The amount of road needed per acre harvested varies in response to many factors, e.g., logging system used, topographic relief, and environmental factors. Several years ago the Forest Service adopted new guidelines for establishing road design standards by service level which assures that the minimum standards to serve the resource will be utilized. All long-term roads are used for more than one year. *Some of the road costs can be considered an investment* for future uses.

Roads normally deteriorate because of use and weather impacts. This deterioration can be reduced through adequate maintenance or restriction of use. All system roads will be maintained to at least the basic custodial care required to maintain drainage, protect the road investment, and minimize damage to adjacent land and resources. This level is the normal prescription for roads that are closed to traffic. Higher levels of maintenance may be chosen to reflect greater use or resource protection.

New roads and total miles needed for all alternatives are discussed in Chapter 4 of the FEIS.

Subject Area 1100 - Protection

@1100-01 Toxic Chemicals and/or Catastrophic Accidents

Four respondents, including the EPA, noted that none of the draft proposals addressed toxic chemicals and/or catastrophic events such as oil spills. The respondents wanted to know if the Forest had a plan for such events, and whom to contact in an emergency.

Response:

The Forest Plan does not deal directly with this concern. Instead, the Plan is tiered to the Pacific Northwest Region's Environmental statement for Vegetation Management (1988), and all actions under the plan are required to be in compliance with NFMA regulations 36 CFR 219.27 (b). In addition, all Federal agencies are required to be in compliance with the Renewable Resource and Conservation Act (RCRA), and the RCRA amendments. The Forest also has an emergency spill plan which relates not to activities conducted by the Forest or Grassland, but to transport of materials on highways through the area.

Emergency procedures and RCRA requirements for spill maintenance plans have been incorporated into the final documents. See Appendix H of the Forest Plan and Appendix L of the Grassland Plan.

Subject Area 1110 Fire

@1110-01 Fuel Buildup

Eighteen letters were received with comments on fuel buildup. Most of the respondents were concerned that allowing slash and down material to

accumulate creates a fire hazard. Most encouraged allowing firewood collection to help mitigate the dangers. Many commented that grazing should be allowed over much of the Forest to cut down on fuel buildup.

Even-aged management was also targeted by some as a cause of serious fire hazards. Some felt that selective cutting would reduce the danger, stating that organisms of like age are more susceptible to disease and fire.

Some respondents felt that any areas closed to logging are fire hazards. They recommended that dead and diseased trees be harvested wherever they occur to reduce fire dangers.

One respondent suggested leaving more fuel for risk analysis. This, according to the reviewer, would help the Forest to formulate a better plan to coordinate fuels management.

Another respondent commented that broadcast burning is permissible for disturbed, undisturbed, and surface-buried cultural resource sites, but was left out of the fuel treatment options for buried disturbed sites.

One reviewer was confused by the tables and text covering disposal of Forest residues by burning. This person wished to know what the common denominator is between particulates, described in "thousand tons;" slash burning, described in "acres," and salvage firewood, described in "cords."

Response:

The Forest shares the concern over potential fire hazards mentioned in the above comments. New sections have been added to the FEIS and Forest Plan which help address this issue. These will help guide the forest residue management.

Forest residues accumulate through natural processes. These conditions will be monitored and when conditions approach maximum acceptable levels identified in each management area prescription, appropriate treatments will be instituted. This will maintain a mosaic of residues providing an acceptable fire risk and meeting other ecosystem needs.

Activity residues hazard abatement is an integral part of project level planning and is one of many residue management goals considered in the Forest's Residue Management Plan.

While the Forest will have a younger average stand age under a managed situation, the mosaic of stand ages will help prevent catastrophic insect outbreaks, disease, and the resultant increased fire hazard associated with large areas of older stands. Younger stands certainly are at higher risk in the event of fire, but only if the residues are not managed at an acceptable level of risk

The cultural resource oversight has been corrected in the discussion on fuel treatment options for buried disturbed sites (see Chapter 4 of the FEIS).

The common denominator requested is forest residues. The first two subjects (particulates and slash burning) are related in that the second produces the first. They are discussed together in the section on Air Quality in the FEIS, Chapters 3 and 4. The change in amount (acres) of burning over time gives an indication of expected change in atmospheric visibility due to the amount (tons) of smoke particulates produced. The third subject, salvage firewood, is a method of residue treatment emphasizing utilization rather than disposal, and the most common unit of measure is cords.

The Forest has developed additional direction in new sections in the FEIS and Plan which deal with Residue Management. A number of new analysis techniques are coming on line which will assist in the risk analysis as well as the economic analysis included in such decision making. See FEIS Chapters 3 and 4, and Forest Plan Chapter 4 for further discussion.

@1110-02 Prescribed Burning

Nineteen letters contained comments on prescribed fire. The majority of the respondents were in favor of continuing or even expanding the prescribed burning program, stating that the Forest and Grassland are in dire need of large-scale treatment. Some included Wilderness and Research Natural Areas in

their recommendations. In addition, many felt that the Forest Service should allow naturally occurring fires to burn out on their own.

Others, however, registered opposition to the prescribed fire program They felt that slash burning destroys many trees unintentionally, and that broadcast burning is simply too destructive to soils and vegetation. Some stated that prescribed fire encourages non-native plants to be introduced to burned areas.

One respondent suggested removal of only 25-40 percent of the volume per acre than is the present practice, and treatment of the resultant slash. This, it is felt, will be far less disturbing than removing 12-20 MBF per acre and burning 35-60 tons per acre of slash all at once.

One respondent noted that the old growth definition does not include an understory description, and that it is necessary to know what structural characteristics and vegetation the Forest is attempting to produce within each plant community before applying a forage and/or fire treatment prescription.

Response:

Fire is a natural process of recycling and renewal in local ecosystems. However, because of the random nature of its occurrence it sometimes conflicts with the timing of management Realizing late in this century the importance of fire in ecosystem maintenance and its usefulness as an economically efficient means of vegetation and residues control, the Forest now "prescribes" the use of fire in terms of when and where it will occur.

Used initially in reducing activity fuels, it has become widely used locally in treating "natural" fuel accumulations in order to mimic historic fire cycles which allowed for the establishment of "large" diameter old growth pine stands on so much of the Forest.

The discussions on these subjects in the FEIS, Chapter 3 and 4, and in the Forest Plan, Chapter 4, have been expanded in response to the above comments to clarify the points raised. New sections dealing with Forest Residues also relate to some of the comments above and can be found in FEIS Chapter 4, and Forest Plan Chapter 4. The detailed decisions on the proper application of prescribed fire are carried out on a case by case basis in the project planning environmental assessments under the broad guidelines of the Forest Plan. See Chapter 4, Forest Standards and Guidelines, and Management Area Prescriptions.

Prescribed fire will not be used in mixed conifer old growth until adequate research provides the desired vegetation description. This will most likely occur within the next planning period (next ten years) and thus will not be a major departure from experienced fire history in this type of stand Moderate use of prescribed fire is being allowed in ponderosa pine old growth since this species is seral and will disappear in the absence of fire (see Chapter 4 of the FEIS). It is likely that a variety of treatment prescriptions will evolve due to the different vegetation types involved.

@1110-03 Risk Management

There were four letters with comments on fire suppression The respondents were unanimous in suggesting that all areas on the Forest should be open to road building for fire access. One reviewer stated that areas for wildlife winter range without roads become fire hazards and will prove difficult to protect from fire.

Response:

Fire suppression access has been considered in the transportation planning for the Forest and is commensurate with the values at risk and the management objectives of each Management Area.

The Forest has developed additional direction in new sections in the FEIS and Plan which deal with Residue Management. A number of new analysis techniques are coming on line which will assist in the risk analysis as well as the economic analysis included in such decision making. See FEIS Chapters 3 and 4, and Forest Plan Chapters 2, 3, and 4 for further discussion.

@1110-04 Fire Protection

Three respondents, among them the Oregon State Forester, commented on fire protection.

The State Forester remarked that the Oregon Department of Forestry supports the Forest Service's policy of applying aggressive suppression action to wildfires that threaten life, private property, public safety, improvements, or investments.

One reviewer stated that the Plan needs to place more emphasis on low-impact Wilderness management, including fire control. The person stated that he was angry to find a cat line in the Bridge Creek Wilderness Area that had been used for fire suppression.

The third respondent stated that the 100 acre per decade maximum for burning seemed arbitrary and recommended that acreages burned be decided on a case-by-case basis.

Response:

Protection of life, property and investments is a common concern of all wildland fire protection agencies and will continue to be the Ochoco's primary policy direction to minimize losses and cost of suppression.

The fireline mentioned in the Bridge Creek Wilderness was cut several years prior to the designation of the area as wilderness. Since that time rehabilitation requirements have been instituted on all such suppression techniques, even those outside of wilderness areas. This fireline has been brought to the attention of the District, and rehabilitation will be carried out as necessary.

The maximum acceptable burn acreage per decade is a function of the size of the Management Area, the probability of occurrence of a fire at Fire Intensity Level (FIL) III in that Management Area, and, given that occurrence, the likely area burned at that FIL prior to containment of the fire. It also takes into account how much impact such an area of intense burn will have on the management objectives for the Management Area in question. Each fire, as it occurs, will be dealt with on a case-by-case basis in comparison with the objectives (including maximum area at FIL III per decade) for the Management Area(s) involved. See FEIS Chapter 4, and Forest Plan Chapter 4 for further discussion on this topic.

Subject Area 1120 Pesticides

@1120-01 Prohibition

Three letters were received with comments on pesticide and herbicide use. Concerns were voiced about the effects of pesticide use on non-target species and long-term effects on the environment. Some felt that pesticides and herbicides should be prohibited, or that if they do again become legal, a rigorous set of application guidelines and monitoring safeguards should be implemented.

Response:

In December of 1988 the Regional Office published an Environmental Impact Statement entitled "Managing Competing and Unwanted Vegetation." This document sets forth the direction for all National Forests in the Pacific Northwest Region for Vegetation Management. Pesticide and Herbicide use are dealt with in that EIS, and Vegetation Management activities on the Ochoco will comply with those guidelines. The projected outputs from this plan do not depend on the use of herbicides, although the availability of herbicides would lower reforestation costs in some cases. Insecticides may be used to control insects but this is not the preferred method. See response to Insects and Disease, and also the Forest Health section in Chapter 4 of the Plan.

Subject Area 1130 Insect and Disease Control

@1130-01 Diseased Trees and Insect Control

There were many comments on the management of the Ochoco National Forest as it related to insects and disease.

Thirty-four letters contained comments on insect and disease control. Among them was the letter from the Oregon State Forester.

Most of the comments, including that of the State Forester, were to the effect that the Ochoco should place more emphasis on insect and disease control. Some felt that controlling damage from disease and insects is vital to maintain sustained yield. Others stated that disease will spread if action is not taken quickly.

Some respondents were against clearcutting because they felt that even-aged management contributes to insect and disease problems.

One individual felt that the public should be educated concerning the need to depart from normal harvest practices when dealing with insect and disease problems.

Response:

The effects of each of the alternatives on insects and disease are covered under "Forest Pests" in Chapter 4 of the FEIS. The Forest PLan has been rewritten to include Standards and Guidelines for treating each major forest pest group (see Forest Health, Chapter 4). These guidelines are specific to each Management Area. The actual on-the-ground activity will depend on a project-level analysis which will be guided by above direction. These and the Timber guidelines encourage the prompt harvest of dead and dying material when compatible with direction for the management area, and allow varying the harvest level when necessary as a result of catastrophic events.

The basic strategy for insect and disease control is to prevent damage by managing stands through species and stocking manipulation. Diversity in size and species is one of the keys to this (see discussion on Diversity) It will take several decades to get stands in the desired condition, but in the long run this should prove the most effective control. Spraying or other direct control measures may be used if within the direction for the management area and supported by an EA or EIS. This would be a back-up measure, and spraying has been planned or included in costs considered necessary for projected outputs. There are Entomologists and Pathologists available to help in on-site evaluation and/or treatment recommendations.

Effects of insects and disease on timber yields have been incorporated in the yield tables by basing yields, including mortality and defect, on historical data. The effects of individual pests cannot be isolated, nor will this reflect the loss that will occur in a specific year, but should be a fairly accurate estimate of losses over a rotation.

Subject Area 1140 Law Enforcement

@1140-01 Enforcement

Two comments were received concerning Law Enforcement.

One respondent felt the best way to improve conditions for big game would be to enforce existing laws, especially those dealing with road hunting and using CB radios to track animals, and to increase fines for poaching

The other respondent wanted the entire Forest opened up to hunting. This person suggested a less complicated program of law enforcement, desiring a

more positive relationship between Forest Service personnel and the public. The individual also stated that the Forest should review some of its rules for appropriateness.

Response:

Poaching, road hunting and the use of radios are violations of existing state game laws. The Forest Service has a Memorandum of Understanding with the Oregon State Police, in which the role of each agency in game law enforcement is identified. In effect, it states that the Oregon State Police will have the primary role of enforcing game laws. The Forest Service agrees to monitor and report known or suspected violations.

The primary objective of any law enforcement program is to prevent violations.

One way the Forest Service attempts to do this is through public education. Another is the prosecution of those individuals found to be in violation. Most Forest Service field employees receive 40 hours of law enforcement training. The subject emphasized most heavily is making a law enforcement contact in a positive, safe, effective manner. Like all law enforcement agencies, the Forest Service reports violations to a prosecuting body, in this case the U.S. Attorney's Office. Appropriate action is then determined by that office. The Forest Service has no control over actions taken by the U.S. Attorney's Office, but Forest Service personnel are working with that office to improve the situation.

Most Forest Service regulations are imposed by Congress or by the Secretary of Agriculture They are therefore outside the scope of the Ochoco National Forest Plan. Occasionally, the Forest Supervisor may impose specific, local regulations. These are intended to assist in managing unique, local problems which may arise. These generally relate to special fire prohibitions or road closures for resource protection purposes, and are required to be reviewed annually.

Subject Area 1200 Economic Considerations

@1200-01 Local Economics

One hundred respondents, including the Oregon Labor Market Economist, said they did not favor the Preferred Alternative, or any alternative that would harvest less than 130-137 MMBF, because they believed that it would cause significant problems due to unemployment, low payments to counties, and other economic problems.

Response:

The Ochoco National Forest compared the results of all the alternatives to the "current situation," that is, an average picture of the communities over recent years. The results do not predict any major changes under the Preferred Alternative I. In fact, the prediction is for a slight positive change.

1200-01.1 Mill Modernization

Seven respondents pointed out that the wood products industry has been, and is, modernizing. The State Economist states that any economic estimates which are based on old data regarding technology are questionable estimates. Some parties say that an attempt to maintain employment levels by increasing harvest levels will not work.

Response:

The Ochoco National Forest has added a section to Chapter 3 of the FEIS which discusses mill modernization. The IMPLAN model has also been updated to reflect 1987 mill performance (see Appendix B, Section 5).

1200-01.2 Timber Sale Projections

The State Economist and the Director of the State Economic Development Department questioned whether the projections from timber sale revenues might be too high. One question was whether all sales would sell. Another question was when the harvest would occur and the receipts come in.

Response:

From past experience, the Ochoco projects that it will have no problem in selling its sales. Receipts may come in at uneven rates, but the average receipts are accurate.

1200-01.3 Errors

The State Forester pointed out that in DEIS Table III-4, there is an error in Deschutes County's population. The population of 65,300 is reported as 15,300.

Response:

The error has been corrected in the FEIS (FEIS Chapter 3).

1200-01.4 Data/Analysis

The State Forester's Office commented that DEIS Table III-4 displayed incomes for the affected counties and the State, but not the U.S. This was deemed misleading.

Response:

Information for the United States has been included in the FEIS Chapter 3 text.

1200-01.5 Data/Analysis

The State Forester's Office referred to the analysis of county economic bases as reflected in DEIS Figure III-3. The Forester wanted to know the source of the data. The Office also disagreed with the statement that combining the government and the manufacturing sectors overstated the importance of timber to the county economies.

Response:

The data is derived from the 1985 Business and Employment Outlook, JTPA Districts 10, 12, and 14. The statement which was challenged was questionable and has been withdrawn.

1200-01.6 Local Log Sales

One participant discussed the topic that Willamette Valley mills purchase central Oregon logs. The basic point was that the Forests of central Oregon are big enough to meet the needs of central Oregon, but not big enough to meet the needs of Valley mills also. Questions were asked such as:

-Why should local Forests increase harvest levels when there is no guarantee that the increase will produce local jobs?

-Could the local Forests restrict log sales as has been done in the Lakeview area?

-How can central Oregon enable its wood processing industry to compete more effectively with Valley sawmills and remanufactures?

Response:

The question of who successfully bids for local logs is a valid one. Some of the eastside Forests, such as the Deschutes NF, are more affected than the Ochoco NF, but effects on the Ochoco NF are likely to increase. Chapter 3 of the FEIS contains a discussion of the effects of the Ochoco NF statewide, as well as on local economies

The Forest participates in one program which tends to favor local firms: the small business set-aside program. The U. S. Department of Agriculture is authorized to participate in such programs with the Small Business Administration (Small Business Act, 15 U.S.C. 631). Participation tends to favor local small business because more distant small businesses are less likely to bid on sales.

The policy of the Forest Service which underlies this program is that small businesses should have the opportunity to purchase a fair share of the timber sales off National Forest lands The small business "fair proportion" of the annual timber sale program is determined by the Regional Forester and provided to the Forest as part of the timber program. The Forest Supervisor maintains a continuing record of sale volumes purchased by large and small businesses. The record provides the basis to determine if there is a need for a set-aside program in the area during any six-month period.

Speaking more generally, the Ochoco National Forest does not intend to be involved in programs which tend to favor local mills. Being a National Forest, it is obligated to all the people of the nation The needs of central Oregonians have been specially addressed in this document and in other ways, but it is not felt proper that the ONF give special preference to local residents. It is believed that the best way to serve competing bidders from near and far is to sell the timber in an open market fashion.

In a similar way, many local residents can explore ways to benefit local wood processors in competition with Valley wood processors, however, it is not appropriate for the ONF to be involved in these discussions.

1200-01.7 Departure Harvest

One respondent pointed out that 25 percent moneys are assumed to rise and fall with timber revenues; whereas the two do not necessarily move in the same directions or at the same rates. The comment was directed toward the fact that the DEIS Preferred Alternative was a Departure; it said that the 25 percent moneys, in particular, would decline in the third decade and beyond, depriving the communities of a stable economic base.

Response:

It is true that 25 percent moneys may move differently than timber revenues. Elsewhere in this Appendix, there are comments regarding the Departure, and also concerning the Forest's commitment to long term community stability. See Forest responses to Departure Harvest under Timber, and responses to Community Stability under Social Considerations.

1200-01.8 Small Business Impacts

One reviewer stated that the economic impact of the proposed Plan is understated, especially for small businesses. He stated that more analysis of the effect upon small businesses is required by Public Law 96-354, the Regulatory Flexibility Act.

Response:

Public Law 96-354 applies to governmental agencies who generate regulations which might apply to small businesses, small not-for-profit organizations, or small governmental bodies. Since the Forest Service does not regulate in this manner, the law does not apply to it.

Nevertheless, the Forest Planning process under the National Forest Management Act has much in common with the provisions of Public Law 96-354. Regulatory agencies publish proposed new regulations in the Federal Register; this corresponds to the Draft EIS which was released in 1986 and which was also referred to in the Federal Register. Comments are solicited from the public in both processes. And those comments help to shape the regulatory agency's final regulations, just as the Final EIS is shaped by the comments listed in this Appendix.

@1200-02 Economic Impacts

There were 23 comments addressing the issue of employment multipliers. The concern was that the multipliers used were too low. The Ochoco NF multiplier was said to be only 1.5, when comparable multipliers range between two and three.

Two respondents made their own estimates of the effect of the Preferred Alternative. The DEIS estimated that the Preferred Alternative would pro-

duce an additional 63 jobs and an additional $0.3 million in payroll. Brian Long, an economist hired by the Central Oregon Economic Development Council, projected a loss of 289 jobs and $5.8 million. (Mr. Long's estimate of the combined effects of the draft plans of the Ochoco NF and the Deschutes NF was a loss of 317 jobs and $6.5 million). Jim McClain of the Northwest Forest Resource Council predicted a loss of 118 jobs and $2.0 million. Other reviewers quoted these figures and preferred them to the Ochoco NF estimates.

State officials voiced concerns about the multipliers. Two Labor Economists, the Director of the State Economic Development Department, and the State Economist all said that the multiplier should range between two and three. The Director of the State Economic Development Department predicted a loss, not a gain, in employment.

Response:

Two questions are addressed here. One is, What is the correct employment multiplier? The other is, What will be the effect of the Draft Preferred Alternative on income and employment?

The DEIS never reported a value for employment multipliers. The multipliers as computed by others were deduced from data in the following tables:

Table IV-2--Employment changes by alternative, decade 1;

Table IV-3--Employment changes by alternative, decade 2;

Table B-V-3--Employment changes by alternative by county, decades 1 and 2; and

Table B-V-1--Employment per unit of Forest output.

Table B-V-1, for example, states that 1 MMBF of ponderosa pine will produce eight wood products jobs and four jobs in other industries. The concern expressed is that this implies an employment multiplier of 1.5. This is perhaps a reasonable conclusion from the information given However, the line labels in the table were misleading. The table, when correctly labeled and correctly understood, does not contain data which could be used to compute a multiplier.

To understand the question of multiplier values, it is first necessary to define what a multiplier is. IMPLAN (or any input/output model) classifies employment into the following three categories.

Direct employment--the employment involved in creating products which will be exported from the local economy or purchased for final consumption within the local economy. Examples would be exported molding, exported 2x4's, or 2x4's purchased locally for new construction. For the local wood products industry, 99+ percent of employment is involved in preparing exported products.

Indirect employment--the employment involved indirectly in creating the above products. Millwork operations buy dimension lumber from sawmills, who buy logs from loggers, who buy gasoline from local operators, and so on.

Induced employment--The employees involved in the above activities will purchase goods and services for their households, thereby producing employment in trade and service sectors.

Any change in employment will produce direct effects, indirect effects, and induced effects. The definition of the input/output model multiplier is critical. It is the ratio of the total effects to the direct effects.

The terms "direct effects" and "indirect effects," as defined above, are different from the way in which a person might use them in a non-technical sense They are also different from the way that they are used in Tables IV-2, IV-3, and B-V-3. For Alternative E-Departure, for example, the timber harvest declines slightly. This results in some lost jobs in the wood processing industry, which in turn causes other jobs to be lost. Tables IV-2, IV-3, and B-V-3 refer to these losses as "direct effects" and "indirect effects," but the use of these terms is technically wrong. The change in the wood processing industry, here called "direct effects," is actually the sum of the direct effects and the wood processing portion of the indirect effects (about two-thirds of the total

indirect effects). This change should be re-labeled as "Employment Changes in the Wood Products Industry Due to Changes in the Timber Harvest Level." The change called "indirect effects" is the remaining portion of the indirect effects plus the induced effects. The correct label for this change would be "Employment Changes in Non-Wood-Products Industries Due to Changes in the Timber Harvest Level."

These terminology changes are significant. If the values reported as "direct effects" were truly direct effects, the data would indicate an employment multiplier of around 1.5. But the true direct effects are smaller than those shown, and the multiplier is therefore larger.

The same type of confusion has occurred concerning Table B-V-1. The figures in this table show that 1 MMBF of ponderosa pine produces eight jobs in the wood processing industry and four jobs in other industries. Similarly, 1 MMBF of other species produces four wood processing jobs and two other jobs. This has led some to say that the multiplier is only 1.5. But because the eight jobs include both direct and indirect effects, the multiplier will be larger than 1 5.

Employment multipliers were not shown in the DEIS. Neither was the "direct effect" data which would allow the multipliers to be computed. However, the employment multiplier, when computed, is 2.0. This is at the low end of the range mentioned by all the reviewers. Since the county economies are small, it is considered that this value is reasonable.

The second question which needs to be addressed is whether the DEIS estimates of employment change are realistic. The key question here is what harvest level should be used as a comparison point. Mr. McClain and the Director of the State Economic Development Department compared the harvest under the Preferred Alternative to the Potential Yield of 137 MMBF. Mr. Long used the 1984-1986 average level of 147 MMBF. We agree that if these were the proper levels to use, there would be a sizeable loss in employment and income. But we do not believe that these are appropriate comparisons. This question is dealt with under the topic "'Current Situation' economic level used in IMPLAN."

1200-02.1 Current Situation

When reading the following discussion it should be remembered that the DEIS was published in 1986, and the public comments were written the same year. In discussion of what should constitute the "current situation," the data used were the most recent available at the time.

Six respondents took issue with the Ochoco NF definition of a "current situation." Some respondents, including the Director of the State Economic Development Department, recommend the use of the Potential Yield level of 137 MMBF. An economist hired by the Central Oregon Economic Development Council recommends the 1984-1986 harvest level of 147 MMBF. The Oregon State Forester takes a different approach and recommends basing the "current situation" on the average 1976-1985 employment level.

Response:

This is an important question because changes in employment and income are determined relative to the "current situation." The "current situation" used in the DEIS was the 1984 harvest level of 127.3 MMBF.

The Ochoco agrees that to use a single year as the "current situation" is not appropriate. The wood processing industry has traditionally gone through cycles. In addition, in recent years, it has been affected by resource use debates, lawsuits, and other actions which affect timber harvest levels To examine a short period of time is to invite unreasonable results

The Forest does not believe that use of the Potential Yield level is appropriate because it does not reflect a "current situation." The 1984-1986 figures, though current at the time, were also known to be abnormal due to the recession recovery and the repurchase of timber under the timber buyback program. The concept of comparing to employment levels is interesting, and the long time frame is appropriate. However, employment levels include many factors beyond the control of the National Forest.

What is needed is a measure that reflects actual conditions over a period of several years -- long

enough to even out cyclical conditions or other short term effects. The ONF has chosen to use the average harvest over the years 1980-1988, which represents a harvest level of 110.7 MMBF.

1200-02.2 Recreation-Related Employment

Four reviewers, among them the Oregon State Office of Economic Analysis, the State Economist, and the State Labor Economist, said that employment gains associated with recreation -- in particular, with fishing -- appear to be too high.

Response:

An error was discovered in the Draft in the estimation of employment due to fishing. As a result, employment levels for all alternatives were too high and have been recomputed.

1200-02.3 Employment/Income Change

One comment concludes that based on DEIS figures on employment change, the figure containing the change in income is wrong. Looking at Table IV-2, the letter states that there would be 69 lost timber jobs at $24,200 per year, and 59 gained recreation jobs at $18,000 per year. The computed loss in income over one decade would be over $11 million, even before multiplier effects were computed.

Response:

Table IV-2 was misunderstood -- partially due to confusing line labels. See the section on multipliers for a fuller explanation. The change in wood products jobs would equal:

-50 (Crook County)

+23 (Harney County)

-27 Total change in wood products jobs

The jobs labeled/mislabeled as "Timber, Indirect Effects" are not jobs in the wood products industry. Rather, they are jobs in other industries which are affected by changes in the wood products industry. The total change in non-wood processing jobs is:

-19 (Crook County, "Timber, Indirect Effects")

+59 (Crook Cty, "Recreation, Wildlife and Range Effects")

+15 (Harney County, "Timber, Indirect Effects")

+22 (Harney, "Recreation, Wildlife and Range Effects")

+77 Total change in non-wood-products jobs

1200-02.4 Effects on Recreation

One reviewer questioned the effects on "recreation-related industries." The respondent pointed out that the effects included many economic sectors that were not directly related to recreation.

Response:

The line label perhaps should have been more explicit. When jobs directly caused by recreationists increase or decrease, other economic sectors are affected. The total effects caused by recreation activities were termed "recreation-related." See the discussion of multipliers for more discussion of problems with line labels in some tables.

1200-02.5 Non-Cash Benefits

One person wrote that non-cash benefits such as recreation, fishing, and hunting were given misleading high cash values and included in the economic analysis. Two respondents believe that the "amenity" values are too low.

Response.

The cash benefits associated with amenity outputs are derived from gains or losses in jobs and the income resulting from those jobs. Therefore, they are true cash benefits.

The derivation of these benefits is an involved matter. The Forest Service started with an economic model with 528 economic sectors. For a given activity -- twelve hours spent hiking in Wilderness, for example -- the anticipated expenditure for each sector was computed. (For example, twenty cents will be spent on dairy products.) For each area analyzed -- for example, Crook County -- expenditures were totaled for all the existing economic sectors.

The value associated with, say, an RVD would depend on the expenditure per sector, and the criteria for including that sector's expenditures. Values can run higher or lower depending on what assumptions are made. The Forest believes that this analysis is accurate and adequate.

1200-02.6 Wheeler County

Three reviewers, including a State Labor Economist, stated that effects on Wheeler County should be computed because the 25 percent moneys are a significant contribution to the county's budget.

Response:

Wheeler County was modeled in the FEIS analysis. (See FEIS Chapter 4, and Appendix B Section 5.)

1200-02.7 IMPLAN

Three comments said that IMPLAN analysis should be redone using the 1982 IMPLAN model. The IMPLAN work was criticized because it was based on data that was as much as nine years old.

Response:

The 1982 IMPLAN model (Version 2 0) was used in the FEIS. This model incorporates various improvements over IMPLAN 1.1. More importantly, it was based on 1982 data rather than 1977 data.

The Ochoco felt that 1982 data was still not current enough for adequate analysis. Information for the wood products industry was obtained privately from the area's mills and updated to 1987. The remainder of the 1982 data were examined and concluded to be accurate enough to meet the needs of the planning process.

1200-02.8 Implan

Two respondents stated that the IMPLAN model should span Crook, Harney, Jefferson, Grant, and Wheeler counties. According to the respondents, this would allow better estimation of the effects of the wood products industries and consumer expenditures.

Response:

An IMPLAN model should determine the "boundaries" of a local economy and be sized accordingly. The Forest treated Crook County, Harney County, and Wheeler County as three distinct economies for two reasons

> Consumer expenditures are well "bounded" by county lines. Neither residents of Fossil, nor residents of Burns, do much shopping in Prineville.
>
> To some extent, county lines serve as good boundaries for the wood products industries. Little or no timber from Crook County is milled in Harney County. Nearly all the timber remilled in Harney County comes from Harney County.

It is true that wood processing stretches far beyond county lines. The IMPLAN models go to some length to capture these effects. For example, for timber harvested in Harney County, the models distinguish between the following:

> Timber milled in Harney County,
>
> Timber milled in Crook County,
>
> Timber milled neither in Harney County nor in Crook County;
>
> Timber milled in Harney County and remilled in Harney County, and
>
> Timber milled in Harney County and remilled in Crook County.

The Ochoco National Forest believes that the IMPLAN models constitute a good model of the area, and represent reality much more closely than a multi-county model.

1200-02.9 Employment Changes

One individual requested the calculation of changes in employment and income for the year 2030.

Response:

IMPLAN, like any input/output model, assumes that the economy modeled will stay the same. It allows for no technology change or any other changes in the basic industrial structure. Especially given the rapid rate of modernization in the wood products industry, the ONF does not believe that changes in employment or income that were projected out to the fifth decade would be valid.

1200-02.10 Economic Analysis

Ten respondents requested that additional economic analysis be performed. Some thought that impacts on employment and income should be done in greater detail, or that more analysis should be done. One reviewer suggested comparing employment levels to what would happen if the mills ran at full capacity. Others requested additional analysis of recreational or forage values. Still others desired additional studies on impacts on service industries and small businesses, and on county and school budgets. Some requests for further analysis related to the value of inputs such as recreation or forage.

Response:

The Forest believes that it has used appropriate values. See the section on "IMPLAN values associated with amenities" for further information on how these values were obtained.

Most of these comments request additional detail or additional analysis of the effects of the Preferred Alternative. The Ochoco National Forest attempted to present the effects in enough detail to describe the impacts of all the alternatives, including the Preferred Alternative.

1200-02.11 Economic Analysis

Two comments questioned the DEIS projection that Harney County would gain jobs during the first decade, while Crook County would lose employment. One of these comments came from the State Economist.

Response:

In the new Preferred Alternative, which schedules harvests differently, there is no significant difference between the effects on Crook and Harney counties.

1200-02.12 Capacity

Four letters referred to capacity. One recommended that mill capacity be considered in estimating impacts on employment

Response:

Mill capacity has no direct effect on employment. It represents no historical level of employment and is therefore not an appropriate number to use for a "current situation" comparison. The subject of mill capacity did not play a part in the selection of the Preferred Alternative.

@1200-03 National Economics

One comment expressed the concern that while PNV calculations seem to be major influences on FORPLAN outputs, they are not responsive to the ICO's. This respondent requested that the relationship of FORPLAN PNV calculations to the national concern of economic efficiency be addressed in depth.

Response:

Economic efficiency is a major planning criteria addressed in NFMA and its implementation regulations. The major use of PNV is not the control of

FORPLAN outputs, nor is it directly related to ICO's. PNV is used 1) to ensure that scheduled activities and practices are cost effective, 2) to select the most efficient activities and practices to achieve a set of goals and objectives, and 3) as one of the decision criteria in deciding which alternative best maximizes Net Public Benefits.

@1200-04 Timber Economics

One comment was received stating that PNV analysis promotes the liquidation of old growth ponderosa pine by discounting future value.

Response:

Of all benefit/cost analysis techniques, Present Net Value (PNV) is considered the most appropriate for land management problems of this scale. Economic efficiency analysis using PNV does associate a time value with money. Put another way, a dollar today is worth more than a dollar ten years from now. As a result, given the choice of harvesting a high value product today or in the future, PNV analysis will choose to harvest today.

In the DEIS, only Alternative H-Departure was designed and developed with the main objective of maximizing PNV. The objectives of all other alternatives were based on public issues, management concerns and opportunities (ICO's). The maximization of PNV was the criterion then used to assure that each alternative had the most economically efficient combination of outputs and activities needed to meet its objectives.

In the FEIS, three alternatives (I, B-Modified, and C-Modified) incorporate uneven-aged management for ponderosa pine. Alternative I also incorporates extended rotation ages for ponderosa pine. These objectives slow the rate of harvest for large diameter pine and increase the size of pine that will be managed in the future.

Refer to Chapter 2 of the FEIS for a description of the Alternatives and to Appendix A of the FEIS for a description of the quantified indicator of the issues.

@1200-05 Multiple Use Management

One comment expressed the concern that PNV is a valid comparator only if it can accurately account for all priced and unpriced, market and nonmarket, and direct and indirect costs and benefits. The respondent stated that the costs and benefits described as being evaluated in the economic analysis are not all significant factors applicable to decisions based on multiple use resource management of public lands.

Response:

It is true that all criteria important to the decision maker are not part of economic efficiency analysis (PNV). Appropriate methods to quantify certain nonpriced values (for instance, visual quality, old growth, and snag habitat) have not been developed. These values need to be considered in qualitative and subjective terms.

PNV is considered a valid comparator because it puts many of the priced resource values, both market and nonmarket, on similar terms for the purpose of comparison. However, both market and nonmarket priced resources have factors besides economic considerations. As with unpriced values, priced resources should also be evaluated qualitatively. Therefore, PNV should be, and is, only one of the criteria used to evaluate resource outputs.

NFMA regulations charge the Forest Service with identifying the alternative which comes closest to maximizing net public benefits (NPB). NPB represents the overall value to the nation of all outputs and positive effects (benefits) whether they can be quantitatively valued or not. Net public benefits include both priced and nonpriced resource outputs, less all costs associated with managing the area All priced outputs and all costs associated with managing the Forest are included in the calculation of PNV. The net subjective values of the nonpriced outputs must be added to this in order to arrive at the overall NPB of an alternative. The Forest then chooses the alternative with the greatest NPB as the Preferred Alternative

Appendix B, Section 8 of the FEIS displays the

major criteria used to compare the alternatives' responsiveness to the ICO's. PNV is only one of these criteria.

See Forest Response to Multiple Use Comments, 0350 and 1300-10.

Subject Area 1215 Social Considerations

@1215-01 Future Generations

Thirty-nine respondents commented on the ecological and/or social need for old growth, older trees, wildlife, streams, recreation and wilderness. The Columbia River Inter-Tribal Fish Commission stressed the need for fish habitat. Many reviewers feared that poor decisions would harm their resources for future generations.

Response:

The Ochoco National Forest is aware of the need to manage all the Forest's resources with long-range goals and objectives in mind. The Ochoco National Forest has attempted to meet these goals through the forest planning process, and will continue to plan for the future of all Forest users, keeping in mind the needs and desires of all Forest users.

@1215-02 Community Stability

Ninety-six respondents, among them the Crook County Soil and Water Conservation District, said that a primary concern in Forest Planning should be the economic stability of the affected communities.

Response:

Community stability is a specific requirement for the selection of the Preferred Alternative.

1215-12.1 Community Stability

Eighty-two respondents stated that a decline in harvest levels would undermine community stability, both now and in the future.

Response:

The Forest recognizes the importance of community stability. Community and economic stability concerns were specific considerations in the development of the Preferred Alternative (Chapter 2, FEIS). The results of all the alternatives were compared to the "current situation," that is, an average picture of the communities over recent years. The results of this comparison predict a slight increase in benefits to local communities under the Preferred Alternative I over the present.

@1215-03 Lifestyles - Elderly, Handicapped

Fifteen respondents said that more consideration should be given to the elderly and handicapped. (Many of these comments were made in connection with access to Lookout Mountain, and some of the comments referred to snowmobiles. Refer to these specific discussions in the Recreation section.)

Response:

The Forest Service has been seeking to increase the opportunities available to elderly and handicapped people Forest offices have been barrier-free for several years, and now barrier-free facilities are being provided on the Forest and Grassland.

The ONF has provided barrier-free day use facilities at the Walton Lake area. By summer, 1989, a barrier-free fishing platform is scheduled for completion at the lake. The Forest and Grassland Plans will provide other barrier-free trails and campsites in future years.

@1215-04 Lifestyles

Two respondents stated that firewood availability is essential to their way of life.

Response:

Firewood levels will be difficult to maintain over several decades (see Chapter 4 of the FEIS for details on firewood and how it relates to other activities and goals). Nevertheless, the ONF recognizes the historical, current, and future importance of firewood and will attempt to meet that need. See response to Firewood comments, 0750-01.

@1215-05 Lifestyles - Native Americans

One respondent questioned whether the predicted effects of the alternatives on Native Americans and Hispanics would in fact occur. He stated that, in Harney County, only five percent of Native Americans were employed in wood products jobs, and a similar situation existed for Hispanics. In addition, the respondent claimed, less than three percent of minority people would be affected by increased federal budgets under the EEO program.

Response:

The Forest has reviewed its data and it appears that the above comments are accurate for Harney County, and for Crook County as well. Comments relating to the EEO program have been modified, and the rest of the predictions that were on DEIS pp. 102-103 regarding employment effects on American Indians have been deleted in the FEIS.

@1215-06 Taxes

One hundred sixty-one respondents said that they did not want any alternative that would increase taxes or decrease income.

Response:

The ONF compared the results of all of the alternatives to the "current situation," that is, an average picture of the local communities over recent years. The results predict a slight increase in income under the Preferred Alternative (I), and the Forest can see no reason why this alternative would cause taxes to increase.

Subject Area 1230 Budget

@1230-01 Budgetary Concerns

Two respondents expressed concern about the large increase in proposed budgets over historic levels.

Response:

The Ochoco National Forest understands that the large difference between the planned budget amounts shown in the draft and the average budget levels of the past may seem unreasonable. Those differences are part of the reason that our process included the use of a "draft." The information was a first attempt to figure the costs of all the variables included within the document for such a long time frame. In this effort each resource area staff was asked to provide the true cost of the total effort required to insure the highest quality products and services. Allowing for factors including federal budget levels, inflation, consumer price indexes, wage rates and emerging technological advances made some inputs hard to substantiate in the early phases. With implementation some of the figures will undoubtedly fluctuate, but the experience will give the Ochoco a sounder basis for comparison.

See Chapter 5 of the Final Forest Plan for Budget Proposals.

@1230-02 What if the Proposed Budget Fails to Materialize?

Sixteen letters contained comments regarding effects of federal budget practices on Forest budgets.

Several references were made to the Gramm-Rudman act and how it may affect funding for the Forest Service. In particular, the viability of non-revenue-generating projects such as water development, range and forage production, fisheries, and trails were questioned. Some suggested that the Ochoco attempt to maximize receipts while providing a sustained yield in order to offset future budget constraints.

Many other respondents were concerned about future availability of funds. Several asked which programs would be cut or reduced if funds were not forthcoming from Congress. One reference was made to Region 4 National Forests in Idaho which have a 25 percent constrained budget alternative in their DEIS.

It was felt that the Ochoco's planning documents failed to consider the possibility of future cutbacks in funding in any of the alternatives.

Particular areas of concern were the budgeting of reforestation projects and forest recreation.

CRITFC recommended that timber and grazing quotas be tied to both budget and environmental goals, so that if either of the latter were not met, the allowable cut and AUM's would drop respectively.

Response:

As with all agencies of the Federal Government, the Ochoco National Forest is subject to varying budget levels based on national economic conditions. These budget levels are submitted to Congress as part of the program for the United States Department of Agriculture. Congress sets the final program dollar and output levels for all Federal Agencies.

To prevent wide swings in any agency's program, the Congress requires a range of opportunities to consider for funding in any individual year. The long term nature of our planning effort is really a plus in displaying this range of opportunities on a long term basis. This process is called the PROGRAM BUDGET.

Nationally the program budget process is an incremental process designed to provide the budget information necessary to implement Forest Plans within various constrained funding levels and/or rates of implementation. Each Forest submits a level known as "Implement Forest Plan" for a specific year and the total need for the decade. Forests are not constrained in funding; however, they must be able to accomplish implementation within current work force, skills, and environmental requirements. Forests also submit a list of programs or projects that can be foregone. This list of programs can be up to a forty percent reduction in individual years and includes an accelerated program of up to ten percent. These lists are used for priority setting to develop program levels to meet Regional constraints. The Regional Office then submits these varying levels to the Washington Office Headquarters. Typically five to seven levels are submitted. Forest plans will be implemented to the extent practical within funding constraints and targets tied to plans submitted to the Washington Office. Each Forest's information goes forward to the Washington Office Headquarters for use in the Explanatory Notes that are sent to Congress. This program is updated to better reflect the national and local economic conditions each fall.

Using a broad spectrum of alternatives, long time frames, and detailed information produces a product that negates wide program swings in any individual year, but allows Congress to adjust national budgets to meet the nation's economic condition. In the case of the Forest Service, Congress can do this with detailed knowledge of economic opportunity and resource effects.

See Chapter 5 of the Forest Plan for details concerning Budget Proposals.

@1230-03 Livestock Concerns

One individual cited an article in *Fishing and Hunting News* magazine which stated that the Ochoco National Forest's Range Management Program loses approximately $360,000 per year. The reviewer questioned the proposed increases in Range expenditures in the DEIS in light of this deficit.

Response:

The figures available when the Ochoco National Forest published its draft planning document did not contain adequate data to do accurate cost benefit analysis. The Forest Service began to address this problem area in cooperation with the General Accounting Office as directed by Congress in October 1984. The initial effort is detailed in "TIMBER SALE PROGRAM INFORMATION SYSTEM" (TSPIRS), Final Report to Congress. This program systematically addressed Forest Service cost centers to identify elements similar to private industry. This resulted in a financial statement that provides a clearer look at investments, operation costs and revenues in a short- and long-term framework. The process presents a consistent depiction of the cost/benefit relationship. This "new" tool provides an opportunity for the Forest Service manager to invest dollars where the greatest benefit is available. The success of this program has led to "All Resource Accounting." The concepts refined in TSPIRS are now being applied to all resource areas. Reports should be available in 1990 or 1991.

Even though the returns to the Forest Service from grazing fees do not cover administrative costs, the benefits to the local economy are deemed to outweigh those costs. All programs administered by the Forest Service do not necessarily make a profit, nor would it be practical to expect them to.

See Chapter 5 of the Final Plans for details on budget proposals.

Subject Area 1275 Indian Rights

@1275-01 Rights Adequately Addressed

One respondent felt that the issues important to Native Americans had been adequately addressed in all the alternatives in the DEIS. The observation was made that since less than five percent of the Native American workforce is employed in timber-related jobs, the likelihood was low that Native Americans would be affected by any of the alternatives in terms of employment.

Response:

Five percent may be the national average, but in Crook County the percentage is much higher due to the presence of Warm Springs tribe members.

In addition to the relationships between Native American employment and harvest levels of the different alternatives, the ONF tried to address Indian treaty rights, the American Indian Religious Freedom Act (AIRFA), cultural resources and burial sites with the rights and interests of the Native American community in mind. As the Forest and Grassland Plans are implemented, the ONF encourages the public to continue to assist us in meeting treaty obligations, handling AIRFA issues, identifying cultural areas important to Native Americans, and providing input to all cultural resource management activities.

Subject Area 1300 Planning Comments

@1300-01 Planning

1300-01.1 Planning in General

There were 59 comments on planning in general.

Some reviewers felt that the Forest has been managed well in the past and that this planning process is merely changing for the sake of change. They wanted the Ochoco to find an acceptable plan and stick with it.

Many were displeased with the bulk of the DEIS and Draft LRMP. They felt that the documents were wordy and redundant and that the public was not given adequate time or notice to review the DEIS. The planning documents were also said to be far too complex (especially the sections on Economics and FORPLAN modeling) for the average reader to grasp.

Several people stated that the analyses were flawed, or that the quality of work in preparing the plan was poor. Some claimed that data were omitted or conclusions did not follow from the information presented.

Others felt the process was adequate, and that the documents were professional and well done. Several complimented the ONF on the DEIS and Draft Plan.

Some commented on the Forest Service personnel who worked on the plan. A few felt the document was a waste of money and a way to "make work" for Forest Service employees. Others thought the Ochoco could be run better with fewer employees. Still others stated that they were confident the personnel now in place would come to the best conclusion for all concerned.

There were also a few comments urging a plan that would benefit the majority.

Response:

Planning on the National Forest is directed by law under the National Forest Management Act of 1976. Other laws relating to management of resources on the National Forest also contain provisions that are required to be incorporated into National Forest Planning; for example, the National Environmental Policy Act of 1969, Endangered Species Act of 1973, Wild Horses and Burros Protection Act of 1971, Clean Water Amendments to the Federal Water Pollution Control Act of 1972, etc. The process and procedures for National Forest land and resource management are described in part by Federal Regulations CFR part 219 - Planning, the Forest Service NEPA implementation regulations, policies, and procedures; FSM 1900; and specific procedures, policies, and guidelines contained in Forest Service manuals, handbooks and the 1984 Pacific Northwest Regional Guide.

The subject of planning for management of the National Forest resources is by nature a large, complex and technical undertaking involving many disciplines and varied political, public and legal interests, which requires dealing with a wide range of natural resource issues over time. It follows that planning for the National Forests requires, by law and regulations, following certain procedures. Documentation of information, processes, results, and decisions is one of these procedures. Satisfying legal requirements sometimes results in redundancy and the structuring of documents in a manner which may not always contribute to ease of understanding or readability.

Given the above comments on planning document preparation and format, complexity can be expected to vary based on the particular individuals, interest groups, or agencies reviewing them. Summaries, tables of content, indices, figures, tables, and glossaries have been included to assist document reviewers. Materials and documents were edited to assist readability and reduce volume. A reviewer's guide was also published to assist readers. Intentions are to continue to improve readability and understanding in the FEIS/LMP.

1300-01.2 Planning Analysis

Six public responses, including that of the U.S. Department of the Interior, commented on the analysis issue of the planning process.

Some felt that given the limitations of current scientific knowledge and computer technology, scientific uncertainty is a fact of life in National Forest Planning. In addition, some stated that attempting to combine objective, quantifiable resource data with subjective values and public interests invalidates the modeling process. They believed that subjective values have no place in computer modeling.

Some comments indicated that the DEIS should be more understandable in its descriptions of modeling used to evaluate various solutions, more explicit as to the value of linear programming in making decisions, more accessible in its use of "planning documents" which were not provided to reviewers, and should use more widely accepted meanings of English words and phrases.

The U.S. Department of the Interior stated that the Plan should make it clear that the development of new research questions and methods will, in most cases, not be a consequence of project level identification and avoidance activities. They stated that it will come largely through broad-based planning studies, non-project survey, and data recovery projects.

The Office of Economic Analysis stated that each Forest should circulate its alternatives for comment prior to making computer runs. This, they feel, will allow for a cost-effective method of examining a wider range of alternatives.

Response:

The planning process data base and modeling assumptions are described in detail in Appendix B of the FEIS. Additional information is contained in the Planning Records on file at the Forest Supervisor's Office in Prineville, Oregon.

1300-01.3 Planning Coordination

Some letters, including that of the Grant County Court, stated that they would like to see more coordination and cooperation in planning between adjacent Forests. The Grant County Court recommends that no single Forest Plan be implemented until all area Plans have been finalized.

Reviewers noted that in order for State agencies to agree on an alternative which satisfies their concerns, the alternative must recognize and incorporate State objectives utilizing statewide programs and policies. They feel, therefore, that the alternative must consider the effects, on a regional basis, of implementation.

The Oregon Division of State Lands commented that the Forest had not addressed the effects the Plan will have on similar resources managed by the State or adjacent private lands. They stated that the Federal Government, as the major landowner in a geographical area can, with its management policies, enhance or stifle the economy, or alter the development of that area.

Response:

Forest Service planning is conducted on several hierarchical levels. A Regional Guide (1984), as well as a Vegetation Management EIS (1988) and other plans, were prepared to give broad overall guidance to planning on National Forests in Region 6. In addition, various Forest Service manuals and handbooks exist which provide coordinating directives.

The Pacific Northwest Region conducted an "Aggregate Analysis" of alternative outcomes for various resources based on the draft Forest Plans. This analysis dealt, for instance, with regional timber supply and provided an overview of the effects of alternative courses of action. On a more local basis, National Forests did coordinate on location of management area boundaries and development of certain standards and guidelines.

A great deal of attention was given to consistency in dealing with certain issues between adjacent Forests. Other agencies, such as the BLM and Bureau of Reclamation, were involved throughout the process.

Finally, the Forest has worked closely with the State of Oregon and other agencies in the development and selection of a final alternative. This involved a great deal of coordination and interaction with State Agencies and the Governor's office. The Governor's office provided a State-wide view for the process.

1300-01.4 Planning Coordination

The Columbia River Inter-Tribal Fish Commission noted that the Forest Service coordination with Pacific Northwest fisheries enhancement activities is required by law, and that the Ochoco National Forest DEIS and proposed Plan do not reflect the consideration of these processes required by the NFMA.

The Commission further suggests that, to adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 Forest Plans in the Region on the Columbia River anadromous fish runs and the four Columbia River treaty tribes.

Response:

The Forest Service has coordinated its planning with the Columbia River Inter-Tribal Fish Commission (CRITFC). The Ochoco National Forest and Crooked River National Grassland are involved with the Forest Service's "Rise to the Future" incentives, and the riparian and wildlife habitat improvement projects scheduled in the Plan reflect this. The ROD specifically mentions the Forest's agreement with CRITFC to involve them early on in the scoping phase of projects potentially affecting anadromous fisheries.

@1300-02 Monitoring/ Implementation/Mitigation

Several respondents, including the U.S. Environmental Protection Agency, indicated that the Forest's monitoring system was not intensive enough. They suggest that it be more frequent than once every three to five years if the habitat for wildlife and anadromous fish is to be protected before significant damage occurs.

Some, including Governor Vic Atiyeh, suggested that the definition of monitoring be improved by adding a clause that will indicate certain deviations as a trigger for revision of management practices. Others, among them the Oregon Water Resource Department, remarked that there is no timeframe for the measurement of riparian improvements and that aspects of the Plan which pertain to meeting Federal or State mandated standards or regulations should be mentioned so the public will be better able to monitor the results of the program.

The reviewers suggested that the monitoring and evaluation program of the Forest Plan should be expanded to provide greater detail by species and monitoring objective. In addition, some felt that threatened, endangered and federally listed species should be added as an action and effect to be monitored.

Many, among them the State Forester, stated that the Ochoco had provided a very good framework for its monitoring and evaluation plan. However, they felt the plan needs to be improved in the following areas, funding of the monitoring process, flexibility of the plan to accommodate growth factors when they are greater than forecasted, and monitoring of logging operations.

Others felt that compliance with standards and guidelines or management prescriptions is generally not monitored, and that the public will not be able to tell if the Forest Service is trying to meet Plan objectives. In addition, they stated the monitoring plan, as presented, will not accomplish its presumed objective because monitoring compliance with many LMP objectives is not addressed.

One person indicated that the monitoring surveys should be conducted by independant technicians under contract in order to insure the highest level of impartiality.

Response:

Monitoring is required under NFMA Sec. 6(8)(1)(c). The monitoring process is described in Chapters 5 of the Plans. The environmental analysis (NEPA) process is tied into the monitoring and implementation program. This process provides for public involvement. Significant amendment or revision to the Plan as a result of monitoring will include public involvement and publication of a decision notice.

@1300-03 Management Strategies (Alternatives)

There were 91 letters with comments concerning alternatives in general. Most respondents expressed displeasure with either the number of alternatives or the range of resource outputs in the alternatives.

Some felt that eleven alternatives were far too many and confused the issue. Others were unhappy with the major discrepancies between the Forest Service alternatives and those proposed by private industry. These respondents wanted an alternative that emphasized timber yields and commodity outputs.

Others asked that the Forest Service not allow harvest levels to determine management strategies. They recommended that the Forest be managed with an emphasis on wildlife and biological diversity. Many of these respondents expressed disappointment with what they considered the narrow focus of the plan on timber and beef production. Some stated that any Forest Service alternative would be better than an alternative proposed by the timber industry.

Most respondents simply stated that the alternatives failed to satisfactorily deal with the issues and that they could not support any proposed alternative. Some, however, were pleased with the way the issues were responded to in the DEIS.

The major concern of the respondents seemed to be that the Forest Service implement a plan with the needs of the majority in mind.

One individual suggested that the Ochoco combine the best policies of forests all over the world into its program.

Response:

Under the requirements of the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA), a range of alternatives, which might realistically be implemented, is required to be considered. Eleven such alternatives were analyzed in the draft (DEIS); in addition, another alternative was presented in a Supplement (SEIS) to the draft. Represented were a range in alternative management plans, from intensive timber management to emphasis on noncommodity resources with reduced timber yields. Other alternatives attempted to portray a more "balanced mix" of resources and outputs. Three alternatives incorporated "departures" from even-flow of timber. The departure alternatives maintained high levels of timber supply for the forest product industry during the decade to follow.

The complexities of planning requirements, and the difficulty and frustrations in understanding the alternatives, are reflected in the above range of public comments (also see comments under 1300-1 Planning). Likewise the Forest Service's problem of attempting to meaningfully apply public comment in decision making is demonstrated by the range of responses above. Comments specific to particular alternatives are addressed under other 1300 headings.

In the Final, the Forest Service has reduced the number of alternatives considered in detail. Alternatives in the Draft, which received little, if any, public support or interest, have been treated under a section of the FEIS entitled, "Alternatives considered, but eliminated." (See FEIS Chapter 2.) Six alternatives are analyzed in detail in the Final. The decision to present the six particular alternatives in the Final is based on NEPA requirements, legal considerations and public input.

The Final Preferred Alternative, Alternative I, is a new alternative. It represents an amalgamation of new information, parts of the draft alternatives, and incorporation of public comment. The formulation of the Preferred Alternative involved changes which were primarily in response to public comment (see Chapter 2, FEIS). The Final Preferred Alternative is within the decision constraints for alternatives as identified in the DEIS.

@1300-04 Management Strategies (Alternatives B+, B, B-Departure, B-Modified)

There were 106 comments on Alternatives B, B-Departure, and B-Plus (the timber industry alternative).

The vast majority of the respondents indicated a preference for Alternative B-Plus on the grounds that it emphasized timber and commodity production. They felt that only B-Plus would permit the economy of Central Oregon to survive.

A few were opposed to B-Plus because they felt it would deplete the resources in the region, damage the environment, and reduce big game populations.

Some Preferred Alternative B, feeling it offered a balance between commodity and amenity production.

A few recommended B-Departure with amendments to balance near- and intermediate-future timber yields and to ensure strong emphases on community stability.

The Crook County Soil and Water Conservation District suggested the Ochoco implement a combination of Alternatives B-Plus and E-Departure.

Some expressed concern that the form letters sent in by those preferring the timber industry's alternative (B-Plus) would receive less consideration from the Forest Service than would other forms of response.

Response:

Alternative B in the Draft Plan and DEIS was designed to attempt to meet Regional Guide 1980 RPA timber and range program targets. The alternative's focus was on intensive management for timber and range, but other resources were managed at minimum levels. To meet the RPA target all available forested lands were planned to be managed intensively for timber production in this alternative. In addition, another similar alternative was developed - Alternative B-Departure. It was found that even with departure harvest, neither alternative could meet 1980 RPA timber targets for all 50 years while simultaneously meeting other RPA objectives. With the exception of Alternative H-Departure, Alternatives B and B-Departure offered the greatest timber yields of any considered in the Draft.

The forest products industry used Alternative B as a basis for its own plan, called Alternative B-Plus. This alternative was strongly supported by the timber industry lobby and local communities through form letters and organized efforts (see Public Comment Analysis, Appendix A).

Timber industry officials and personnel of the Ochoco National Forest met and formulated a modified B-Plus alternative, called B-Modified in the Final Plan. B-Modified is an amalgamation of parts selected by industry from Alternative I and Alternative B. It represents an entirely new alternative and is fully addressed in the FEIS and Final Plan. In reality, industry's final version of Alternative B-Modified is more closely related to Alternative I than to Alternative B.

In terms of numbers alone, Alternative B-Plus received the most positive comments. This was a result of intensive organized efforts by the forest products industry. The questionable aspects of this alternative, and its poorly developed nature (except for the section on timber harvest) were recognized by the industry, as evidenced by the formulation of Alternative B-Modified in the FEIS.

None of the B alternatives discussed above (B, B-Departure, B-Plus) were selected for the reason that, while they provided high short-term economic benefits, they did not represent balanced or equitable resource mixes and they had potentially undesirable environmental and socioeconomic effects over time. Options would be reduced with the adoption of any of these alternatives and the risk of irreversible environmental effects was high.

See Chapter 1 of this appendix and 1300-17 Public Involvement Responses in this chapter for Public Participation information.

@1300-05 Management Strategies (Alternative C)

Many respondents favored Alternative C because they felt the reduced harvest levels would help heal the land from the many years of overharvesting. Also, many felt that this alternative best protects the Forest's natural values, such as riparian areas and wildlife, and would decrease the harmful effects of grazing.

Some felt that this Alternative would provide a suitable mix of recreational and commercial uses of public lands. Furthermore, many stated that this Alternative comes closest to meeting NFMA requirements.

Many felt that this alternative would maintain steady Old Growth. Reviewers said that Old Growth is a unique resource, and should be protected until fully understood.

Some opposed Alternative C because it would limit commodity production and would cause undue stress and hardships on local communities that depend on the timber production.

Response:

Alternative C was the conservation community's Preferred Alternative. It emphasized amenity or non-monetary values. A newspaper flier supporting this alternative was widely distributed by conservation organizations and individuals. There are environmental benefits associated with alternative C, but implementation could be only done with very high costs and radical change to established local, social and economic settings In the Forest's opinion, Alternative C does not provide a balance between environmental considerations and the economic realities of dependent communities, and therefore was not selected. It is presented in the FEIS as one of the final alternatives after being modified to include uneven age management and legislated changes such as classified Wild and Scenic Rivers.

@1300-06 Management Strategies (Alternative D)

A letter was received from one respondent suggesting that Alternative D comes the closest to true multiple use and protection of basic resources.

Response:

Alternative D emphasized fish and wildlife, especially big game. Timber and range outputs were significantly reduced, as was scenic and unroaded recreation. In emphasizing one resource, wildlife habitat, the alternative failed to incorporate other resource management opportunities. Reasons for nonselection were similar to those described under Alternative C

@1300-07 Management Strategies (Alternatives E, E-Departure)

Some respondents favored Alternative E because they felt it reflects a wise allocation of land, good objectives and sound management practices. They also note that it preserves greater than 97 percent of the employment base and provides a lessened long-term economic impact on local communities while still protecting the natural environment.

Many respondents Preferred Alternative E over E-Departure because they felt it meets the overall environmental needs prudently. Some felt that any departure from even-flow would cause long-term social, economic and environmental impacts.

Some, including Richard Kuczek, Labor Market Economist for Wheeler and Grant Counties, stated that they favored Alternative E-Departure on the grounds that it provides fairly high levels of non-market resources while maintaining current timber harvest levels for the first decade.

Others, including Governor Victor Atiyeh, opposed Alternative E-Departure because they felt it does not reflect a real balance between environmental concerns, recreation and the economy. In addition, they suggested that it is not compatible with State goals and does not maximize net public benefits. Some people stated that this alternative avoids controversial decisions by proposing a massive over-utilization of the Ochoco's resources which will result in a future crash where Forest utilization must be drastically decreased to allow recovery.

A few individuals opposed Alternative E because they felt it is too extreme and benefits the Forest, but not the people who use it.

Response:

Alternative E-Departure was the draft Preferred Alternative. There was strong public opposition to departure (see response to Timber Comments, 0700-01). Nearly all segments of the public felt that departure harvest was inappropriate. Using the public comment, new information, and additional analyses, the Forest Service created Alternative I - the Preferred Alternative in the Final Plan. The changes and reasons for change are summarized in Chapter 2 of the FEIS and Section 4 of the ROD.

@1300-08 Management Strategies (Alternative G)

A few respondents, particularly the State of Oregon in its original response, felt that Alternative G provides the best basis from which to create the Forest's and the State's Preferred Alternative. However, they noted that Alternative G needed some revisions to make it a more useful alternative. These included: retaining current levels of timber harvest for a stable local economy; improving riparian zone management, wildlife habitat and livestock management conditions; compliance with approved State and Federal plans for air and water quality standards, and maintenance of the current level of semi-primitive motorized and non-motorized recreation trails as presented in Alternative E.

Response:

Alternative G was the State of Oregon's original preference for an alternative among those displayed in the draft subject to the above modifications. Since then the Forest Service has continued to work closely and in cooperation with the State to assure that both agencies are in accord with the Preferred Final Alternative.

The State developed its own alternative and held public meetings in April 1989. There were no significant differences between the State's alternative and the Forest Service Alternative I in the FEIS.

@1300-09 Management Strategies (Alternative H)

Some public respondents favored Alternative H. They claimed this alternative has the best mix of timber, wildlife, water and recreation. Some also felt this alternative provided the most use for the most people while maintaining natural resources.

Response:

Alternative H emphasized management of timber and range resources in a manner that yielded the greatest economic returns with minimum attention given to other resources. It did not represent a balanced mix and was rejected in the selection of a final for reasons similar to those given under the comments on the B alternative.

@1300-10 Management Strategies (Multiple Use)

There were 363 comments concerning Multiple Use.

Many felt the Ochoco has been managed primarily for the timber and cattle interests and that commodity production should be secondary to environmental and recreational concerns. These comments favored minimal development and greater emphases on Fish and Wildlife and other nonconsumptive uses of the Forest.

Others were of the opposite opinion. They felt that commodity production should be stressed on all available acres. They commented that the Forest should be open for public use, not closed as a private playground Some cited the Multiple Use Sustained Yield Act and a requirement for the maintenance of a viable timber industry. Others stated that, in order to serve the greatest numbers of people, commodity outputs had to be stressed on the Ochoco.

Still other respondents expressed the desire for a balance between commodity and amenity outputs. Some of these individuals stated that past Forest practices have been adequate and should not be changed. Some stated that some harvest is acceptable, but clearcutting is not.

Response:

The issue of definition and application of multiple use is addressed in response to comments under 350-Multiple Use.

The above comments raised two other commonly expressed viewpoints relating to multiple use management strategies and planning: 1) don't change things, keep them as they are; and 2) management, or the Plan, is biased toward timber and range.

First, the Forest Service is required by law - the National Forest Management Act of 1976 - to prepare plans for the management of the National Forests. The regulations or requirements for those plans require that certain alternatives be considered, furthermore, certain things are required to be done differently than they are in existing plans to meet the intent of the law

Other recent legislation, such as the Oregon Wilderness Act and the Oregon Wild and Scenic Rivers Act, both affecting the Forest and Grassland, are further examples of changes that have taken place which the Forest Service, in order to act responsibly, must respond to. New information on Forest resources is available, and the Forest Service is required to update its plans for timber management every decade. These are but a few examples of things that have changed or continue to change. National Forest and Grassland management is not static. Planning and management are required to be flexible and dynamic.

Second, the Plan and FEIS alternatives represent different ways the Forest and Grassland may be managed. Different resource mixes, emphases and outputs are reflected by the alternatives. In the selection and preparation of the FEIS, the ONF has attempted to take a multiplicity of factors and concerns into account. In the Forest's judgement, Alternative I represents a "balanced mix" of resources, emphases, and outputs for the Forest and Grassland that is truly a multiple use alternative. It is certain though, that not every interest group or user group will be satisfied. Most will demand more, such is the nature of allocation of resources on public lands. However, making those demands under the auspices of "multiple use" is a corruption of the meaning and intent of multiple use management.

@1300-11 Standards and Guidelines

Some felt that the Standards and Guidelines were well thought out and very implementable.

Several respondents stated that Standards and Guidelines have two separate and distinct meanings. In addition, they felt these meanings are not carried over into the Plan, which gives no indication as to which requirements are mandatory standards and which are non-mandatory guidelines

Some stated that meadow protection was not adequate and that the subjective guidelines were not sufficient.

According to the U.S. Environmental Protection Agency, the annual budget will influence the level of projected outputs and Plan implementation. However, they feel that certain categories of activities should not be excluded at the expense of others. In particular, they felt the mitigation measures and Standards and Guidelines designed to protect or enhance resources should not be tabled while other goals are met.

Some doubted, based on the current economic situation and past project costs, that very many projects would be cost effective over the long term. Others felt, however, that it is quite possible such projects may be necessary to mitigate some of the other negative effects which will appear as the character of the Forest lands change.

Response:

Standards and Guidelines, and management area prescriptions, are given in Chapters 4 of the Forest and Grassland Plans. There are numerous directional statements in the Plans representing Standards and Guidelines, which deal with all resources.

The distinction between a standard being an absolute or mandatory requirement, as compared to a guideline, has not been made by the Forest Service.

The "MR's," or Management Requirements, are standards or guidelines which deal specifically with NFMA requirements. They are the ways that the legal requirements of NFMA have been incorporated into the planning process. The distinction is that standards and guidelines are established to meet management objectives, whereas management requirements carry the additional necessity of meeting NFMA legal requirements. This is described in detail in Appendix F of the FEIS.

@1300-12 Management Areas (MA 1)

Many respondents stated that they oppose the inclusion of any National Forest lands in the Draft Management Area 1 prescription. They suggested that, while timber production is an appropriate use of the Ochoco, the dominance it would be accorded in this allocation violates multiple-use management requirements.

Some stated that Management Area 1 is not suitable for the Ochoco National Forest because it emphasizes the rights of the cattle and timber industries while minimizing the rights of the public at large. Some expressed concern that too much Management Area 1 would mean too much clearcutting and too much grazing.

A few reviewers suggested the Forest needs to recognize the importance of the roaded "General Forest" area for recreation and establish guidelines to manage for this.

Response:

In the Final EIS, the Forest has continued a similar allocation termed MA-22 General Forest Under requirements of the NFMA, "suitability" is a factor that must be considered in planning and allocation. For the ONF, 533,177 acres have been determined to be suitable, as per NFMA, for timber management purposes. About 93 percent of this area has been allocated to General Forest (MA-22) in Alternative I, subject to requirements to provide protection of other resources. These requirements have an estimated opportunity cost in terms of allowable sale quantity (ASQ), which contradicts the above comments and assertions that the General Forest is being managed to the exclusion of other multiple use values.

Refer to 350 Multiple Use and 1300-10 Management Strategies comments (the converse of those represented here) and the Forest Response to those comments.

@1300-13 Environmental Effects/Impacts

Some comments indicated that with population growth and resulting heavier recreational use of the Forest, conservation becomes increasingly important for both economic and social reasons.

Others stated that they have watched the National Forest being destroyed year after year with an "irreversible, detrimental impact" due to lazy management and poor conservation practices.

Some noted that they felt the goal of a management plan should be no degradation of the resource.

Others noted that the DEIS should reflect a more conservative approach to irreversible commitments of National Forest resources. They felt that unavoidable adverse effects vary by alternative and should be compared as objectively as possible in the DEIS. Also, they felt the irreversible commitments of the DEIS should acknowledge that the adoption of a departure alternative is an irreversible commitment of future options.

Response:

In the preparation and selection of a final alternative, retaining options and minimizing environmental effects (particularly irreversible and irretrievable ones) were taken into consideration. The effects of the proposed action and alternatives on the environment have been taken into account throughout the planning process in alternative formulation, and allocation selection, Standard and Guideline development, and in mitigation and monitoring procedures (see Chapters 4 and 5 of the Final Plans). Adverse effects that cannot be avoided and irreversible and irretrievable commitment of resources were dealt with in the FEIS Chapter 4.

@1300-14 NEPA, NFMA, and RPA Comments, MR's

1300-14.1 NEPA Requirements

Several respondents indicated that the Draft Management Plan and DEIS was not in compliance with either NFMA or NEPA. One indicated that the DEIS does not present a worst-case analysis as is required by NEPA regulations.

Some remarked that the draft document fails to present a full range of alternatives in regard to several important issues, contrary to NEPA regulations.

Several respondents felt the DEIS should have included objective guidelines describing the analysis criteria which will be used to determine whether a resource management activity will require a categorical exclusion, an environmental analysis, or an environmental impact statement to comply with NEPA.

A few people indicated that, from a procedural standpoint, the DEIS was inadequate in several areas, including unavoidable adverse environmental effects, short term uses of the environment and maintenance of long term production, and irreversible commitment of resources.

Response:

A full range of Alternative plans were analyzed through the NEPA process--12 in the DEIS and 6 in the FEIS. The environmental consequences and comparisons of alternatives were analyzed in detail in Chapters 4 and 2 respectively. A full range of alternatives for each resource activity, such as ORV use or grazing, was not investigated. However, a "benchmark alternative" with minimum levels of grazing and other resource uses was formulated and used in the analysis process. The planning process was issue-driven, and alternatives, allocations, and standards and guidelines were developed to address the issues identified. The Plan is intended to be programmatic in nature, and as such it generally does not deal with project specific decisions.

The process and documentation for preparing the Plans closely followed the NEPA and NFMA requirements.

Worst-case analysis generally relates to proposed projects or actions that are specific or singular in nature. For the multiplicity of issues addressed in the Forest and Grassland Plans this is simply unrealistic. Worst-case analyses are generally not conducted in Forest planning unless specific issues emerge where such analysis is necessary or implied. No such issues were determined to exist for the Forest or Grassland.

1300-14.2 NFMA, Management Requirements

Many reviewers felt that the Forest needed to provide sufficient background to explore various ways to mitigate projected harvest reductions and that the Plan should discuss the individual impacts of each Management Requirement.

Some felt that the "minimum" Management Requirements in the Plan were more like "maximum" requirements and should be revised to be realistic and show a minimum need. In addition, some said they were unable to find where Management Requirements MR's are described in full or summary form.

A few felt that the EIS alternatives did not include variations of MR's. In addition, many felt the Forest must look at a range of alternatives for MR's.

Some commented that the Forest should have examined alternative ways to achieve the objectives of the MR's in the most cost-efficient manner.

Response:

Management requirements that are specified in NFMA were discussed and analyzed in the draft in the DEIS Appendix B, pages 59-61. Additional information and analyses on management requirements were also given in the Supplement to the DEIS, pages 17-34. In these analyses, alternative ways to achieve the requirements or objectives, and the opportunity costs in timber yields, were examined and displayed. Detailed information on management requirements is presented in Appendix F of the FEIS.

1300-14.3 No Change Alternative

One person noted that NFMA requires the development of a "no action" alternative, and that the Region, including the Ochoco National Forest, has chosen to include new scientific information and "management requirements" in the current direction alternative. The respondent felt that this does not allow the public an opportunity to make an unbiased comparison to determine the true resource trade-offs and resulting economic losses or gains.

Response:

The Forest prepared and displayed two "no action" alternatives in the draft--Alternative A and "Current Direction with NFMA." In the Supplement to the DEIS the Forest described still another "no action" alternative which was a continuation of management under existing plans, particularly the 1979 Timber Resource Plan. The latter alternative is not implementable, since it does not incorporate all legal requirements. The No Change Alternative has also been described in Chapter 2 of the FEIS.

@1300-15 National Grassland Management

1300-15.1 Grassland Plan

Many felt the Forest and Grassland should not be included in the same long-range plan. Some felt the Grassland should be separate as it is almost completely a forage producing area with very little timber.

Response:

The Forest Service recognizes the validity of the above comments. There are some good reasons to treat the Forest and Grassland separately.

Some of the laws and requirements for management of the National Grassland are different from those for the National Forest, and the resources on the Forest and Grassland are also different. The National Grassland and its management were overshadowed by the National Forest in the Draft. Specifics for the Grassland were difficult to separate from those of the Forest in the documents. Important resources and uses occurring on the Grassland were simply overlooked in the Draft. The Draft Plan recognized only eight management units or areas for the Grassland; the Final Plan now recognizes 15.

Two separate plans have been prepared in the Final, one for the Grassland and one for the Forest. The two plans and processes for their development are treated under a single Environmental Impact Statement and Record of Decision.

1300-15.2 Grassland Management

Many respondents felt that the Crooked River National Grasslands is a unique resource deserving of multiple use management. However, they felt the grassland is managed mostly for cattle grazing and should be managed to provide wildlife and all other resources.

Some felt that the Grassland has a long way to go before it returns to its natural balance. However, others felt that at present the Ochoco National Forest and Crooked River National Grassland is managing the grasslands reasonably well.

In addition, some commented that the livestock industry pays for the usage of the Grasslands, not only through grazing fees, but by water and land developments which help the entire multiple use program.

Response:

National grasslands are established under the provisions of the Bankhead-Jones Farm Act which requires management to maintain and improve soil and vegetation cover, and to demonstrate sound and practical principles of land conservation and multiple use (36 CFR 213.1). This law applies to the Grassland only, not the National Forest. Other laws affecting the management of public lands and resources also apply to the Grassland.

The National Grassland has a complex ownership pattern. Resources are frequently managed in cooperation with State and other Federal agencies. The Final Grassland Plan has 15 management areas, which reflect a diversity of uses, resources, and management prescriptions, in order to attain or maintain desired future conditions. The Plan deals with all resources, and truly reflects the multiple resource values and management occurring on the Grassland.

@1300-16 Analysis (FORPLAN)

1300-16.1 FORPLAN

One comment questioned the analysis used in the planning process. This respondent stated that the information needed by the public to evaluate the validity of the FORPLAN calculations was not provided in the DEIS and suggested that the FEIS provide a more understandable explanation of how linear programming was used to influence planning decisions.

The respondent asked that the EIS identify the objective constraint values used and the validation for their use. He pointed out that only a few modeling constraints were quantified or objectively defined in the DEIS.

He also suggested that the EIS contain a "benchmark" which drives the linear programming model to minimize "unavoidable adverse impacts."

This respondent also addressed the size and efficiency of analysis units. The question of whether a 3-acre analysis unit could be efficiently managed, or managed at full intensity, was raised.

Finally, the respondent suggested that the way in which the weaknesses of the computer models were overcome should be explained in the EIS.

Response:

There is no legal requirement to develop detailed documentation of FORPLAN models so that the public could review and interpret all outputs, calculations and options used. Documentation of this nature presently exists in the FORPLAN Users Guide and Mathematical Programmer's Guide, which are available for review in the Ochoco National Forest Supervisor's Office. Probably the best means of communicating information of this sort to inter-

ested publics would be through small group meetings rather than through additional technical documentation.

The usefulness and appropriateness of FORPLAN and other linear programs is well documented. Excellent reviews of FORPLAN can be found in "Proceedings of the Workshop on Lessons from Using FORPLAN," and "The Genesis of FORPLAN." Dennis Teeguarden, in his paper, "FORPLAN: An Evaluation of a Forest Planning Tool," stated:

> A simulation or optimizing model such as FORPLAN, creatively used by knowledgeable persons, provides a powerful tool for Forest planning. However, the nature of the planning problem makes it unlikely that any single model will ever satisfy all the requirements It is probably best to think of the planner/decision-maker as operating in an environment of several different models or processes. Some, such as FORPLAN or input-output models such as IMPLAN, will be quantitative and objective in nature, while others are qualitative and subjective.

Thus, it is useful, if not essential, to have a computer system that can provide a framework within which to address the analytical requirements of both NFMA and NEPA. There are limitations and weaknesses associated with all models, and no model is a perfect representation of reality. As a result, they must be used and interpreted with care. The bottom line is that any model is just a tool. The decision makers must use various tools and professional judgement in managing the Forest.

There is no requirement to display the value of the constraints used in the FORPLAN model. Only the purpose and effect of a constraint must be discussed. Constraint values are included in the FEIS when this helps in understanding the purpose or effect of the constraint.

Some constraints (for example, Legal Policy and Management Requirements #1 and #2) are internal to the FORPLAN model. These constraints were comprised of complex mathematical formulas and would be of value to only a few individuals. These types of constraints are documented in "FORPLAN Version 1: Mathematic Programmer's Guide," which is available for review in the Ochoco National Forest Supervisor's Office.

Benchmarks were used in the planning process to establish the maximum and minimum resource output levels. This range of output levels defined a "decision space" in which a range of alternatives addressing the ICOs was developed. Thus, it would be difficult to develop a benchmark which measured adverse impacts. Because the term "adverse impact" is somewhat subjective, the decision as to which alternative best meets this criterion would be based on individual preferences.

The basic units used in FORPLAN are referred to as analysis areas. They represent aggregations of many individual non-contiguous mapping units with identical delineators. The mapping units which make up an analysis area are considered homogeneous in terms of costs and yields (See Figure B-3-1 in the Appendix B of the FEIS). Without reference to these individual units, analysis areas, and therefore FORPLAN analyses, lose site specificity.

Appendix B describes the major Ochoco National Forest planning problems in relation to the inherent weaknesses of linear programming. A summary of the analyses undertaken to help remedy these shortcomings is included.

1300-16.2 Present Net Value

One comment expressed the concern that while Present Net Value (PNV) calculations seem to be major influences on FORPLAN outputs, they are not responsive to the ICO's. This respondent requested that the relationship of FORPLAN PNV calculations to the national concern of economic efficiency be addressed in depth. The concern was also expressed that PNV does not address the national interest of ensuring that the Forest and Grassland is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced.

Response:

Economic efficiency is a major planning criteria addressed in NFMA and its implementation regulations. The major use of PNV is not the control of FORPLAN outputs, nor is it directly related to ICO's. PNV is used 1) to ensure that scheduled activities and practices are cost effective, 2) to select the most efficient activities and practices to achieve a set of goals and objectives, and 3) as one of the decision criteria in deciding which alternative best maximizes Net Public Benefits.

Thus, PNV does not directly relate to the quality of the physical environment. Instead, Standards and Guidelines are used to protect and enhance the environment Only if a practice was built into or left out of an alternative due to high costs or the cumulative effects of selection of cost-effective practices would PNV indirectly interfere with maintaining or enhancing the environment.

1300-16.3 Tradeoff Analysis

One comment addressed the use of tradeoffs in FORPLAN analysis. The respondent interpreted tradeoff as meaning a positive or negative change in PNV and ASQ, and objected that increases in PNV or ASQ are actually benefits, not tradeoffs. He also pointed out that a number of tradeoffs, including big game numbers, RVDs, fish numbers, riparian habitat, water quality, and soil retention, were not evaluated.

Response:

Appendix B does consider tradeoffs involving criteria besides PNV and timber outputs. Increases in PNV and ASQ are benefits, not tradeoffs. This has been clarified in the FEIS.

Appendix B analyzes the effects of major resource objectives on PNV and ASQ. It is correct that the effect of raising or lowering PNV or timber volume on other resources is not displayed in a similar fashion These effects are disclosed in Chapters 2 and 4 and in Section 8 of Appendix B of the FEIS.

1300-16.4 FORPLAN Analysis

One comment addressed the marginal effects on "willingness to pay." The respondent stated that the value of an output should be greater in alternatives that produce less of that output. For example, the respondent felt the value of semiprimitive, nonmotorized recreation visitor days (SPNM RVD's) should be higher in Alternative E than in Alternative C, because Alternative E produces fewer SPNM RVD's. Similarly, it was felt that the value of timber should be greater in Alternative E than in Alternative B.

Response:

The Ochoco National Forest and Crooked River National Grassland used a horizontal rather than a downward sloping demand curve in its analysis. In other words, regardless of whether the Forest offers one board foot or one million board feet of timber, or one SPNM RVD or one thousand SPNM RVD's, the value per unit of output will be the same. Economic principles do suggest that supply and demand for a given product will interact in the marketplace and influence price. However, the Ochoco National Forest is only one supplier. Therefore, the derived demand for any one product also depends on the supply of that product from other sources.

The assumption made for timber is that the demand for timber is great enough to consume any quantity that the Ochoco National Forest could offer. In addition, the Ochoco National Forest will have a minimal influence on current prices because of the mobility of logs and timber purchasers and the response of other owners to opportunities created.

The value of an output will not vary between alternatives when supply exceeds demand. This is the case with SPNM RVDs in Alternatives C and E for the first and second decades.

1300-16.5 Opportunity Costs

One comment addressed opportunity costs. The respondent pointed out that the DEIS did not explain how the opportunity costs were generated, nor did it address opportunity costs in terms of other

resource values lost for each incremental increase in PNV.

Response:

The explanation of how opportunity costs were generated has been included in Appendix B, Section 7 of the FEIS.

Appendix B displays all tradeoff comparisons and sensitivity analyses required by Regional and National direction. Opportunity cost analysis for resource values based on incremental changes was not performed.

It has been the intent of planning analysis to define resource output decision space and to identify the significant opportunity costs associated with various legal, policy and discretionary constraints imposed in the process of formulating benchmarks and alternatives. Because of the uncertainty of basic data such as production coefficients and future prices, a good deal of sensitivity analysis and trade-off analysis has been incorporated in the FEIS. The purpose of such analyses has been to provide information that can be used to explain the PNV differences between alternatives and to identify the implications of using uncertain information in decision making. Because of the time pressures involved in Plan completion schedules and the overwhelming volume of potential analysis that could be conducted, efforts have been focused on providing the public with relative opportunity cost information where major resource trade-offs occur.

PNV is dependent upon the interactions of all priced and non-priced resource outputs, not the other way around. In order for PNV to vary, one or more of the resource outputs must vary.

The Forest has examined and displayed the type of information which might address this concern in a more quantitative and objective manner. For example, Section 8 of Appendix B displays some of the key non-priced outputs along with PNV of the alternatives. It also displays the PNV and certain priced and non-priced outputs both as an absolute value and as a percent of the maximum.

@1300-17 Public Involvement

1300-17.1 Administrative Appeals System

One respondent stated that the environmentalists will be forced to use legal and other coercive methods to handle what should have been addressed in the planning process.

Response:

Within the newly revised Administrative Appeal procedures, (CFR 36 - 217 and CFR 36 - 251 February, 1989), opportunities for negotiating/mediating public concerns of line officer decisions is encouraged. In addition, the appeal procedures continue to provide a formal review of these line officer decisions. Individuals still not satisfied can seek relief through the judicial system.

1300-17.2 Administrative Appeals System

The Grant County Court expressed the feeling that anyone who has the opportunity to participate in this planning process, and does not, should not have the option of appealing and holding up the implementation of the Plan. To allow this, according to the Court, is essentially to say that the planning process is not sufficient, and negates the purpose of having a Plan in the first place.

Response:

The USDA Forest Service's Administrative Appeal procedure is a process open to all American citizens to ensure that they have an opportunity to formally contest line officer decisions. Under the revised appeal regulation (February 1989), the appeal of individuals who have not participated in the planning process or the discussion of pertinent issues will not be given the same merit in an administrative appeal as those who have participated in such processes

1300-17.3 Public Information

Some respondents recommended that the ONF start an educational program in the schools, similar to the Smokey Bear program, to teach children that the public domain is for everyone to enjoy and that all groups must work together to keep it beautiful, productive, clean and available for all.

One reviewer felt that the Forest needs to get more people involved in the management of the forest through stewardship programs, meetings, videos and environmental education news items.

Response:

The Ochoco National Forest has sponsored several environmental education activities involving school age children. The 1988 Crook County Fair included an educational program involving twelve different organizations and agencies, entitled "Safety Town," which was visited by over 400 children and their parents. The Forest also has coloring contests and Learning Tree instruction activities with school age children. The Forest's Smokey Bear fire prevention program and Woodsy Owl anti-vandalism campaign are highly visible and are effective means of teaching youth to respect and appreciate our public lands.

In addition, the ONF is very interested in seeking and establishing partnerships and public involvement in management activities. In February, 1989, the Forest met with representatives from more than 20 different special interest groups and concerned citizens to seek and establish better ways to incorporate public involvement in annual project planning The Crooked River National Grassland has been cooperatively involved with several private and governmental organizations in riparian enhancement and received national recognition in 1988 from the American Fisheries Society.

The Forest also has Adopt-A-Campground programs and on the Prineville District, a local equestrian group is contributing to the development of a horse camp. Through a cooperative effort with the Oregon Army National Guard, there are nine recreation-related projects that were be completed on the Big Summit Ranger District in mid-June 1989.

The push for cooperative funding and/or staffing of programs previously sponsored solely by governmental agencies alone is well understood by the National Forest and the Ochoco has been working very hard to promote cooperative partnerships.

1300-17.4 Public Involvement Methods

One person felt that an issue of this magnitude requires the Forest Service to actively pursue public comment by making contact not only with interest groups, but by making the entire process more visible to the people it will affect the most.

Some respondents felt that the Forest should listen to a broad spectrum of citizens, not just from those who are supporting special interest groups.

Response:

The Ochoco National Forest and Crooked River National Grassland have held over thirty meetings with the public, involving individual citizens as well as various interest groups. The Forest has a planning newsletter which was sent to about 2,600 people on the planning mailing list. (The mailing list is made up of those people who responded to the Draft Environmental Impact Statement or Draft Plan and also include those agencies and elected officials required under NEPA.) The ONF also disseminated a great deal of information with the help of the media. See the Introduction to this Appendix.

Additionally, the Forest encourages all interested individuals to participate in annual project planning activities and to get on the Forest Plan Report mailing list. The ONF does not promote any one group over another and everyone's opinion is given thorough consideration by Forest officials.

1300-17.5 Public Involvement

One individual believed that the process the ONF is undertaking will prove in the end to be one of the best processes that have been undertaken in regard

to the stewardship of the National Forest. The respondent believed this process will for the first time actively involve the local community to a large extent.

Response:

The ONF hopes that the land management planning process will prove to be a beneficial practice as it relates to resource management and involvement of all publics.

1300-17.6 Public Comment Period

The Office of Economic Analysis felt that each Forest should circulate its alternatives for comment prior to making computer runs. The agency feels that this will allow for a cost-effective method of examining a wider range of alternatives.

Response:

Prior to development of alternatives, the Forest identified issues, concerns, and opportunities (ICO's) as defined by the public through the public involvement process. The ICO's were an integral part of the creation of the wide range of alternatives offered in the Draft Environmental Impact Statement (DEIS).

The framework for each alternative was conceptualized by the Forest Management Team (FMT) and the Interdisciplinary Team (ID Team). The computer model was built to reflect the objectives that the FMT and ID Team have established for each alternative. Throughout the entire analysis process, there was ongoing refinement of the computer model, and hence of the various alternatives. Alternatives could have been circulated for public comment prior to computer analyses, but until the analyses had been completed, the forest did not know the outputs and environmental consequences in enough detail to fully define the alternative. As a result, the Forest chose to do a more detailed analysis prior to circulation of the alternatives for public comment. After formal public review of the draft forest plan in 1986, public comments have been used to a great extent in designing the final Preferred Alternative. See summary and chronology of the Public Involvement process in the Introduction to this Appendix.

1300-17.7 Public Involvement - Local vs. Other

Some respondents felt that the community closest to the Forest being considered in the plan should be taken into consideration before those who do not live in the community.

A few felt that most of the input should come from local groups that derive a living from Forest lands, and not from the special interest groups from large metro areas

One person felt that the Ochoco National Forest people are listening to the wrong people and don't seem to care about what happens to the local economy.

Response:

The Forest Service realizes the importance of the National Forest and Grassland to the local economy and does not take that relationship lightly. However, the National Forest and Grassland is a National forest or Grassland and managed according to legal mandates. The Forest must consider all public comment and give thorough consideration to each person and/or group regardless of proximity to the forest or whether the person(s) or organization responding are from an urban or rural area.

Appendix I

Response to Public Comment

Section 4

Comments from Elected Officials, Agencies and Indian Tribal Governments

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United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
500 N E MULTNOMAH STREET, SUITE 1692
PORTLAND, OREGON 97232

January 20, 1987

ER 86/1434

Dave Rittersbacher
Forest Supervisor
Ochoco National Forest
P.O. Box 490
Prineville, Oregon 97754

Dear Mr Rittersbacher:

The Department of Interior has reviewed the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (PLRMP) for the Ochoco National Forest and Crooked River National Grassland, Oregon The following comments are provided for use and consideration when preparing the final documents

GENERAL COMMENTS

Fish and Wildlife Resources

In consultation with state biologists and coupled with field inspections, the Fish and Wildlife Service (FWS) believes that excessive livestock grazing now occurs in various areas of the forest and grassland. This has resulted in unacceptable losses to fish and wildlife habitat, especially in the riparian areas. Eight of the eleven management alternatives, including the "preferred alternative" would increase even further the excessive amount of grazing (AUMs) which already occurs. FWS recommends that the existing AUMs be reduced and considerable effort be directed toward restoring degraded habitat Fencing riparian zones should be a priority in such habitat restoration.

The FWS has initiated a formal consultation regarding threatened and endangered species under Section 7 of the Endangered Species Act of 1973. A biological opinion is being prepared and will be forwarded to the Ochoco National Forest under separate cover.

Cultural Resources

Based on a cultural resource review conducted by the National Park Service Interagency Archeological Services (IAS), the PLRMP is extremely deficient in detail about how Ochoco National Forest intends to identify and plan for the protection of its cultural resources We note that the DEIS contains more of the type of information we would expect to find in the Plan. The Plan states that 1,700 sites have been identified in the Forest, the management of which should require substantial planning However, the Plan's treatment of cultural resources suggests that they may not be accorded the same level of management planning as other environmental resources.

The Forest's major goal is to identify cultural resources in advance of timber sales and other projects and to avoid or mitigate impacts to those determined to be significant. This approach is considered necessary for compliance with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). The content of the Plan implies that this will be the Forest's primary cultural resource activity for the next decade.

The DEIS, however, indicates that the Forest is currently exploring cultural resource planning beyond the project level. This type of planning has become increasingly useful, and we recommend that it be incorporated in the Plan as an equally important goal This is because of the growing management problems associated with project-by-project identification and avoidance of cultural resources. The placement of the Forest's resources in broader planning contexts will eventually allow more critical appraisals of resource significance and investigation/protection needs

NEPA, NHPA, and attendant regulations state that Federal agencies have an affirmative responsibility to protect and enhance all cultural resources within their jurisdiction. This responsibility can best be served through comprehensive planning at both Forest and State levels We encourage the use of overviews, predictive models, and sampling to identify cultural resource topics relevant to Ochoco National Forest and logical environmental areas that require survey beyond the project level The use of these methods coordinated with the State Historic Preservation Officer's (SHPO) statewide goals and priorities, will result in the contexts necessary for evaluating the Forest's cultural resources and planning their long-range treatment.

For each Management and Wilderness Area, the Plan should discuss affirmatively what will or will not be done to identify, evaluate, protect and interpret cultural resources For most of these areas, cultural resources are not mentioned. It should also explain the basis of the following statements made in reference to several of the areas· "Do not enhance or interpret cultural resources," "Avoid enhancing and interpreting cultural resources."

Wild and Scenic Rivers

No units of the National Park System will be adversely affected by the proposed action However, the National Park Service has certain responsibilities for Wild and Scenic Rivers and is the Custodian of the Nationwide Rivers Inventory, which was conducted under the authority of the Wild and Scenic Rivers Act.

The proposed plan states that segments of the Deschutes, North Fork Crooked, and mainstem Crooked Rivers which have been "inventoried suitable for classification as scenic or recreational rivers will be protected until Congress resolves their status." We suggest that you recommend, in the final EIS and Plan, designation of the rivers found suitable for inclusion in the Wild and Scenic River system Until such time as Congress acts on the recommendation, we concur with your proposal to establish special management provisions for these rivers to preserve their eligibility and suitability for designation

Mineral Resources

A mineral potential map is needed. It should be at the same scale as the alternative maps for direct comparison with the alternatives. The Okanogan National Forest

PLRMP/DEIS contains a good example. Illustrations and a more detailed discussion of mineral potential for each of the roadless areas in the appendices are needed

A discussion is needed in the DEIS of how minerals are affected by each of the alternatives The DEIS from the Wenatchee National Forest, Washington, provides a good example of point-counterpoint discussion of how minerals affect other resources and how decisions affecting other resources will, in turn, affect minerals.

A narrative section on minerals, containing history of development and mineral production, value of past production, projected mineral demand; and current operations in locatable, leaseable, and salable minerals is needed The Beaverhead National Forest PLRMP/DEIS has one of the best examples

A list of current mineral withdrawals, acres involved, and mineral potential for locatable and leaseable would be useful The best example is in the PLRMP/DEIS for the Los Padres National Forest, California.

The meaning of existing access for locatable minerals should be clarified. It should be noted that although an area may have many access restrictions because of a lack of roads, rough terrain, etc , a claimant does have the statutory right to develop reasonable and good access to claims if necessary. Recent court cases have demonstrated that excessive restrictions on access to mining claims may constitute unlawful taking of private property, the mining claim, without just compensation.

The documents acknowledge that the continuing emphasis on protection of other resource and amenity values can place increased restrictions on mineral exploration and development. However, it would be helpful to also point out the responsibilities of the Forest Service to accommodate mineral development on lands open to mineral development in order to comply with Federal mining laws

Water Resources

The statement should address the range of yields from the water wells and estimate the usage of ground water on the Forest. The current quality of ground water should be addressed The Plan indicates that at fee campgrounds drinking water quality is to be monitored. The statement and plan should also indicate monitoring plans for other ground-water sources of drinking water made available to visitors and staff on the Forest and Grassland. Effects of changes under the Plan, such as increased visitation, should be discussed in terms of potential impacts resulting from disposal of solid waste generated within the Forest

Hazards

This area has been repeatedly subjected to the effects of volcanism, both tephra falls and flows Landslides, both volcanically induced and otherwise, do occur in this region. These potential hazards should be evaluated.

Coordination with other Federal Agencies

While the plan and EIS reflect coordination in some programs, provision for additional coordination with the Bureau of Land Management (BLM) regarding utility corridors and

timber/firewood sales should be made.

It does not appear that the proposed land use plan addresses utility corridors as required by Sec. 503 of the Federal Land Policy and Management Act of 1976. Planned and existing corridors identified by the Western Regional Corridor Study (May 1980) are not addressed in the Plan, nor are maps provided. The Ochoco National Forest should coordinate utility corridors with the BLM since utility lines, etc., pass through both jurisdictions An update to the Corridor Study is expected to be issued by the Western Utility Group in early 1987.

Discussion in the Plan of firewood and timber sales coordinated between USFS and BLM would assist the public's understanding of land use interrelationships More effective combined sales could be accomplished and cumulative effects better analyzed for the public.

SPECIFIC COMMENTS

DEIS

Page 73, Vegetation The discussion of "sensitive" plants fails to use the categories for Federal listing. The Oregon Natural Heritage Data Base categories are not necessarily comparable. This section should reflect the Federal status in addition to that listed in the March 1985 Data Base:

Species 3-5	Allium madidum, A. plelanthm, A tolmei platyphyllum are "limited in abundance", thus are category 3 in the 1985 report
Species 10:	Calochortus longebarbauts peckii is Federal Candidate 2 (Federal Register September 27, 1985).
Species 11·	Collomia macrocalyx is Federal Candidate 2 (Federal Register September 27, 1985).

The BLM's Prineville District Office lists several other threatened and endangered T&E/sensitive plant species on public lands. We urge coordination with Burns and Prineville District Office botanists regarding inventory of species which may also be present on the adjacent Ochoco National Forest.

Reference is made to the possible need for monitoring category 4 plants. Monitoring T&E/sensitive plant species did not appear to be directly referenced in the plan.

Page 79, Cultural Resources The DEIS should explain the past, current, and planned treatment of "lithic scatter" sites, a class of resource that has been determined eligible for the National Register of Historic Places

Page 83, Minerals and Energy Resources. The Bureau of Mines has suggested a modification of Table III-17, using percentages rather than acreages. This may make it easier to envision the comparison and comprehend the effects each alternative may have on mineral resources. Sample tables have been provided to the Forest under separate cover.

Page 107-111, Riparian (Fisheries). Described mitigation measures tend to emphasize expensive, structural techniques. Consideration or inclusion of more preventive techniques such as no-cut buffers, careful and minimal road construction, location criteria for roads, etc., is suggested

Plans for management actions near streams should consider the effects on fisheries, water quality, etc., rather than stream class designations alone. In Eastern Oregon, Class III streams are often used by fish during part of the year for spawning This is especially true for anadromous fish (steelhead in particular) in the John Day watershed. Class IV streams can have an indirect affect on fisheries of streams to which they are tributaries.

Page 144, Cultural Resources· Assumptions and Interactions The PLRMP and the DEIS differ in regard to the Forest's proposed use of its identified sites. The DEIS states that the expansion of recreation facilities would see "a concomitant increase in cultural resource inventories" and "an increase in opportunities to enhance and interpret significant cultural resource sites for public education and enjoyment " In all but one instance, however, the Plan specifically excludes Management Areas from opportunities to enhance and interpret sites for the public benefit. This apparent conflict should be resolved.

Page 145, Cultural Resources, Transportation. This section should address the indirect negative impacts of improving access in areas, especially those previously far from roads These effects on cultural resources, in the form of artifact collecting, vandalism (looting) and inadvertent damage, are not limited strictly to recreational use of the forest. The Forest's plan to survey linear historic or ethnohistoric features in their entirety should prove increasingly useful for planning purposes as projects intersect them in the future

Page 152, Assumptions and Interactions The definition of withdrawals needs to be reviewed Staking of new claims and establishment of new leases may be prohibited depending upon the individual withdrawal. Development of leases and claims established prior to the date of withdrawal is not necessarily prohibited, depending on the type and specifics of the individual withdrawal.

Page 178, Irreversible or Irretrievable Commitment of Resources We agree with the statement that "continued avoidance of cultural resource sites ..tends to undermine efforts to acquire data which would expedite future site evaluations." However, we do not agree that data recovery should be the exclusive, or even primary method, to generate data for the management of the Forest's cultural resources. Whenever data recovery is conducted on sites, the opportunities for doing such work in the future, with improved technology, are precluded The evaluation phase prior to data recovery can be most efficiently and economically served by intensifying field efforts to properly identify the character of each site discovered during survey and by establishing Forest-wide, regional, and/or State-wide historic (or prehistoric) contexts for comparative purposes.

Proposed Land and Resource Management Plan (PLRMP)

Page 13, Vegetation Cross-referencing to the DEIS, page 73, discussion of sensitive plants would assist the reviewer.

Page 27, Desired Future Conditions of the Forest and Grassland. The Plan should make it clear that the development of new research questions and methods will, in most cases, not be a consequence of project level identification and avoidance activities. This will come largely through broad-based planning studies, non-project survey, and data recovery projects

Page 42, Research Natural Areas It would be helpful to include a description of the features of those RNAs proposed for designation. We also suggest that a discussion on management objectives, constraints, and other management-related information be included for each RNA. A reference to both Appendix E (Appendix Volume) and Appendix E-1 (PLRMP volume) would also assist the reviewer.

Silver Creek Research Natural Area is a name already used by BLM. We suggest communication with the Burns BLM District Office to see if RNA cell needs have already been met by BLM.

Page 43, Cultural Resources. The basic character of the Inventory Plan needs to be explained. This should be more than a schedule of surveys done in connection with timber sales, etc. The Inventory Plan represents an opportunity for the Forest to consult with the SHPO and implement field investigations and studies that are based on and/or will result in broader planning contexts. This approach is recommended so that the Forest can better understand the significance of its numerous cultural resources and be more selective about funding their protection and management

Page 44, Ecosystem Management. It is unclear whether threatened and endangered plant species are included in monitoring activities under item 12. Table V-2 apparently combines both plant and animal species, making it difficult for the reviewer to differentiate possible plans to monitor T&E/sensitive plants.

Page 44 and App. D-1&2, Item 7. This statement implies that the applicable Native American group will only be contacted if reinterment in-place is not possible. The issue would be more in line with Oregon State Law and the American Indian Religious Freedom Act if statement "b" followed "c" The Native Americans should be contacted in any case dealing with a prehistoric burial or cremation. Notification of the Oregon State Historic Preservation Officer and the Oregon Commission on Indian Services is appropriate action.

Page 49, Mining Claims. The sentence concerning approval of mining activities states "Approval will be given when the Forest's concerns are mitigated in a responsible and responsive manner." To clarify this section, the text could reflect that Federal law gives claimants the statutory right to develop their mining claims.

Explaining what the words "responsible" and "responsive" mean would also be helpful. These words, and phrases such as "as much as possible," found throughout the mineral discussions, lack clarity.

Page 56, Threatened, Endangered and Sensitive (Plant) Species

Items 1-2. It would seem that field examinations would be important especially where no sensitive species are shown by existing data, the absence of data may be due to an area never having been inventoried. Also, periodic reinventory may be necessary since new sensitive species are continuously being added to lists.

Item 7. Rare Plant Survey forms are available from the Oregon Natural Heritage Data Base. The Data Base is the "central file" for all threatened and endangered plant and animal species information in Oregon and would be a depository for this information. Also, information exchange with other Federal agencies in the Forest's ecological province would be valuable; e.g., BLM has an active T&E plant program in the Prineville and Burns District Offices.

Page 84. Minerals Locatable. While all reasonable and practicable measures will be

taken to prevent undue and unnecessary degradation of the wilderness values, the rights accorded holders of valid unpatented mining claims should be recognized in this discussion.

Appendix C-1, Page C-3. Under the paragraph heading "Culling of Excess Numbers within the Original Territories" the document indicates " ... mature horses will probably never develop into gentle saddle horses." We suggest this statement be revised as follows: "Any person interested in acquiring a mature wild horse should realize that some of these animals may never develop into a gentle saddle horse."

Appendix C-1, Page C-5. Public Law 92-195, as amended, (commonly called the Wild Free-Roaming Horse and Burro Act of 1971) permits the humane use of motor vehicles and aircraft by authorized officers, except that no motorized vehicle other than a helicopter can be used for pursuing and gathering.

Appendix J, Page J-1. This appendix contains a brief list of 13 sites representing "the more significant cultural resources on the Forest and Grassland." This document would be more useful if it summarized the various classes of prehistoric and historic resources recorded within the Forest; discussed which are considered important in relation to recent research; explained the evaluation process used when such resources are identified; listed how many of the 1,700 sites, structures or classes have been determined eligible for the National Register in consultation with the SHPO, and specified how significant sites are being and will be protected.

APPENDICES

Since several appendices duplicate sections of the PLRMP, comments made on the PLRMP are also relevant in the corresponding appendix.

MAPS

Management Area No. 11 is not detectable on the Alternative maps. While existing Forest recreation sites are shown (as part of the base map legend), proposed sites are not, thus the impact of management on future recreation sites cannot be visualized. Both existing and planned sites could be shown by use of symbols on the 1/2 inch = 1 mile maps. Figure IV-4 (page 64 in the PLRMP) does not show Management Area No. 11 either, probably due to the scale.

Thank you for the opportunity to comment on your Proposed Plan and Draft EIS

Sincerely,

Charles S. Polityka
Regional Environmental Officer

OW156

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D C 20240

In Reply Refer To:
ER-86/1434

Dave Rittersbacher, Forest Supervisor
U.S. Department of Agriculture
Forest Service
Ochoco National Forest, P.O. Box 490
Prineville, Oregon 97754

Dear Mr. Rittersbacher:

This is in regard to your transmittal of September 11, 1986, requesting the Department of the Interior's review and comments on the draft environmental statement and proposed land and resource management plan concerning the Ochoco National Forest and Crooked River National Grassland, Oregon

This is to inform you that the Department will have comments but will be unable to reply within the allotted time as we have just received your transmittal. Please consider this letter as a request for an extension of time in which to comment on the statement.

Our comments should be available about January 19, 1987.

Sincerely yours,

Bruce Blanchard, Director
Environmental Project Review

United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
EAST 360 3RD AVENUE
SPOKANE WASHINGTON 99202

December 18, 1986

Mr. David Rittersbacher
Forest Supervisor
Ochoco National Forest
P.O. Box 490
Prineville, Oregon 97754

Dear Mr. Rittersbacher:

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) AND PROPOSED LAND AND RESOURCE MANAGEMENT PLAN FOR THE OCHOCO NATIONAL FOREST AND CROOKED RIVER NATIONAL GRASSLAND, OREGON (1920 LMP)

The DEIS and Proposed Land and Resource Management Plan have been reviewed by this office and are found to have the following deficiencies:

1. The report needs a mineral potential map. It should be at the same scale as the alternative maps for direct comparison with the alternatives. The Okanogan National Forest in Washington is a good example.

2. It needs illustrations and a more detailed discussion of mineral potential for each of the roadless areas in the appendices.

3. It needs a discussion to go along with table IV-20 of how minerals are affected by each of the alternatives, and a section in the summary that compares how minerals fare by all of the alternatives.

4. It needs a point-counterpoint discussion of how minerals affect other resources and how decisions affecting other resources will, in turn, affect minerals. The best example to date is the DEIS from the Wenatchee National Forest, Washington.

5. It needs a narrative section on minerals, containing history of development and mineral production, value of past production, projected mineral demand; and current operations in locatable, leasable, and salable minerals. The Beaverhead National Forest is one of the best examples.

6. It also needs a list of current mineral withdrawals, acres involved, and mineral potential for locatable and leasable. The best example is the Los Padres National Forest, California.

We have reviewed most of the forest plans of the far western United States and have noted certain methods of presentation that are improvements over other forest plans. The following are offered as suggestions for improvement.

1. We suggest a modification of table III-17, as shown on enclosure 1, using percentages rather than acreages. We feel it is easier to envision the comparison and comprehend the effects each alternative may have on mineral resources.

   The potential classification consists of five parts, with a range from high potential to very low potential based on current knowledge. The availability classification consists of four categories, including withdrawn, specific legal protection measures, special management conditions, and standard operating conditions.

2. Expand your Evaluation Criteria for Nonenergy Minerals such as that from the Wallowa Whitman National Forest, Oregon (enclosure 2).

3. Provide a definition of access restriction categories such as that from the Beaverhead National Forest, Montana (enclosure 3).

Overall, the documents are quite good, with most minerals issues being treated well with respect to their abundance on the forest. We sincerely hope you incorporate our suggestions in your final EIS and modify the documents accordingly.

Sincerely,

D'Arcy P. Banister, Supervisor
Minerals Involvement Section
Branch of Engineering Studies

Enclosures (3)

	Non-energy Mineral Potential Category (MPC)[1]					Energy Mineral Potential Category (MPC)				
	I	II	III	IV	V	I	II	III	IV	V
Total acres of potential	579,789	425,032	1,142,700	0	0	216,257	376,288	1,382,040	173,036	0
Access Category[2]	Percent of total acres of each MPC affected					Percent of total acres of each MPC affected				
Alt. 1 A	12	16	17	0	0	0	0	16	58	0
Alt. 1 B	27	2	4	0	0	1	4	12	7	0
Alt. 1 C	8	2	4	0	0	0	0	8	1	0
Alt. 1 D	53	80	75	0	0	99	95	6	34	0
Alt. 2 A	0	0	16	0	0	0	0	6	58	0
Alt. 2 B	16	2	3	0	0	2	5	8	1	0
Alt. 2 C	29	45	42	0	0	54	58	34	17	0
Alt. 2 D	55	52	40	0	0	45	36	52	23	0

[1]See enclosure 2 from DEIS, Wallowa-Whitman National Forest, Oregon.
[2]See enclosure 3 from DEIS, Beaverhead National Forest, Montana.

Enclosure 1

1-4-6

Table J-3 *
EVALUATION CRITERIA FOR BONEHEART MINERALS

CATEGORY	I	II	III	IV	V
1. Potential for Substantial Development/ Production Within Ten Years	High	Moderately high	Moderate *	Low	Very low based on current knowledge.
2 Current Activity Level	Production or development is progress or pending investment decision	Comprehensive exploration, development likely. May include some small scale production.	Exploration programs which may include sampling, geochemical and geophysical surveys, geologic mapping, reconnaissance drilling. May include some hobby-size producers.	Sporadic exploration with occasional isolated intense programs by companies or prospectors.	Occasional interest by prospectors
3 Land Position	Long-term maintenance of claims by established mineral companies/ individuals.	Long-term.	Intermittent by established mineral companies/individuals, long-term by prospectors.	Short-term by established companies/ individuals Intermittent by prospectors.	Sporadic
4 Geology	Known and favorable for development of significant ore deposits.	Known and considered favorable from comparison with other producing districts.	Not well known, but appears to have favorable characteristics.	Not well known, some favorable characteristics.	Either unknown or unfavorable
5 Reserve/Resource	Ore reserves established Will sustain significant production	Presence of, or strong potential for, substantial resources. May include small reserves.	Potential for large resource is unknown. Small resources, possibly some very small pockets of reserves.	Some mineral occurrences, but not enough information to establish resources.	Unknown

* Includes all areas not in other categories

J-10

Wallowa Whitman NF
EIS Appendices

Enclosure 2

Access Restriction Categories
Beaverhead N F, Montana

02145

2

Category A — Withdrawn or proposed for withdrawal from mineral entry.

1. Wilderness areas.
2. Wild and scenic rivers
3. Sites for facilities
4. Historic and cultural sites
5. Developed recreation sites.

Category B — Statutes or executive orders require specific protection or mitigation measures.

1. Proposed wilderness areas.
2. Congressionally mandated wilderness study areas.
3. RARE II Further Planning areas.
4. T & E Species.
5. Roadless (Type I) dispersed recreation areas.
6. Culturally significant areas.

Category C — Special conditions exist on lands which require special lease stipulations or plan of operation conditions.

1. Big game winter range.
2. Elk calving area.
3. Riparian area.

Category D — Standard lease stipulations and plan of operation conditions apply.

1. Timber production areas.
2. Existing mineral processing areas.

Enclosure 3

Department of Energy
Bonneville Power Administration
P O Box 3621
Portland, Oregon 97208

DEC 2 9 1986

In reply refer to: SJ

Mr. Dave Rittersbacher
Forest Supervisor
Ochoco National Forest
P.O. Box 490
Prineville, OR 97754

Dear Mr. Rittersbacher

Bonneville Power Administration (BPA) has reviewed the Proposed Land and Resource Management Plan and Draft Environmental Impact Statement (EIS) for the Ochoco National Forest and Crooked River National Grassland. We offer the following comments for your consideration.

1. Of particular importance to BPA is the designation of both existing and planned transportation and utility corridors. We could find no corridors on the EIS and Plan maps listed as "designated," nor was there any mention of corridor designation in the text. Designation of corridors should help avoid a proliferation of rights-of-way and should facilitate the timely and orderly development of future utility projects. Therefore, we request that you add this information to both documents.

2. To assist you in identifying corridors, we have enclosed a marked-up Proposed Alternative (Alternative E) Map illustrating existing BPA transmission grid lines as well as Central Electric Coop and Pacific Power & Light Co. (PP&L) lines. These lines should be shown on the other alternative maps also. Most of these transmission lines were not shown on the Land Adjustment Map in Appendix B1. BPA has no new projects in its current 10-Year Plan that would affect your Management Plan. You might want to contact utilities in your area for information on their plans or concerns.

3. It is difficult to identify in the Plan and EIS which management areas are considered "avoidance" or "exclusion" areas for energy transmission corridors. It would be desirable to have this information summarized in one section of the documents

4. We recommend that the Plan and EIS address renewable energy resources such as wind, hydroelectric, geothermal, small hydroelectric, or biomass. You could identify the type and amount of potential resources and the conflicts that may be associated with resource development. BPA has information available on Northwest energy resources, which we could provide to you.

5. The proposed alternative does not appear to have any adverse impacts on existing or planned transmission projects, therefore, we find it satisfactory from the corridor planning standpoint.

If you should have any questions on these comments or need more detailed information on planned and existing transmission corridors, please contact John Hooson, of the Division of Land Resources, Office of Engineering and Construction, at 230-3299 (FTS 429-3299).

Thank you for the opportunity to participate in the scoping process.

Sincerely,

Anthony R. Morrell
Environmental Manager

Enclosure
Proposed Alternatives Map

02152

U S ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE WASHINGTON 98101

DEC 2 9 1986

REPLY TO ATTN OF M/S 443

Mr. Dave Rittersbacher
Forest Supervisor
Ochoco National Forest
P.O. Box 490
Prineville, Oregon 97754

Dear Mr. Rittersbacher:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act, we have reviewed the Draft Environmental Impact Statement and Proposed Land and Resource Management Plan (DEIS and Plan) for the Ochoco National Forest (ONF) and the Crooked River National Grassland (CRNG). The ONF and CRNG are located in central Oregon and include 955,100 acres. The preferred alternative upon which the Plan is based provides for intensive timber management and grazing for parts of the forest. Big game habitat as well as developed and dispersed recreation would be emphasized. Geothermal, oil, and gas leasing would be permitted.

Based on our review, we have rated the DEIS EC-2 (Environmental Concerns-Insufficient Information). The basis for our rating is summarized below with details included in the enclosed review report. Our report is divided into three sections providing general and then specific comments on each document. Also enclosed is an explanation of our rating system for draft EISs.

Our primary concern is that the Plan be consistent with Oregon's adopted Statewide Water Quality Management Plan for Forest Practices required by the Clean Water Act. The Plan and DEIS should reference Oregon's Forest Practices Act and Rules and indicate how they will be complied with in the Plan. This is necessary to ensure that appropriate coordination occurs between the ONF and CRNG and Oregon's Departments of Environmental Quality and Forestry and that beneficial uses are protected.

In particular, standards and guidelines for Fisheries and Water need to be more fully discussed/developed in the Final EIS/Plan. These issues are presently discussed as a subset of the discussion on Riparian areas. In addition, standards and guidelines for Air need to be more fully discussed/developed with regard to how the Oregon State Implementation Plan would be met.

The details of our comments are included in the enclosed review report. Several of the items identified in this review were discussed in the meeting we had with your staff in Seattle on November 13, 1986, and in subsequent telephone conversations. This interaction has been useful for us in becoming familiar with issues on the ONF and CRNG.

The intent of our comments is to be constructive. We are confident that by addressing our concerns and comments the ONF can present a Final EIS and Plan which clearly shows that important resources will be adequately protected while providing ONF personnel with the necessary flexibility to manage day to day activities on the ground.

Thank you for the opportunity to review this DEIS and Plan. If you have any questions about our review, please contact Ann Uhrich of our EIS and Energy Review Section at (FTS) 399-8512.

Sincerely,

Robert S. Burd
Director, Water Division

Enclosure

cc Office of the Governor, State of Oregon
USFS, R-6
USFS, R-1, 4
Oregon DEQ
USFWS
NMFS
BLM
Oregon Forestry Dept.
ODFW
CRITFC
TWS
SC
IEPLC (Osborn)
Braun

U.S. ENVIRONMENTAL PROTECTION AGENCY REVIEW REPORT ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED LAND AND RESOURCE MANAGEMENT PLAN FOR THE OCHOCO NATIONAL FOREST AND CROOKED RIVER NATIONAL GRASSLAND, OREGON

GENERAL COMMENTS

Process Description

The primary output of the National Forest planning process is the Land and Resources Management Plan (the Plan), and the heart of the Plan is the forestwide standards and guidelines and the more localized management area prescriptions These, in addition to the existing minimum management requirements (MMRs), set the backdrop against which goods and services are produced on the Forest and Grassland

A ready knowledge of these three things at the outset (standards and guidelines, prescriptions, and MMRs) would greatly facilitate the readers' understanding of the Plan Hence, a summary of how they are similar and/or how they vary would be helpful This might be appropriately put in the Plan in Chapter 1 under "Purpose," or in the Draft Environmental Impact Statement (DEIS) in Chapter 1 under "Planning Process"

The DEIS and the Plan rely heavily on subsequent environmental analyses and data collection for pinpointing specific impacts from forest activities In order that we can be assured that the environmental effects of the selected alternative are acceptable, we need to have a complete picture of the forest management process There are a number of elements within the forest management process that we believe are very important in minimizing adverse environmental impacts, particularly water quality effects They include

1 A data base of existing conditions from which technical experts and the public can judge expected effects and levels of uncertainty of the predictions

2 Best Management Practices (BMPs) and management area prescription development

3 Selection of BMPs for a particular activity [Environmental Assessment (EA) preparation] and how uncertainty is factored into selection

4 Thorough on-site inspection and administration, verifying that a particular activity is occurring consistent with BMPs and as prescribed in contracts, leases, or permits

5 Monitoring after the completion of an activity to determine whether predicted impacts were exceeded

6 Repairing damage caused by adverse effects that exceeded predictions

7 Upgrading BMPs or prescriptions to correct inaccurate predictions

The DEIS and Plan did a good job of describing the available data base and best management practices (BMPs) In general, the monitoring and evaluation program plan appears to be adequate for the various actions and effects to be monitored, though it would be improved by expanded discussion in the text (versus the condensed format of Table V-2) Selection of BMPs, on-site inspection, repairing damage, and upgrading BMPs have weaker commitments and are not clearly described

The most important component that is missing is a good description of how these elements are related and dependent on each other It would also be well to stress the iterative nature of the forest management planning process, in that information from the on-site inspections and monitoring can flow up to the management level to be used not only to modify management practice, but also to assist in the development of the forest's multi-year budget proposals, in an attempt to help circumvent implementation problems due solely to inadequate funding as opposed to technical difficulties

Water Quality and Monitoring

The DEIS notes that increased grazing (p 131) and exceeded threshold levels on individual watersheds (p 133) could each have negative impacts to water quality under the preferred alternative, but that these impacts "should be offset by the fairly high level of mitigation proposed " The DEIS then very aptly makes the statement that "this points to the need to develop and administer an effective monitoring plan to assure that minimum management requirements are met and that an effective level of mitigation is undertaken" (p 133) With this in mind, we believe the discussion of water quality monitoring and evaluation in the Plan (p 106) should be expanded For example, when and how would projects be selected to receive monitoring and mitigation? Also, monitoring helps assure standards and guidelines are met, not just minimum management requirements

The adequacy of the monitoring plan to assess environmental impacts, and methods to ensure that the assessments are used in management decisions, are key factors in EPA's ability to evaluate the adequacy of Forest Plans and EISs The monitoring plan together with the standards and guidelines should serve to highlight how the Plan will be implemented The Final Plan should clearly outline how monitoring will be carried out such that mid-course corrections can be made in forest management This serves as a system of accountability, reduces anxiety for any uncertainties in predicting Plan impacts, and makes it clear to the public how the plan will be implemented As the uncertainty in being able to protect against water quality and fish habitat effects increases, a higher level of monitoring becomes necessary

Domestic and Irrigation Water Supplies

According to discussions with the ONF planning staff, only one instance of domestic use of surface water (actually, spring water) occurs on the National Forest To ensure that any current and future drinking water supplies are protected, information on the existing source should be included in the Final EIS, including location, size, source, and municipality or number of people served A statement as to the lack of any other public supply watersheds should also be made Also, any instances of waterborne disease occurrences should be summarized, as should any pertinent water quality monitoring information (e g , for turbidity and fecal coliform levels)

Other questions relative to the domestic source are as follows Is the existing source in a highly sensitive watershed? What management area activities are planned for that watershed? Sensitive areas may be defined by such factors as the physical features of the watershed, the number of water users in the watershed, the type of water treatment employed, the location of water intakes, and past history of water quality problems The DEIS nicely identifies watershed sensitivity (p 75), but does not relate this to the existing public source This should be done even if the agreement with the users is of a verbal nature There may also be effects on ground-water supplies across the ONF and DRNG The potential impact of the proposed Plan on drinking water aquifers should be addressed

Fisheries/Fish Habitat

Chapter III of the DEIS provides a very good overview of existing knowledge of the status of fish habitat and fish population on the ONF by drainage However, since riparian areas and fishery impacts are discussed together in Chapter IV, it would be helpful if one more column was added to Table III-13, to be called "present riparian condition " Appendix A-4 in the Plan identifies one of these drainages as being in "poor" condition (Bear Creek), but the condition of the other drainages in Table III-13 is not identified The condition of all the drainage should be included in the Final EIS

Chapter IV of the DEIS presents a good description of the impacts to riparian areas and to fish habitat resulting from the various alternatives (pp 107-111), but the heading for the section is simply "Riparian " It should either be "Riparian and Fish Habitat," or perhaps "Fish Habitat" should be discussed separately in its own section The latter would probably be most appropriate since fish habitat is not solely a function of riparian condition, but is also closely tied to water quality (and water quality is a function of timber management, grazing management, ORV use, sanitary facility management at recreational facilities, and mining management as well as riparian area condition)

We agree with emphasis being placed on undertaking fish habitat/riparian improvement projects It should also be emphasized that fish habitat improvement work, while important and potentially very successful, does not take the place of avoiding impacts to the greatest extent practicable from the beginning

It is unclear how land was allotted to management areas 13 and 14 (riparian areas) Since they are not mapped, they should be described in the text, at least in terms of the distance from each stream type, etc

We are pleased that the DEIS considered not only presently utilized fish habitat on the ONF, but also included potential fish habitat Of the 200 miles of streams that have potential for additional cold water fisheries, how many miles are part of the John Day or Deschutes River drainages (and therefore potential habitat for anadromous fish)? Also, if Bear Creek presently supports anadromous fish, would it not follow that the Crooked River drainage (which includes Bear Creek) is also of importance to anadromous fish (though admittedly perhaps not as great as the other two major drainages)? Is there more potential habitat for anadromous fish in the Crooked River drainage?

Four of the streams listed in Table III-13 of the DEIS (Badger, Cottonwood, Black Canyon, and Wind Creek) are not listed in Appendix A-4 of the Plan, which lists streams with riparian areas to be maintained or enhanced for fish production Are they sub-drainages of streams listed in Appendix A-4 or were they inadvertently omitted?

We note that alternative C has the greatest potential for increasing habitat capability for rainbow trout and steelhead (p 108) The preferred alternative, E-Departure, would also increase capability, but not nearly as much as alternative C While it is realized that alternative C primarily attains its level of habitat capability goals by reduction in harvest level and livestock grazing (DEIS, p 135), other differences between the two alternatives appear to mainly relate to the number of improvement projects, which can be summarized as follows

	Alternative	
Project	E-Departure	C
Fencing	300 ac	500 ac
Beaver Transplants	50	100
Rock Structures	50	100
Woody Material	300	500
Log Weirs	300	500
	1,000 ac	1,700 ac

Since K-V funds increase as timber harvesting increases, we would anticipate that more funds would be available under the preferred alternative for habitat improvement than under alternative C It is therefore surprising that the amount of improvement work proposed under E-Departure is substantially less than for alternative C

Grazing

The ONF and CRNG provide a significant amount of livestock grazing in the Pacific Northwest Region It is not surprising, then, that certain range management problems exist Several specific allotments are identified where obligated AUM's exceed the estimated carrying capacity (Plan, Appendix F) and impacts due to overgrazing, particularly in riparian areas, are discussed in the DEIS (e g , p 107, 123, 130) Though damage to soil, vegetation, and water quality is mentioned as occurring, specific problem areas are not identified Of the drainages listed in Appendix A-4 of the Plan, it can be inferred that most of those are degraded because of grazing related rather than timber related impacts Adverse impacts related to grazing would therefore seem to be rather widespread

The Final EIS should identify the areas where grazing related water quality or other riparian area problems exist A table which combines the data presented in Appendix A-4 with those of Table III-13 (DEIS, p 78) would then nicely suffice as a summary of how the anadromous fish habitat would be maintained or improved

In general, domestic water supply watersheds and anadromous fish habitat should be managed for particularly high levels of protection Where it is determined that impacts to these beneficial uses have occurred or would be unavoidable, serious consideration should be given to defining grazing as an incompatible use and livestock should be excluded The ONF is to be commended for recognition and incorporation of this fact via plans for fencing, as described under Riparian Enhancement (DEIS, p 150) The U S Bureau of Land Management (BLM) conducted a fencing study along Camp Creek (tributary to the Crooked River) which was highly successful (1) No doubt such a strategy could be successful on the ONF and CRNG as well

Riparian Area Management

The importance of riparian zones to water quality and fish and wildlife habitat quality greatly exceeds the actual area occupied by riparian vegetation Any evaluation of the cost effectiveness of timber harvesting or grazing in these areas should reflect this fact It is essential to carefully explain how activities such as timber harvesting and livestock grazing can be made compatible with other riparian area resource values (e g , protecting and enhancing water quality and fish habitat potential), keeping in mind that it may not be possible to replace these other resource values elsewhere on the Forest

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(1) Winegar, Harold "Camp Creek Channel Fencing Plant, Wildlife, Soil and Water Response " In Rangeman's Journal Feb , 1977, and Winegar, Harold Streamflow Augmentation Through Riparian Recovery (Unpublished 1982)

It was gratifying to see Riparian Area management standards separately presented in the Plan It is also commendable that those drainages listed as sensitive are the same ones to be maintained or improved to "excellent" riparian condition However, the implication that fair to excellent riparian conditions will automatically result in good smolt habitat and/or streams meeting state water quality criteria (DEIS, p 93, App A, p 30) are assumptions that will need to be confirmed via the planned monitoring program Hence, we believe the discussion of riparian monitoring and evaluation in the Plan (pp 105-106) should be expanded For example when and how would drainages be selected to receive monitoring?

It is apparent that several drainages need to be improved such that they could even meet MMRs Will this effort be undertaken first, and then implementation of prescriptions 13 and 14? If so, this should be stated in the Plan Also, as proposed, timber harvest and grazing would be allowable in essentially all riparian areas as long as Standards and Guidelines (and prescriptions 13 and 14) were met We would submit that this, again, points to the need for monitoring and mitigation programs that are built into the budget process for the forest For example, the Plan states that additional water developments would be constructed "where analysis shows these developments to be cost efficient" (p 67) Since additional water developments may very well be critical to the success of riparian prescriptions (p 94), we propose that serious consideration should be given to funding such developments from this standpoint

Mining

It is well to state in the standards and guidelines that management or operating plans will be developed for each area where a mineral source is to be developed, and list the items to be covered in such plans (Plan, p 49) However, for locatable minerals we believe the Plan should include water quality monitoring requirements for sites with the potential to affect water quality and beneficial uses Water quality monitoring data may be needed to ensure compliance with the minerals management plan

The ground-disturbing potential of energy development or mining activities is discussed under cultural resources (DEIS, p 145), but not under mineral exploration (DEIS, pp 152-154) This potential and subsequent potential environmental impacts on water quality, as well as cultural resources, should be discussed under mineral exploration, not simply how other activities could impede such exploration

Air Quality

Approximately 13,100 cords of firewood are projected to be taken for personal use from the ONF each year over the first decade There has been a 2330% increase in firewood permits issued by the Forest and Grassland from 1971 to 1981 The DEIS correctly identifies indirect effects on winter air quality in local urban communities via the firewood provided by the ONF and CRNG However, it is not stated that there are potential health effects

Forest land managers that provide firewood have a unique opportunity to educate the public regarding fuelwood use and air pollution through the permit process Pamphlets discussing the association between wood stoves, air pollution, and health concerns, or providing tips on efficient wood stove operation, for example, could be distributed with fuelwood permits If appropriate literature is not readily available, we would be happy to provide examples that are being used elsewhere

The Plan should provide more guidance on minimizing air quality impacts from slash burnings (p 43) How does the ONF propose to meet the Oregon SIP (e g , regulating timing and amount of slash burning, etc)? The Plan should describe the measures to be used to assure that peak air quality impact episodes will be kept to a minimum, as well as those to be used to assure that average annual emissions do not exceed standards

Cumulative Impacts

We have discussed the use of "area analyses" with other national forests and generally support their use It appears that much of the detailed analysis we believe to be necessary, but which the Forest Plan does not provide and can be missed by individual project evaluations, could be performed at this level of study Area analyses would be the most appropriate vehicles for evaluating the cumulative effects of many similar activities, and the combined effects of different types of activities, occurring in a fairly large area and over a period of time

Because detailed and specific analysis of cumulative impacts is extremely important, the Final Plan should discuss in some detail the process for assessing these effects For example, for how large an area (2nd order drainages?) would such analyses be performed? What period of time between projects would be considered? Would all activities producing sediment in the area be included (e g , timber harvest, plus roads, mines, grazing, etc)? How will multiple ownership drainages fit into these analyses? Will documents be prepared and available for public review and comment?

We believe that an area analysis would be appropriate for all watersheds in which development is planned near important aquatic resources We further believe that such analyses should generally receive public review as Draft EAs or EISs, depending upon the source conflict potential of the projects

SPECIFIC COMMENTS ON DEIS

XVIII Table S-4 Management Area numbers were omitted from column one

XXI A short description of how these directives were incorporated would be helpful (e g , are they part of MMRs or standards and guidelines?)

XXIII Are there any ongoing activities on the ONF or CRNG which involve toxic and hazardous materials? If so or if not, this should be mentioned

XXV As "short-term" and "long-term" are defined in the glossary, increases in road densities could create impacts in a period of time much shorter that "short-term "

1 Since the Plan covers essentially the next 15 years, we would suggest that this be the time period for "long-term effects" and that a shorter period, say 5 years, be the time period for "short-term effects," in the glossary (p 203 & 210) There are many environmental effects, water quality among them, for which 15 years would be considered long-term

8 Which streams have fallen below state water quality standards? For which stream segments, and for what parameters?

29 The riparian acreage in alternative D totals 19,400 acres Is this correct? We understood 19,000 acres to be the maximum total

35 The riparian area in alternative E totals 20,500 acres Is this correct?

68 Can we assume that stream condition categories "fair" through "excellent" meet state water quality standards, but that "poor" does not?

74 It is our understanding that there are 24 major watersheds on the ONF and CRNG, 22 on the forest and 2 on the grassland Is this correct?

75 Two watersheds are apparently missing from Table III-11 Also, since there are about 800 miles of streamside areas (p 68), essentially all of the streams would appear to be potentially suitable for trout Is this correct?

78 Cottonwood, Black Canyon, and Wind Creek drainages are not mapped on p 74 Are they part of larger drainages? If so, which ones?

82 Of the 800 mining claims currently located on the forest, how many are placer mines? Drift claims?

87-88 The text mentions six roadless areas, but the figure (p 88) shows eight Which is correct?

89 In Table III-25, line IV appears to be in error Should it not be as follows 575,375 - [(31,072) + (23,551-12,425)] - 533,177

94 Acreages for wilderness areas listed here do not agree with those on p 4 of the DEIS, nor with numbers presented in the Plan

95 Column 2, paragraph 3, last sentence This sentence seems to have lost part of its meaning

104 It is our understanding that, as of this writing, the state of Oregon has not completed revising its existing SIP for managing air quality The text implies there is currently no such plan

115 Where are the high clay soils located?

119 Cumulative effects The potential for erosion from other ownerships plus the NF should be discussed

130 If mining will be allowed on 80-90% of the NF, how can it be said that mining would have a "minor effect on the water resource"? Many "small" mining projects put together could have a larger cumulative effect, particularly if road building increased due to mining projects

131 Will grazing increase by 9% per year? Elsewhere 10 8% is cited for the first decade

133 We understood the NF to have 22 major watersheds, not 24, as stated here

177 Increased costs in grazing management are not really "environmental" effects

Glossary

195 Is "acceptable riparian condition" the equivalent of "fair" or "good" (p 68)?

201, 211 Guidelines (p 201) and standards (p 211) have two separate and distinct meanings here, as well they should However, we do not find these meanings carried over into the Plan, which gives no indication as to which requirements are the "mandatory" standards and which are the "non-mandatory" guidelines We believe that the Plan would be improved if it reflected these definitions

204 It would be helpful to add a sentence as to how MMRs differ from other standards described in the Plan

204 The definition of monitoring might be improved by adding a clause such as " and to use identified deviations as a trigger for revision of management practices and/or plan revision "

SPECIFIC COMMENTS ON THE PLAN

1 It is recognized that the annual budget will influence the level of projected outputs and plan implementation, however, certain categories of activities should not be excluded at the expense of others. In particular, mitigation measures and standards and guidelines designed to protect or enhance resources should not be "tabled" while other Plan goals are met

2 In prioritizing the development of forest level plans, we would encourage making the Allotment Management Plan one of the first (if not the first) to be prepared This is because it will have a direct bearing on riparian areas, water quality, and the protection of beneficial uses Also, it would seem that guidance for mineral extraction would be helpful to forest managers, perhaps in the form of a Mineral Extraction Management Plan

13 The acreages cited here for wilderness areas do not coincide with those cited in the DEIS on page 94 Which is correct?

5-13 Under Current Situation/Resources there is no discussion of soils This should be added

21 How will research needs be prioritized? How will they be funded? For example, given that state water quality standards are not now met by certain streams on the ONF and CRNG, we believe the riparian area research needs cited here to be of utmost importance What assurances are there that they will be carried out in a timely manner?

26 It is stated that livestock will have less impact on riparian areas and will be better distributed, due in large part to water developments However, in management prescription #1 (pg 67) it is stated that water developments would be constructed "where project level analysis shows these developments to be cost efficient " If not found to be cost efficient, do we assume that impact to riparian areas could continue? This is confusing

27 Is there a commitment to improving a certain number of acres per year in riparian areas? To realize the goal of 7,500 acres of improvement by the year 2000 will require timely implementation of enhancement projects and management strategies under prescriptions #13 and #14

Standards and Guidelines

48 The items listed under a minerals management plan are good, but the Forest Service role in monitoring and enforcement of the operating plan requirements should be described, particularly with regard to water quality Also, a general description of the process under which operating plans would be approved or disapproved in sensitive areas would help to strengthen this portion of the Plan

52 The riparian discussion should refer the reader to appendices A-1 and A-4

MANAGEMENT AREA PRESCRIPTIONS

93, 95 The total acreage of management areas #13 and #14, as given here, is 15,886 acres This does not coincide with the 19,000 acre figure given throughout the rest of the Plan and the DEIS for total riparian area Why? Also, it is stated that these prescriptions will apply to designated watersheds This implies that some watersheds would not be designated and would therefore lack specific protection under these prescriptions Would the remaining acres simply be covered by the other standards and guidelines? If not mapped, these areas should at least be described as to which drainages they occur in

94 How would ORV use be "discouraged?"

94, 97 "Water Management" practices should refer to the monitoring plan so as to describe how goals would be attained

MONITORING PLAN

102-108 This is a nice summary of such a plan, however, further detail should be provided, particularly on aspects of the plan which pertain to meeting federally or state mandated standards or regulations, such that reviewers can ascertain that correct parameters will be monitored at the correct time(s)

102-103 The reporting period for habitat condition monitoring of wildlife and anadromous fish would need to be more frequent than every 5 years if individual projects are to be revised before significant damage has occurred

105 A similar argument as the one above can be made for riparian areas

109 A portion of the title of Table V-3 seems to be missing

A-4 This table does not address future maintenance or improvement of the following anadromous fish drainages Badger, Cottonwood, Black Canyon, and Wind Creek Why not?

H-1 Is it the case that there are 22 major watersheds on the Forest and that 20 of these are forested? Are the other two watersheds in range?

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Portland Field Office
727 NE 24th Street
Portland OR 97232

January 16, 1987

Ref 1-7-87-F-2

Dave Rittersbacher Forest Supervisor
United States Department of Agriculture
Forest Service
Ochoco National Forest
P O Box 490
Prineville Oregon 97754

Dear Mr Rittersbacher

This is in reply to your agency's letter of October 2, 1986 which was received on October 8 1986, requesting formal consultation with the Fish and Wildlife Service (the Service) as described and required by Section 7(a) of the Endangered Species Act of 1973, 16 U S C 1531 et seq (the Act) This consultation addresses the possible effects of selecting Alternative E-Departure of the Draft Environmental Impact Statement (DEIS), Proposed Land and Resource Management Plan (Forest Plan), and Appendices The subsequent impacts of this proposal to the bald eagle (Haliaeetus leucocephalus), federally classified as threatened in Oregon and the peregrine falcon (Falco peregrinus anatum), federally classified as endangered within the State of Oregon, are discussed herein

Candidate species are not subject to the provisions of Section 7 of the Endangered Species Act Therefore, the determination of jeopardy or non-jeopardy to candidate species will not be addressed in this Biological Opinion However, candidate species will be discussed since they occur or may occur on Ochoco National Forest and Crooked River National Grasslands and may be affected by Forest actions

On January 16, 1987, we completed our endangered species review of the proposed project During the course of our review other individuals were contacted who had special knowledge or expertise concerning the proposed project, project area, or threatened and endangered species in the area These include

Bernie Carter, Ochoco National Forest, Prineville, Oregon
Dr Robert Anthony, Oregon State University Cooperative Wildlife Research Unit
Frank Isaacs, Oregon State University, Cooperative Wildlife Research it
Harlan Scott, Oregon Department of Fish and Wildlife, Prineville, Oregon
Mary Walters, Oregon Department of Fish and Wildlife Corvallis, Oregon
Rich Howard, U S Fish and Wildlife Service, Boise Idaho
Robert Parenti, U S Fish and Wildlife Service, Boise, Idaho

An extension was requested by the Service on December 17 1986 and acknowledged by Ochoco National Forest on December 29 1986 A biological assessment on bald eagle and peregrine falcon was received on October 21, 1986

BIOLOGICAL OPINION

It is our Biological Opinion that implementation of the proposed Alternative E-Departure of the Ochoco National Forest and Crooked River National Grasslands Forest Plan is not likely to jeopardize the continued existence of the bald eagle and peregrine falcon Further informal consultation will be needed and further formal consultation may be needed on project specific actions as the Forest implements the Plan

DESCRIPTION OF ACTIVITY

The proposed Forest Plan sets forth Forest-wide goals and objectives land use allocations, management area prescriptions standards and guidelines, and monitoring and evaluation requirements to establish direction for management of the Ochoco National Forest over the next 50 years The Forest Plan will be revised on a 10-year cycle The Forest Plan is based on the preferred Alternative E-Departure

Alternative E-Departure emphasizes a combination of timber production, roadless recreation, and big game habitat Timber is scheduled as a departure from nondeclining yield Timber harvests are scheduled so that first decade volumes remain close to current levels, and then decline over the next 10 to 50 years The departure is designed to maintain local jobs in the short term All resources are managed or maintained at some moderate level

Bald eagle

Management guidelines for the protection of bald eagle nest and roost trees occupied during the breeding season are outlined in the Forest Plan (page 62) and Appendix D (page D-26) These have been adopted from the Bald and Golden Eagle Protection Act

The Forest Plan (page 61) and the Biological Assessment indicate that the preservation of actual and potential bald eagle winter roost sites is a goal In addition, it is the expressed intent of Ochoco National Forest to utilize the findings and recommendations of the 1986-1987 bald eagle winter roost survey conducted by the Oregon Cooperative Wildlife Research Unit Preliminary recommendations include the development of site-specific management plans for each roost site with input from the Service through Section 7 consultation (Isaacs et al, 1986) No written management plans have been prepared for any roost as of yet However, management plans are on schedule for development in 1988-1989 (Carter, pers comm) Where roosts have been located, modifications to the timber harvest schedule have been made in consultation with the Service

Regarding recovery and Recovery Plans, a general statement has been included in the Forest Plan (page 62) and Appendix D (page D-25) that recovery plans take precedence over other management direction No other details regarding recovery plan implementation are provided in the Forest Plan

Peregrine falcon

No management provisions have been included in the Forest Plan specifically for the peregrine falcon Some general guidelines have been prescribed for the protection of raptor hawk and prairie falcon nesting habitat (Forest Plan, page 62-63, Appendix D, page D-26 and D-27)

Candidate species

Regarding federal candidate wildlife species, the Forest Plan (page 63) and Appendix D (page D-25) indicate that consultation with the Service will be initiated when conflicts between project activities occur, when habitat needs cannot be resolved, when uncertainty exists, when species management guides are developed or when other technical assistance is needed In addition, inventories of essential habitats are to be maintained

Regarding federal candidate plant species, the Forest Plan (page 56, item 1) and Appendix D (page D-18 item 1) indicate that project activities will be screened for known and suspected locations of sensitive (which include federal candidate) species When suitable habitats or reported locations are suspected to occur, a field reconnaissance is to be performed (item 3) Item 4 indicates that safeguards will be identified, and project personnel notified and held responsible for implementation of safeguards Item 6 indicates that if other high values or uses would be foregone if the proposed activity were modified or deferred, additional study and assessments may be needed before an appropriate course of action is determined with input from appropriate state and Federal agencies

SPECIES ACCOUNT

Bald Eagle

There are currently no known active bald eagle nesting territories within the Ochoco National Forest and Crooked River National Grassland Historical records indicate that a bald eagle breeding territory was once associated with Big Summitt Prairie

The draft Pacific States Bald Eagle Recovery Plan indicates that Big Summitt Prairie and Lake Billy Chinook may have the potential for supporting one and two bald eagle breeding territories respectively It is likely that potential bald eagle breeding territories in these areas would involve Ochoco National Forest and Crooked River National Grassland lands

A population of wintering bald eagles occurs along the upper Crooked River drainage in central Oregon As many as 115 bald eagles have been observed during peak periods In addition to roosts on private lands the bald eagles roost in forest lands adjacent to valley foraging areas along the Crooked River Roost trees tend to be the largest, dominant or co-dominant conifer trees in roost stands Coniferous roost trees are larger than the United States Department of Agriculture, Forest Service minimum old-growth specifications for ponderosa pine forest type (Isaacs et al, 1986)

The primary food source available to bald eagles in this area consists of dead cattle, road kill deer, dead calves and afterbirths, and ground squirrels (Carter, pers comm , Isaacs et al, 1986)

Inventories and surveys were conducted in 1983, 1984 and winter of 1985-1986 to locate winter roost areas The 1983 and 1984 inventory resulted in locating two roosts (Pine Springs Canyon, Miller Canyon) on the Snow Mountain Ranger district and one roost on Bureau of Land Management lands accessible through Forest Service roads

A 2-year survey which began in the winter of 1985-1986 was contracted out by Ochoco National Forest to the Oregon Cooperative Wildlife Research Unit to investigate and locate suspected winter roosts in the Pine Creek drainage, Shotgun Creek drainage, Wolf Creek drainage, Sugar Creek drainage around Big Summitt Prairie and McKay Creek Winter roosts are expected in these areas because they contain coniferous trees with suitable characteristics for roosting by bald eagles and/or sightings of eagles flying in the direction of these areas have been noted

Peregrine Falcon

No active nests have been observed on the Ochoco National Forest or Crooked River National Grassland No records of nesting or nest sites on Ochoco National Forest are known to exist Peregrine falcon sightings noted by or reported to the Forest Service and the Oregon Department of Fish and Wildlife occur at a frequency of one or two every winter

Potential habitats for breeding and overwintering by peregrine falcons have not been evaluated to any detail Cliffs, talus, and cave habitats are available on the Ochoco National Forest While such habitats may provide suitable habitat for peregrine falcons, these habitats are currently occupied by prairie falcons

The Recovery Plan for Peregrine Falcon (Pacific Population) indicates a need for two breeding pairs in the management unit which includes portions of Ochoco National Forest

Candidate Species

Federal candidate wildlife species which may occur on Ochoco National Forest and Crooked River National Grasslands include Swainson's hawk, Ferruginous hawk western sage grouse, western snowy plover, tricolor blackbird, spotted bat Townsend's big-eared bat, California wolverine, and California bighorn

Based upon available information, the following federal candidate plants may occur on Ochoco National Forest and Crooked River National Grasslands

Species	Occurrence	Status
Allium madium	D	3C
Allium pleianthum	S	3B
Artemisia ludoviciana	S	2
Astragalus diaphanus	S	2
Astragalus pegetarioides	S	2
Calochorus longebarbartus peckii	D	2
Collomia macrocalyx	D	2
Lupinus biddlei	S	2
Lupinus cusickii	S	2
Silene scaposa var scaposa	S	2

D - Documented S-Suspected

2 - Category 2 consists of taxa for which existing information indicates listing may be warranted, but for which substantial biological information to support a proposed rule is lacking

3B - Category 3B consists of taxa which are not being considered for listing on the basis of current taxonomic understanding These taxa could be reevaluated in the future on the basis of subsequent research

3C - Category 3C consists of taxa which are not being considered for listing on the basis of being more abundant or widespread than previously believed or lack of any identifiable threats These taxa could be *reevaluated in the future* should further research or changes in land use indicate a significant decline

It should be noted that candidate species have no protection under the Endangered Species Act, although additional protection for these species may be provided by internal policy

EFFECTS OF THE ACTION

Bald eagle

The plan (page 62) and Appendix (page D-26) itemizes prescriptions to protect bald and golden eagle nest, roost, and perch trees utilized during the breeding season While these prescriptions may be in conformance to the Bald and Golden Eagle Protection Act, they do not incorporate the best scientific data available on the protection and management of bald eagles, and thus may not adequately protect essential breeding habitat for bald eagles In Oregon breeding eagles may begin to occupy or establish a breeding territory as early as January 1 However, since there are no breeding eagles presently on Ochoco National Forest, no impact to breeding bald eagles are anticipated at this time from the proposed action

The biological assessment indicates that timber harvest activities and road construction could affect bald eagle winter roosting without implementation of management constraints However, there appears to have been considerable effort to identify winter roost sites While not all roosts have been identified to date, surveys are currently being conducted to identify remaining existing and potential winter roost areas in suspected areas on and adjacent to Ochoco National Forest and Crooked River National Grassland The biological assessment indicates that it is the intent of Ochoco National Forest to utilize the findings of the surveys and follow the management recommendations for preserving the integrity of actual and potential bald eagle winter roost sites The biological assessment further indicates that these management guides will be developed with input from Oregon Cooperative Wildlife Research Unit, U S Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and Oregon Natural Heritage Data Base

While the Forest Plan (page 62) and Appendix D (page D-25) indicate that recovery plans will take precedence over other management directions, no *specific actions* have been identified in these documents appropriate sections, or other supporting documents regarding the inventory and protection of potential or suitable bald eagle nesting habitat

Peregrine falcon

Based upon recorded sightings, the peregrine falcon appears to be a rare *migrant through Ochoco National* Forest lands at present time The likelihood that a peregrine falcon would be affected by a forest action at present time appears extremely remote

Wildlife management guidelines directed to protect breeding prairie falcons and their nesting habitat should provide some measure of protection for peregrine falcons in the event peregrines establish an eyrie within Ochoco *National Forest*

As recovery efforts for the peregrine falcon gain momentum in the Pacific Northwest, the importance and magnitude of monitoring should increase over the next 10 years The level and rate of increase is impossible to predict with available information

Candidate Species

Management guidelines have been outlined for various raptors which should provide some management for nesting habitat for candidate hawk species However, similar guidelines are lacking for other candidate species and non-breeding habitat requirements of raptors In addition, inventory and monitoring procedures are not clearly defined for any candidate wildlife species No implementation plan has been provided for various candidate wildlife species References to inventories are generally made with no clearly defined time or monetary budgets to indicate what minimum level of effort is expected to occur during implementation of the Forest Plan

It is unclear whether or not items 4 and 6 (see DESCRIPTION OF ACTIVITY, Candidate species) apply to candidate or only listed plant species Should items 4 and 6 apply only to federally listed threatened and endangered plant species and not candidates, then the action the forest will take on candidate plants or in determining the action to be taken on candidate plants has not been defined in the Forest Plan If these items extend to consideration of candidate species then the procedures would appear to be in place to avoid impacts wherever possible However, if a decision is made to proceed with an activity which may or will adversely affect a candidate species, the outlined procedures do not indicate that monitoring of the impact and/or a post-project evaluation of affect to the population will be documented Such information would provide a valuable basis for consideration of similar activities in the future

The sensitive plant species list provided in the DEIS (page 73) does not reflect accurate information regarding federal candidate plant species If this list is used as a basis for management decisions and as long as a procedure for the periodic updating of a candidate species list is not defined some avoidable forest actions may have an adverse affect on candidate plant species

CUMULATIVE EFFECTS

Cumulative effects are those impacts of future State and private actions which are reasonably certain to occur A non-federal action is 'reasonably certain" to occur if the action requires the approval of a State or local resource or land-use control agency, and such agencies have essentially approved the action In regard to the bald eagle and peregrine falcon, we know of no cumulative State or private actions that will occur in areas adjacent and within Ochoco National Forest at this time

INCIDENTAL TAKE

We anticipate the incidental take attributable to implementation of the Forest Plan preferred Alternative E-Departure to be zero (0)

CONSERVATION RECOMMENDATIONS

In the furtherance of the purpose of Section 2(c) and 7(a)(1) of the Act,

which mandate federal agencies to carry out programs for the conservation of listed species, we recommend that the following conservation measures be implemented to further conserve and avoid adverse impacts to bald eagles peregrine falcons and candidate species

General

1 Management Areas with known or suspected essential, critical, or potential habitat for listed species should be noted in Section V of the Forest Plan (pages 63-98) An alternative would be to designate a separate Management Area which provides for the management and protection of known and suspected essential, critical, and potential habitats of threatened and endangered species (and selected sensitive species) This alternative was used by the Deschutes National Forest

2 The Monitoring and Evaluation Program Plan of the Forest Plan (Table V-2, pages 102-109) should be expanded to provide greater detail by species and monitoring objective, i e , bald eagle productivity survey bald eagle winter roost inventory, bald eagle potential nesting habitat survey, peregrine falcon inventory, candidate species and habitat status determination habitat enhancement actions

3 Threatened, endangered, and candidate species should be added as an action and effect to be monitored under the following resource/activity categories Recreation, Timber, Range (Forest Plan, page 102-109)

4 Coordinate with the Oregon Natural Heritage Program the Oregon Department of Fish and Wildlife, and the Service to exchange information on the status and distribution of threatened, endangered, and candidate (or sensitive) species This should be added as an item to the section on Threatened, Endangered, and Sensitive Wildlife Species in the Forest Plan (page 62) and Appendix D (page D-25)

Bald eagle

1 Develop site specific habitat management plans for each individual bald eagle winter roost site and breeding territory in informal consultation with the Service An implementation plan for the development of these habitat management plans should also be documented in the Forest Plan or referenced in the Forest Plan if one already exists

2 Conduct an inventory of potential breeding habitat Tree stands with characteristics suitable for nesting bald eagles should be identified and protected If necessary, develop management prescriptions designed to preserve or enhance desirable nest tree characteristics in informal consultation with the Service An implementation plan for conducting this inventory should be developed

3 Prescriptions to protect bald eagle nest trees should be developed in consultation with the Service Regarding the section on Bald and Golden Eagles in the Forest Plan (page 62) and Appendix D (page D-26) the following changes should be made

Either

a Delete all references to bald eagle in this section, and

b Indicate that Section 7 *consultation with Service will* be initiated in the event bald eagles establish a breeding territory in or adjacent to Ochoco National Forest and/or Crooked River National Grassland lands

Or

a Change "March 1" to "January 1", and

b Indicate that additional management considerations may be necessary to protect bald eagle breeding and non-breeding habitats and that these will be determined in consultation with the Service

4 Maintain winter inventories of bald eagles which can be used to establish long-term winter population trends

Peregrine falcon

1 Maintain records of *sightings to establish long-term* trends

2 Conduct periodic inventories to determine status of the species on *forest lands*

3 Identify and preserve the integrity of potential nesting and non-breeding habitat

Candidate Species

1 Adverse impacts to candidate species should be avoided *wherever* possible and technical assistance sought from appropriate state and federal agencies and academic organizations or institutions when adverse impacts appear to be unavoidable *When adverse impacts to candidate species* are unavoidable, the effects should be monitored and documented

2 On page 56 of the *Forest Plan, the Section name is* mistitled and should read 'Plant" rather than "Wildlife"

3 *In the Forest* Plan, references to "jeopardize" on item 4, page 56 should be changed to "may adversely affect" to avoid confusion with the legal definition of the term "jeopardize

4 Coordination with the Oregon Natural Heritage Program should be added to the Forest Plan, page 56, item 7

5 An accurate candidate plant list should be provided in the *DEIS*, page 73 A statement which clearly defines the procedure and time frame to be used for the periodic updating of plant status information should also be included in the DEIS (page *73), the Forest Plan (page 56), and/or* Appendix D (page D-18)

This concludes formal consultation on this project If the proposal is significantly modified in a manner which would change the impacts on bald eagles and/or peregrine falcons as discussed in this Opinion if new information is learned about theses species that could change the conclusions of this Opinion, if a new species occurring in the area is listed or if there is incidental take of bald eagle *and/or peregrine falcon which exceeds* that specified in this Opinion, formal consultation should be reinitiated Your decision regarding the recommendations presented in this Opinion should be *sent* to this office

We appreciate the cooperation expressed by your staff members during this consultation

Sincerely,

Russell D Peterson
Field Supervisor

Enclosure

cc OES
RO-FWE (SE)
BFO-SE
OFO-SE

REFERENCES

Carter B 1986 and 1987 Personal communication Ochoco National Forest and Crooked River National Grassland Prineville Oregon

Isaacs, F 1987 Personal communication Oregon State University, Cooperative Wildlife Research Unit Corvallis, Oregon

Isaacs, F , T Bryan R Goggans & R Anthony 1986 Habits of Bald Eagles Wintering along the Crooked River, Crook County, Oregon, 1986 Oregon State University, Oregon Cooperative Wildlife Research Unit Corvallis, Oregon

VICTOR ATIYEH
GOVERNOR

Department of Fish and Wildlife

506 SW MILL STREET, P O BOX 59, PORTLAND, OREGON 97207

November 10, 1986

James E Brown
State Forester
Department of Forestry
2600 State Street
Salem, Oregon 97310

Dear Jim

The Oregon Department of Fish and Wildlife staff has reviewed the Ochoco National Forest Plan documents and has attached comments to this letter

The Ochoco National Forest is to be congratulated on their completion of the Draft EIS and Draft Forest Plan We recognize that this is a culmination of many years of work by a very dedicated staff Review of this plan, years in preparation by many people, in the very short time frame provided, by a small staff is at best an arduous task Hopefully we have not misunderstood the issues or information provided Our comments and recommendations are meant to be constructive and hopefully will lead to positive results

We find no alternative that we can support in total The land allocations for commodities (MA1) and big game (MA2 and 3) are at extremes in each alternative We feel that there is a need for an alternative with a better balance of integrated resource management There are issue responses scattered through the alternatives that would meet demand, as we see it, for fish and wildlife resources during the life of the plan Our comments are based on what we feel are wildlife resource needs and we hope our recommendations will be reflected in the selected alternative

It should be pointed out at the outset that we find any departure alternative objectionable because wildlife resources would be diminished by overall reduction of habitat for a short term economic gain Accelerated harvest will risk recreational opportunities associated with fish and wildlife

This response to the Forest Plan is based on our understanding of NFMA and key provisions of the policy of the State of Oregon which, by statute, in part declare

> " wildlife shall be managed to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of this state In furtherance of this policy, the goals of wildlife management are

1) To maintain all species of fish and wildlife at optimum levels and prevent the serious depletion of any indigenous species

2) To develop and manage the lands and waters of this state in a manner that will enhance the production and public enjoyment of wildlife "

It is to those ends we reiterate messages we have continued to send forest managers about habitat components that are at risk with or benefit from commodity extractions The State of Oregon needs

1) Its basic soil resources and productivity
2) Dependable supplies of clean water
3) A diverse and dynamic range and forest ecosystems, changing over time and in arrangement with multiple resource management, but never losing its inherent capacity to deliver all kinds of public benefits
4) Forage management for grazing animals that is intolerant of resource degradation
5) Management of riparian vegetation in a condition meeting 1979 interagency optimal guidelines
6) Forestwide management of motorized vehicle use

We feel we are espousing a realistic and reasonable position on the amounts and condition of needed habitats The forest has been supplied the Department's forest planning review criteria as an aid A wealth of research has been compiled that describes what is necessary to enhance wildlife and wildlife habitats Our response also addresses maintenance of non-diminishing hunting opportunities and enhancement of all wildlife related resources

In reviewing the plan we find that there are five issues that have not been satisfactorily addressed

1) Riparian conditions on the Forest are below standard The Plan did not follow definitions or inventory methods described in "Managing Riparian Ecosystems for Fish and Wildlife in Eastern Oregon And Eastern Washington, 1979 " The plan does not place acceptable emphasis or direction for riparian zone restoration

2) Information on livestock grazing is not sufficient for an EIS There is not enough data on management systems, condition and trend, actual use, or improvement programs to evaluate effects of the grazing program

3) Roading poses a problem for wildlife managers The Plan is deficient in resolving the impacts of roading on habitat effectiveness and hunting quality

4) Much big game winter range on the Forest was not acknowledged as such, important transition ranges were also omitted

5) Snag management proposals will not meet future requirements for snag dependent species

These five issues will be discussed in detail as we address our planning criteria, but it is important that these issues be pointed out at the onset

Sincerely,

Randy Fisher
Director

rrj
Attachments

L4-11

Oregon Department of Fish and Wildlife Comments on
Ochoco National Forest
Draft Environmental Impact Statement and Proposed Plan
November 7, 1986

This portion of the comments deal with how the Proposed Plan addresses the 12 issues identified by the Ochoco National Forest with respect to fish, wildlife and habitats

Additional comments are added to express the Oregon Department of Fish and Wildlife (ODFW) concerns and recommendations for Forestwide Standards and Guidelines, Management Area Standards and Guidelines, and the proposed Monitoring Plan Additional comments and questions on sections of the plan are listed under General Comments

Issue One Timber Production

The proposed plan states that the Forest has 495,006 acres of land suitable for timber production We recognize that most of this suitable timber land is allocated to intensive timber management (MA1) while lesser amounts are spread across MA2, 3, 5, 6, 7, and 10

The proposed plan allocates 547,072 acres to MA1 general forest which is approximately 52,000 acres more than the suitable timber base With this in mind and the fact that various amounts of the suitable timber base acreage are in other land allocation there appears to be room to better integrate the general forest allocation with other resource allocations

Seven of 11 alternatives allocated zero acres to either general forest or big game (an all or nothing situation) In alternatives E, E-Departure, and G the allocation of general forest is 7 to 8 times that of big game winter range Alternative "A" allocation to general forest is approximately 20 times that of big game winter range

Salvage Program To ensure that this program is not working in opposition to and at the expense of snag objectives, baseline snag levels need to be determined for the defined management area

As mentioned in the cover letter we do not support a departure alternative due to long-term impacts on wildlife, wildlife habitat and wildlife based recreation for short-term economic gains.

In reference to demand the Proposed Plan (p 14) states "The Forest does not have the capability to meet local demand for timber " While on Page 13 the Plan states "The average annual sale volume between 1975 and 1984 was 134 mmbf The average annual cut, 1975 to 1984 was 106 mmbf ." The average annual cut is a reflection of demand and as displayed in the figures above, the Forest was more than capable of meeting local demand We support the harvest level identified in "The Forest Program for Oregon, 1980 "

Issue Two Social and Economic

No Comment

Issue Three Livestock Grazing

We do not support an increase in the Forest grazing program We find it difficult to justify continuation of the current grazing program considering the Standards and Guidelines in the proposed plan The Plan states that 28 percent of the range resource is in poor condition and 42 percent is in fair condition It also states "Utilization of riparian forage by livestock ranges up to an estimated 80 percent in places "

The Forest has mentioned three items that would decrease grazing in some areas

1) Forestwide Standards and Guidelines for Ecosystem Management state " Encourage recoverage or prevent deterioration where activities may be leading to poor condition, downward trend "

2) MA2 (Big Game Winter Range) allocates all fall green-up to big game

3) The two riparian MA's place tighter controls on grazing use

In order to counter this decrease the Forest proposes to increase utilization in other areas We feel that before an increase in livestock AUM's is implemented the Forest needs to demonstrate that the above items can be met with the current grazing program The key to accomplishing the above does not rest solely with range improvements, the driving factor should be stronger administration of Forest Grazing Permits The Forest has the direction and authority to accomplish all three items but has not elected to do so

We have a concern for the utilization level (actual use) of other specific vegetation types of the Forest, (i e dry meadow, wet meadow, scabland) We can not address this concern without allotment use data The concern lies with maintaining cover for nongame wildlife species and suitable habitat for state and federally listed plants

The first priority for range improvement funds (either RBF or PM) should be restoration of degraded sites We urge the Forest to use the key area concept to determine stocking rates and season of use

Issue Four Riparian

The Affected Environment section on Riparian and Fisheries Habitat identifies the importance of riparian zones to wildlife and recreation use The write-up states "The three most important riparian area factors .. are stream temperatures, streambank stability and large woody debris " While these are important factors for fish resources, habitat diversity and wildlife values need to be emphasized also

Region 6 MMR Direction for wildlife states a need for Forests to select a *management indicator species* for riparian habitats, if a species is not selected for riparian habitats the reasons must be stated We recommend the Forest designate the ruffed grouse as a management indicator species for riparian areas This species is a good indicator of habitat conditions and its population on the Forest has decreased due to degradation of riparian habitat

The Forest has selected steelhead, rainbow trout, and brook trout as management indicator species We recommend resident trout be used as an indicator species The Department policy for wild fish is "The protection and enhancement of wild stocks will be given first and highest consideration " The Forest recognition of wild fish as an indicator species would provide support to Department policy

The proposed plan addresses the management of 19,000 acres of riparian zones on Class I and II steams Table IV-2 on Page 30 lists streamside Management Units for Class I and II streams as having 36,046 acres What *is the basis for the apparent* discrepancy between these figures? The Forest goal for riparian area is to "Maintain or restore the inherent values of riparian ecosystems " This goal needs to apply to all areas meeting the definition of riparian areas, including all or part of an estimated 824 miles of Class III stream

In 1978 the Regional Forester signed "Managing Riparian Ecosystems (Zones) For Fish and Wildlife In Eastern Oregon and Eastern Washington This document established standards for optimum habitat conditions and established an inventory procedure for evaluating riparian *habitats* We strongly urge the Forest to follow the above document in managing the riparian areas The Forest has not displayed the riparian areas or their conditions

Page 23 of the proposed plan states that "The following acres are enhanced with the construction of the following structural improvements, 3,000 acres of fencing, 300 acres improved by woody debris additions, 300 acres of log weir construction, 50 acres of rock structures, and 50 acres of habitat from shrub plantings " The Riparian Improvement Schedule on Page A-4 states "Rehabilitation activities will include 1,175 improvement acre equivalents of fencing, seeding " Which set of improvement figures would be used if the proposed plan were implemented? The Forest needs to program and budget improvement projects for resident trout habitat that is separate from anadromous fish

We feel that Silver Creek should be allocated to a MA-14 prescription Silver Creek is a *major water source with important fish* values that needs additional protection

Issue Five Road Management

The Plan states that 4 1 miles of road exist for each square mile of developed area Since most of the road mileage is in the southern two-thirds of the Forest the road density there could be 5-7 miles/section High road densities in the MA-1 areas would reduce HEI to a fraction of optimum We have a concern for the adverse effects

open roads have on big game in the Ponderosa Pine type allocated to General Forest The proposed plan calls for maintaining 10 percent cover for big game in all winter ranges allocated MA-1 Thermal cover is one element of the habitat effectiveness equation The proposed plan further states "Evaluate road densities to determine their influence on habitat effectiveness for elk Initiate road closures where appropriate " What *does the term "where appropriate" mean?* Roads are tied to habitat effectiveness and should be quantified ODFW believes road closures are appropriate on all Forest land to keep road densities at or below 2 5 miles per section

We encourage more physical road closures on the Forest that are in addition to the green dot system These actions would benefit wildlife, reduce the potential for resource damage, and maintenance costs Roading was found to be the single greatest concern of elk hunters in ODFW elk workshops

Issue Six Habitat for Big Game

The Affected Environment Section on Wildlife does not adequately address the big game winter range requirements on the Forest It should include how many acres of winter range and transition range, as identified by big game use, are on the Forest, and why they are important It should also *include a land type break-down by percentage* for the winter ranges?

What percent of the 72,881 acres allocated to Big Game Winter Range is capable of meeting optimum habitat effectiveness (HEI)?

ODFW provided the Forest with maps of summer, transition and winter ranges Attached is a map that displays Alt "E" MA-2 allocations, transition winter range, and areas that we feel need to be allocated to MA-2 These areas are essential for wintering deer and elk Maintenance of the identified winter ranges at optimum HEI is necessary to assure deer and elk productivity

Forestwide Standards and Guideline for deer and elk address maintenance of viable populations *Explain why the habitat standard has been set* for viable population when the proposed plan identifies much higher population level? The standard must be related to the herd size and distribution to be managed for The fact that big game habitat is a public issue would justify *a higher standard than viable population*

Elk were chosen as an indicator for the big game issue because they have a greater sensitivity to man's activities than do deer The failure to use deer as an indicator has resulted in deficiencies in the analysis relating to seasonal deer habitat requirements The DEIS needs to address the cumulative effects of the alternatives on the deer herds To correct this deficiency we recommend mule deer be used as a management indicator species with elk We recommend a better distribution of MA-2 allocations across the Forest that meets the needs of both deer and elk

We do not know how the Forest converted HEI figures to population numbers The Forest needs to explain the process used to select the

winter range allocations in the preferred alternative More discussion relating to the above may answer our concerns

The 10 percent cover standard for the MA-1 areas will not provide enough thermal cover to maintain population levels The hiding cover element during hunting season would also be deficient

Issue Seven Roadless Recreation

We support the MA-9 roadless area allocations in Alternative F for Lookout Mountain, Silver Creek, Green Mountain, Rock Creek, and Cottonwood. We recommend that the standard for Timber Harvest be changed to read "No Harvest" The intent of MA-9 as stated in Emphasis, Description, and Desired condition statements is to maintain a nonmotorized roadless environment This intent would be lost if timber harvest or salvage were allowed

We support the allocations for Deschutes Canyon-Steelhead Falls in Alternatives E and G

Issue Eight Scenic Values

Under the proposed plan approximately 82 percent of the Forest would be subject to vegetative manipulation The Forest will need a strong monitoring program to ensure that soil resources and plant community diversity standards and goals are met

We support the Scenic Travel Corridor allocations in Alternative C The rationale for this support is tied to the old growth wildlife species Species with a strong preference for late successional habitats need travel corridor to move from one area to the next The Forest Scenic Travel Corridors and Riparian Management Areas will help meet that need Will the travel corridors provide other old growth habitat characteristics beside large old trees?

Issue Nine Old Growth

Region 6 MMR Direction for wildlife lists old growth species for the Ochoco as pileated woodpecker, marten, and northern 3-toed woodpecker The Forest has addressed the pileated woodpecker but not the marten or the northern 3-toed woodpecker The Department has data that show that the northern 3-toed woodpecker occurs on the Malheur National Forest not far from the Ochoco There is no reason to believe that this species does not occur on the Ochoco We do not have data that shows marten use on the Forest We recommend that the Forest include the 3-toed as an old growth indicator species for mature lodgepole pine stands We further recommend that the Forest select a MIS to replace the marten The size and dispersal distance of marten units was also intended to meet the needs of other old growth related species These species still need to be represented, whether or not marten actually exist on the Forest

The Forest has selected the common flicker as an indicator for old growth juniper Will the 40 acre old growth juniper stands be mapped? What measures will be taken to maintain the old growth juniper stands?

New data from westside pileated woodpecker study indicate that this species needs more than 300 acres for a core area The area that was studied on the Starkey Experimental Forest had a higher snag density than that on the Ochoco With these two points in mind we recommend that the Ochoco allocate 460 acres to the pileated woodpecker core area for this planning period

How does the distribution of the old growth prescription (MA-4) fit with the Malheur National Forest?

The proposed plan does not contain sufficient information to evaluate the old growth situation In order to do so the maps should indicate which areas are suitable or capable, and the plant communities they represent

How will the Forest delineate and manage the 300 acre foraging area for the pileated woodpecker? We recommend that the minimum snag size in the foraging area be 15 inches Research has found this snag size to be necessary for a prey base of carpenter ants

It is important that a number of replacement stands be designated in the plan The numbers should be equal to the expected loss for the next 150 years

As 40 percent of the MA-4 areas are capable an equivalent amount of suitable habitat should be retained, on a drainage by drainage basis, until the capable areas reach a suitable condition Replacement stands should be managed for 100 percent potential population levels of primary cavity excavators

Issue Ten Firewood

Our comments on firewood will be addressed under Forestwide and MA Standards and Guidelines for dead and down woody material

Issue Eleven Snags

Region 6 MMR Direction for wildlife states "Each Forest will determine their management indicator species for this MMR", (Primary Cavity Excavators) The Forest has not selected a MIS for snags ODFW recommends that the Forest use the hairy woodpecker as a MIS for the ponderosa pine, mixed conifer, white fir, lodgepole, pine, and subalpine fir communities We also recommend the downy woodpecker as a MIS for the riparian communities

With a designated MIS for snags the Forest can establish specific criteria for meeting snag distribution on the Forest In-unit snags should be left as well as clumps to provide for primary as well as secondary cavity users

Region 6 established MMR's for wildlife to meet an NFMA requirement The Forest was directed to use MMR's as a constraint for benchmark runs and alternatives that are commodity oriented The level at which the Forest operates above these constraints is established by standards and guidelines We want to emphasize that managing for 100 percent of potential population of primary cavity excavators does not mean managing for 100 percent snag retention With this understanding we will make recommendations for snags in the Standards and Guidelines Review

Issue Twelve Winter Recreation

We recommend that the Forest control use of winter recreation in areas of wintering big game and bald eagle wintering areas

Response to Standards and Guidelines

For the purpose of the DEIS and the Proposed Plan the Forest has defined guideline and standard as

Guideline - An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to standard, which is mandatory)

Standard - Performance criteria indicating acceptable norms or specifications that actions must meet A principle requiring a specific level of attainment, a rule to measure against

1 Range: Under Forestwide S & G's no standards have been set except for use on crested wheatgrass Most of the statements appear to be goals We recommend that specific utilization standards be applied to decreaser species A generic approach to utilization does not protect decreaser species, and does not protect sites with moist soils Under Forage Utilization #2 the word "integrity" is subjective, the Forest needs a standard to measure against to determine protection needs for a riparian zone In #3 state a distance for salt location from water -- establish a standard

Under Range Improvements we recommend establishing standards for protection of water sources and overflow areas We recommend the following as additional standards and guidelines

4 "Protect newly developed water sources with a fenced exclosure The exclosure will have no gates If a stock tank has an overflow pipe, the overflow should be piped away from the tank Protect the overflow site as stated above for developed water sources" (Sanitary water sources are a defense against disease and parasite transmission between wild and domestic animals and man)

5 "Each Ranger District will establish a priority list for protecting existing water sources to the same standard established for new water developments The priority list will allow for the protection of all existing water developments by September 30, 1989"

6 The use of prescribed fire as a method to improve forage quality should be designed to protect important browse stands such as mountain mahogany thickets Prescribe burns should be coordinated with wildlife biologists

We support the MA-2 standard to reserve all fall green-up for big game The fall green-up is important on transition ranges and winter ranges not allocated to MA-2 Fall green-up should be maintained on all areas that were delineated as transition or winter range by ODFW

2 Residue Management In #1 establish a Forest standard for what must be left ODFW recommends two logs (>12" by 20') per acre and/or two brush piles (>10' dia) per acre except in riparian areas In riparian areas allow for natural accumulation of dead and down woody material Logs must be uncharred

3 **Riparian:** Riparian and SMU and Fish Habitat #2 include "wildlife habitat protection"

Please explain what is meant by "is significant degradation of water quality"? There is a need to establish the standard for water quality that addresses sediment In riparian areas the standard for ground cover should be 80+ percent

4 **Soils·** MA-13 and 14 have a standard to "Maintain 90 percent of the area in an acceptable productive condition" How will the Forest determine "acceptable productive condition"?

We have a concern for soil compaction and displacement on the Forest What is the background level of soil loss on the Forest? P 117 of DEIS the Forest indicates 102,000 acres have compacted soils and that figure will increase to 127,000 acres in the first decade What will the long term effect be on productivity from these compacted acres?

5 **Fragile Areas:** When considering standards for fragile areas, (scablands, bogs, springs, we meadows, dry meadows, etc.) two elements must be addressed First, standards to protect the site from adverse effects of management activities, second, standards that protect the values of the edge habitat around the fragile area A standard that allows for over-story removal of a portion of the edge while maintaining a screen of understory vegetation would meet the intent of number 2 Protection of fragile areas from adverse grazing impacts may require fencing

Dead and down woody material in the edges of fragile areas and natural openings should be maintained for 100 percent potential population levels

The Forest should address state and federally listed plants under this category and the special management consideration for each species or group of species

6 **Timber Management** ODFW supports the Forestwide S & G described under Silviculture We recommend the following be added to #9 (1st para) "A screen of understory vegetation will be left along the edge of natural openings and along roads to reduce the sight distance

Under MA-2 and MA-3 the standards for reforestation should be driven by big game cover objectives not an annual or decade timber target Base a need to plant trees on a need to increase or replace cover for big game

MA-2 and MA-3 precommercial thin-stocking rate should be based on cover needs for big game not Managed Yield Tables

The MA-7 Harvest standards would all meet partial retention of middleground except the rotation age Activities under partial retention must remain subordinate to the characteristic landscape A rotation age of 90 to 100 years will over time change the character of the landscape by removing large mature and old growth trees The rotation age should be the same as MA-6

MA-10 As stated in our Issue Response the Department does not support salvage harvest in these areas

7 **Transportation System** Traffic Management #2 recommend adding the following paragraph

"Road closures for big game will be needed to maintain higher habitat effectiveness and assure hunting quality If habitat effectiveness drops below HEI = 35 roads will be closed"

Entry to new roads should be designed for easy and effective closure

3 **Wildlife·** As stated in the Issue response we feel the Forest should establish the northern 3-toed woodpecker, downy and hairy woodpecker as MIS and should select a replacement species for the marten

We also recommend the ruffed grouse and resident trout as MIS for riparian areas

Primary Cavity Excavators Recommend dropping #1 This is confusing and the specific levels are identified in the prescriptions

Recommend à minimum snag size of 15" for pileated woodpecker forage areas

#2 The size of the clumps should reflect the needs of indicator species

A The area of evaluation should be on a subwatershed basis

B Hard and soft snags must be left in harvest units

C Clumping alone will not meet cavity user needs

Rocky Mtn Elk and Mule Deer #1 and #3 should set a level commensurate with desired herd numbers not viable population numbers Maintaining 10 percent cover on one-half of the Forest will not maintain desired herd levels

#2 How will Forest protect sites?

Threatened, Endangered and Sensitive Species We recommend that a bald eagle roost area be established at the Grasslands within 1/4 mile of Lake Billy Chinook We recommend that the Forest use criteria in "Management of Wintering Bald Eagles" (1978, USFWS) to protect roost sites

Species Associated with Dead and Downed Logs See Pesidue Management

Species Associated with Various Plant Communities... The statement "Diversity is to be provided through time" is a goal and a legal requirement How does the Forest propose to accomplish this task?

Snag Management As stated in the Issue response the snag levels by MA could be higher We recommend the following

MA	Percent Potential Pop	Snags/100 Acres	
1	60	108-118a	1-1 2 snags per acre
2	100	180-300	2-3 snags per acre
3	100	" "	
4	--b	--	
5	100	180-300	
6	100	" "	
7	100	" "	
8	--	--	
9	--	--	
10	100	180-300	
11	100	" "	
12	100	" "	
13	100	" "	
14	100	" "	

[a] Varies by plant community
[b] Forest management would not affect level of snags

Snags must be uncharred The recommended height and numbers by D B H are identified in Thomas (1979)

Raptors The plan should reference and support the guidelines for cliff and rimrock habitats in "Wildlife Management in Managed Forests"

Monitoring Plan

Wildlife

Old Growth -
Under "Methods" 5% per year is not a method, it's a frequency At 5% per year it would take 20 years to verify that the MA-4 areas are in place This time period is too long for a resource that is being managed at a low level We recommend 20% per year is verified and utilize remote sensing as a method to inventory and monitor

Snags -
Recommend moving snag information on Page 103 under Fish and Wildlife, Range to Page 102 under Snags

Anadromous Fish -
Recommend monitoring for resident fish be included

Elk Habitat -
Recommend establishing on HEI Management Objective for Variability Threshold

Soils -
Place stronger emphasis on project level monitoring for compaction and displacement

Recommend that 5 year monitoring reports be sent to coordinating agencies

Recommend that the monitoring plan address Dead and Down Wood Material

General Comments

1 *DEIS Affected Environment*

Vegetation
The Forest lists 12 plant species from "Rare, Threatened, and *Endangered Plants of Oregon*", March 1985 How will these species and their habitats be protected?

2 ODFW supports the RNA allocations in Alternative E

3 ODFW encourages stricter enforcement of ORV regulations

4 Recommend that the Delintment Lake improvement project be added to the fish and wildlife capital investment plan

5 Appendix A5
Timber Sales - Are the timber sales scheduled in MA-2, MA-3, MA-13 and MA-14 designed to meet specific wildlife and riparian objectives?

6 Chapter IV of Proposed Plan

P 25 Riparian "Maintain *or restore inherent* values " Only MA-14 would meet this goal Does the Forest propose to increase the MA-14 *allocation* in the next planning process to work toward this goal? Due to the poor condition of some riparian areas recovery will be a slow process

P 28 *Desired* future condition "Vegetation composition will change overtime giving way to weedy, adventive, and annual species " We recommend that the Forest delete the above paragraph This condition is not desirable and is not consistent with Forestwide standards and Guidelines for Ecosystems Management#12 " Encourage recovery or prevent deterioration "

P 96 of the Proposed Plan
What is the rationale for the difference of 10° in the temperatuie standards for the *Deschutes and John Day rivers*?

In an effort to *have* better data and species inventories for the next planning period we recommend that the Forest identify the needs in the Statewide *Comprehensive* Fish and Wildlife Plan The Department will cooperate when possible to help gather this information

The following *comments* list *how well the proposed plan accommodates the Fish* and Wildlife Habitat Protection Criteria For Forest Lands (March 1985, Reformatted and Revised September 1986) - copy attached -

Old Growth

1 Forest will maintain only three percent in old growth ODFW criteria is 5-15%
2. Does not include northern 3-toed woodpecker as indicated in R-6 MMRs
3 The Forest is dedicating old growth stands, plan does comply
4 No fuelwood cutting, may be roaded in some areas

Snags·

1 Inventory by TRI compartment or watershed needs to be completed
2 Will be met, ODFW recommends core area of 460 acres
3 Not met, Forest MA snag levels vary from 40% to 100%
4 In S & G's
5 Plan does comply

Dead and Down

1 *In plan, recommend as standard under residue*
2 Same as #1
3 Plan does not comply

Hardwoods and Minor Conifer Species

1 Would be met under diversity requirement
2 N/A
3 Only portion of winter range considered, most of transition areas and winter ranges not considered

Riparian

1 No map to show location and condition
2 All addressed but no sediment standard
3 *Will be met on 19,000 acres of Class I and II streams*
4 is planned for part of degraded area
5 *Yes* for a portion of area
6 Yes

Meadows, Freshwater Wetlands, Natural Openings

1 Not sure
2 No, only 66% ensured - made recommendation for remainder
3 No, 2/3 of area will have trees but may not be in natural condition
4 The Direction is there
5 Does not comply

Cliffs, Rim rock, Caves, and Talus

1 Recommend that Forest use standards in (Thomas 1979)

Aquatic Habitats

1 Yes on a limited basis
2 No
3 Yes
4 For anadromous fish only, recommend monitoring of resident trout

In-stream Habitat

1 Yes, but not for all acres

Water Quality

1 Temperature ok (but not for all acres), sediment--no standard
2 Yes

Water Quantity

1 Yes, but not for all acres
2 Yes

Elk and Deer Habitat

1 Yes, on 24% of Forest, ODFW management objectives will not be met on MA-1 allocations
2 N/A
3 No
4 No discussion of current condition
5 Only on portion of Forest and not by geographic area
6 Not in total
7 a Not complete
b Not complete
c Yes
8 Yes
9 No

Species of Concern

1 Bald eagle
a Yes
b Yes
c Yes

2 Peregrine falcon -- N/A

3 Spotted Owl -- N/A

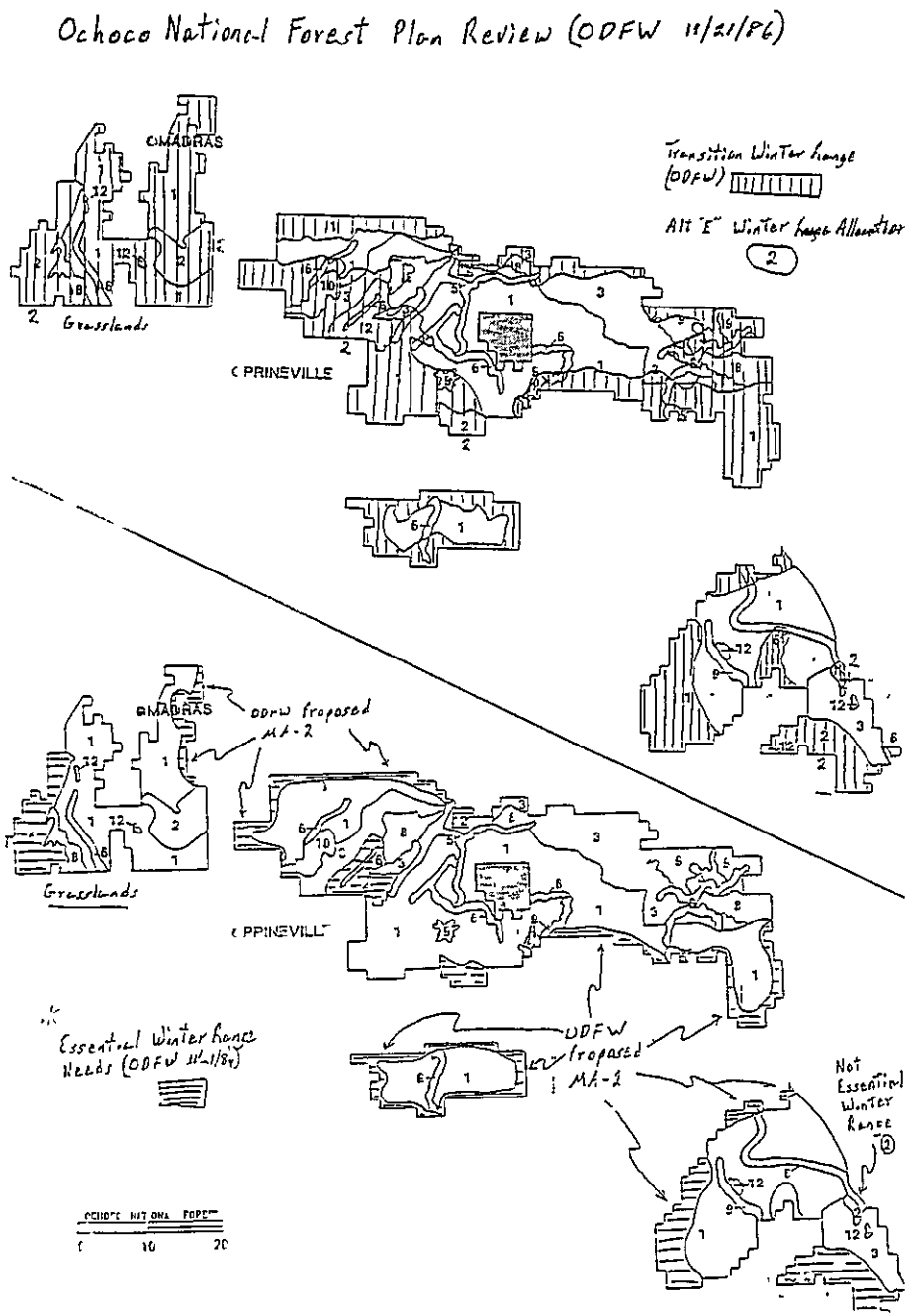
Road Management

1 Only in part
2 No
3 Forest will attempt to meet these
4 Some are

Grazing

1 No
2 No

L4-11



Department of Transportation

PARKS AND RECREATION DIVISION

525 TRADE STREET SE, SALEM OREGON 97310

October 30, 1986

Jim Brown
State Forester
Oregon Department of Forestry
2600 State Street
Salem, OR, 97310

Dear Jim:

We have reviewed the draft of the Ochoco National Forest Plan with an emphasis on its impact on the Division's programs - parks, scenic waterways, trails, and to recreation in general. We have relied on the 1983 Statewide Comprehensive Outdoor Recreation Plan (SCORP) endorsed by Governor Atiyeh and the 1983-89 Oregon State Parks System Plan adopted by the Oregon Transportation Commission

Our review paid special attention to the plan's provision for recreational diversity (as shown by the Recreation Opportunity Spectrum).

The Ochoco plays an important role in providing outdoor recreation opportunities in Oregon. It provides high quality hunting and river dependent opportunities as well as winter nordic activities. It also will become an important trail connector between the Pacific Crest and Desert Trail systems Our specific areas of concern are:

1. Predictions for future recreation use are based on state population growth. Much recreation grows faster than population. Predictions of future use would be better grounded based on historic trends in the Ochoco

2. We endorse expansion of the trail system, especially the development of the East-West intertie which will join the Pacific Crest Trail with the Desert Trail

3. We agree with management of the Deschutes Canyon-Steelhead Falls area to retain wilderness values until designated or released by Congress.

4. We also agree with maintenance of scenic and recreational values on those described portions of the Crooked, North Fork Crooked and the Deschutes River until Congressional decision is made. Oregon State Parks has recently completed a state scenic waterway study of the Deschutes from Lake Billy Chinook upstream.

5 Major reductions are being made in those lands providing semi-primitive motorized and non-motorized recreational opportunities, to the extent that demand has or soon will outstrip supply. The reduction of these opportunities pose a loss of recreational diversity as delineated by the recreational Opportunity Spectrum. We suggest that this issue be reevaluated in the Ochoco.

6. Methods employed to estimate the economic values of recreation are flawed and result in a serious undervaluation of recreation. This undervaluation becomes particularly of concern in those areas of the forest where irreplaceable recreational opportunities may be traded for low value timber resources.

We are pleased to offer these comments. If you have any questions, please contact Don Eixenberger at 378-6597.

Sincerely,

Alan J. Cook, Manager
Planning and Grants

AJC:jn
1692D

STATE OF OREGON
Parks and Recreation Division

INTEROFFICE MEMO
378-6597

TO Files

DATE October 30, 1986

FROM Don Eixenberger
Research Analyst

SUBJECT Review of Ochoco National Forest Plan, 1986

The U.S Forest Service (U.S.F S) plays a major role in the provision of recreation in the State of Oregon It is an indispensible element in maintaining a diverse quality of recreational opportunity which will gain even greater importance as the state's population grows and as out-of-state tourism plays an even more crucial role in the state's economy. For example, federally administered lands provide over 30% of the state's campsites and picnic tables, 50% of its hiking and bridle trails and 60% of its ORV areas. Thus, while the plan states that the U.S.F.S. provides 7 5% of outdoor recreation nationally, in Oregon, it is likely 3 to 4 times that amount if not more.

The U.S.F.S is also the near sole provider of certain types of recreation in the state Much river recreation, snow activities and primitive and semi-primitive recreational opportunity are greatly dependent on public lands managed by the U.S.F.S. Forests such as the Ochoco form a mosaic of recreational richness and diversity that are irreplaceable.

Recreation

Overall, the plan adequately describes the general recreational issues in the Ochoco National Forest We have concerns, however, in using state population projections in estimating future recreational demand

Forests have varying degrees of recreational attractiveness; activities within a forest can have differing rates of demand Some of these may follow population growth; others may greatly exceed it Basing demand on population risks inappropriate planning for future use. Projections based on historical growth rates for specific activities would likely be more accurate

Dispersed Recreation

The Ochoco has no primitive recreation opportunities, excluding wilderness, its semi-primitive motorized and non-motorized opportunities are limited Currently, there are some 59,000 acres of land providing such experiences. The preferred alternative (E departure) would reduce this to about 32,000 acres or 3 8% of some 843,000 acres of forested land Yet demand for semi-primitive opportunities according to U.S F.S. data is increasing in the forest

Ample supplies of developed and roaded natural opportunities exist through all years of the planning horizon. Yet demand for semi-primitive motorized presently exceeds supply by over 100%; demand for semi-primitive non-motorized will exceed supply by the year 2005. The problem would not be so crucial if this were an isolated case. But the diminishment of both primitive and semi-primitive opportunities is also projected in other Forests. The reduction of these opportunities pose a loss of recreational diversity as delineated by the Recreational Opportunity Spectrum.

The U.S.F.S. is nearly the sole provider of these opportunities. We suggest that this issue be reevaluated in the Ochoco Perhaps a regional analysis should be made to examine the status of the supply and demand for primitive and semi-primitive opportunities and the cumulative effects the current round of planning will have on them.

Trails

We endorse the expansion of the trail system, especially the development of the East-West intertie which will join the Pacific Crest Trail with the Desert Trail

Wilderness

We agree with management of the Deschutes Canyon-Steelhead Falls area to retain wilderness values until designated or released by Congress.

Scenic Rivers

We agree with maintenance of scenic and recreational values on those described portions of the Crooked, North Fork Crooked and the Deschutes River until Congressional decision is made. Oregon State Parks has recently completed a state scenic waterway study of the Deschutes from Lake Billy Chinook upstream. A copy of this study is available upon request.

Developed Recreation

The plan proposes four new developed sites in the Ochoco. According to the State Comprehensive Recreation Plan, the counties influenced by the Ochoco have large surpluses of campsites through the forseeable future. However, as described, several campsites in the forest are at peak use and development of new sites is needed and justified.

Economic Concerns

Methodology

Each of the 11 management alternatives has a calculated Public Net Value (PNV) expressed in millions of dollars. This is the difference between the discounted value (benefits) of all outputs to which the monetary values or established market prices are assigned and the total discounted costs of managing the planning area As such, PNV is a estimate of the total monetary benefits gained through the various mixes of resource tradeoffs across the alternatives

In formulating these values, a 1 percent per year real price trend for stumpage was used for harvest scheduling analyses These were applied for the first fifty years and a 0 percent price trend was used for the remaining 100 years of the planning horizon. A 0 percent real price trend for all other resources was used during the development of the benchmarks and the alternatives In other words, their future nominal values will change at rates equal to inflation According to the plan then, recreational resources will not increase in real value; their contribution to PNV in real dollars remain static throughout the 50 year planning period.

In addition, the contribution of recreational values to PNV were reduced 37.5% for use in comparing resource allocation choices. This was based in part on dissatisfaction with travel cost methods of determining recreational activity values. To arrive at this 37.5% reduction, the following method was used·

First it was estimated that nationally, a 5 percent increase in price would result in a 1 percent decrease in quantity of outdoor recreation demanded for a price elasticity of .2

$$P E. = \frac{\text{quantity demand}}{\text{price demanded}}$$

It was also estimated that in 1982, the Forest Service provided 7 5% of all outdoor recreation and that as a consequence, there will be a 5 percent decrease in price for each percent of the 7.5 percent Forest Market Share or a total decrease of 37.5 percent for clearing the market In other words, the increase in supply created by the Forest Service creates a 37.5% decrease in the price of outdoor recreation For example, the initial value of $24 for a day of resident trout fishing was reduced to $15.

Discussion

The methodology used to estimate the current and future value recreational resources merits careful consideration if responsible planning of our shrinking resource base is to occur.

1. Assigning a 0 percent real price trend for all non-timber resources, including recreation flies in the face of economic reality. The demand for much, if not most, outdoor recreation is growing at an accelerated pace.

   Skiing and river-dependent recreation are two prime examples of this growth. The supply available for many of these activities is sluggish or even static. It is a well established fact that as demand grows faster than supply, real price increases.

   The assumption of a 0 percent real price trend gravely undervalues the contribution of outdoor recreation to the PNV of all the alternatives.

2. Adjusting recreational activity values 37 5 percent downward is clearly erroneous.

   The values for many of these activities were generated using Forest Service sites and when Forest Service contributions to the overall supply were present. It is erroneous to assume that the Forest Service land is an addition to quantity which lowers these values when that land was already a part of the total quantity when the values were estimated.

3 A nationwide demand elasticity is likely misrepresentative of the demand elasticity for specific recreation activities and may not be relevant to Oregon and the Ochoco National Forest

4 It is faulty to assume that because nationally the Forest Service provides 7.5% of all outdoor recreation, the same holds true for the Ochoco Forest. Also many of the opportunities offered by the forest have no reasonable substitutes. Mountain climbing, wilderness travel, skiing are examples of this

5. There is no reason to believe that Travel Cost methodology consistently over estimates trip length, and therefore no reason to adjust those values downward as a result of this contention *

These methods, the 0 percent real growth rate assumption and the further 37.5 percent devaluation of recreation activity values, are erroneous.

Their net effect is to seriously confound and underestimate the value of recreational resources and their contribution to Present Net Value Consideration of resource allocations in the Ochoco Forest will be distorted unless appropriate recreation value estimates are refigured throughout the alternatives.

*Corroboration of these points are provided in the accompanying comments by Rebecca L. Johnson, Assistant Professor, Resource Economist, Department of Resource Recreation Management, Oregon State University, Corvallis While these comments were made pertinent to the Deschutes NF; the same methodology was used in the Ochoco and is relevant to it.

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Enclosure
Comments on the Recreation Values for the
Deschutes National Forest Plan

In summarizing the rationale for adjusting the initial values of the Resource Evaluation Group, the plan states that TCM values need to be adjusted to be comparable with marginal values of other forest outputs (p 193) The nationwide demand elasticity of .2 is used to show that if the Forest Service quantity of outdoor recreation in the nation by 7 5% (their current share of quantity), price should decrease by 37 5%. There are several problems with this logic:

-- The prices which are being adjusted downward were estimated when the Forest Service land was a part of the total quantity. In fact, many of the studies which were used to generate the recreation values were done for Forest Service sites Studies that were done on non-Forest Service sites would frequently have had Forest Service sites as substitutes, and regional models would have included these Forest Service substitutes directly in the estimation It is erroneous to assume that the Forest Service land is an addition to quantity which will lower these values which were estimated at a time when Forest Service land was already a part of the total quantity

-- A nationwide demand elasticity for outdoor recreation may be a poor representation of the elasticity for specific recreation activities. Similarly, the percentage of the total quantity of outdoor recreation in the U S that the Forest Service land represents may be a poor representation of the percentage that is relevant in the Deschutes National Forest If adjustments are to be done, an attempt should be made to use regional or Forest-related factors for adjustment whenever possible

Other reasons stated for adjusting the values downward were related to problems with the TCM, including an assertion that TCM studies typically are done for higher quality sites, substitutes are not accounted for, and trip length is not accurately measured While any of these may be true for a particular study, several points should be made.

-- Values for some activities were based on CVM studies instead of TCM studies Adjusting these values downward for problems with the TCM is clearly erroneous

-- Not all of the studies used single-site TCM models, and therefore an adjustment for substitutes may or may not be necessary There is clearly no single factor to adjust all of the values by to account for exclusion of substitutes - it would vary by site

-- Aside from the argument of whether or not TCM studies accurately measure trip length, there is no reason to believe that trip length is consistently over-estimated, and therefore no reason to adjust these values downward as a result of this contention

If the planners for the Deschutes National Forest are not satisfied with the activity values estimated by the Resource Evaluation Group, they should make an attempt to find recreation valuation studies which have been done in the Pacific Northwest region for specific activities which are provided on their forest. It appears that planners want recreation values to be comparable to other forest resource values, and therefore the same effort should be made to find values which reflect as accurately as possible the conditions that exist on the Deschutes National Forest.

DE:jn
1661D

Water Resources Department

3850 PORTLAND ROAD NE SALEM OREGON 97310 PHONE 378-3671

November 12, 1986

James E. Brown, State Forester
Department of Forestry
2600 State Street
Salem, OR 97310

ATTN: Dave Stere - Ochoco National Forest Comments

Dear Mr. Brown,

We have reviewed the Ochoco National Forest and Crooked River National Grassland Proposed Land and Resource Plan. The Water Resources Department has no preference for any plan finally selected. However, we recommend that the goal of protecting water resources originating on forest lands be included in any management program implemented

As identified in Table IV-6, The Plan, water yields could diminish by a few percent per decade for the next three decades Data is not available to determine if this is the result of projected precipitation patterns or management programs. The Department would encourage implementation of a monitoring program to measure the effects of various forest management techniques on runoff. A comprehensive monitoring program may provide the necessary data for additional evaluation on the effects of various management techniques on runoff

Specific comments - DEIS

The DEIS should acknowledge state water resource policies and the relationship to the various alternatives presented on pages 74 and 175.

Proposed Plan

Page 13 The last sentence in the water section should be clarified as to specific meaning. Does the sentence mean needs will outpace water resources or water will still be sufficient to meet demands?

Page 27 This section should put more emphasis on improvement of the watersheds in the poor to fair condition

A-1 Water rights will be required for the water development projects identified in the report.

I-11 Potential developers should be aware of state policies affecting hydroelectric projects.

Enclosed is the basin program for the area. Thank you for the opportunity to review the report.

Sincerely,

WILLIAM H. YOUNG
Director

WHY:jt
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BEFORE THE WATER RESOURCES COMMISSION

OF THE

STATE OF OREGON

In the matter of formulating an integrated, coordinated program for the use and control of the water resources of the John Day River Basin	)))))	John Day River Basin December 2, 1985*

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the John Day River Basin as delineated on State Water Resources Board Map, File 6.70146;

WHEREAS results of this study have been published in the State Water Resources Board Report, John Day River Basin and the Water Resources Department has conducted further studies pertaining to the development of water resources of the basin;

WHEREAS in these studies consideration was given to means and methods of augmenting, conserving and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control; and

WHEREAS the Water Resources Commission under the authority of ORS 536.300 through ORS 536.340 may classify or establish minimum perennial streamflows on the water resources of the John Day Basin;

WHEREAS as a result of said studies the following findings and conclusions have been reached by this Commission:

1. The total basin yield is adequate on an average-year basis to supply all existing and presently contemplated needs and uses of water.

2. There are areas where the yield is not adequate to supply existing needs during a critical year.

3. Flows are not sufficient during low-flow months to meet existing or future instream or out-of-stream demands.

4 Simultaneous use of a major portion of the existing consumptive water rights results in flows at or near the zero level in many streams during the summer and early fall months.

* Modifies John Day River Basin programs dated April 3, 1964, and April 4, 1981,

5. Flows at or near the zero level also occur under existing conditions on many streams having little water under appropriation.

6. Augmentation of the water supply in periods of need can come through more efficient use of presently appropriated water.

7. There are many physically feasible storage sites.

8. Available data indicate that the ground water resource is limited.

9. Ground water represents an important source of water, primarily in meeting existing domestic, livestock, and municipal needs.

10. There are substantial quantities of unappropriated water.

11. Over 1,400,000 acre-feet of the waters of the John Day River and its tributaries were withdrawn in 1915 by the State Engineer for out-of-basin diversion for irrigation, power and domestic purposes. This withdrawal amounts to more than the average annual discharge of the John Day River at McDonald Ferry.

12. No water has been applied to beneficial use under the aforementioned withdrawal.

13. Utilization of this withdrawal and its priority will preclude maximum beneficial use of the waters of John Day River within the basin.

14. More than 25 percent of the land holding water rights is no longer irrigated. More than 75 percent of the water appropriated for mining and power uses is no longer utilized for these purposes.

'5. There is need to investigate modification or rescission of the aforementioned withdrawals and unused rights.

6. There is need to insure water for domestic, livestock, municipal, and wildlife uses which, while small, are of great importance.

7. There is need to develop stock water facilities for better range utilization.

8. Irrigation is and will continue to be the major consumptive use of water.

9. Irrigation development is restricted by the limited acreage of bottom land and the unfavorable location of other arable land.

). Most irrigated lands do not receive an adequate supply of water throughout the irrigation season in an average water year and experience severe shortages in a critically low water year.

Storage would be necessary to provide an adequate water supply for irrigated and irrigable lands.

22. The hydroelectric power potential of the basin is limited.

23. Existing stream regimen and water use reduce the desirability of hydroelectric power development in the basin.

24. Present industrial use of water is small and is not expected to increase materially.

25. There is potential for increased mining activity.

26. Present mining use of water is small and is not expected to increase materially.

27. Water-based recreation is limited by low seasonal streamflows and the small number of lakes and reservoirs.

28. The natural lakes have significant recreational value.

29. The main stem of the John Day River from Service Creek Bridge (river mile 157) to Tumwater Falls (river mile 10) is designated as a State Scenic Waterway.

30. Aquatic life, including fish life, is and will continue to be the major nonconsumptive use of water.

31. A major conflict exists between irrigation and fish life use of water.

32. There is potential for enhancement of fish life and recreation.

33. Storage or other watershed management measures would be required to attain flows for enhancement of fish life and recreation.

34. Flows recommended by fisheries agencies are substantially higher at many locations than the flow levels that exist during an average water year.

35. Maintenance of minimum perennial streamflows would benefit fish life, wildlife and recreation.

36. Thirteen minimum perennial streamflows included in the Senate Bill 225 (1983) application are located in the John Day River Basin.

37. The proposed minimum streamflows would protect flows during parts of the year for important populations of wild anadromous and resident fish in the mainstem John Day River and its North, Middle, and South Forks; Beech, Canyon, Cottonwood, Rock and Bridge Creeks tributary to the mainstem John Day River, Clear Creek tributary to Middle Fork John Day River, and Granite Creek tributary to the North Fork John Day River.

38. Municipal use for Mitchell, Dayville, and Mt. Vernon is of greater importance than support of fish life and should be exempted from minimum perennial streamflows

39. Existing industrial use is more important than fish life use in the river reach from gage 14038530 to the North Fork.

40. Exemption of industrial applications filed before December 2, 1986 would allow development of alternative sources for existing and future industrial demands

41. Criteria for the determination of desirable base flows commensurate with all beneficial uses of water have not been developed.

42. Agriculture is a more important use than increasing the existing minimum flows on the North Fork John Day.

43. Pollution of surface and ground water is local, intermittent in occurrence, and is not a serious basinwide problem

44 Utilization of flows to minimize pollution should only be permitted if it does not limit or conflict with the multiple-purpose objectives for water use in the basin.

45. Flooding and streambank erosion are serious local problems in some areas

46 Erosion of cropland and rangeland is a major problem and often results in siltation of streams.

47. Major drainage problems occur on irrigated lands.

48. Because of physical and economic factors, classification of certain waters for limited-purpose use would be in the public interest.

NOW THEREFORE BE IT RESOLVED that this Commission hereby adopts the following program in accordance with the provisions of ORS 536 300(2) pertaining to the water resources of the John Day River Basin

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the John Day River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, pollution abatement, wildlife and fish life uses The waters of the John Day River Basin are hereby so classified with the following exceptions·

1. The maximum economic development of this state, the attainment of the highest and best use of the waters of the natural lakes of the John Day River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or

noncommercial garden not to exceed one-half acre in area, power development not to exceed 7-1/2 theoretical horsepower, recreation, wildlife and fish life uses, and the waters of the natural lakes of the John Day River Basin are hereby so classified.

2. The maximum economic development of this state, the attainment of the highest and best use of the waters of the John Day River from Service Creek Bridge (river mile 157) to Tumwater Falls (river mile 10), and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, industrial, mining, recreation, wildlife and fish life uses;

B. For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life, no appropriations of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters listed below and as shown in Table 1:

1. The Middle Fork John Day River above its mouth or of its tributaries for flows of the Middle Fork John Day River at USGS Gage 14-0440 at Ritter (SW 1/4 NW 1/4 Section 8, Township 8 South, Range 30 East) below 10 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

2. The North Fork John Day River above former USGS Gage 14-0415 near Dale (SE 1/4 SE 1/4 Section 35, Township 6 South, Range 31 East) or of its tributaries above said gage for flows of the North Fork John Day River below 35 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

3. The North Fork John Day River above its mouth or of its tributaries for flows of the North Fork John Day River at USGS Gage 14-0460 at Monument (SE 1/4 Section 2, Township 9 South, Range 27 East) below 55 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

4. The John Day River above USGS 14-0465 at Service Creek (N 1/2 Section 18, Township 9 South, Range 23 East) or of its tributaries above said gage for flows of the John Day River below 30 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

5. The John Day River above its mouth or of its tributaries for flows of the John Day River at USGS Gage 14-0480 at McDonald Ferry (NW 1/4 Section 11, Township 1 North, Range 19 East) below 20 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage

C. To support aquatic life and minimize pollution, in accordance with Section 3, Chapter 796, Oregon Laws, 1983, no appropriation of water shall be made or granted by any state agency or public corporation of the state for waters of the streams and tributaries in Table 1 when the flows are below the levels specified. This limitation shall not apply to:

a. Water legally stored or released from storage.
b. Domestic and livestock uses.
c. Municipal uses on Bridge Creek, South Fork John Day River, and the John Day River from USGS gage 14038530 to the North Fork.
d. Industrial use rights and industrial use under permits with priority dates before December 2, 1986 on the John Day River from USGS gage 14038530 to the North Fork.

Attainment of the specified flow levels during some portion of the year will require use of stored water or other measures to augment flows.

D. Applications for the use of the waters of the John Day River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

E. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

F. Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give cognizance to the multiple-purpose concept.

ated December 2, 1985

WATER RESOURCES COMMISSION

William H. Young
William H. Young, Director
WATER RESOURCES DEPARTMENT

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TABLE I
JOHN DAY RIVER BASIN
Minimum Perennial Streamflows (cfs)

DEC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG 1-15/16-31	SEP	OCT	NOV	Priority Date
JOHN DAY RIVER MAINSTEM												
John Day River from Rail Creek to USGS gage 14-034850												
25	25	25	24	24	24	25	15	15/34	34	25	25	11/03/83
John Day River from USGS gage 14-034850 (above John Day) to South Fork												
80	80	80/118	118	118	118	80	50/30	30	30	50	80	11/03/83
John Day River from South Fork downstream to North Fork												
120	120	120/140	140	140	140	120	60	60	60	60	120	11/03/83
John Day River at USGS gage 14044300 (near Service Creek)												
30	30	30	30	30	30	30	30	30	30	30	30	4/03/64
John Day River at USGS gage 14048000 (at McDonald Ferry)												
20	20	20	20	20	20	20	20	20	20	20	20	4/03/64
Canyon Creek from East Fork to mouth (near John Day)												
25	25	25/34	34	34	34	25	15/9	9	9	9	15	11/03/83
Beech Creek: from East Fork to mouth (near Mt. Vernon)												
30	30	30/44	44	44	44	30	15/8	8	8	8	15	11/03/83
South Fork of John Day River from Black Canyon to mouth (at Dayville)												
100	100	100/133	133	133	133	100	50/25	25	25	25	50	11/03/83

DEC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG	SEP 1-15/16-31	OCT	NOV	Priority Date
JOHN DAY RIVER MAINSTEM												
Cottonwood Creek (below Dayville): to mouth												
10	10	10/15	15	15	15	10	7/3	3	3	3	10	11/03/83
Rock Creek: from Mountain Creek to mouth (in Picture Gorge)												
35	35	35/50	50	50	50	35	20/10	10	10	10	20	11/03/83
Bridge Creek from mouth of Bear Creek to mouth												
25	25	25/40	40	40	40	25	15/6	6	6	6	25	11/03/83
NORTH FORK OF JOHN DAY RIVER												
Granite Creek: from Clear Creek to mouth												
55	55	55	71	71	71	55	30	30/71	71/30	30	30	11/03/83
North Fork at Oala												
35	35	35	35	35	35	35	35	35	35	35	35	4/03/63
North Fork from USGS gage 14-0440 (near Monument) to mouth												
55	55	55	55	55	55	55	55	55	55	55	55	04/03/64

DEC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG 1-15/15-30	SEP 1-15/16-30	OCT 1-15/16-31	NOV	Priority Date
MIDDLE FORK OF JOHN DAY												
Clear Creek to mouth												
18	18	18	25	25	25	18	10/4	4/25	25/10	10	10	11/03/83
Middle Fork from USGS gage 14-0440 (near Ritter) to mouth												
10	10	10	10	10	10	10	10	10	10	10	10	04/03/64
60*	60	60/125*	125*	125*	125*	80*	50/25*	25/125*	125/50*	50*	80*	11/03/83

BEFORE THE WATER RESOURCES COMMISSION

OF THE

STATE OF OREGON

In the matter of formulating an integrated, coordinated program for the use and control of the water resources of the John Day River Basin	)))))	John Day River Basin December 2, 1985*

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the John Day River Basin as delineated on State Water Resources Board Map, File 6.70146;

WHEREAS results of this study have been published in the State Water Resources Board Report, John Day River Basin and the Water Resources Department has conducted further studies pertaining to the development of water resources of the basin;

WHEREAS in these studies consideration was given to means and methods of augmenting, conserving and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control; and

WHEREAS the Water Resources Commission under the authority of ORS 536.300 through ORS 536.340 may classify or establish minimum perennial streamflows on the water resources of the John Day Basin;

WHEREAS as a result of said studies the following findings and conclusions have been reached by this Commission:

1. The total basin yield is adequate on an average-year basis to supply all existing and presently contemplated needs and uses of water.

2. There are areas where the yield is not adequate to supply existing needs during a critical year.

3. Flows are not sufficient during low-flow months to meet existing or future instream or out-of-stream demands.

4. Simultaneous use of a major portion of the existing consumptive water rights results in flows at or near the zero level in many streams during the summer and early fall months.

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* Modifies John Day River Basin programs dated April 3, 1964, and April 4, 1981.

5. Flows at or near the zero level also occur under existing conditions on many streams having little water under appropriation.

6. Augmentation of the water supply in periods of need can come through more efficient use of presently appropriated water.

7. There are many physically feasible storage sites.

8. Available data indicate that the ground water resource is limited.

9. Ground water represents an important source of water, primarily in meeting existing domestic, livestock, and municipal needs.

10. There are substantial quantities of unappropriated water.

11. Over 1,400,000 acre-feet of the waters of the John Day River and its tributaries were withdrawn in 1915 by the State Engineer for out-of-basin diversion for irrigation, power and domestic purposes. This withdrawal amounts to more than the average annual discharge of the John Day River at McDonald Ferry.

12. No water has been applied to beneficial use under the aforementioned withdrawal.

13. Utilization of this withdrawal and its priority will preclude maximum beneficial use of the waters of John Day River within the basin.

14. More than 25 percent of the land holding water rights is no longer irrigated. More than 75 percent of the water appropriated for mining and power uses is no longer utilized for these purposes.

15. There is need to investigate modification or rescission of the aforementioned withdrawals and unused rights.

16. There is need to insure water for domestic, livestock, municipal, and wildlife uses which, while small, are of great importance.

17. There is need to develop stock water facilities for better range utilization.

18. Irrigation is and will continue to be the major consumptive use of water.

19. Irrigation development is restricted by the limited acreage of bottom land and the unfavorable location of other arable land.

20. Most irrigated lands do not receive an adequate supply of water throughout the irrigation season in an average water year and experience severe shortages in a critically low water year.

21. Storage would be necessary to provide an adequate water supply for irrigated and irrigable lands.

22. The hydroelectric power potential of the basin is limited.

23. Existing stream regimen and water use reduce the desirability of hydroelectric power development in the basin.

24. Present industrial use of water is small and is not expected to increase materially.

25. There is potential for increased mining activity.

26. Present mining use of water is small and is not expected to increase materially.

27. Water-based recreation is limited by low seasonal streamflows and the small number of lakes and reservoirs.

28. The natural lakes have significant recreational value.

29. The main stem of the John Day River from Service Creek Bridge (river mile 157) to Tumwater Falls (river mile 10) is designated as a State Scenic Waterway.

30. Aquatic life, including fish life, is and will continue to be the major nonconsumptive use of water.

31. A major conflict exists between irrigation and fish life use of water.

32. There is potential for enhancement of fish life and recreation.

33. Storage or other watershed management measures would be required to attain flows for enhancement of fish life and recreation.

34. Flows recommended by fisheries agencies are substantially higher at many locations than the flow levels that exist during an average water year.

35. Maintenance of minimum perennial streamflows would benefit fish life, wildlife and recreation.

36. Thirteen minimum perennial streamflows included in the Senate Bill 225 (1983) application are located in the John Day River Basin.

37. The proposed minimum streamflows would protect flows during parts of the year for important populations of wild anadromous and resident fish in the mainstem John Day River and its North, Middle, and South Forks; Beech, Canyon, Cottonwood, Rock and Bridge Creeks tributary to the mainstem John Day River; Clear Creek tributary to Middle Fork John Day River; and Granite Creek tributary to the North Fork John Day River.

8. Municipal use for Mitchell, Dayville, and Mt. Vernon is of greater importance than support of fish life and should be exempted from minimum perennial streamflows.

39. Existing industrial use is more important than fish life use in the river reach from gage 14038530 to the North Fork.

40. Exemption of industrial applications filed before December 2, 1986 would allow development of alternative sources for existing and future industrial demands.

41 Criteria for the determination of desirable base flows commensurate with all beneficial uses of water have not been developed.

42. Agriculture is a more important use than increasing the existing minimum flows on the North Fork John Day

43 Pollution of surface and ground water is local, intermittent in occurrence, and is not a serious basinwide problem.

44. Utilization of flows to minimize pollution should only be permitted if it does not limit or conflict with the multiple-purpose objectives for water use in the basin.

45. Flooding and streambank erosion are serious local problems in some areas.

46 Erosion of cropland and rangeland is a major problem and often results in siltation of streams.

47. Major drainage problems occur on irrigated lands

48. Because of physical and economic factors, classification of certain waters for limited-purpose use would be in the public interest

NOW THEREFORE BE IT RESOLVED that this Commission hereby adopts the following program in accordance with the provisions of *ORS 536.300(2) pertaining to the* water resources of the John Day River Basin

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the John Day River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, *irrigation, power development,* industrial, *mining,* recreation, pollution abatement, wildlife and fish life uses. The waters of the John Day River Basin are hereby so classified with the following exceptions

1. The maximum economic development of this state, the attainment of the highest and best use of the waters of the natural lakes of the John Day River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7-1/2 theoretical horsepower, recreation, wildlife and fish life uses, and the waters of the natural lakes of the John Day River Basin are hereby so classified.

2. The maximum economic development of this state, the attainment of the highest and best use of the waters of the John Day River from Service Creek Bridge (river mile 157) to Tumwater Falls (river mile 10), and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, industrial, mining, recreation, wildlife and fish life uses;

B. For the purpose of maintaining a minimum perennial streamflow *sufficient to support aquatic life, no appropriations* of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters listed below and as shown in Table 1:

1. The Middle Fork John Day River above its mouth or of its tributaries for flows of the Middle Fork John Day River at USGS Gage 14-0440 at Ritter (SW 1/4 NW 1/4 Section 8, Township 8 South, Range 30 East) below 10 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

2. The North Fork John Day River above former USGS Gage 14-0415 near Dale (SE 1/4 SE 1/4 Section 35, Township 6 South, Range 31 East) or of its tributaries above said gage for flows of the North Fork John Day River below 35 cubic feet per second measured at said gage except that this limitation shall not *apply to waters legally stored or legally released from storage.*

3. The North Fork John Day River above its mouth or of its tributaries for flows of the North Fork John Day River at USGS Gage 14-0460 at Monument (SE 1/4 Section 2, Township 9 South, Range 27 East) below 55 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

4. The John Day River above USGS 14-0465 at Service Creek (N 1/2 Section 18, Township 9 South, Range 23 East) or of its tributaries above said gage for flows of the John Day River below 30 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

5. The John Day River above its mouth or of its tributaries for flows of the John Day River at USGS Gage 14-0480 at McDonald Ferry (NW 1/4 Section 11, Township 1 North, Range 19 East) below 20 cubic feet per second measured at said gage except that this limitation shall not apply to waters legally stored or legally released from storage.

C. To support aquatic life and minimize pollution, in accordance with Section 3, Chapter 796, Oregon Laws, 1983, no appropriation of water shall be made or granted by any state agency or public corporation of the state for waters of the streams and tributaries in Table 1 when the flows are below the levels specified. This limitation shall not apply to:

a. Water legally stored or released from storage.
b. Domestic and livestock uses.
c. Municipal uses on Bridge Creek, South Fork John Day River, and the John Day River from USGS gage 14038530 to the North Fork.
d. Industrial use rights and industrial use under permits with priority dates before December 2, 1986 on the John Day River from USGS gage 14038530 to the North Fork.

Attainment of the specified flow levels during some portion of the year will require use of stored water or other measures to augment flows.

D. Applications for the use of the waters of the John Day River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

E. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

F. Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give cognizance to the multiple-purpose concept.

Dated December 2, 1985

WATER RESOURCES COMMISSION

William N. Young
William H. Young, Director
WATER RESOURCES DEPARTMENT

4918A

TABLE 1
JOHN DAY RIVER BASIN
Minimum Perennial Streamflows (cfs)

DOC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG 1-15/16-31	SEP	OCT	NOV	Priority Date
JOHN DAY RIVER MAINSTEM												
John Day River from Rail Creek to USGS gage 14-03830												
25	25	25	24	24	24	25	15	15/34	34	25	25	11/03/83
John Day River from USGS gage 14-034500 (above John Day) to South Fork												
80	80	80/118	118	118	118	80	30/30	30	30	30	80	11/03/83
John Day River from South Fork downstream to North Fork												
120	120	120/140	140	140	140	120	40	40	40	60	120	11/03/83
John Day River at USGS gage 14043000 (near Service Creek)												
30	30	30	30	30	30	30	30	30	30	30	30	4/03/64
John Day River: at USGS gage 14048000 (at McDonald Ferry)												
20	20	20	20	20	20	20	20	20	20	20	20	4/03/64
Canyon Creek from East Fork to mouth (near John Day)												
25	25	25/34	34	34	34	25	15/9	9	9	9	15	11/03/83
Beech Creek: from East Fork to mouth (near Mt. Vernon)												
30	30	30/44	44	44	44	30	15/8	8	8	8	15	11/03/83
South Fork of John Day River from Black Canyon to mouth (at Dayville)												
100	100	100/133	133	133	133	100	50/25	25	25	25	50	11/03/83

DOC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG	SEP 1-15/16-31	OCT	NOV	Priority Date
JOHN DAY RIVER MAINSTEM												
Cottonwood Creek (below Dayville): to mouth												
10	10	10/15	15	15	15	10	7/3	3	3	3	10	11/03/83
Rock Creek: from Mountain Creek to mouth (in Picture Gorge)												
35	35	35/50	50	50	50	35	20/10	10	10	10	20	11/03/83
Bridge Creek from mouth of Bear Creek to mouth												
25	25	25/40	40	40	40	25	15/4	4	4	4	25	11/03/83
NORTH FORK OF JOHN DAY RIVER												
Granite Creek: from Clear Creek to mouth												
55	55	55	71	71	71	55	30	30/71	71/30	30	30	11/03/83
North Fork at Dale												
55	55	55	55	55	55	55	55	55	55	55	55	4/03/63
North Fork from USGS gage 14-0460 (near Monument) to mouth												
55	55	55	55	55	55	55	55	55	55	55	55	04/03/64

DOC	JAN	FEB 1-15/16-29	MAR	APR	MAY	JUN	JUL 1-15/16-31	AUG 1-15/15-30	SEP 1-15/16-30	OCT 1-15/16-31	NOV	Priority Date
MIDDLE FORK OF JOHN DAY												
Clear Creek to mouth												
18	18	18	25	25	25	14	10/4	4/25	25/10	10	10	11/03/83
Middle Fork from USGS gage 14-0440 (near Ritter) to mouth												
10 80*	10 80	10 80/125*	10 125*	10 125*	10 125*	10 80*	10 50/25*	10 25/125*	10 125/50*	10 50*	10 80*	04/03/64 11/03/83

BEFORE THE WATER POLICY REVIEW BOARD

OF THE

STATE OF OREGON

In the matter of formulating an integrated, coordinated program for the use and control of the water resources of the Deschutes River Basin	))))	Deschutes River Basin November 29, 1984*

WHEREAS the State Water Resources Board under the authority of ORS 536.300 completed a study of the Deschutes River Basin,

WHEREAS results of that study were published in State Water Resources Board Report, Deschutes River Basin, dated January 1961;

WHEREAS the Water Policy Review Board under the authority of ORS 536.340 may reclassify the water resources of the Deschutes River Basin;

WHEREAS the Water Policy Review Board under the authority of ORS 536.300 and 536.340 has undertaken a restudy of the water resources of the Deschutes River Basin,

WHEREAS in this study consideration was given to means and methods of augmenting, conserving, and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control; and

WHEREAS as a result of said study the following findings have been reached by this Board

1. The total quantity of water is sufficient on an average year basis to satisfy all existing and contemplated needs and uses of water with the exception of utilization of water to minimize pollution.

2 Flows are not sufficient on many streams during the summer months of average water years to supply existing and future demands.

3. Simultaneous use of a major portion of existing consumptive rights results in flows at or near the zero level on some streams during the summer months.

4. Augmentation of the water resources can be achieved through storage of surplus winter and spring runoff; reduction of storage, channel, and transmission losses; and more efficient use of presently appropriated water.

5. There are physically feasible storage sites in the basin.

6. Unappropriated waters of the Deschutes River and its tributaries above Bend, Tumalo Creek above Columbia-Southern Canal, Crooked River, Ochoco Creek and White River and its tributaries have been withdrawn for special uses.

7. The established limited purposes of existing storage developments restrict multiple beneficial use of the water resources.

8. The existence of ground water has been established in certain sections of the basin, but quantities have not been determined.

9. Domestic, livestock, and municipal uses of water, while important, represent minor quantities in existing and contemplated future water use.

10. Irrigation is and will continue to be the major consumptive water use in the basin.

11. Adequately irrigated agricultural lands represent only a small portion of the total irrigated area.

12. The existing irrigated acreage could be more than doubled providing an adequate supply of water were available.

13. The basin has substantial potential for power development.

14. The basin has potential for industrial development.

15. Sufficient water will not be available in many locations for major water-using industries *without provision for seasonal* storage, acquisition of existing rights, or development of ground water resources.

16. The use of water for mining purposes is slight and is not expected to increase materially in the foreseeable future.

17. *Recreation is a major* use of water and an important factor in the economy of the basin.

18. There is an abundance of reservoirs, lakes and streams available for water-based recreation in the western portion of the basin.

19. There is potential *for more extensive use of existing* waters for recreation purposes.

* Modifies Deschutes Basin Programs dated February 20, 1962; May 24, 1962, April 3, 1964, May 26, 1967, July 7, 1978, January 10, 1980, April 1, 1980 and April 4, 1981

20. In the area of intermittent streams, reservoirs provide water-based recreation.

21. Water consumption by wildlife does not represent a significant quantity.

22. A major conflict exists between irrigation and fish life use of water.

23. A major conflict exists between power and fish life use of water.

24. Reduction of present reservoir and stream level fluctuations, maintenance of minimum reservoir levels and improved streamflows would enhance fish life and recreation.

25. River related recreation is important to the economy of the upper Deschutes Basin.

26 The support of resident and stocked fish is essential to river-related recreation.

27. Recommended base flows suggested by fisheries agencies are substantially higher in many locations than flow levels that can be obtained during average water years under current stream regimen and existing water rights and priorities.

28. Storage and scheduled releases of excess winter and spring runoff, reduction of channel and transmission losses, or acquisition of some existing rights would be necessary to obtain the flows recommended by fisheries agencies The economic feasibility of such measures has not been determined.

29. Pollution of surface and ground water is not a significant problem at present.

30. Floods, drainage and streambank erosion are not major problems.

31. *Major foreseeable quantitative uses of water in the Deschutes River* Basin will be for irrigation, power, recreation, and fish life uses.

32. Utilization of flows to minimize pollution should not be permitted if such use limits or conflicts with the multiple-purpose concept.

33. Establishment of restrictions on further appropriations would prevent an increase in depletion potential on some streams which would aid in maintaining minimum flows.

34. Where streams are seasonally overappropriated, the establishment of restrictive actions would have no immediate physical effect until additional flows become available

35. Criteria for determination of desirable base flows commensurate with all beneficial uses have not been developed. Flow levels for recreational use may be substantially greater than flows recommended for the support of aquatic life.

36. It is imperative that single-purpose development of available sites does not preclude optimum utilization of the resource.

37. Certain major rivers, or river sections, and numerous lakes, minor streams, and creeks are by nature of their physiography, location, land ownership, or economic potential available only for limited resource uses.

38. Physical features, degree of economic development, and water use requirements vary from subbasin to subbasin.

NOW THEREFORE BE IT RESOLVED that for reason of variance in physical features, degree of economic development, and water use requirements from subbasin to subbasin, the Board adopts the following findings and issues program statements for each of the subbasins of the Deschutes River Basin.

UPPER DESCHUTES RIVER

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the Upper Deschutes River Basin as delineated on State Water Resources Board Map, File 5.7014;

WHEREAS in this study consideration was given to means and methods of augmenting, conserving and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control, and

WHEREAS as a result of said study the following findings have been reached by this Board:

1. The total quantity of water is sufficient on an average-year basis to satisfy all existing and contemplated needs and uses of water with the exception of utilization of water to minimize pollution.

2. There is not enough water legally available on a critical-year basis to meet existing and contemplated consumptive needs within this basin.

3. Maldistribution exists with regard to physical location and with respect to availability during time of need.

4. Many streams do not provide enough flow for present nonconsumptive public uses in periods of relatively low as well as critical flow.

5. Augmentation of the water resources in periods of need would require storage of surplus runoff.

6. There are physically feasible storage sites in the basin

7. The existence of ground water has been established in certain sections of the basin, but quantities have not been determined.

8. *All unappropriated waters of the* Deschutes River and its tributaries above Bend have been withdrawn by the State Engineer for domestic, irrigation and power purposes.

9. A major portion of the withdrawn waters has *been appropriated.*

10. There is need to insure water for domestic, livestock, and municipal uses which, while small, are of benefit to the state.

11. Irrigation use of water is small in this basin and is not expected to increase materially in the foreseeable future.

12. Substantial quantities of water have been appropriated for irrigation use in downstream basins.

13. Power development appears to be economically and physically feasible.

14. There is limited potential for industrial use of water.

15. There are no existing water rights for mining operations in the basin. Potential for such use of water appears to be minor.

16. The basin has potential for expanded recreation *use of water. The* natural lakes and reservoirs constitute valuable recreation assets.

17. Water consumption by wildlife does not represent a significant quantity.

18. There are no anadromous fish in the basin, but resident fish *constitute an important asset of the state.*

19. There is potential for development of anadromous fish, but this cannot be achieved without the improvement of fish passage and low-flow conditions

20. Conflicts exist between fish life and irrigation uses of water.

21. Pollution of surface and ground water is not a significant problem.

22. Drainage and reclamation of drained lands are not significant factors in present *and contemplated water use*

23. Flood problems are minor.

24. Utilization of flows to minimize pollution should not be permitted if such use interferes with the multiple-purpose concept.

25 Certain lakes are, by nature of their physiography, location, land ownership, or economic potential available only for limited resource *use.*

26. The maximum beneficial use of the waters of the Upper Deschutes River Basin will be for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, *wildlife and fish life* uses.

NOW THEREFORE BE IT RESOLVED that this Board hereby adopts the following program in accordance with the provisions of ORS 536.300(2) pertaining to the water resources of the Upper Deschutes River Basin.

A. *The maximum economic development* of this state, the attainment of the highest and best use of the waters of the Upper Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters *only for domestic,* livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Upper Deschutes River Basin are hereby so classified with the following exception:

> The maximum economic development of this state, the attainment of the highest *and best use of* the waters of the natural lakes of the Upper Deschutes River Basin, except for Crescent Lake, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for *domestic,* livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7 1/2 theoretical horsepower, recreation, wildlife and fish life uses and the waters of the natural lakes, Upper Deschutes River Basin, except for Crescent Lake, are hereby so classified.

B. To support *aquatic life and minimize* pollution, in accordance with Section 3, Chapter 796, Oregon Laws, 1983, no appropriation of water shall be made or granted by any state agency or public corporation of the state for waters of the Upper Deschutes River and tributaries when flows are below the levels specified *in Table 1. This* limitation shall not apply to

1. *Human* and livestock consumption.
2 Water legally released from storage.

Attainment of the specified flow levels during some portions of the year will require development of water *storage or implementation* of other measures to augment flows.

C. Applications for the use of the waters of the Upper Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

D. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on the condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

E. Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

MIDDLE DESCHUTES RIVER

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the Middle Deschutes River Basin as delineated on State Water Resources Board Map, File 5.7014.

WHEREAS in this study consideration was given to means and methods of augmenting, conserving, and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control; and

WHEREAS as a result of said study the following findings have been reached by this Board

1. The total quantity of water is sufficient on an average-year basis to *satisfy all* existing and contemplated needs and uses of water in this basin with the exception of utilization of water to minimize pollution.

2 Maldistribution exists with regard to physical location and with respect to availability during time of need.

3. Simultaneous use of a major portion of existing consumptive rights results in flows at or near the zero level on many streams during the summer months.

TABLE 1
Minimum Perennial Streamflows
(Cubic Feet per Second)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Priority Date
Deschutes River - to be maintained from Wickiup Reservoir to the confluence of the Little Deschutes River	300	300	300	300	300	300	300	300	300	300	300	300	11-3-83
Deschutes River - to be maintained from Little Deschutes River to the confluence of Spring River	400	400	400	400	400	400	400	400	400	400	400	400	11-3-83
Deschutes River - to be maintained from Spring River to North Canal Dam at Bend	660	660	660	660	660	660	660	660	660	660	660	660	11-3-83

4. The existence of ground water has been established in certain sections of the basin, but quantities have not been determined.

5. There are legislative restrictions on the use of waters of Tumalo Creek.

6 There is need to insure water for domestic, livestock and municipal uses which, while small, are of benefit to the state.

7. Irrigation is and will continue to be the major consumptive use of water.

8 Natural flow and present degree of regulation are insufficient to satisfy existing irrigation requirements

9 Water supply will be a limiting factor in developing potential irrigable land.

10. Augmentation of the water resources in periods of need can be achieved through storage of surplus winter and spring runoff, reduction of storage, channel, and transmission losses; and more efficient use of presently appropriated water.

11. There are physically feasible storage sites.

12. There is substantial potential for power development.

13. The development of the power potential could seriously conflict with recreation and fish life values.

14. There is considerable potential for industrial use of water

15. Storage and scheduled releases of surplus winter and spring runoff; reduction of channel and transmission losses, or acquisition of some existing rights would be necessary to obtain the waters needed by major water-using industries.

16. Use of water for mining purposes is slight and is not expected to increase materially in the foreseeable future.

17. Recreation is a major use of water.

18. The Metolius River is superior as a natural recreation value.

19. Water consumption by wildlife does not represent a significant quantity.

20. There is inadequate streamflow for fishery requirements.

21. Base flows recommended by fisheries agencies are substantially higher in many locations than flow levels that can be obtained during average water years under current stream regimen and existing water rights and priorities.

22. Pollution of surface and ground water is not a significant problem.

23. Major foreseeable quantitative uses of water will be for irrigation, power, recreation and fish life.

24. Utilization of flows to minimize pollution should not be permitted if such use limits or conflicts with the multiple-purpose concept

25. Maintenance of minimum perennial streamflows would generally benefit recreation, wildlife and fish life.

26. Criteria for determination of desirable base flows commensurate with all beneficial uses of water have not been developed.

27. Certain river sections, minor streams, creeks and lakes are by nature of their physiography, location, land ownership, or economic potential available only for limited resource use.

28. The maximum beneficial use of the waters of the Middle Deschutes River Basin will be for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses.

NOW THEREFORE BE IT RESOLVED that this Board hereby adopts the following program in accordance with the provisions of ORS 536.300(2) pertaining to the water resources of the Middle Deschutes River Basin.

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the Middle Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Middle Deschutes River Basin are hereby so classified with the following exceptions·

   1. The State Water Resources Board program, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

   2. The maximum economic development of this state, the attainment of the highest and best use of the waters of the main stem, Metolius River, above river mile 13.0, and the attainment of an integrated and coordinated program for the benefit of the state

as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or non-commercial garden not to exceed one-half acre in area, power development, recreation, wildlife and fish life uses and the waters of the main stem, Metolius River, above river mile 13.0, are hereby so classified.

3. Further, no out-of-basin diversions of the waters of the mainstem Metolius River, above river mile 13.0, shall be permitted for any use.

4. No further appropriations except for domestic or livestock uses shall be permitted for waters of the mainstem Deschutes River, *from the head of Lake Billy Chinook* near river mile 120 to the North Canal Dam near river mile 165.

5. The maximum economic development of this state, the attainment of the highest and best use of the waters of the natural lakes of the Middle Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7-1/2 theoretical horsepower, recreation, wildlife and fish life uses.

B. For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life, no appropriations of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters of Lake Creek or its tributaries above the confluence of Lake Creek with the Metolius River for flows of Lake Creek below 20 cubic feet per second measured at the mouth of Lake Creek except that this limitation shall not apply to waters legally stored or legally released from storage (priority date - May 24, 1962).

C. Applications for the use of the waters of the Middle Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

D. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

E Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudical to the public interest unless planned, constructed, and

operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

LOWER DESCHUTES RIVER

WHEREAS the State Water Resources Board under the authority of ORS 536.300 studied the Lower Deschutes River Basin as delineated on State Water Resources Board Map, File 5.7014;

WHEREAS the Water Policy Review Board under the authority of ORS 536.300 and *536.340* has undertaken a *restudy of the Lower Deschutes Basin*;

WHEREAS in this study consideration was given to means and methods of augmenting, conserving and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation and flood control; and

WHEREAS as a result of said study the following findings have been reached by this Board for the tributaries of the Deschutes River within the Lower Deschutes River Basin:

1. The total quantity of water is sufficient on an average-year basis to satisfy existing needs and uses of water with the exception of utilization of water to minimize pollution.

2. Maldistribution exists with regard to physical location and with respect to availability during time of need

3. Many streams do not provide enough flow for nonconsumptive public uses at present in periods of relatively low as well as critical flow.

4. Simultaneous use of a major portion of existing consumptive rights results in flows at or near the zero level on many streams during the summer months.

5. Flows, unless augmented by storage, would not be sufficient on most streams during the summer months to supply future consumptive and nonconsumptive demands.

6. The existence of ground water has been established in certain sections of the basin, but quantities have not been determined

7 All unappropriated waters of White River and tributaries have been withdrawn by the State Engineer for special uses.

8. There is need to insure quantities of water for domestic, livestock, and municipal uses which, while small, are of benefit to the state.

9. Irrigation is and will continue to be the major consumptive use of water.

10. Potential exists for the development of the agricultural economy through expanded irrigation

11. The unavailability of dependable supplies of adequate water in the future would be a restriction on the development of the agricultural potential of the basin.

12. Power development appears to be economically and physically feasible.

13. There is limited potential for industrial use of water.

14. Use of water for mining purposes is slight and is not expected to increase materially in the foreseeable future.

15. Recreation is an important use of water in the basin.

16. Water consumption by wildlife does not represent a significant quantity.

17. Full development of the anadromous fishery potential cannot be achieved without the improvement of fish passage and low-flow conditions.

18 Material improvement of minimum flows for fish life cannot be achieved without the development of surface water storage.

19. Pollution of surface and ground water is not a significant problem

20. Major foreseeable quantitative uses of water of the Lower Deschutes Basin will be for irrigation, recreation, and fish life.

21. Drainage and reclamation of drained lands are not significant factors in present and contemplated water use.

22. Limited flood problems exist, mainly on the eastern tributaries of the Deschutes River.

23. There are physically-feasible storage sites within the basin.

24. Small reservoirs on minor tributaries could reduce flash floods and streambank erosion and provide late-season irrigation water.

25. Utilization of flows to minimize pollution should not be permitted if such use limits or conflicts with the multiple-purpose concept.

26. Maintenance of minimum perennial streamflows would be in the public interest.

27. Certain lakes are by nature of their physiography, location, land ownership, or economic potential available only for limited resource use.

28. Criteria for determination of desirable base flows commensurate with all beneficial uses of water have not been developed, although information is available on flow requirements for aquatic life.

29. The maximum benefical use of the waters of the tributaries of the Deschutes River within the Lower Deschutes Basin will be for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses.

NOW THEREFORE BE IT RESOLVED that this Board hereby adopts the following program in accordance with the provisions of ORS 536.300(2) pertaining to the water resources of the Lower Deschutes River Basin:

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the Lower Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Lower Deschutes River Basin are hereby so classified with the following exceptions:

   1. The State Water Resources Board program, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

   2. The waters of Boulder Lake in Hood River and Wasco Counties are classified only for domestic and livestock uses; power development not to exceed 7-1/2 theoretical horsepower; recreation, wildlife and fish life uses; and irrigation not to exceed 100 acre-feet annually from water stored in the lake.

   3. The maximum economic development of this state, the attainment of the highest and best use of the waters of the other natural lakes of the Lower Deschutes River Basin, and the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7-1/2 theoretical horsepower, recreation, wildlife, and fish life uses and the waters of the natural lakes of the Lower Deschutes River Basin are hereby so classified.

B. For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life, no appropriations of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters of the White River or its tributaries above the confluence of White River with the Deschutes River for flows of the White River below the specified flows in Table 2, except that this limitation shall not apply to waters legally stored or legally released from storage.

C. Applications for the use of the waters of the Lower Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

D. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

E. Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give cognizance to the multiple-purpose concept.

DESCHUTES - UPPER CROOKED RIVER

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the Deschutes - Upper Crooked River Basin as delineated on State Water Resources Board Map, File 5.7014,

WHEREAS in this study consideration was given to means and methods of augmenting, conserving and classifying such water resources, existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses, and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control, and

WHEREAS as a result of said study the following findings have been reached by this Board.

1. The total quantity of water is sufficient on an average-year basis to satisfy all existing rights to water in this basin.

2. There is not enough water on a critical-year basis to meet existing consumptive needs.

TABLE 2
Minimum Perennial Streamflows
(Cubic Feet per Second)

OCT	NOV	DEC	JAN	FEB 1-15	FEB 16-29	MAR	APR	MAY	JUN	JUL	AUG	SEP	Priority Date
Measured at USGS gage 14101400 and maintained to the confluence of the White River and Deschutes River													
60	60	60	60	60	100	145	145	145	100	60	60	60	1-10-80
60	60	60	60	60	95	95	95	95	95	60	60	60	5-24-62

3. Maldistribution exists with regard to physical location and with respect to availability during time of need.

4. Simultaneous use of a major portion of existing consumptive rights results in flows at or near the zero level on many streams during the summer months.

5. Most streams do not provide enough flow for nonconsumptive public uses at present in periods of relatively low as well as critical flow.

6. The existence of ground water has been established in certain sections of the basin, but quantities have not been determined.

7. There is need to insure quantities of water for domestic, livestock, municipal and mining uses which, while small, are of benefit to the state.

8. There are no municipal water systems in the basin.

9. Irrigation is and will continue to be the major consumptive use of water.

10. Most irrigated lands in the basin do not receive an adequate supply of water.

11. Substantially more than the average annual yield of the Upper Crooked River Basin has been withdrawn by the State Engineer for irrigation purposes.

12. Power development appears to be economically and physically feasible.

13. There is limited potential for industrial use of water.

14. Water-based recreation will become a more significant use of water in this basin.

15. Water consumption by wildlife does not represent a significant quantity.

16. Game fish populations are limited because of extreme low flows, high water temperatures, and extensive populations of rough fish.

17. Pollution of surface and ground water is not a significant problem.

18 Drainage and reclamation of drained lands are not significant factors in present and contemplated water use

19. Flood problems exist mainly on the mainstem of Crooked River.

20 There are physically feasible storage sites within the basin.

21. Small reservoirs on minor tributaries could reduce flash floods and streambank erosion and provide late-season irrigation water.

22. Utilization of flows to minimize pollution should not be permitted if such use limits or conflicts with the multiple-purpose concept.

23. Criteria for determination of desirable base flows commensurate with all beneficial uses of water have not been developed.

24. The maximum beneficial use of the waters of the Upper Crooked River Basin will be for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses.

NOW THEREFORE BE IT RESOLVED that this Board hereby adopts the following program in accordance with the provisions of ORS 536.300(2) pertaining to the water resources of the Deschutes - Upper Crooked River Basin:

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the Deschutes - Upper Crooked River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Deschutes - Upper Crooked River Basin are hereby so classified.

B. Applications for the use of the waters of the Deschutes - Upper Crooked River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

C. Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

D. Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

DESCHUTES - LOWER CROOKED RIVER

WHEREAS the State Water Resources Board under the authority of ORS 536.300 has undertaken a study of the Deschutes - Lower Crooked River Basin as delineated on State Water Resources Board Map, File 5.7014;

WHEREAS in this study consideration was given to means and methods of augmenting, conserving, and classifying such water resources, existing and contemplated needs and uses of water for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and for pollution abatement as well as other related subjects including drainage, reclamation, and flood control, and

WHEREAS as a result of said study the following findings have been reached by this Board:

1. The total quantity of water is sufficient on an average year basis to satisfy all existing and contemplated consumptive needs and uses of water.

2. There are streams within the basin whose average annual yield is not sufficient to satisfy existing rights.

3. Maldistribution exists with regard to physical location and with respect to availability during time of need.

4. Simultaneous use of a major portion of existing consumptive rights results in flows at or near the zero level on many streams during the summer months.

5 Most streams in the basin do not provide enough flow for nonconsumptive public uses at present in periods of relatively low as well as critical flow

6 The existence of ground water has been established in certain sections of the basin, but quantities have not been determined.

7. There is need to insure water for domestic, livestock, municipal and mining uses which, while small, are of benefit to the state.

8. Irrigation is and will continue to be the major consumptive use of water.

9 There is additional potential for irrigation use of water.

10. Power development appears to be economically and physically feasible.

11. There is potential for industrial use of water.

12. Sufficient water will not be available in many locations for major water-using industries without the provision of seasonal storage.

13. Reservoirs will provide a major portion of water-based recreation.

14. The waters of the Crooked River, including Opal Springs, from rive mile 6.5 to river mile 18.0, are a valuable source of municipal, irrigation, and industrial water.

15. Little potential for enhancement of fish life exists and is dependent upon securing adequate streamflow.

16. Increases of population and the need to serve presently unsewered areas will require municipal sewerage works to be expanded

17. Limited flood problems exist.

18. A coordinated plan of operation of Ochoco and Prineville Reservoirs will materially alleviate flood damages in the Prineville Valley.

19. There are physically feasible storage sites within the basin.

20. Small reservoirs on minor tributaries could reduce flash floods and streambank erosion and provide late-season irrigation water.

21. Utilization of flows to minimize pollution should not be permitted if such use limits or conflicts with the multiple-purpose concept.

22. Certain river sections, minor streams and creeks are by nature of their physiography, location, land ownership, or economic potential available only for limited resource use.

23. Criteria for determination of desirable base flows commensurate with all beneficial uses of water have not been developed.

24. The maximum beneficial use of the waters of the Deschutes - Lower Crooked River Basin will be for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses.

NOW THEREFORE BE IT RESOLVED that this Board hereby adopts the following program in accordance with the provisions of ORS 536.300(2) pertaining to the water resources of the Deschutes - Lower Crooked River Basin:

A. The maximum economic development of this state, the attainment of the highest and best use of the waters of the Deschutes - Lower Crooked River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Deschutes - Lower Crooked River Basin are hereby so classified with the following exceptions:

1. The State Water Resources Board program, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

2 No further appropriations of water except for domestic or livestock uses shall be made or granted by any state agency for the waters of Ochoco Creek and its tributaries.

B. Applications for the use of the waters of the Deschutes - Lower Crooked River Basin shall not be accepted by any state agency for any other use and the granting of applications for such uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

C. Rights to use water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

D. Structures or works for the utilization of the water in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

Dated November 29, 1984

WATER POLICY REVIEW BOARD

Ralf Hakanson, Chairman
WATER POLICY REVIEW BOARD

4929A

VICTOR ATIYEH
GOVERNOR

OREGON STATE LAND BOARD
VICTOR ATIYEH
Governor
BARBARA ROBERTS
Secretary of State
BILL RUTHERFORD
State Treasurer

Division of State Lands

1600 STATE STREET, SALEM, OREGON 97310 PHONE 378-3805

November 17, 1986

Bob Brown
Office of State Forester
2600 State Street
Salem, OR 97310

Re. Ochoco National Forest Agency Response

Dear Bob

Our concern is that the Forest Service has not addressed the effect their management plan will have on similar resources managed by the state or adjacent private lands.

The federal government, as the major landowner in a geographical area, can, with it's management policies, enhance or stifle the economy or alter the development of that area. We feel this is a very important aspect which needs attention in the management plan.

Thank you for your consideration in this matter I will look forward to seeing you at the meeting on November 24.

Sincerely,

Perry E. Lumley
Engineering Technician

PEL/amg
0492E

VICTOR ATIYEH
GOVERNOR

Oregon Department of Agriculture

635 CAPITOL STREET NE, SALEM, OREGON 97310-0110

November 5, 1986

James E. Brown, State Forester
Oregon Forestry Department
2600 State St.
SALEM OR 97310

Dear Jim:

The proposed Land and Resource Management Plan of the Ochoco National Forest and Crooked River area is within the Jefferson, Wheeler, Grant, Crook, Deschutes, and Harney County Soil and Water Conservation Districts. Each of these districts are governed by a Board of local elected Directors who, under the Oregon Soil and Water Conservation District Laws, ORS 568, have a responsibility to work with the Forestry Department as described in the Memorandum of Understanding between the Department of Agriculture and the Forestry Department.

ORS 568.225 empowers the districts to provide for conservation of renewable natural resources of the state, to conserve and develop natural resources, control and prevent soil erosion, control floods, conserve and develop water resources and water quality, preserve wildlife, conserve natural beauty, and promote recreational development.

Each chapter of the Ochoco National Forest and Crooked River proposed Land and Resource Management Plan identifies areas where the soil and water conservation districts would have concerns. Such as, how the implementation would affect the soil and water runoff, and to what extent erosion and sedimentation would be kept to a level within acceptable standards.

The study, as written, defines areas that show what is being proposed to minimize soil and water problems. If these suggestions are followed throughout the program, and if assistance from Soil Conservation Service and soil and water conservation districts is utilized, there would be greater chance of improved soil and water conservation practices being followed throughout the study area.

Sincerely,

George C. Stubbert, Administrator
Soil & Water Conservation Division
(503) 378-3810

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VICTOR ATIYEH
GOVERNOR

Department of Energy

625 MARION ST NE, SALEM, OREGON 97310 PHONE 378-4040 TOLL FREE 1-800-221-8035

November 7, 1986

Mr James E Brown, State Forester
Oregon Forestry Department
2600 State Street
Salem, OR 97310

SUBJECT Ochoco National Forest and Crooked River National Grassland Proposed Land and Resource Management Plan

Dear Mr Brown

The Oregon Department of Energy has reviewed the Forest and Grassland Proposed Land and Resource Management Plan, DEIS and Appendices The Department has no problems with the Proposed Forest and Grassland Plan

Areas of interest to the Department are siting of major energy facilities and policies concerning development of energy resources Major energy facilities include fossil-fueled, geothermal, hydroelectric and biomass plants over 25 MW in size, biomass-fueled co-generation plants in excess of 50 MW capacity, high voltage transmission lines and large pipelines Our comments are below

Fossil Fuels The DEIS suggests that 90 percent of Ochoco lands are prospectively valuable for oil or gas resources ODOE feels the lack of conclusive data, other than speculative leases, may not support that conclusion However, ODOE agrees that any post leasing activities will be evaluated through both NEPA and prescriptions developed in this plan In addition, there appears to be little potential of siting a fossil-fueled power plant in the Forest and Grassland Thus, none of the alternatives presented by the DEIS, including the Preferred Alternative, appear to have any effect on siting these facilities

Geothermal The low potential of finding exploitable geothermal resources in the Forest and Grassland is indicated in the DEIS ODOE agrees with this conclusion and the resulting lack of specific policies addressing development of this energy resource In addition, other federal standards exist should development ever appear likely

Hydroelectric There appears to be little potential to develop additional hydroelectric facilities which are larger than 25 megawatts in the Forest and Grassland Thus, none of the alternatives presented in the DEIS appear to have any effect on siting these facilities

The Oregon Department of Energy is an Equal Opportunity Employer

Biomass There appears to be little potential of siting a biomass-fired power plant in the Forest and Grassland in the next ten to fifteen years Thus, none of the alternatives presented by the DEIS, including the Preferred Alternative, appear to have any effect on siting these facilities

Transmission Lines and Pipelines The DEIS indicates that transmission lines and pipelines cross portions of the Forest and Grassland, and that additional facilities are likely in the future The DEIS states that all alternatives allow the transmission of power through the area Thus, the Department has no objection to the Proposed Alternative However, the DEIS contains no discussion of the effects of the alternatives on siting transmission lines and pipelines Given the likelihood that future transmission lines and/or pipelines will need to cross the Grassland, the DEIS would benefit from including such a discussion

Sincerely,

Lynn Frank
Director

TEM/LF ja
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VICTOR ATIYEH
GOVERNOR

Department of Geology and Mineral Industries
ADMINISTRATIVE OFFICE
910 STATE OFFICE BLDG , 1400 SW 5th AVE , PORTLAND, OR 97201-5528 PHONE (503) 229-5580

November 12, 1986

Mr. James E. Brown
Department of Forestry
2600 State Street
Salem, Oregon 97310

Dear Jim,

We have prepared this response to the Draft Environmental Impact Statement to the Proposed Land and Resource Management Plan for the Ochoco National Forest & Crooked River National Grassland.

Apparently the planning team has a minimal background in geology and mineral resources. A different set of standards were used for minerals than for other resources. For example, a dollar value was placed on campers using the forest but the thousands of dollars worth of mineral exploration that has occurred in recent years was not counted. Thousands of dollars worth of gemstone production from commercial and recreational sites was not counted. The $999,000 ($3.00 per ton for 333,000 tons) of road metal (aggregate) was not counted; however, a cost figure of $866,080 was used for mineral operations and maintenance program management.

Appendix B - Description of Analysis Process contains no inventories for minerals, no maps showing rock quarries, mining claims, gemstone mines or metal mines. The data base does not reflect the gold and other geochemical anomalies, found in the Department's open-file reports 0-83-4 and 0-86-6, which suggest mineral potential. It is surprising that the land was rated as moderate or high mineral potential without an adequate mineral resource data base.

The following detailed comments may be helpful in revising these documents.:

Appendices - Draft Environmental Impact Statement

Page	Comments
A-5	The issue of "Provide a mining and mineral inventory" and "Geothermal energy opportunities should be studied and developed" were deferred for resolution outside of Forest Plan. However, judgments were made in these documents that could only be made based on inventory data.
B-4,5 & 6	If inventories could be performed on recreation, cultural resources, ecoclass, and soil and water, why not minerals including energy?
B-44	On this page minerals had a cost of $866,080. Under Benefits pages B-45 to B-50 minerals are not listed except as something that would hurt the protecting of historic and cultural resources. Under Priced Benefits should include the value of road metal, gemstone production, and mineral exploration. Oil and gas and geothermal energy lease revenues should also be included under Price Benefits.
C-5 &C-8	For the Lookout Mountain roadless area on page C-5 only 2 mines are within the roadless boundaries, on page C-8 there are 200 mining claims within the boundaries.
C-40	How was the grading of Moderate Potential for the Greer Mountain roadless area derived? The potential given for those roadless areas with mining, claims, mines, and mining districts are listed as unknown.
E-3	The Department and BLM have identified a potential gold mineralized area just to the south of Haystack Butte. This area should not be withdrawn from mineral location or leasing.

Draft Environmental Impact Statement

Page	Comments
12	Under Net Public Benefits, only Federal minerals are listed as having a market value. The market value of the exploration, development, and mining of locatable minerals should be added.
17	It is shown that Alternative H would emphasize market opportunities. This is the alternative that is used until formal mineral inventory is completed.
49	The statement is made that alternatives have little effect on mineral activities is not true. Withdrawing acres from mineral location has an effect of mineral activity. Under Economic Benefits the production of locatable minerals is not considered.
79	The Forest Service has not performed a mineral resource inventory but under "Cultural Resources" mines and mining camps have been inventoried.
83	The statement is made that "Mineral and Energy Resources on Forest and Grasslands" have been classified in terms of potential value and existing access restrictions. How can this be so when there has not been a mineral inventory? The statement is made that the forest and grassland have no known geothermal resources. The Department's geothermal maps show a warm water spring on the Forest.
146	The bias against mineral production is shown in the statement that several old mines may meet the National Register and that potential could be used against re-establishing any of these mines.
162	The jasperoid being mined may be an indicator of a hot spring gold systems and rockhound sites should not be withdrawn from being located under the mining law
163	A mineral inventory should be completed before areas are picked for Research Natural Area.
180-186	No geologist or mineral people were listed as preparers.
217-226	No mineral or geology reports were listed in the references.

Sincerely,

John D. Beaulieu
Deputy State Geologist

JDB:ab
AT1/word/brown

VICTOR ATIYEH
Governor

Department of Environmental Quality

522 SW FIFTH AVENUE BOX 1760, PORTLAND OREGON 97207 PHONE (503) 229 5696

November 7, 1986

James E. Brown, State Forester
Forestry Department
Office of State Forester
2600 State Street
Salem, Oregon 97310

Subject. Draft Environmental Impact Statement and Plan for the Ochoco National Forest and Crooked River National Grassland

Dear Mr. Brown.

The Department has reviewed the Draft Environmental Impact Statement (DEIS) and Plan for the Ochoco National Forest and Crooked River National Grassland and provides the following comments for the Forest Service to use in preparing the State's coordinated response. These comments are related to air quality and water quality impacts of the proposed Plan. The Department does not recommend a "preferred alternative" at this time. The deficiencies outlined below reflect a need for background information that is necessary for the Department of Environmental Quality to evaluate and select an alternative After this information is included in the EIS, the Department would be more capable of recommending a preferred alternative.

Regarding air quality, the Department's main area of concern is that of air quality impacts related to forest prescribed burning The EIS indicates that significant increases in emissions from prescribed burning are likely under most alternatives over the next 20-30 years If emissions are expected to increase above 1977-78 baseline levels, an analysis needs to be included in the plan regarding the impact of the proposal with respect to the Clean Air Act and Oregon Clean Air Implementation Plan requirements; the impact of planned burns on nearby Class I and II areas, the impact of proposed prescribed burning activities on the Visibility Protection Plan, and consistency of the proposed Plan with Federal and State environmental policies.

Regarding water quality, the Department's concerns are that the Plan be consistent with Oregon's adopted Statewide Water Quality Management Plan for forest practices as required by the Clean Water Act. It is important to ensure that the proposed activities of timber harvest, road construction, chemical handling and usage, sewage disposal, livestock grazing and other forest land activities comply with Oregon's water quality standards and guidelines. Adequate information exists in the draft EIS for

some factors such as sediment and temperature control from forest management activities. However, equally important information on other factors in a multiple use forest, such as sediment control from grazing and motorized recreation, is lacking. In addition, findings need to be made regarding the relationship between baseline water quality conditions and the effects of the planned forest activities.

Thank you for allowing us the opportunity to review the Draft EIS. The Department looks forward to reviewing the amendments to the Draft EIS before a final recommendation is made regarding the "preferred alternative" Forest Management Plan.

Sincerely,

Fred Hansen
Director

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ivisions' Attachment

State of Oregon
Department of Environmental Quality
Comments on the Draft Environmental Impact Statement
and Plan for the
Ochoco National Forest and
Crooked River National Grassland

I. AIR QUALITY

This checklist summarizes Department of Environmental Quality, Air Quality Division concerns that should be included in the Environmental Impact Statement (EIS) for the Ochoco National Forest and Crooked River National Grassland that was submitted for Department review. This list is not intended to be all inclusive, but should rather be viewed as a framework outlining the major areas which should be addressed in the EIS. Statements which fail to address the concerns listed will be considered inadequate to meet Department approval.

The checklist is organized into 4 major sections, each of which should address the adequacy and consistency of the proposed plan with respect to the following elements.

1. Attainment and Maintenance of Air Quality Standards
2. Prevention of Significant Deterioration Requirements
3. Visibility Protection of Class I areas
4. Consistency with respect to Federal and State of Oregon environmental policies

Current information describing air quality monitoring activities and summarizing air quality conditions across the state may be found in the Air Quality Division's Annual Report Copies of this report and other information can be obtain by writing to the Division or calling (503) 229-5380. Technical assistance and guidance in the preparation of EISs is available from the Department on request

In reviewing forest plan EISs, the principal issue of concern to the Department related to air quality is that of air quality impacts related to forest prescribed burning A basic requirement related to air quality of an EIS is presentation of an analysis of planned burning in relation to past burning activities Generally, if it can be shown that projected annual and daily air pollutant emissions do not exceed, or are expected to be less than that which occurred during the baseline period, then issues discussed in Sections 3 and 4 are satisfied and no additional technical analysis of these issues is required. Since the baseline used in the analyses reflects current emissions, an evaluation of current versus 1977-

78 emission levels is required to relate projected emissions and impacts to the PSD baseline period,

In the DEIS section on air quality effects of each alternative (pages 103-104), it is projected that all of the alternatives (with the exception of "D") will result in a reduction in emissions 20 to 30 years in the future. In the interim, increases in emissions of as much as 39% above current levels are expected to occur The projected increase in emissions (as much as 4,000 tons tsp per year) is significantly above the emission baseline and will require completion of a detailed analysis of emission impacts on PSD increments, Class I area visibility, attainment/maintenance of air quality standards and consistency with environmental policies.

1 Attainment and Maintenance of Air Quality Standards.

A basic requirement of the EIS is to evaluate the impact of the proposal with respect to the Clean Air Act and the Oregon Clean Air Implementation Plan requirements. The first issue that must be addressed is that of impacts on air quality standards attainment and maintenance. Specifically, the EIS must show that the proposed action does not cause or significantly contribute to air quality standard violations. Air quality impacts within an attainment area, such as where the Ochoco National Forest is located, must not exceed Prevention of Significant Deterioration (PSD) increments (see attached Table 2) nor may the impacts cause violations of air quality standards (See DEQ Annual Air Quality Report) estimated by summing current air quality conditions and the estimated increment for the appropriate averaging times.

2. Prevention of Significant Deterioration

Part C of the Clean Air Act, requires the Department to insure that pollutant increments in Class I areas do not exceed specific limits adopted by Congress irrespective of the originating source (see attached Table 2) To assure that these increments are not exceeded due to planned increases in prescribed burning emissions, a technical analysis of the impact of planned burns on nearby Class I areas (see DEQ Annual Air Quality Report) and Class II lands is required. If the analysis indicates significant impacts, specific quantifiable measures designed to mitigate the impacts must be described in the EIS.

3. Visibility Protection For Class I Areas

The Oregon Visibility Protection Plan, adopted by the Environmental Quality Commission on October 24, 1986, requires the protection of visibility within Class I areas during the period of the July 4th weekend to Labor Day, inclusive. The EIS should describe the Forest's

Smoke Management Plan as it applies to Class I area visibility protection and evaluate the impact of proposed prescribed burning activities with respect to (a) assuring the continued protection of visibility within Class I areas from further deterioration and (b) the affect of proposed burning activities on short and long-term visibility control strategies as outlined in the Visibility State Implementation Plan (SIP) Copies of the adopted visibility protection plan are available from the Department.

4. Consistency With Federal and State Environmental Policies.

Department policy (OAR 340-20-001) requires that Highest and Best Practicable Treatment and Control be applied to pollution sources within Oregon OAR 340-13-005, Environmental Standards for Wilderness Areas, sets forth policy on environmental impacts within wilderness lands while USDA Forest Service Region VI policy (Service Manual No 2400, Supplement 347, March 1985) requires that, in recognition of the value of forest residues utilization, prescribed burning only be accomplished for those units where all other alternative treatments are unacceptable. The EIS should include a statement addressing the consistency of the proposed plan with respect to these policies, stating the degree to which alternatives to prescribed fire have been considered.

For further information regarding air quality, contact John Core (229-5380).

Table 1
Significant Air Quality
Ambient Air Quality Impacts
For Nonattainment Areas
(micrograms per cubic meter)

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
SO2	1.0	5 0		25 0	
TSP	1 0	5 0			
NO2	1.0				
CO *			0 5		2.0

* Milligrams per cubic meter

Table 2
Maximum Allowable Increases
(PSD Increments)
Micrograms Per Cubic Meter

Class I Areas

Pollutant	Annual	24-Hour	8-Hour	3-Hour
SO2	2.0	5.0		25.0
TSP	5.0	10 0		

Class II Areas

Pollutant	Annual	24-Hour	8-Hour	3-Hour
SO2	20 0	91.0		512 0
TSP	19.0	37 0		

Class III Areas

Pollutant	Annual	24-Hour	8-Hour	3-Hour
SO2	40.0	182 0		700.0
TSP	37 0	75 0		

II WATER QUALITY

The Management Plan and DEIS were reviewed within the concept that land management activities have the potential to beneficially or adversely impact the quality of the waters in the forest land downstream of the forest The Management Plan has the opportunity to improve existing degraded resources and to maintain or protect existing desired resource conditions. The level of emphasis placed on water quality conditions and the processes used to protect that quality play an important role in providing guidance to the managers in the future on a project-by-project basis

The Water Quality Division comments are detailed in the following five sections

1 Consistency with Provisions of the Clean Water Act

The Plan provides a goal statement to maintain or improve water quality It also has a goal of maintaining or restoring inherent biological, physical, and aesthetic values of riparian ecosystems We believe these are comparable goals, both of which, will maintain or improve water quality in the forest. Two comments need to be made regarding these goals (1) We request that specific reference to Oregon's Water Quality Standards (OAR Chapter 340, Division 41) and Oregon's Forest Practice Rules (OAR Chapter 629, Division 24) be added to the water quality goal statement (page 25, Proposed Plan) (2) There are no existing state water quality standards for riparian areas as stated in DEIS Table S-3, "Riparian Conditions " We agree that the condition of the riparian zone can have an impact on the water quality That is the concept used in the current forest practice rules and in the proposed riparian rules currently before the Board of Forestry We believe the statements made in Table S-3 are necessary but would suggest the following clarifying word change "Any degraded riparian areas found to be adversely affecting water quality will be improved to assure that the water quality meets State Water Quality Standards " We agree with the streams listed for riparian improvement in the Plan's Appendix A4

The proposed Plan appears to be consistent with the state's Water Quality Management Plan for the John Day and Deschutes River Basins. The "Desired Condition" statement for river temperatures is accurate.

It is obvious that the Forest Service staff is aware of the problem areas and those solutions necessary to correct the water quality problems This is apparent by the discussion in the DEIS beginning on page 107 What is not clear in the discussion is whether the proposed improvements and mitigation efforts for forest management are solely directed at mitigating forest harvest impacts or are in

concert with the proposed grazing activities. The Proposed Plan shows an increase in animal unit months (AUMs) by range allotment, with many allotments showing an increase in grazing pressure How does the Forest Service propose to handle the increased grazing pressure and yet improve riparian zone conditions? What specific forest grazing procedures will be used? We believe the response to these questions should be displayed in the Plan and be included in an expanded discussion on page 111 of the DEIS

The Plan discusses standards and guidelines for water quality The discussion translates these standards into levels of activity for forest management This is appropriate in the Plan if the process of translating watershed sensitivity into forest management requirements is described in the DEIS or the Plan We commend this effort and strongly support the concept of using an equivalent clear-cut area (ECA) standard. From our perspective, two items need to be addressed in the discussion of ECAs and their utility (1) What criteria were used to derive the ECA values from the stream sensitivity values? (2) How will the ECA value be determined and implemented in a specific watershed?

The Plan also discusses standards for sewage disposal We request you include the following language "Sewage treatment and disposal facilities shall be approved by the Department of Environmental Quality or its contract agents and shall be in compliance with rules of the Environmental Quality Commission "

We would like to recognize the Forest Service staff's effort to make predictions of sediment yield for each alternative and to predict changes over time. The various tables where these predictions are shown generate some questions

(1) Is the unit of measure correct for sediment in DEIS Table II-3A part 2 and Table S-2 part 2? Should it be tons/acre/year? If the unit of measurement is correct as stated, then we would disagree with the predicted 1 8 ton/year value for the preferred alternative and would like to see the analysis supporting the prediction

(2) Are the values for sediment yield displayed in the same tables an average for the forest? If so, are there watersheds with larger amounts of sediment production and are these the same watersheds listed in Plan Appendix A4?

(3) Do these values incorporate erosion from grazing?

Discussion of existing water quality and trends is inadequate considering the public value placed on the forest for visual quality, recreation and water quality. We suggest the Plan and DEIS provide the existing water quality in a section of the appendices to the DEIS. Is the material in the Plan Appendix A4 also those streams with the poorest water quality? With the magnitude of the potential impacts that this Plan can have on water quality, it is vitally important to display the baseline water quality conditions in some detail prior to implementation of the Plan

2 Review of Water Quality Monitoring Plans

Statements of goals and the accompanying Plan to achieve the goals and objectives, in our estimation, are only a portion of what is necessary in a plan The Plan must also include a process to assess its effectiveness in protecting the water quality during the life of the Plan

The monitoring Plan that was reviewed is contained in Tables V-2 and V-3 in the Plan We find the proposed monitoring in the soil resource section adequate for water quality. We did not find the same activity proposed for range, wildlife, or wilderness areas We believe that water is a resource that needs management and monitoring for quality and quantity A suggested modification to Table V-2 to cover our concerns would be to add "water" to the "Resource/Activity" column and add "quality" in the "Action and Effect Monitored" column In the "Units of Measure" column, add "pesticide, herbicide as appropriate."

3 Review of Management Strategies and Alternatives

The DEQ made no attempt to determine a preferred alternative for water quality We recognize that this is a land management plan, so we are concerned with the various levels of potential water quality impacts from those land activities We also recognize that differences in management intensity of an activity among alternatives will create varying potential impacts on water quality

We reviewed all alternatives and management strategies and prescriptions with interest towards the degree of potential for water quality impacts and the opportunities available to ensure water quality protection We assumed that the higher the level of soil disturbance by activities, the greater the potential for erosion problems, also, the greater the encouragement for recreation and livestock grazing, the greater the potential for additional water quality problems.

If the proposed Plan alternative can maintain or improve water quality (as suggested on page 27 of the Plan), then the DEQ could support the preferred alternative However, we are not convinced from what we have been presented for review that this goal can be fully achieved This assessment is based on a lack of information on grazing techniques and the effectiveness of ECAs as proposed. Included in this concern is our understanding that the Forest Service is proposing to encourage harvest of tree species that are located closer to streams. Such harvesting practice will potentially place greater pressure on the water resource

4 Review of Management of Special Use Watersheds

We concur with the management prescriptions designed for wilderness and "semi-primitive nonmotorized" areas The management prescriptions for "semi-primitive motorized" areas lacks a prescription for protecting water quality. It is our opinion that a major source of sediment production can come from these areas if they are not controlled for erosion Increased sediment production to the streams will occur without mitigation and should be so stated A prescription for erosion control should be included.

The Plan does not discuss management considerations for small private water systems that might include the national forest as part of their watersheds. Protection should be provided to any such watersheds in the *Ochoco National Forest The Plan should* also describe how the protection program will be monitored.

5. Review of Plan for Ground Water Quality Protection

The Plan virtually ignores the ground water component of the hydrologic cycle. Although ground water probably will be minimally affected by forest management activities, the plan should recognize the importance of ground water quality protection and discuss the following points

a) Activities that affect ground water quality will eventually affect surface water quality Conversely, change in surface water quality might be reflected in ground water quality

b) Lakes with unique pristine water quality may need special ground water protection requirements to prevent nutrient enrichment, particularly with regard to sewage disposal practices associated with intensive recreational use

c) All sewage disposal practices need to be in compliance with state requirements. Please state those requirements by reference in the Plan.

d) Ground water protection planning should be included in all chemical handling practices in the forest. This would include, but not be limited to, herbicides, pesticides, fertilizers, and degreasing solvents at maintenance shops

e) Activities and procedures that minimize erosion, and surface water runoff also will increase infiltration, allowing for more stable year round stream flows

For further information regarding water quality, contact John Jackson at 229-6035.

VICTOR ATIYEH
GOVERNOR

Department of Land Conservation and Development

1175 COURT STREET N E , SALEM, OREGON 97310-0590 PHONE (503) 378-4926

November 10, 1986

James E. Brown, State Forester
Department of Forestry
2600 State Street
Salem, OR 97310

Dear Jim:

The purpose of this letter is to provide DLCD comments for the state response to the proposed resources plan and draft environmental impact statement for the Ochoco National Forest.

As you know, the statewide goals and acknowledged comprehensive plans outside Oregon's coastal zone do not have any binding effect over federal resource planning activities, like the Forest Service's management plans Nevertheless, DLCD is quite concerned that the Forest Service demonstrates that such plans (and their various alternatives) are developed to be as compatible as possible with the affected communities' acknowledged comprehensive plans.

Our preliminary review reveals that the Ochoco's planning staff has endeavored to produce the proposed resources plan and DEIS with extensive interest group and local involvement. We are pleased that the DEIS on page 172 discusses the general compatibility of the various management alternatives with the acknowledged county comprehensive plans in the area Such information in the DEIS not only serves to strengthen federal-local coordination but hopefully can aid in easier identification of a preferred alternative from the state's perspective

In order to assure that information in the selected alternative and final EIS is as up to date and complete as possible, we suggest that the Ochoco staff request that the affected counties check to make sure that the cited land use

references are correct and accurate This would seem to be in order particularly for Grant County whose plan was recently acknowledged by LCDC. Second, the counties should be consulted by the Ochoco about which city land use plans in their areas, if any, should be reviewed, especially from an economic standpoint

I hope these comments are helpful in preparing Oregon's response to the Forest Service's plan for the Ochoco National Forest. Please feel free to contact Jim Knight of our office if you have any further questions about our letter

Sincerely,

James F. Ross
Director

JFR JBK kj

cc: Crook County Court
Deschutes County Board of Commissioners
Grant County Court
Harney County Court
Jefferson County Court
Wheeler County Court
Brent Lake, DLCD
Jim Knight, DLCD
Bob Brown, ODOF

General File #7-2-3-300

VICTOR ATIYEH
GOVERNOR

Forestry Department

OFFICE OF STATE FORESTER

2600 STATE STREET, SALEM, OREGON 97310 PHONE 378-2560

MEMORANDUM

SUBJECT OCHOCO NATIONAL FOREST DRAFT ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED LAND AND RESOURCE MANAGEMENT PLAN

TO James E. Brown, State Forester

FROM Dave Stere, Director, Forest Resources Planning

DATE November 6, 1986

The Department of Forestry Resources Planning Section and field staff have reviewed the Ochoco National Forest Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (LRMP)

Our review concludes that the Department cannot support implementation of the Forest's Preferred Alternative, "E-departure". Instead, adoption of Alternative "H" is recommended for the following reasons

1. *The Forestry Program for Oregon timber harvest targets for the Ochoco* are met for 40 years without a departure from nondeclining evenflow

2 Riparian conditions are significantly improved while maintaining grazing potential

3 Economic efficiency is maximized

4. Job numbers, personal income, and payments to counties are maintained at satisfactory levels throughout the planning horizon

5 Intensive forest management levels exceed the Forestry Program objective

6 *Department of Fish and Wildlife management objectives for elk are* exceeded for at least the next 20 years

7 Most of the remaining unroaded areas are allocated to prescriptions which allow timber management

8 The Deschutes Canyon-Steelhead Falls area and portions of Lookout Mountain are managed to provide needed semi-primitive, nonmotorized recreation opportunities.

Therefore, the Ochoco National Forest should modify its Final EIS and LRMP by selecting Alternative "H" as the preferred alternative in order to maximize net public benefits

The Department of Forestry's review also compares the Ochoco DEIS and LRMP to the objectives and policies expressed in the Forestry Program for Oregon and identified factual errors and omissions in the documents. A detailed analysis of the Ochoco National Forest Plan is attached. These comments are an integral part of the Department's review and should be considered substantive by the Forest Service

By considering these comments and recommendations, the Forest could further improve the performance of Alternative "H" Particular attention should be given to the Ochoco's economic assumptions and analysis, timber yield tables and salvage program, and big game management strategies.

DHS/DM jp
Attachment

STATE OF OREGON INTEROFFICE MEMO

TO James Brown, State Forester
State Forestry Department

DATE November 10, 1986

FROM Ann Nolan Hanus, State Economist
Office of Economic Analysis

SUBJECT Summary of Findings and Recommendations for the Ochoco National Forest Plan

Overview

I have reviewed the Draft Environmental Impact Statement (DEIS) for the Ochoco National Forest. The Department of Economic Development and the Employment Division have provided their analyses (attached) which have been critical for my response I have discussed the plan with Forest Service planners, industry representatives, members of the Council of Economic Advisors, and local officials

The counties most directly affected by the Ochoco National Forest Plan are Crook, Harney, Jefferson, Wheeler, and Grant These counties, especially Crook, rely heavily on the Forest for their mainstay For example, over 1,600 Crook County workers are directly employed in lumber and wood products, mainly in Prineville The forest products industry in Prineville consists essentially of four lumber mills (Pine Products, Consolidated Pine, Ochoco Lumber, and Prineville Sawmill Company) which employ about 500 people. Two millwork plants (Clear Pine Mouldings and American Forest Products) employ another 920 workers Including several other small operations and logging firms brings the total to 1,620 workers Overall, Crook County is more dependent on timber than the state average.

	Oregon	Crook County
Percentage of workers engaged in		
Manufacturing	19 9%	39 1%
Lumber and Wood	31 9%	98 0%

The 1,640 lumber and wood products employes comprise 36 percent of the total 4,450 employment covered by unemployment insurance. If Forest Service employes were included, the percentage would be raised from 36 to 42 percent Considering the indirect effects from lumber and wood employment, industry and Forest Service payrolls in 1985 amounted to 54 percent of total covered payroll

Local governments also depend upon the Forest for revenues Twenty-five percent of timber receipts are given to counties for schools and roads Crook and Wheeler counties derive thirty to forty percent of their revenues from the Ochoco National Forest timber sale revenues

Lifestyles are tied closely to the Ochoco not only do most people earn their living from it, but they also derive much enjoyment from various forms of recreation. Furthermore, water quality and availability are closely linked to the forest

The Forest Service's preferred Alternative E-departure emphasizes a combination of timber production, roadless recreation, and big game habitat. Timber harvests are scheduled so that first decade volumes remain close to current levels, and then decline over the next 10 to 50 years According to the Forest Service, the departure harvest schedule was designed to maintain local jobs in the short term.

Comments

1 The Forest Service selected Alternative E-departure on the grounds that it would boost the economy in the first decade of the plan Thereafter, the harvest would fall substantially, and the economy would be harmed significantly The long-term cost of the departure cannot be justified by a short-term gain, particularly when it would be so damaging to the region's long-term economic stability

The departure schedule provides for 123 MMBF per year for the first decade, 118 MMBF per year in the second, and 89 MMBF in the subsequent decades The current harvest level is 160 MMBF while the 1975 to 1984 annual average is 134 MMBF The current harvest level is unusually high because loggers are taking advantage of renegotiated prior year contracts The departure schedule would result in a significant number of job and local government revenue losses in decades following the first This would undermine the region's long term economic stability Furthermore, the reduction may come at a time when the demand for Northwest timber is rising if projections are correct that show declines in Canadian and Southern states' timber harvests

The proposed schedule could have an adverse effect on the industry's incentive to make large capital investments necessary to process smaller dimension logs In the future, smaller dimension logs will comprise a much larger share of the timber harvest Industries will need to retool and perhaps modify products The preferred alternative may not provide sufficient economic incentive for industry to make these capital investments since the future timber harvest would decline drastically

2 The Forest Service should correct its estimates of employment effects and clarify the methodology and terminology behind its multipliers The figures for direct and indirect employment imply very low multipliers -- less than two for direct timber jobs This multiplier should be around two to three In addition, the figures used for employment gains due to recreation, wildlife and resource effects appear to be too high For example, in the first decade the plan estimates a loss of 27 "timber, direct" jobs, a loss of only four "timber, indirect" jobs and a gain of 94 "recreation, wildlife and range resource" jobs.

The direct employment impacts in the timber industry may be incorrect if they are based upon historical relationships between mill employment and timber harvest. Gains in labor productivity in recent years have been significant, especially in areas like Harney County where new, more efficient mills began operating in 1982

The Forest Service should re-examine its assumptions about employment shifts between Harney and Crook Counties The assumption that the shift in timber harvest emphasis to the Snow Mountain District will boost Harney County at the expense of Crook County is questionable The Prineville mills already compete successfully for sales on Snow Mountain and will probably continue to do so

3 The Forest Service excluded the impact on Wheeler County entirely. This cannot be justified when the Ochoco comprises 10 percent of Wheeler County's total land area Also, Wheeler is the gateway for tourists, campers and hunters entering the Ochoco Although Wheeler's population is relatively small, it is heavily dependent on the Ochoco for its economic welfare Logging still accounts for 10 percent of its private sector wage and salary employment

4 The changing species mix and availability of old growth Ponderosa Pine will have a major impact on the industries Ponderosa Pine provides, by far, more jobs per million board feet than any other species in the forest The Forest Service should explore harvesting and silvicultural techniques that would increase the harvest of Ponderosa Pine.

5. The Forest Service proposes the reduction of timber full yield acreage Currently, 423,000 acres are managed for full yield Under E-departure, 262,500 acres would be managed at full yield and 232,000 at partial yield (50 to 90 percent) The Forest Service should explain its reasons for this shift and the implications for timber harvesting The land base for timber harvesting has been eroding over the last ten years with consequential negative impacts on timber harvests.

6. The projections for local government revenues from timber sales may be high Currently, the Forest Service assumes that all timber offered for sale will be sold for a projected price This yields a projection of the maximum revenue a county might receive Actual receipts could be lower if all the timber offered for sale is not harvested in the same year A range of probable county receipts should be shown.

7 The Forest Service should address the implications of its shift from uneven aged management to even aged management If uneven aged management was successfully used in the past, why is it no longer

advantageous? While even aged management may result in an increased harvest volume, would the larger trees produced under uneven aged management result in higher valued timber? What is the impact on visual, wildlife, and recreational values?

8 The economic impact of the alternatives for the management of the Ochoco National Forest cannot be fully determined without considering how changes in other Forest plans -- particularly the Malheur - will affect the region For example, Harney County receives twice as much timber from the Malheur National Forest than from the Ochoco If harvests are reduced on the Malheur, competition for timber on other forests would increase Also, recreational opportunities should be considered in the context of total opportunities available from not only the Forest being studied but also from adjacent National Forests and wilderness and other reserved areas

Recommendation

Alternative E-departure should be rejected because it would significantly damage the region's economy in the long term Alternative H should be selected because it maintains a sustained yield timber harvest close to the 1975-1984 harvest level A sustained, predictable harvest level is more likely to benefit the area's economy without the severe disruption that would be caused by Alternative E-departure

Alternative H's present net value is higher than any of the other alternatives except Alternative H-departure Alternative H provides for jobs slightly higher and returns to counties considerably higher than the current level Livestock grazing would be significantly higher (+19 percent) than the present Elk habitat would support 90 percent more than the current population in the first decade, and riparian zone management would be excellent in all areas with high recreational use or potentially high use The tradeoff would be less old growth and roadless recreation Wilderness acreage, however, under Alternative H would not change from the current amount of 36,000 acres

It should be noted that Economic Development Department has recommended Alternative B because of its higher timber sales (137 MMBF per year) They believe that Alternative B would have "the least amount of negative impact on local communities

ANH slf
2327J

cc Jon Yunker
Thomas F Kennedy
Don Steward
Laila Cully
Jeff Hannum

Attachments

Appendix

U.S. Forest Service Methodological Problems

1. Population Projection

The population projection used has little to do with reality. The staff of the national forests are using a population projection of 2.8% annual growth rate for Oregon Oregon's population has been increasing at an average annual rate of 0.7%. Additionally, the use of population to predict recreational land use is questionable.

The Department agrees with the Division of State Parks that a better procedure for projecting recreational land use should project what types of recreational use will be needed and the number of people that will be involved in each type of recreation. This is a more difficult task; however, the results will be much more meaningful.

2. Cost Accounting

Each forest develops its own method for allocating costs. This results in widely varying accounting systems and in turn cause two problems:

- Different forests' costs are not comparable. It would help in reviewing these plans to compare various projected costs. This cannot now be done in a meaningful way.

- Different cost accounting methods are reflected in the answers the computer provides for alternatives. Therefore, part of the difference between proposed forest plans is due to different accounting methods and not to differences in conditions.

3. No public input until the plan has been fully developed.

Currently, the forest staff develops about a dozen alternative actions and runs these alternatives through an input-output model on a computer in Colorado. These computer runs are quite expensive. Therefore, after the Draft Environmental Impact Statement (DEIS) is circulated for review, the forest staff is quite hesitant to make additional computer runs.

On the Wallowa-Whitman DEIS, in particular, the state has requested a new alternative to be devised. The forest staff is very hesitant to comply, not only because of the cost of the computer run, but also if the new run falls outside the range of previous alternatives, additional public hearings would be needed.

To avoid this, each forest staff should circulate their alternatives for comment prior to making the computer runs. This will allow for a cost-effective method of examining a wider range of alternatives.

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GENERAL FILE
7-2-3-300

OREGON STATE DEPARTMENT OF FORESTRY
REVIEW OF THE OCHOCO NATIONAL FOREST'S
DRAFT ENVIRONMENTAL IMPACT STATEMENT AND
PROPOSED LAND AND RESOURCE MANAGEMENT PLAN

The Oregon State Department of Forestry's Resource Planning Section, in cooperation with other Department staff, has reviewed the Ochoco National Forest's Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (LRMP). Our comments focus on four areas of concern. (1) Compatibility of the Ochoco DEIS and LRMP with the basic objectives of the Forestry Program for Oregon (FPFO), (2) Factual errors and omissions in the document, (3) Comparison of the DEIS and LRMP view of the future with the Forestry Program for Oregon, and (4) Preferred alternative recommendations

SUMMARY

The Ochoco DEIS and LRMP documents are well written, comprehensive and informative. The Forest has set a standard that the Department hopes other Oregon National Forests will attempt to match. However, our review has indicated that several important technical problems remain. In addition, the Department does not support the selection of Alternative "E-departure" as the preferred alternative. Instead, adoption of Alternative "H" is recommended. The following comments are the Department of Forestry's recommendations for improving the Ochoco plan when it is issued in final form Each of these comments should be considered as substantive and all should be addressed in the final EIS

COMPATIBILITY OF THE OCHOCO DEIS AND LRMP WITH THE BASIC OBJECTIVES OF THE FORESTRY PROGRAM FOR OREGON

Treatment of the Forestry Program for Oregon - (DEIS, page 172) The Department of Forestry appreciates the text devoted to addressing the goals and objectives of state, local and other federal agencies In particular, the Ochoco has provided a good overview of the FPFO. Unfortunately, the Forest has failed to meet the requirements of the May 13, 1986, Regional direction to the Forest on comparing the DEIS alternatives with the basic objectives of the FPFO The DEIS has incorrectly compared the alternatives to the Forestry Program's timber harvest targets alone and has failed to consider the actual objectives which include:

1. To maintain the maximum potential commercial forest land base consistent with other resource use while assuring environmental quality.

2. To identify and implement economically feasible levels of intensive forest management required to achieve cost effective growth and harvest.

3 To maintain community stability, by remaining flexible for increases in future harvest levels that would offset projected shortages.

The May 13, 1986 Regional direction provided specific compatibility standards by which the DEIS alternatives can be compared with these objectives. An example which makes this comparison for the Ochoco alternatives is attached. *This information must appear in the final EIS.*

FACTUAL ERROR AND OMISSIONS IN THE DOCUMENTS

Wilderness Acres - (DEIS, page 42) Figure II-3 incorrectly portrays the number of acres that would be managed for Wilderness under Alternatives "B" and "B-dep". The acreages shown are only one-tenth of the actual amount allocated under these two alternatives.

Old Growth Acres - (DEIS, page 42, 139) The DEIS in Figure II-3 and Table II-3A misrepresents the amount of old growth timber that will be preserved by the different alternatives. For example, Alternative "F" is shown to preserve 17,743 acres old growth Figure IV-6 illustrates that this alternative will actually provide around 57,000 acres of old growth when lands allocated to other management areas that will provide old growth conditions are considered. This same discrepancy occurs in the other alternatives as well.

This example illustrates a larger problem in National Forest planning The *public has not been fully informed about the wildlife, recreation and scenic* values that are currently being produced through land allocations such as Wilderness, RNA's and other management areas which limit or prohibit timber management Timber values that have been lost to these and other management designations are not clearly presented in the plan analysis. Therefore, the public cannot easily determine the actual level of values provided by the National Forest. They also cannot examine tradeoffs that have been made by previous land allocation processes nor trace the continued erosion of the commercial forest land base.

To leave out a discussion of the valuable contributions to recreation, wildlife habitat, watershed protection and other non-market values that accrue to the public from legislative and administrative designation and from management strategies that are not decided through the current planning process is doing the public a great disservice and, in addition, may violate NEPA and NFMA requirements

Change in Jobs and Personal Income - (DEIS, page 46) According to planners on the Ochoco, employment and personal income levels for 1984 were used as the *basis for comparing the changes proposed in the alternatives for these* parameters. Instead of using a single year for this analysis, the Department recommends using the 1976 to 1985 average levels This ten year average results in 2,013 lumber and wood products jobs compared to the 1984 level of 1,950 jobs. Using an average recognizes that the lumber and wood products industry in cyclical and that new technology also changes employment patterns.

LUMBER AND WOOD PRODUCTS EMPLOYMENT IN CROOK & HARNEY COUNTIES
(1976-1985)

1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
2420	2540	2640	2590	1580	1390	1310	1670	1950	2040

Ten Year Average. 2013

Recreation Demand Growth - (DEIS, page 51, App., page B-143, LRMP, page 16) The DEIS text on page 51 states that " .. recreationists on this Forest are predominately local". It also states that the population within the two county Primary Zone of Influence is expected to increase at least 15 percent during the next 20 years This infers an annual growth rate of 0.75 percent per year which matches the most recent statewide projection by the State Economist In contrast, the Appendix on page B-143 states that "Current estimates show the state's population to be increasing at an annual rate of roughly 2 percent" Which population growth estimate was used in calculating the recreation demands shown in Table II-13 of the LRMP? If the Ochoco has used a 2 percent growth trend, the analysis of recreation demand may provide unrealistically high results. The State Economist's most recent population growth projections for this portion of the state or another accepted methodology should be used in this analysis to estimate recreation demand. Regardless of the method used, both the Ochoco's estimate of the growth in recreation demand and the Forest's selected alternative should be consistent with the recreation and population projections of existing local land use plans.

Potential Timber Yield - (DEIS, page 59) The text incorrectly defines potential yields as " .. the total harvest level that could be sustained assuming intensive forest practices on all available acres". A more accurate definition is that potential yield is " .. the optimum perpetual sustained-yield havesting level attainable with intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationship with other resouce uses and the environment" (from Ochoco 1979 Timber Management Plan). This latter definition makes "potential yield" equal to "allowable sale quantity" (ASQ). However, the text states that potential yield is equivalent to a maximum timber FORPLAN run and is not comparable to the DEIS alternative ASQ levels. The Department disagrees with this conclusion and urges the Ochoco National Forest to provide additional discussion on the relationship between existing potential yield and the alternative allowable sale quantities in the final EIS

Comparison of Past, Present, and Predicted Timber Outputs - (DEIS, page 60) Table II-8 would be more useful if the planned volume by alternative was given for each of the five decades rather than just the high and low decades Cubic foot comparisons should also be given

Social and Economic Setting - (DEIS, page 64-66) Several points in this discussion must be revised

1. Deschutes County population in 1985 should be 65,300 not 15,300

2. Table III-4 is misleading in that it does not provide total U.S. economic data for comparison. Oregon's per capita income is only 90 percent of the U S average. Therefore, even if the county data shown is near the Oregon average it is still below the national average.

3. What units were used to develop the graphs in Figure III-3? The Department disagrees with the statement that combining government and manufacturing sectors overestimates the importance of timber to the economy. The importance may actually be understated since the greater direct, indirect, and induced personal income created by milling and remanufacturing is not shown. Both here, in DEIS Table VI-2, and in Appendix Table B-V3, comparisons of personal income derived from timber versus other resources should be displayed IMPLAN just totals job numbers and fails to differentiate if they are part-time or full-time. Concentrating on employment numbers rather than personal income levels downplays timber's contribution to the economy, particularly with respect to family-supporting incomes. A more accurate portrayal would show both job numbers and total personal incomes.

Prescribed Fire and Air Quality - (DEIS, page 67) The text makes several references to the contribution of prescribed fire to airshed degradation. The DEIS fails to note that prescribed burning reduces the risk of catastrophic natural and man-caused wildfires which could generate severe and unplanned reductions in visibility. Forest smoke will originate on the Ochoco whether or not prescribed burning occurs. Through the use of smoke management techniques and by employing today's controlled burning methods, the effect of prescribed fires on visibility can be minimized. The Department supports full use of this and other management tools in order to prevent the significantly greater air quality problems and other costs which would result from wildfires in areas of untreated fuel accumulations.

Elk Management Objectives - (DEIS, page 77) The text provides the current and proposed Department of Fish and Wildlife management objectives (MO) for elk and states that these objectives ".. have been used as indicators of demand during the planning process". The DEIS then states on page 175 that "If the Forest selects a habitat management level that varies significantly from ODFW's MO, it is anticipated that ODFW will assess the consequences and readjust the MO if necessary" The latter statement appears to depict the management objective as a measure of supply rather than demand Given this discrepancy, the Department of Fish and Wildlife's management objective seems to be of little value in comparing the merits of the different alternatives The final EIS should clarify the relationship between the Forest plan and the ODFW elk management objective.

Assumptions Concerning Leisure Lifestyles - (DEIS, page 99) This discussion centers on the point that greater recreation opportunities will bring more money into the local economy. However, the DEIS has noted elsewhere that most of the recreation use on the Forest comes from local residents If higher paying timber industry jobs are lost to provide more leisure time opportunities, recreation use could actually decrease as families move to other areas seeking employment. The remaining population would not make up this lost income and local businesses would suffer rather than benefit. Wallowa County provides an example of this scenerio The Ochoco should reevaluate its assumptions on the economic effects of changing recreation supply

Effects of Timber Harvesting on Soils - (DEIS, page 115) While it is true that the intensity of site disturbance is greater with the clearcut harvest system than in selection harvests, the text should also emphasize that the frequency of entry into stands is higher when the selection system is used. Overall, soil damage may be more significant in partial cuts Soil characteristics at the time of entry, the number of entries, and the type and degree of disturbance all determine potential for soil damage The Department supports the mitigation measures outlined on pages 121 and 122 to minimize forest soil damage.

Semi-Primitive Recreation - (DEIS, page 157) A significant amount of the recreation use on the Ochoco National Forest occurs in the form of hunting. Regulated road closures provide opportunities for semi-primitive non-motorized recreation during the hunting season while providing roaded recreation opportunties throughout the rest of the year. Has this source of semi-primitive, non-motorized recreation been considered in the estimates of supply provided by the different alternatives?

Development of Timber Yield - (App., page B-36) It appears that the substantial drop in potential yield from that previously established by the 1979 Ochoco Timber Management Plan is mostly caused by changing managed yield tables. This is similar to the drop in potential levels we and others have experienced in our projections The magnitude of the drop on the Ochoco, however, is greater than expected.

While we agree that the approach taken in building these tables is technically correct, we suggest that you review them to determine where intensive management could further increase timber outputs. For example, setting the PROGNOSIS keyword BAMX for the PIPO habitat type to 121 may be inappropriate. While current, natural stands have not grown to be denser than 121 square feet per acre, there may be opportunities in managed stands to decrease clumpiness and to exceed this selected maximum through pre-commercial thinning and brush control

It appears that opportunities for cost-effectively increasing timber growth through intensive forest management have been lost in these yield tables. Is this because the Ochoco has averaged site-specific stocking levels and plantation performance into one Forest-wide average? Averaging on forests with relatively low productivity such as the Ochoco would seem to take away opportunities to intensively manage high site lands while adding few opportunities to obtain increased growth from low site lands If this is the case, yields should be increased to reflect actual management and growth opportunities. The South Central Oregon/Northern California Variant PROGNOSIS model may be appropriate to reassess the accuracy of the Ochoco managed yield tables for stands similar to those on the Deschutes National Forest

Employment Effects - (App., page B-52) It appears that errors may exist in the documentation of employment effects that could distort the socio-economic analysis of the alternatives. Such distortion could also affect the theoretical performance of the DEIS alternatives. The final EIS must address the following problems and document how any revisions will modify the alternatives

1. The text states that the ninth line of Table B-V-1 informs the reader that 1000 hunting recreation visitor days spent in Harney County will create one hunting job. Line 6 in the same table already tabulates the employment effects of hunting. Does line 9 double count hunting employment effects by assuming that all semi-primitive non-motorized recreation is hunting?

2. Our research shows that the job multiplier coefficient should be closer to 2 than 0.5 Why does the Ochoco use such a small multiplier to estimate indirect and induced employment?

3. If a multiplier of 0.5 has been used, why are the indirect employment effects for Alternative "B" in decade 1 in Crook County almost equal to the direct effects?

4. Table B-V-3 shows no indirect effects in Jefferson County from timber harvesting, but does for recreation, wildlife and range resources. The text also indicates that no income from any of the resources is spent in Deschutes County, the primary shopping hub of Central Oregon. These conclusions appear to be incorrect and should be revised to more accurately portray the economic importance of the Ochoco National Forest.

5 Is the "current situation" harvest level of 127 MMBF the correct basis for determining the employment effects of changing the amount of timber sold? Has the contribution of salvage volume been fully considered? If the purpose is to describe potential job losses, would not the use of the existing potential timber yield of 137 MMBF be more appropriate? Does the species composition of the "current situation" reflect historic average?

Harvest Dispersion Constraints - (App., page B-60, LRMP page H-1) Page B-60 states that the watershed harvest dispersion constraints will be between 17 percent and 23 percent. On page H-1 the range of dispersion constraints is given as 25 percent to 35 percent. Which set of figures is correct? What rational supports these very restrictive Ochoco harvest dispersion constraints when the Deschutes National Forest satisfied this minimum management requirement' (MMR) with a 58 percent constraint?

Wildlife MMR Constraints - (App , page B-61) The final EIS should include a table similar to the August 8, 1984 Wildlife MMR Matrix produced by the Region. This table provides needed information on the number on habitats being provided by the Forest for each indicator species, the acres of suitable land involved, the effect of these allocations on timber production and other useful details. Such data is critical in determining if the Ochoco MMR constraints are consistent with Regional guidelines and that the constraints are indeed truely minimum requirements

Elk Numbers - (App., page B-145) Table B-VIII-10 presents only the projected elk habitat capability in Decade 5. The document fails to point out that most of the alternatives will support elk numbers above the proposed ODFW management objective for at least 30 years, well beyond the life of this plan. As an example, Alternative "H" has an elk habitat capability in Decade 2 which is 2 6 times greater than the current management objective and 1 2 times greater than the proposed objective. The Forest plan should emphasize the irretrievable commitment of resources such as elk habitat rather than citing long-term projections that future planning decisions may alter.

Big Game Thermal Cover - (LRMP, page 1) The plan proposes maintaining at least 40 to 50 percent of the land base in big game ranges in thermal cover In contrast, research recommends 40 percent of the range in thermal and hiding cover as being optimum. Of that 40 percent, 20-30 percent should be hiding cover, and 10-20 percent in thermal cover in order to achieve optimum conditions Why is the Ochoco recommending less than optimal levels of hiding cover and forage areas on big game ranges? Without adequate forage areas, the target population cannot be maintained.

COMPARISON OF THE DEIS AND LRMP VIEW OF THE FUTURE WITH THE FORESTRY PROGRAM FOR OREGON

Demand for Ochoco Timber - (DEIS, page 5, App , B-41) The text on page 5 of the DEIS states that a lack of a " . suitable timber supply from the Ochoco has been protrayed (sic) as causing higher stumpage prices ..." and that "higher volumes of timber sold from the Ochoco could be processed locally, possibly leading to lower stumpage prices". These statements combined with the fact that much of the ponderosa pine processed in Crook County is transported from outside the area, conflict with discussion in the Appendix which assumes a horizontal demand curve for Ochoco timber.

The DEIS also has failed to fully address the changing timber supply situation in Oregon Inventories on private industry lands are falling and ponderosa pine availability on all ownerships is decreasing In light of these trends, it is unrealistic to assume that the Ochoco National Forest faces a horizontal demand curve for timber and that the number of jobs, personal income, and payments to counties will not be affected by economic influences outside the National Forest boundaries. The economic analysis for the DEIS should take into account the dynamic social and economic environment in which the Forest operates

The Department disagrees with the assumption that the Forest's activities have no measurable effect outside the "zone of influence". For example, Oregon's metropolitan economy, through such industries as banking, insurance, and heavy machinery, is indirectly dependent on timber and other resources from all the Region's National Forests This large-scale economic influence of the Ochoco should be addressed.

Ponderosa Pine Volume - (DEIS, page 59) The text states that the current timber inventory shows 67 percent of the total volume on the Forest is ponderosa pine and that the ponderosa pine harvest in all alternatives will be within 62 to 72 percent of the total harvest volume This claim is contradicted by information received from the Ochoco planning team. The latter shows the proportion of ponderosa pine varying from a high of 80 percent in decade one of Alternative "A" to a low of 55 percent in decade three of Alternative "E". Maintaining a reasonably constant supply of ponderosa pine to milling and remanufacturing plants is critical to the central Oregon economy. Harvest plans of the alternatives should not propose large changes in species mixes, especially reductions in the percentages of ponderosa pine offered.

Insects and Disease - (DEIS, page 67, 104) The final EIS should provide more detail on how the different alternatives will affect the potential for future insect and disease problems. Specifically, the Forest should address how future mountain pine beetle outbreaks and possible western spruce budworm problems will be prevented or promoted by the alternatives.

The Department believes the ability to prevent future insect outbreaks is deperdent upon the timber management strategy pursued Alternatives which increase the number of acres that are not managed to increase the health and vigor of the timber resource are more likely to result in future insect epidemics. The Department of Forestry supports utilization of an integrated pest management system and intensive forest management practices in all alternatives.

Suitable Forest Land Base - (DEIS, page 89) There appear to be two problems with the suitability analysis shown in Table III-25. Under item IV, inaccurate numbers have been used in the calculation of tentatively suitable land More importantly, there are several undocumented changes from the analysis presented on page 278 of the Ochoco AMS document. As a result, the DEIS shows a forested land base which is 9,485 acres less than the AMS and a suitable land base which is 12,093 acres less than the AMS indicated. What is the justification for these changes?

Big Game Management - (DEIS, page 140) Questions on big game management unanswered by DEIS include:

1. Since some winter range areas receive heavier use than others, would not more intensive management of these preferred ranges and less on the remainder be more desireable and promote both big game and timber with lower overall management costs and higher overall benefits?

2. More challenging hunting opportunties can also be achieved through road closures, limiting the numbers of hunters, and restricting the harvest to certain types of game (example - Bulls with three or more antler points). To what degree would increased use of these other methods of regulation reduce or eliminate the need to limit timber production?

3. Elk numbers in central Oregon could increase to the point where the availability of winter range would be the limiting factor Conflicts with other uses on the privately owned, natural winter range would increase. By continuing to optimize the available summer and winter elk range on the Forest, the Ochoco may be managing its land for elk numbers that cannot be supported by the total habitat In light of the other resource uses on the Forest, at what point will the marginal benefits of additional elk be exceeded by the marginal cost of providing the habitat?

4. What costs and property damage may be incurred by adjacent landowners through elk migration and hunting recreation? How will the Forest's actions affect this problem? How are these costs factored into the Plan's analysis?

Road Management - (DEIS, page 166) The Department supports the efforts of the Ochoco to reduce the costs of road construction and to close unneeded roads either seasonally or permanently to increase effective wildlife habitat. Cooperative road closure programs during elk season have proven to be very successful. Benefits of regulated road closures include

1. Reduced animal harassment through improved hiding cover.

2. More opportunities for high-quality, semi-primative, non-motorized hunting experiences.

3 Reduced conflicts between timber and wildlife management

4. Reduced road maintenance costs by eliminating hunter traffic during wet fall months.

The final EIS should emphasize that it is the use of roads not the roads themselves which affects wildlife habitat. The Ochoco is moving in the right direction by regulating the use of roads while still allowing access for periodic, cost-effective, timber management activities.

Unroaded Areas - (App C) It is inappropriate that the Forest's preferred alternative retains 28,441 acres or 48 percent of the remaining unroaded areas in an undeveloped state. The Oregon Wilderness Act of 1984 states that unroaded areas not designated as wilderness should be managed for multiple-use and that management for future wilderness consideration is not necessary In keeping with the intent of this law, the Department of Forestry recommends that unroaded lands which support productive forests be returned to the suitable land base and that the timber volume be included in the regulated timber harvest schedule.

Fire Protection - (App., page D-9) The Department of Forestry supports the Forest's policy of applying agressive suppression action to wildfires that threaten life, private property, public safety, improvements, or investments. However, the DEIS and LRMP should more clearly explain what criteria will determine when a "threat" exists and the "appropriate" suppression response that will follow Unplanned ignitions should be used as prescribed fires only if compliance with the Oregon Smoke Management Plan can be assured Coordination of protection planning and suppression efforts with other protection agencies, including this Department, should be included as a part of these guidelines.

Minimum Stocking Levels (App., page D-20) The Ochoco National Forest is proposing minimum stocking levels of between 50 to 75 trees per acre, depending on site This level of stocking is below the minimum stocking level permitted under the Oregon Forest Practices Act. Since the Forest Service has agreed to meet or exceed the Forest Practices Act requirements, the proposed minimum stocking levels are unacceptable These standards must be revised to satisfy the requirements of the Act which include establishing at least 100 seedlings or saplings per acre, well distributed over the operation area, within six-years. Refer to OAR 629-24-401 and 402 for details on this requirement. The final EIS should document what effect this higher minimum level would have on future timber yields, big game cover, and other resource outputs

Regeneration Harvests - (App D-30) The timber resource practice standards and guidelines for the General Forest Management area and other prescriptions include the statement that regeneration harvests will occur at culmination of mean annual increment (CMAI). Is it necessary to extend regeneration harvests past 95 percent of CMAI? Whenever shorter rotation lengths will not conflict with the goals of the management area prescription or lower the present net value, 95 percent of CMAI should be used At a minimum, it should be included in the criteria for the General Forest Management area.

Harvest Cutting Methods (App., F) - The Department of Forestry supports the flexible, site specific approach to the selection of harvest cutting methods as required by the Regional Guide. The Ochoco is encouraged to maintain this flexibility in the Forest plan. When determining the harvest cutting method, economic benefits to the Forest and the timber purchaser should be considered as well as logging feasibility, stand characteristics, silvicultural response, and the effect on other resources and their uses. In addition, uneven-aged management should be considered to maintain timber yield in those areas where clearcutting is limited or prohibited to accomodate other resource uses The Forest should work to improve knowledge of uneven-aged management applications in eastern Oregon forests through silvicultural research, refined yield tables, and economic analysis

Research - (LRMP, page 21) The Forestry Program for Oregon encourages research to improve forest productivity, the economics of intensive management practices, and to identify the habitat needs of old-growth preferring wildlife. Therefore, the Department supports the research program outlined by the Forest. In addition to the research needs identified by the Ochoco, we believe more research is needed to

1 Develop new technology to return some of the 2,560 acres removed from the suitable land base for regeneration difficulty to timber management status.

2 Improve knowledge of elk/cattle competition

3. Gain better silvicultural knowledge on understory management and uneven-aged management.

Timber Salvage Program - (LRMP, page 59) The Ochoco National Forest has an opportunity to improve its timber salvage program by more aggressively harvesting scattered, overmature ponderosa pine These large, valuable trees are often lost to insects and disease before they can be included within a planned harvest unit Forest industry estimates that 20 MMBF of high quality, high value timber could be recovered per year. Eighty percent of this salvage work could be conducted on areas suited to tractor logging As a result of increased salvage, forest industry would obtain the larger ponderosa pine desired to supply its mills and remanufacturing plants, communities would enjoy increased employment and personal income, and the Forest Service would receive higher stumpage revenues. The Forest would also enjoy a higher net timber growth rate through reduced future mortality Meanwhile, acceptable levels of old-growth and snags would be retained through management area allocations and MMRs. The final EIS should address this recommendation.

Monitoring - (LRMP, page 99) The Ochoco has provided a very good framework for its monitoring and evaluation program The following changes would improve this very important part of the management plan·

1. Change the reporting period for land suitability from 10 to 5 years. The objective for this category should be revised to include the potential for returning lands incorrectly classified as unsuitable to the suitable land base.

2 As new information becomes available, minimum management requirements should be revised to insure that neither under-protection or over-protection occurs.

3. The variability threshold for payments to counties should be more specific than "an unexpected trend up or down". A variability threshold of ± 10 percent is recommended

4. Personal income should be added as an activity to be monitored. Monitoring frequency should be annual with a ± 10 percent variability threshold.

PREFERRED ALTERNATIVE RECOMMENDATION

The Department of Forestry requests that the Ochoco National Forest select Alternative "H" rather than Alternative "E-departure" when the Forest plan is issued in final form. Alternative "H" provides a more nearly optimum mix of resource outputs which addresses the issues identified by the public, achieves a higher level of long-term net public benefits, and more closely meets the objectives of the Forestry Program for Oregon.

Specifically, the Department supports Alternative "H" for the following reasons

1 The Forestry Program for Oregon timber harvest targets for the Ochoco are met for 40 years without a departure from non-declining even flow

2 Riparian conditions are significantly improved while maintaining grazing potential.

3 Economic efficiency is maximized

4. Job numbers, personal income, and payments to counties are maintained at satisfactory levels throughout the planning horizon.

5 Intensive forest management levels exceed the Forestry Program objectives.

6 Department of Fish and Wildlife management objectives for elk are exceeded for at least the next 20 years

7 Most of the remaining unroaded areas are allocated to prescriptions which allow timber management.

8. The Deschutes Canyon - Steelhead Falls area and portions of Lookout Mountain are managed to provide needed semi-primitive, non-motorized recreation opportunities

Alternative "H" could be futher improved through adoption of the Department of Forestry's other recommendations in this review. The Ochoco National Forest is encouraged to carefully consider this course of action

DM cn
Attachments
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STATE OF OREGON INTEROFFICE MEMO

TO Ann Hanus, State Economist DATE October 29, 1986

FROM Thomas F. Kennedy, Director
Economic Development Department

SUBJECT Ochoco National Forest Plan Review

RECEIVED
OCT 2' 1986
EXECUTIVE DEPARTMENT

This memo is composed of the following sections

I. Background

II. Mills identified as primary and secondary users of timber from Ochoco National Forest

III. Components of the U.S. Forest Service Plan

IV. Economic Development Department's Analysis of U.S. Forest Service Plan

V. Economic Development Department Recommendations

VI. Appendix General Questions Regarding Forest Service Methodology

I. Background

The land administered by the Ochoco National Forest and Crooked River Grassland occupies 955,100 acres within Crook, Harney, Grant, Jefferson and Wheeler Counties of Oregon. The area's economy is highly dependent on forest-related industry, agriculture and tourism.

In Crook and Harney Counties, over 80 percent of the forest land is in public ownership, most of it is administered by the U.S. Forest Service.

Maximum mill capacity in Crook and Harney Counties is approximately 385 million board feet annually. 1983-84 estimates indicate that approximately 160 million board feet (42 percent of maximum capacity) is being milled annually in these two counties. Undoubtedly, timber availability from the Ochoco National Forest affects stumpage prices as well as local economic well-being

All five counties in the affected area of the Ochoco National Forest and Crooked River Grassland are heavily dependent on payments from the Forest Service for their operating budgets. Thirty to forty percent of Crook and Wheeler County revenues are derived from this source. Grant, Harney and Jefferson Counties receive payments representing 15 percent of their revenue. The timber industry and related government agencies account for approximately half of the area's economic base.

RELATIONSHIP OF THE PROPOSED ACTION AND ALTERNATIVES
TO THE BASIC OBJECTIVES OF THE FORESTRY PROGRAM FOR OREGON

DM 19/86

Basic Objective	Proposed Action and Alternatives			Discussion
	Level 1 1/	Level 2 2/	Level 3 3/	
To maintain the maximum potential commercial Forest land base consistent with other resource uses while assuring environmental quality	A,B,Bdep, H,Hdep	A,B,Bdep,Edep, F,G,H,Hdep	C,D,E	Congressional Acts and Executive Orders (see Purpose and Need section) and State law (Oregon Forest Practices Act) mandate management guidelines for certain lands. Incorporated throughout the planning process, these guidelines have served to define the suitable land for timber production that is compatible with the objective
To identify and implement economically feasible levels of intensive forest management required to achieve cost effective growth and harvest	A,B,Bdep, H,Hdep	Edep,F,G	C,D,E	A full range of intensive timber management practices (refer to Management Strategies and Management Area Direction, this chapter) is utilized for timber production New and improved practices would be implemented consistent with technological advances
To maintain community stability by remaining flexible for increases in future harvest levels that would offset projected shortages	A,B,Bdep, Hdep	Edep,F,G,H	C,D,E	Deviation from even-flow sustained yield management would be implemented consistent with NFMA regulations and Forest Plan direction This involves the harvest of available surplus old-growth inventory to offset projected shortages.

1/ Meets share of FPFO target level and is compatible with basic objective

2/ Is compatible with the basic objective but does not meet target level or meets the target level but is not compatible with the basic objective

3/ Does not meet target level and is not compatible with the basic objective.

NOTE *Current direction parameters for jobs and personal income are slightly above recent levels*

Number of decades that alternatives meet FPFO targets B-5,G,H-4,A,Bdep,Hdep-3,Edep-2,F-1,C,D,E-0

II Mills Dependent on Ochoco Timber

Primary Purchasers of Timber from the Ochoco National Forest

Consolidated Pine, Inc.	Prineville
Ochoco Lumber Co.	Prineville
Prineville Sawmill	Prineville
Pine Products Corp	Prineville
Snow Mountain Pine Co.	Hines
DAW Forest Products Co.	Bend

Secondary Users of Raw Material from Ochoco National Forest

~~Cedar~~ Clear Pine Corporation	Prineville
American Forest Products Co.	Prineville
D & E Wood Products, Inc	Prineville
Pioneer Cut Stock Co.	Prineville
Woodmark ~~Woodwork~~ Corporation	Hines
Frenchglen Millwork Co.	Hines

III. Components of Alternative E-Departure are:

1. Reduces the allowable cut for the first ten years of the plan by 9 million board feet (MMBF). The 1975-84 sales volume was 134 MMBF per year. Alternative E-Departure would provide for 123 MMBF per year for the first ten years of the plan.

2 After the first decade the allowable cut would be reduced to 118 MMBF per year for the second decade. For the third decade the allowable cut would be 89 MMBF per year.

3 After the first decade the species mix will change. Ponderosa pine harvest will decline as a percentage of total harvest and the diameter of the ponderosa pine harvested will be significantly smaller The species mix will increasingly consist of more Douglas fir, western larch and white fir

4. Alternative E-Departure forecasts increased employment in the Ochoco region as a direct result of the departure timber schedule:

Table 1. Projected Employment Changes
Resulting from Alternative E-Departure

Employment	Crook County	Harney County
Timber, Direct	-50	+23
Timber, Indirect	-19	+15
Recreation	+59	+22
Total Employment	-10	+60

Source Ochoco Draft Environmental Impact Statement, p. 97.

IV. Analysis of the U S Forest Service Plan

1. The Economic Development Department does not expect the employment increases projected by the Forest Service to actually happen. A reduction in the allowable cut of 9 MMBF per year will likely further reduce employment.

The implicit multiplier used in the above table is extremely low. In timber-dependent communities, a direct timber job usually results in two to three secondary jobs. The above job implies that only a fraction of a job results for each direct timber job. A more reasonable (and conservative) multiplier would assume at least two indirect jobs for each direct job. this means that for the 50 jobs to be lost in direct timber production in Crook County, there is a potential loss of at least 100 indirect jobs.

Also, there is no reasonable explanation in the plan for how 59 recreation jobs will be created in Crook County or how 22 jobs will be created in Harney County.

2. The potential reductions in the harvest are a real concern. The U.S. Forest Service is predicting a reduction in demand for timber after the first decade of the plan. This reduction in demand will result from a decline in new housing demand in the U.S. after 1995 By 1995, the baby boom generation will have, as a group, completed the purchase of new houses.

The Economic Development Department disagrees with this analysis, for the following reasons:

While U.S. demand will decline, so will the supply of timber from the South and from British Columbia as well as areas of the Northwest.

Additionally, the demand for lumber from Pacific Rim nations is just now beginning. As incomes in these nations increase, the demand for lumber for building is expected to increase.

The Economic Development Department, State Forestry Department, and the forest products industry are working to develop these markets. This increased demand, coupled with declining supplies elsewhere, may well take up the potential slack in the U.S. domestic demand. So, it is to Oregon's advantage to make sure that the Forest Service maintains the highest reasonable allowable cut.

3. As the species mix changes and the diameter of the timber decreases, the mills in the area will face increasing costs. They will have to retool to be able to process small trees, find a timber supply from outside the area, or close

This will require capital investment for retooling and the impact on jobs is undefined, i.e., increased productivity may result in job loss.

4. County Revenue Projections

The projections for county revenues from timber sales are not realistic. Currently, the projections assume that all the timber offered for sale will be sold for a projected price. This yields a projection of the maximum revenue a county might receive. Actual county receipts will be less. Based on past trends in timber sales, a range of possible county receipts should be provided.

V. Economic Development Recommendations

1. The Economic Development Department rejects Alternative E-Departure because it predicts a decline in jobs due to timber harvest reductions from the current 160 MMBF per year of actual sales in 1986, to 123 MMBF per year for the first decade and an even worse decline to 118 MMBF per year and 89 MMBF per year for the decades that follow.

2. Table IV-30 of the EIS indicate that the Plan proposes the reduction of acreage in full yield from the current (1979 Timber Management Plan) figure of 423,000 acres to 262,500 acres. this means that less than a third of the land in the Ochoco forest is proposed for full yield (91-99%) management. Approximately half the forest is currently being managed for full yield.

We do not support reducing the acreage proposed for full yield management.

3. The Economic Development Department recommends the adoption of Alternative B with some modifications.

Alternative B has an Allowable Sale Quantity (ASQ) of 137 MMBF per year, which is the current potential yield for the next two decades. (This compares to a reduction of 123 MMBF per year, 118 MMBF per year and 89 MMBF per year for the three decades in the Preferred Alternative.)

Alternative B is the alternative with the least amount of negative impact on the local communities. It also has more elk population in the first decade than the preferred alternative. The loss of some elk population in the third decade could be avoided if the U.S. Forest Service was to have more road closures (with gates, e.g) to mitigate elk habitat disruption Additionally, increased watershed management would improve elk habitat.

Alternative B maintains old growth forest at 32,000 acres compared to 50,000 in E-Departure. This is the price for maintaining a strong local economic job base.

While Alternative B would maintain Lookout Mountain as "General Forest" (GF) category, we would recommend that Lookout Mountain and Silver Creek be maintained as semi-primitive non-motorized (SPNM) category, as proposed in Alternative E-Departure

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State of Oregon
EMPLOYMENT DIVISION
Department of Human Resources

RECEIVED
1 1986
Executive Department

TO Jeff Hannum, State
Address Labor Economist

Date: October 27, 1986

FROM M C. Mahan
Address Labor Economist

No. 0090A

Subject Comment on Proposed Ochoco NF Land and Resource Management Plan

1 Economic dependency of the local area on the Ochoco NF. Since over 80% of commercial timber lands lie within National Forest boundaries in Crook County, mills located in Prineville are largely dependent on publicly owned timber The forest products industry in Prineville consists essentially of four lumber mills (Pine Products, Consolidated Pine, Ochoco Lumber, Prineville Sawmill Co) currently employing about 500 employes, and two millwork plants (Clear Pine Mouldings and American Forest Products) currently employing some 920 employes. Several small operations and logging firms bring total current employment to 1620

The 1620 lumber and wood products employes comprise 36% of the total 4450 employment covered by unemployment insurance Adding 280 Forest Service employes brings this figure to 42%, or 1900 Assumming a multiplier of 2 0, the county's covered employment not attributable to the lumber and wood products industry would be only 650 Also, industry and Forest Service payrolls in 1985 comprised 54% of the total covered payroll Essentially, without the presence of the Ochoco NF Crook County would more closely resemble Gilliam County, economically dependent on agriculture and the Les Schwab Tire Co.

2 Comparison of the Crook County economy to that of the state as a whole
The economy of Crook County is narrowly concentrated in three sectors The manufacture of lumber and wood products, government; wholesale trade Statewide, the percentage of covered employment engaged in manufacturing in 1985 was 19 9% compared to 39 1% in Crook. In Crook, 98% of manufacturing employment was in lumber and wood products compared to 31.9% statewide. Employment in wholesale trade was 8 3% of the total in Crook, 6 6% statewide solely due to the presence of the Les Schwab Tire Co , whose headquarters, warehousing and recapping operation are located in Prineville. Government employment was 19 5% in Crook compared to 18.1% statewide due to the presence of the Ochoco NF headquarters and regional offices of BLM and Oregon State Forestry in Prineville

3. Assessment of the economic analysis and data used in the Ochoco DEIS.
Overall, the Plan appears to be a reasonable compromise responding to the often competing demands placed upon the resources of the Ochoco NF, ranging from recreation and wildlife to timber supplies and grazing The economic analysis appears reasonable in its basic assumptions and input data. However, the computer generated conclusions regarding impacts of the selected alternative (E Departure) on employment are questionable First, the assumption that the shift in timber harvest emphasis to the Snow Mountain District during the first decade of implementation will boost industry employment in Harney County at the expense of that in Crook County is highly dubious. The Prineville mills already compete successfully for sales on Snow Mountain and will almost certainly continue to do so Thus, analysis of Plan impacts on employment should be limited to the overall portion of Table B-V-3 (attached) The assumptions regarding direct effects appear reasonable assuming static conditions are maintained during the decade in the local wood products industry (No new plants, but machinery improvements in existing mills which tend to reduce manpower needs)

However, over the past decade in Central Oregon losses in basic lumber production have more than been offset by gains in remanufacturing Although the Prineville mills are presently basically large old growth Ponderosa processors, given the inevitable change in future timber harvest characteristics implicit in the Plan, it is highly likely that adaptations to more efficiently process smaller logs and new plant(s) for chip or fiber based products will occur. If so, this could offset employment losses, or even produce an overall gain However, the Plan proposes to sustain the old growth timber harvest during the first decade of Plan implementation at the expense of harvest levels in subsequent decades in terms of both mmbf and mmcf (See attached Table II-8) Without the Departure, while mmbf would decline as tree dimensions shrank, mmcf would be unchanged (Table IV-4 attached) This falloff in mmcf might lessen the prospects for chip or fiber based manufacturing Sacrificing long term harvest levels for short term gains should be carefully considered in the light of local preferences

Assuming a multiplier of about 2 0, the indirect employment effects seem very conservative, unless they are the net of combined direct and recreation effects Gains stemming from recreation enhancement appear somewhat optomistic since this activity is highly summer oriented on the Ochoco Also, recreation is heavily oriented towards camping, with local expenditures largely limited to the purchase of fuels and supplies Even if correct, jobs created would be of a highly seasonal nature, averaging perhaps $6-8,000 per year, less than half that of jobs in lumber and wood products This impact is

reflected in the low overall net income gain (+$270,000) given in the overall effects table, despite a net creation of 63 jobs over the first decade

In sum, assuming the almost certain adjustment of the Prineville mills to the shift in harvest emphasis to the Snow Mountain District, mill employment in Crook County will remain relatively stable, except for the gradual ongoing decline resulting from technological change, over the first decade of Alternative E Departure implementation Subsequent employment changes will depend on whether or not plants capable of utilizing changing harvest characteristics are built, with the near term boost in timber harvest at the expense of long term harvest volume possibly hindering this development if the Departure variant of Alternative E is adopted.

4 Economic impact of the preferred alternative on the local area and State
In evaluating both the Deschutes and Ochoco NF DEIS there is a growing awareness that the most basic question regarding the management of Ponderosa pine dominated forests has been inadequately addressed Past harvesting policy appears to have stressed uneven aged management The new plans stress even aged management, with limited analysis of the comparative advantages of the two systems. This omission leaves unanswered a number of questions Among them If uneven aged management was successfully used in the past, why is it no longer advantageous? While even aged management may result in an increased harvest volume, would not the larger trees produced under uneven aged management be of greater value? What about the capital costs incurred by area mills as they are forced to adapt to the processing of smaller, lower value logs? Would not the complexity of the proposed Plans and their implied high management costs be greatly reduced under uneven aged management as almost the entire Forest could be managed for timber production since harvesting of any given tract would only occur on a 30 or 40 year rotational basis and natural regeneration would occur to a much larger extent? Would not adoption of even aged management greatly alter the appearance of much of the Forest in a detrimental manner?...The retention of uneven aged management on those areas most subject to the public view would certainly seem to be a tacit admission on the part of planners of this concern Would not species variation be reduced by even aged management with its emphasis on the generation of a single plant species, Ponderosa pine? Why, under natural conditions, do pine stands usually assume an uneven growth pattern? Have public and timber industry views and concerns regarding such a drastic revision of Forest management policy been solicited? Without due consideration of this most basic forest management concern, the validity of any Plan issued in the Ponderosa pine region must be seriously questioned.

Given the sustained yield of old growth Ponderosa pine provided over the next decade under the Preferred Alternative, E Departure, it is highly likely that all Prineville mills will be able remain in operation, although continuing to experience the slow erosion of employment resulting from technological improvements In the subsequent decade it appears inevitable that reduced harvest levels will force the closure of at least one mill, with the loss of roughly 100 mill and logging employes, while remaining mills will have to adapt to allow for the processing of smaller dimension logs However, part or all of this decline could be offset if the growing volume of material unsuitable for lumber encourages the construction of a plant for chip or fiber based products The impact of the long term reduction in Ponderosa pine lumber production locally on millwork operations is unclear since at present they obtain well over 50% of their lumber requirements from nonlocal sources

The changing character of the timber harvest in coming decades, with its growing volume of small logs ill suited to lumber production, could well have an impact beyond those communities dependent on the forest products industry. It seems likely that in many cases, for reasons of insufficient volume or lack of capital in a given locality, new plants capable of utilizing this material will tend to be built in centralized locations Thus, some communities may well benefit from these changes in employment terms, while others will experience significant declines This development is already underway, with some areas experiencing declines as a result of the decline in sawmill employment of the past few years, while others have expanded remanufacturing operations to replace these losses The message is clear at both the state and local level If present employment totals in the forest products industry are to be maintained, the capital investment needed for new or expanded remanufacturing plants must be attracted

TABLE B V 2 EFFECTS OF THE ALTERNATIVES ON EMPLOYMENT AND INCOME (FIRST DECADE)

	A	B	B-DFP	C	D	E	E-DFP	F	G	H	H-DFP
CROOK COUNTY											
Employment											
Timber, Direct Effects	-88	+31	+79	+277	-216	-124	-50	-81	-49	-33	+74
Timber, Indirect Effects	-16	+29	+38	+141	-109	-59	-19	-38	-19	-7	+55
Recreation, Wildlife & Range Resource Effects	+10	-8	-6	+54	+31	+55	+59	+17	+16	+24	+32
Total Effect	-54	+52	+121	-368	-294	-128	-10	-102	-52	-16	+161
Total Income Change (Thousand $)	-910	+1,129	+2,456	-5,975	-4,657	-2,387	-551	-1,627	-798	-281	+2,472
Pattern of Change	Wood Product Decline	Timber Caused Increase	Timber Caused Increase	Overall Decline	Overall Decline	Mixed Effects	Mixed Effects	Wood Products Decline	Mixed Effects	Minor Effects	Overall Increase
HARNEY COUNTY											
Employment											
Timber, Direct Effects	+60	+26	+9	-12	-16	+18	+23	+11	+21	+30	+33
Timber, Indirect Effects	+39	+19	+11	-14	-13	+10	+15	+8	+15	+22	+27
Recreation, Wildlife & Range Resource Effects	+4	-5	-6	+22	+12	+22	+22	+5	+6	+8	+7
Total Effect	+103	+40	+14	-4	-17	+50	+60	+24	+42	+60	+67
Total Income Change (Thousand $)	+1,371	+623	+279	-184	-299	+561	+706	+286	+552	+800	+868
Pattern of Change	Timber Caused Increase	Timber Caused Increase	Timber Caused Increase	Mixed Effects	Mixed Effects	Overall Increase	Overall Increase	Timber Caused Increase	Timber Caused Increase	Timber Caused Increase	Overall Increase
OVERALL (CROOK, HARNEY, AND JEFFERSON COUNTIES)											
Employment											
Timber, Direct Effects	+12	+57	+88	-289	-232	-106	-27	-70	-28	-3	+107
Timber, Indirect Effects	+23	+48	+59	-155	-122	-49	-4	-30	-4	+15	+62
Recreation, Wildlife & Range Resource Effects	+15	-18	-17	+89	+51	+90	+94	+26	+26	+36	+43
Total Effect	+50	+87	+130	-355	-303	-65	+63	-74	-6	+48	+232
Total Income Change (Thousand $)	+477	+1,719	+2,702	-6,043	-4,875	-1,709	+270	-1,307	-206	+561	+3,382
Pattern of Change	Timber Caused Increase	Timber Caused Increase	Timber Caused Increase	Wood Product Decline	Wood Product Decline	Mixed Effects	Mixed Effects	Wood Product Decline	Minor Effects	Minor Effects	Overall Increase

TABLE B V 3 EFFECTS OF THE ALTERNATIVES ON EMPLOYMENT AND INCOME (SECOND DECADE)

	A	B	B-DFP	C	D	E	E-DFP	F	G	H	H-DFP
CROOK COUNTY											
Employment											
Timber, Direct Effects	-75	+36	+21	-275	-205	-124	-84	-93	-33	-33	+3
Timber, Indirect Effects	-16	+60	+39	-117	-80	-33	-10	-18	+15	+22	+45
Recreation, Wildlife & Range Resource Effects	+10	+2	+2	+83	+28	+75	+75	+37	+7	+10	+20
Total Effect	-81	+98	+62	-309	-258	-82	-19	-74	-11	-1	+68
Total Income Change (Thousand $)	-1,127	+1,804	+1,193	-5,365	-4,105	-1,732	-779	-1,371	-98	+81	+1,152
Pattern of Change	Wood Product Decline	Timber Caused Increase	Timber Caused Increase	Overall Decline	Overall Decline	Mixed Effects	Mixed Effects	Mixed Effects	Mixed Effects	Minor Effects	Overall Increase
HARNEY COUNTY											
Employment											
Timber, Direct Effects	-23	+20	+35	-5	-2	0	+17	+27	+7	+29	+38
Timber, Indirect Effects	-12	+25	+34	-3	+2	+5	+16	+26	+11	+27	+36
Recreation, Wildlife & Range Resource Effects	+4	-3	-2	+33	+11	+28	+29	+12	+2	+2	+5
Total Effect	-31	+42	+67	+25	+11	+33	+62	+65	+20	+58	+79
Total Income Change (Thousand $)	-881	+680	+927	+149	+100	+308	+693	+806	-261	+802	+1,108
Pattern of Change	Wood Product Decline	Timber Caused Increase	Timber Caused Increase	Mixed Effects	Minor Effects	Mixed Effects	Overall Increase	Timber Caused Increase	Minor Effects	Timber Caused Increase	Timber Caused Increase
OVERALL (CROOK, HARNEY, AND JEFFERSON COUNTIES)											
Employment											
Timber, Direct Effects	-98	+56	+56	-280	-208	-124	-67	-66	-26	-8	+41
Timber, Indirect Effects	-28	+35	+73	-120	-78	-28	+6	+8	+26	+49	+81
Recreation, Wildlife, & Range Resource Effects	+16	-5	-3	+135	+46	+120	+121	+57	+11	+13	+25
Total Income Change (Thousand $)	-710	+136	+126	-265	-280	-32	+60	-1	+31	+58	+148
Pattern of Change	-1,548 Wood Product Decline	+2,823 Timber Caused Increase	+2,147 Timber Caused Increase	-5,051 Wood Product Decline	-3,925 Wood Product Decline	-1,274 Mixed Effects	+63 Mixed Effects	-51 Mixed Effects	+193 Minor Effects	+908 Timber Caused Increase	+2,281 Overall Increase

F DEPARTURE decline 31 percent Alternative
I DEPARTURE decline 2? percent, Alternative
H DEPARTURE decline 19 percent

Expressed in board feet all alternative timber harvest levels will decline over time This is due to change in cubic feet/board foot ratio as harvesting changes from old growth to smaller and growth material The larger the material the more board feet per cubic foot for example an existing pine sawlog has 6-1/2 board feet to every cubic foot whereas managed stands of pine may be as low as 4-1/2 to one The most loss occurs in the three departure alternatives, Alternative B-DEPARTURE 31 percent, Alternative E-DEPARTURE 28 percent, and Alternative H-DEPARTURE 24 percent Other alternatives show moderate declines Alternative F, 12 percent A and B, 11 percent, Alternatives E, G, and H by 9, 8, and 7 percent respectively The smallest decreases over time are shown by Alternative D, 2 percent and Alternative C, 1 percent Currently, employment levels are a function of the harvest level in board feet It is uncertain whether employment levels in the future will be more closely related to cubic foot measures or board foot measures Further interpretation of these figures is left to the reader

Table IV 4 ALLOWABLE TIMBER SALE QUANTITY

Alternative	Million Cubic Feet Year 1990	Million Cubic Feet Year 2039	Decli	Million Board Feet Year 1984	Million Board Feet Year 2040	Decli n
A	20 4	20 4	0%	125	111	11%
B	22 9	22 9	0%	137	122	11%
B DEP	24 4	16 9	31%	144	100	31%
C	13 9	13 9	0%	82	81	1%
D	15 5	15 5	0%	93	91	2%
E	18 2	18 2	0%	109	99	9%
E DEP	20 6	16 1	22%	123	89	28%
F	19 4	19 4	0%	116	102	12%
G	20 6	20 6	0%	123	113	8%
H	21 0	21 0	0%	127	118	7%
H DEP	26 4	19 7	19%	156	111	29%

As discussed on page 96 and fully described in Section 5 of Appendix B, ponderosa pine has more influence on employment levels than do other species Table IV-5 shows the percent of total volume ponderosa pine represents for the first two decades for all alternatives

In recent years the percent of ponderosa pine sold has varied from 75 to 80 percent of the total volume sold For the first five decades the percent of pine volume will average 65 to 70 percent for all alternatives

Table IV 5 PERCENT OF PONDEROSA PINE BY ALTERNATIVE

Decade	A	B	B DEP	C	D	E	E DEP	F	G	H	H DEP
1	63	67	67	71	67	71	71	67	71	71	71
2	63	67	71	74	67	74	74	67	74	74	74

SOCIAL MEASURES

In order to examine the social effect of the alternatives five criteria are considered They are

- Effects on occupation lifestyles
- Effects on leisure lifestyles
- Effects on peoples' attitudes beliefs, and values
- Effects on the social structure institutions community cohesion and community stability
- Effects on minorities and women (civil rights)

Some of the social effect estimates are drawn from IMPLAN modeling which have been computed for the first two decades only

ASSUMPTIONS AND INTERACTIONS CONCERNING OCCUPATIONS

Six lifestyles identified in the Socio Economic Overview prepared for the Forest and Grassland (pp 62-92) were Native Americans farmers, loggers millworkers, small town merchants, and government employees

In terms of total County employment the number of government employees is assumed not to vary significantly by alternative The Native American lifestyle is treated in the Minority Groups and Women section Therefore, loggers, millworkers, farmers, and merchants are discussed here

Loggers and mill workers are directly affected by Forest timber availability Workers employed in logging or sawmill operations are affected by the total volume of timber harvested For those employed in remilling operations (which is the largest single industry in Crook County) the critical variable is the harvest level of ponderosa pine However well over half of the ponderosa pine which is remilled in Crook County comes from sources other than the Ochoco National Forest Wherever the logging or milling sector employment changes by 10 percent or more from the current level it is estimated that the millworkers lifestyle would be significantly strengthened or weakened

Small town merchants are also affected by Forest output levels but the effects are less direct If timber harvest levels rise or fall significantly the incomes of loggers and mill workers will be affected They will then be spending more or less in their communities, thus impacting local merchants Similarly but to a lesser degree varying levels of recreation affect the merchant The more recreation available, the more recreationists (both resident and non resident) patronize local businesses

Table II 8 COMPARISON PAST, PRESENT AND PREDICTED TIMBER OUTPUTS 1/

TIMBER OUTPUT COMPONENT	ACTUAL 1975-85 Annual Ave. Sold	Cut	EXISTING 1990 TH Plan P A H, 2/	PLANNED VOLUME BY ALTERNATIVE (SIMMS PROJECTED) HIGH AND LOW FOR DECADES 1 - 5) 2/ A 4/	B	B DEP	C	D	E	E DEP	F	G	H	H DEP
CHARTABLE (Chargeable)														
Green sales (ASQ)3/	138 3	106 2	127 1	125-111	137-122	144-97	82- 77	93- 87	109- 99	123- 89	116-102	123-113	127-117	146-106
Est give values 5/	165 3	71 0	95	100- 64	92- 71	92- 56	59- 46	62- 50	79- 56	87- 52	78- 62	85- 66	80- 66	96- 61
Salvage sales	incl above		2 7	4- 0	7- 0	7- 0	2- 0	3- 0	4- 0	5- 0	7- 0	6- 0	7- 0	9- 0
SALVAGE SALES & SANITATION	138 3	106 2	129 8	129-111	148-122	151- 97	84- 77	96- 87	113- 99	128- 89	123-101	129-113	134-117	155-106
SANITATION (Non-Chargeable)	negligible in existing or planned program													
SUCH AS (Fuel, poles, cull)	,9	3	unestimated in existing or planned program											
NON VARIABLE PRODUCTS														
Firewood 6/	3 6	3 6	unestimated	4- 4	5- 4	5- 3	3- 3	3- 3	4- 3	4- 3	4- 3	4- 4	4- 4	5- 4
TOTAL (TSPQ)	138 2	110 1		133-115	149-126	156-100	87- 80	99- 90	117-102	132- 92	127-104	133-117	137-121	160-110

1/ Note that due to different bases for calculation, these figures may not be directly comparable However, they may be used to show clarres in specific components for calculations, over time All calculations were done in cubic feet. The volumes in this table are estimates based on boardfoot/ cubic foot ratio

2/ Alternative values are for the highest and lowest value for the first five decades Highest level is always the first decade and the lowest is either the fourth or fifth decade The output changes during the five decades because of the change in boardfoot/ cubicfoot ratio, change in salvage and firewood volume, and planned departure from even flow in some alternatives

3/ Yield of timber projected for the period of 1980 to 1989, as calculated for the 1980 Timber Management Plan The Programmed Allowable harvest (P A H) is the savtimber from green and salvage sales scheduled for harvest.

4/ Allowable sale quantity calculated for the current land and resource management plan direction, projected into the future using new scientific information, such as yield tables and suitability for timber harvest, and using FORPLAN analysis model.

5/ Estimated volume of ponderosa pine that is included in green sale volume. Volume based on years 1980 to 1984 Cut volumes ranges from a low of 36 k m3 in 1982 to a high of 109 0 MMBF in 1984

6/ Firewood volume is based on years 1981 to 1984 Essentially all of this was sold as personal use

Comments On The Proposed
Ochoco National Forest
Management Plan

Prepared by
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As I am the LME for Wheeler and Grant Counties, I am, of course, primarily concerned with the impact that the Plan would have on these counties. Most of my comments will directly relate to this concern. Some comments will be more general in nature, as certain overall characteristics of the plan will certainly have significant effects on all the counties which have a dependency on the Ochoco.

First, I would like to briefly address Grant County. While 59,000 acres of the Ochoco are in Grant and Grant is very much a lumber dependent county, the Ochoco represents a relatively small portion of Grant's forest base, there being far more acreage of the Malheur National Forest in Grant. I agree with the Forest Service's assessment that the Plan will not have a major impact on Grant, though I do believe that some of the undesirable aspects of the plan will have a small but negative impact on Grant. Most comments made about Wheeler County, and about the Plan in general will also apply to Grant, but with less impact and less affect. The real danger to Grant would come about if the Malheur Plan (still in production) were to include the same undesirable features as the Ochoco. This 'double hit' could have severely detrimental impacts for Grant.

Wheeler County is summarily dismissed by the Forest Service as a county which does not have a major dependency on the Ochoco. I disagree with this. Indeed, Wheeler may very well prove to be the single most impacted county of all those which contain portions of the Ochoco. While Wheeler only contains 127,495 acres of the Ochoco, compared to 223,237 for Harney, and 433,820 for Crook, Wheeler is a relatively small county, and the Ochoco acreage is fully 10% of the total county land area. More importantly, it represents a much larger proportion of the county's total forested area. In addition, Wheeler is a gateway for tourists, campers, and hunters to enter the Ochoco. While this tourist trade through Wheeler may be small compared to hat through other counties, and while logging activities in Wheeler are minute compared to those of Crook, Harney, and Deschutes, Wheeler is a tiny county with a tiny population and miniscule wage & salary employment Ochoco related employment is a vital part of the County's private sector economy and a significant contributor to wage employment.

While the timber industry in Wheeler County crashed a few years ago, and the county currently has no mills and slight opportunity for regaining one, logging still accounts for 10% of all private sector wage and salary employment. As these logging jobs are among the highest paying jobs in the county, they represent a significant contribution to the county's earned income and provide critical support to the county's small retail trade sector. Retail trade accounts for about 30% of the county's total private sector wage and salary employment. Retail trade also demonstrates a clear seasonal pattern, where employment will increase 50% to 100% during late summer and fall, when recreational and hunting use of the Ochoco is at its peak. Thus a full 40% of the county's private sector wage and salary employment is either directly Ochoco related or potentially so. Perhaps of even greater importance is the County government's dependence on payments from the Ochoco. In 1984, payments from the Ochoco accounted for 44.3% of the county's revenues. Obviously, any significant decrease in these payments would create an immediate and severe financial crisis for the Wheeler County government. In particular, any layoffs of local or county employees would severely impact Wheeler, and would severely affect the small retail sector in the county.

I think that it is safe to conclude that Wheeler stands to experience major impacts from the National Forest Plan for the Ochoco. As these impacts will almost certainly be negative, Wheeler could be severely affected.

Wheeler can hardly afford this. Wheeler is totally dependent on agriculture, timber, and recreation as its economic base. As both agriculture and timber have been troubled industries, with declining employment, Wheeler has suffered greatly. Wheeler's population has decreased by 56% over the last 25 years. Potential for growth in agriculture or timber employment is nil, and recreation related employment is unlikely to significantly increase under even the most recreation/big game emphasized alternative for the Ochoco.

The first flaw with the Ochoco plan is that it attempts to be all things for all people and uses. A national forest is a limited resources. Competing demands (timber harvest vs. big game vs wilderness vs. riparian, etc) mean that not all demands can be maximally satisfied. This will, of course, result in making some people unhappy. The Ochoco planners seemingly wanted to avoid making anyone unhappy, so they attempted to provide everyone (every demand or competing use) with everything. They essentially have achieved this by decreasing general forest acreage (timber harvest emphasis) and increasing acreage for virtually every other usage. Big game management acreage was a particular gainer (the Plan, in all alternatives offered, has, as a primary driver, a Forest Service perceived mandate from the state to double the elk population. This mandates increased big game management at virtually any cost to other uses, and distorts and limits all alternatives.) (This driving of the plan by elk population needs resulted from the acceptance of a state issued goal of doubling the Ochoco's elk population in a game management plan as a minimum requirement for all acceptable alternatives. The Ochoco already meets, and could continue to meet, all other big game management objectives, with reduced big game management areas. Elk require large areas per animal, and the major elk population increase requires significant additional land devoted to big game management to achieve this population expansion goal. No purpose other than increasing elk is accomplished by this, and since the model accepts this elk increase as mandated, it will devise no alternative which doesn't achieve it at least for a period of time. It is also a principal basis (apparently) for downgrading some of the alternatives considered). While this keeps everyone but the timber industries happy, it reduces the timber harvest (the E-Alternative). To make the timber industry accept this reduction in logging potential, the preferred plan (E-Departure Alternative) provides for ten years of significant over-cutting to keep the timber harvest up. To put it bluntly, it appears as if, to avoid making the hard, controversial decisions as to usage priorities, which could result in political pressures, the planners decided to 'burn' the forest for ten years. This proposed massive over-utilization of the Ochoco's resources will

inevitably result in a future 'crash' where utilization must be drastically decreased to allow the forest to recover. This crash effect is totally allocated to timber harvest under the preferred alternative. The impact on the surrounding and affected counties will be severe. Timber related employment will decrease sharply, payments to counties will be significantly reduced, and secondary economic sectors will be impacted by the spin off. The Forest Service contends that some of this future adverse impact will be alleviated by increases in recreation/hunting retail and service employment. This is not true. The Forest Service equates recreation related jobs with logging and milling jobs. Recreation related employment is much more seasonal (and a much shorter season) than timber related employment, and such jobs pay much less per hour than logging or mill work. The adverse financial impact in terms of lost wages would be severe even if we were talking of a one for one job trade. It is plan from the Plan, that even the Forest Service's optimistic (and unsupported) claim for job increases from increased recreational/hunting use does not come close to one for one replacement of lost timber jobs.

A second flaw is that the Plan does not fully credit the impact of the shift from uneven-age management to even-age management. This will mean a drastic decrease in the harvest of valuable older Ponderosa Pine (which the local mills are designed to handle) and a shift to younger, small trees (which the local mills can't utilize). As in ten years the timber harvest will begun to be reduced severely, there is virtually no incentive for local companies to make the investment needed to build new mills, or to revamp existing mills, to handle the smaller logs which the even-aged management will produce. I am not completely satisfied, either, that the planners adequately have accounted for the difference in value between older Ponderosa and the small logs to be produced in the future Even-age management will also have a detrimental effect on the visual quality of the forest, and upon its attractiveness for recreational use.

A final comment needs to be made about how the comparisons between alternatives was made. Almost all the data, and almost all the comparisons were based upon the first ten years of the alternatives. The preferred E-Departure Alternative looks very good from this perspective, it truly provides all things for all people. But, the severely adverse impacts in later decades, due to sharply reduced timber harvests are minimized in this analysis. Any alternative based upon severe over-utilization of the forest's resources for a ten year period will look good, for the first ten years. The next forty are where the preferred E-Departure Alternative crashes, and very little analysis and data/projections are detailed for these years.

There is little doubt in my mind that the preferred E-Departure Alternative will be highly detrimental to the counties (including Wheeler) which have a significant dependence on the Ochoco. The timber industry will be hurt, in the long run, and county revenues from forest payments will greatly decrease. Wheeler County will experience a major decline in county government revenues which it will have no chance to recover from other sources. As timber related employment drops, the secondary economic sectors will likewise suffer, and the few new jobs created in recreation/hunting related sectors will in no way make up for the lost timber earnings. I see little positive about the long range impacts of the preferred alternative, the visual qualities of the forest will even suffer under it.

If other uses are to predominate over the timber harvest, local timber industries would be far better off to see a steady-yield plan (such as E-Alternative, without the departure schedule) implemented directly. A reduction in timber harvest now will be less detrimental than a much larger reduction, for several decades, beginning ten years down the road. Also, while even-age management will help keep cubic-feet (harvest) up, this is of no great benefit to the timber industry, which would have to invest millions to use the resulting logs. Retention of an uneven-age growth management scheme would do much more to keep the value of the harvest up, without large facility investments, which is at least as important as board feet or cubic feet harvested. Uneven-age management would also have superior visual, riparian, big game, and recreational values, as well as higher timber values.

The other direction the planners could go would be to make those hard (and possibly unpopular) decisions they seem to be trying to avoid, by establishing clear priorities as to forest usage. If non-timber uses are to be given the higher priorities, this should be done out front and with a steady-yield plan, which keeps harvest value, not just cubic feet, as high as possible. Such an approach would facilitate planning for the necessary adjustments and would be far easier for the timber industry to deal with. The least adverse approach, of course, in terms of local (and state-wide) economic impact, would be to set timber harvest as a high priority (both yield and value) and to reduce the emphasis on other, competing uses (particularly the ill-considered mandate to double the elk population). The G-Alternative offered, but rejected, seems to accomplish this in at least a minimally satisfactory way, and would clearly have the least adverse impact on local economies of all the alternatives presented, while preserving some use of the forest of non-timber demands. The preferred E-Departure Alternative is clearly not acceptable.

Department of Human Resources
EMPLOYMENT DIVISION
875 UNION STREET N E SALEM OREGON 97311

IN REPLY
REFER TO

August 14, 1986

RES:JH
R&S 2

Camille Hall, Planner
The Oregon Consortium
260 SW Ferry, #102
Albany, OR 97321

This letter is in response to your request for an estimate of the employment multiplier for the lurber and wood products industry both statewide and for the non-metropolitan counties comprising the Oregon Consortium.

First of all, let's define the concept of an economic multiplier Since local businesses, households, and government agencies purchase goods and services from one another, any new development in a community generates both direct and indirect economic impacts. The multiplier is a single number that estimates the total economic impact of a given change in the local economy. There are many different types of multipliers, including multipliers for business output (or sales), personal income (or earnings), and employment. Most multipliers are estimated as follows.

$$\text{multiplier} = \frac{\text{total change}}{\text{initial change}},$$

in whatever units are being considered· business sales dollars, number of jobs, etc. For our purpose, we will focus only on the employment multiplier (# of jobs, not FTE's) for a particular industry, lumber and wood products. Also, this will be considered a Type II multiplier which aggregates the following impacts

1. Direct impact - employment change within the lumber and wood products industry

2. Indirect impact - employment change in other industrial sectors resulting from purchases by the lumber and wood products industry.

3. Induced impact - employment change resulting from purchases by households that receive income through either the direct or indirect effects.

To help you better understand the concept of economic multipliers and avoid their possible misuse, I've enclosed several recent papers on this topic.

To derive an employment multiplier for lumber and wood products for Oregon and for local areas within TOC, we enlisted the help of two economists (Stan Detering of BPA and Hans Radtke) who have had considerable experience in this area. The employment multipliers that follow were generated using the IMPLAN system developed and maintained by the U S. Forest Service. This is a computer-based system which uses input-output analysis procedures and provides forest planners with the capability to develop non-survey based interindustry models and apply them to the evaluation of alternative management programs. The specific IMPLAN computer runs were prepared by the Bureau of Land Management, U.S Department of Interior. Detering and Radtke believe that the IMPLAN system estimates of employment multipliers tend to be a little higher than employment impacts generated using valid survey-based models. I have enclosed a brief paper describing the IMPLAN system. If you want more detailed information, let me know.

Employment multipliers for SIC 242 and 243 are shown below for the State and a number of local areas.

	SIC 242	SIC 243	AVERAGE
Oregon (statewide)	2.9	2.9	2.9
Grant & Harney	2.2	2.3	2.25
Crook, Deschutes, & Jefferson	2.3	2.4	2.35
Coos	2.2	2.2	2.2
Curry	2.1	2.1	2.1
Lincoln	2.1	2.2	2.15
Clatsop	2.1	2.3	2 2
Tillamook	1.7	2.1	1.9
Lake	2.5	INA	2.5
Wheeler, Gilliam, Sherman, & Jefferson	1.9	INA	1.9
TOC Average (based on above areas only)	2.1	2.2	2.2

Additional multipliers for other areas

NW Coast (Clatsop, Lincoln, & Tillamook)	2.1	2.2
Portland Metro (Clackamas, Multnomah, & Washington	3.5	3.3
SW Oregon (Coos, Curry, Douglas, Jackson, & Josephine)	2.3	2.5
Lane	2.5	2.8
E. Oregon (includes 18 counties in E. & C. Oregon)	2.4	2.5
Crook, Deschutes, & Jefferson	2.3	2.4
SE Oregon (Lake, Harney, & Malheur)	2.4	2.4
Willamette Valley (Lane, Linn, Marion, Polk, Yamhill, Multnomah, Washington, & Columbia)	2.9	3.0
Jackson & Klamath	2.5	2.6

Note that, in general, the employment multipliers get larger as the area covered gets larger. This is because the economies of large areas are more diverse, and a larger proportion of income is spent locally on goods and services. This explains why the lumber and wood products multiplier for the state is 2.9, while the one for Eastern/Central Oregon (an 18 county area) is about 2.5. Since you will be doing planning at the sub-district level within TOC, we suggest you use an employment multiplier of 2.2 for lumber and wood products, which is an average of nine individual areas (not the combined area) within TOC for which separate data was available. This average assumes that SIC 242 and 243 are given equal weight, and that they fairly represent the lumber and wood products industry (SIC 24).

Usually, these multipliers are used in the context of analyzing the impacts of new jobs or new industry to an area Whether these multiplier impacts would be of equal magnitude in the opposite direction if an area lost the same number of jobs is an interesting question. To the extent that these workers remained in the area and received income from transfer payments etc. the downside multipliers would probably be lower, at least in the short run.

I hope that this information will be helpful to you. If you have any questions, please don't hesitate to call me or Jeff Hannum.

Sincerely,

Michael D. Staten, Supervisor
Labor Market Information Programs Unit

MDS:jm

Enclosures

cc Area Labor Economists
Radtke

5206D/10-13

IMPLAN AN INPUT-OUTPUT ANALYSIS SYSTEM FOR FOREST SERVICE PLANNING

Gregory S Alward[1/]
Charles J Palmer[2/]

ABSTRACT -- IMPLAN, a computer-based system for developing non-survey input-output models, is discussed The contents and procedures used to develop the extensive nation-wide data base are identified and the analytical capabilities of the system described in the context of Forest Service planning efforts. Finally, possible extensions of the system are noted

INTRODUCTION

The USDA Forest Service has developed a computer-based system referred to as IMPLAN, to assist its land and resource management planning efforts involving economic impact assessment The IMPLAN system utilizes input-output analysis procedures and provides forest planners with the capability to develop non-survey based interindustry models and apply them to the evaluation of alternative management programs This paper provides a general overview of the data model building procedures and analysis capabilities that comprise the IMPLAN system

Input-output models have frequently been used to describe the role of forestry activities in regional economies (Elrod, et al, 1972, Troutman and Porterfield, 1974) Input-output models have also been used to evaluate forest policies and programs (Schallau, et al, 1969, Connaughton and McKillop, 1979) The usefulness and applicability of input-output analysis to Forest Service planning has been demonstrated (Palmer and Keaton, 1978 Alward and Stewart 1978) Indeed several of the planning requirements of the National Forest Management Act of 1976 (P L 94-588) and its implementing regulations (36 C F R 219 Subpart A, September, 1979) require economic analyses of proposed plans such as those that can be performed using input-output techniques.

Many applications of input-output models have utilized primary data obtained through direct surveys Consequently the cost in terms of money and manpower for these studies has been substantial (Bourque and Hansen, 1967) Various techniques for constructing models using secondary data have been proposed (Czmanski and Malizia, 1969,

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Richardson, 1972) and applied, significantly reducing the cost of obtaining a useable model. The debate about the veracity of secondary data models compared to primary data models continues (Schaffer and Chu, 1969, Miernyk, 1979). Given the magnitude of the planning task[3/] confronting the Forest Service, however, the cost of preparing the required number of models using primary data procedures was clearly prohibitive. Consequently, a data base of economic information relying upon secondary sources was developed[4/] as well as an efficient software system to perform the required computations. The resulting IMPLAN system has the capability of producing a non-survey based input-output model for any region of the United States, with the greatest degree of geographic resolution being a single county.

DATA BASE

The IMPLAN data base consists of two major parts (1) a national-level technology matrix and (2) estimates of sectoral activity for final demand, final payments, gross output and employment for each county. The data represent 1977 county level economic activity for four hundred and sixty-six sectors

The national technology matrix denotes sectoral production functions and is utilized to estimate local purchases and sales. This 466-sector, gross domestic based model was derived from the Commerce Department's 1972 national input-output model (U.S. Department of Commerce, 1979(a)). The 'use" and make' tables were rectified to an industry by industry basis and updated to 1977 using relative price changes and the RAS procedure (Stone and Brown, 1962) with the 1977 National Income and Products Accounts (U S Department of Commerce, 1977(b)) information used as control totals Aggregation of some agriculture, construction and manufacturing sectors, and disaggregation of the mining sectors resulted in the reduction in the number of sectors from 496 in the Department of Commerce tables to 466 in IMPLAN. The matrix is a highly disaggregated representation of national average sectoral input and output technology and it is on the basis of these production functions that regional purchase patterns are estimated.

3/ Approximately 124 forest plans, 9 regional plans and a national program

4/ This was developed by Engineering-Economics Associates of Berkeley, California. This use of the company name is for the benefit of the reader, such use does not constitute an official endorsement or approval of any service or product by the U S. Department of Agriculture to the exclusion of others that may be suitable.

Estimates of economic activity and production employment for each of the 466 sectors for all states and every county within each state were made for the components of an input-output table listed in Table 1 The estimates of economic activity for states and counties were made through a downward movement approach beginning with total national activity and disaggregating to states and ultimately to counties with control totals employed at each level. As previously noted, the updated 1977 national table was benchmarked with the 1977 National Income and Product Accounts. Since comparable accounts are not available for states or counties, the most suitable regional measures of economic activity were used to disaggregate the national production and demand activity, first among states and then among counties within each state

Table 1 -- Contents of the IMPLAN Data Base for each U.S. County

A Final Demand

1 Personal Consumption Expenditures
2 Capital Formation
3. Inventory Change
4 State and Local Government Expenditures
5 Federal Government Expenditures
6 Foreign Exports

B Final Payments

1. Employee Compensation
2 Indirect Business Taxes
3 Property-Type Income

C Total Gross Output

D Production Employment

Gross output and employment estimates utilized several sources, principally censuses For example agriculture sector activity used the Census of Agriculture (U.S Department of Commerce, 1977(b)) and the Agricultural Statistics (U S Department of Agriculture 1979) Gross output measures for most other sectors[5/] utilized proxy measures derived from employment and payroll data principally the national summaries of the County Business Patterns (U S Department of Commerce, 1977(a)) and employment data from the Dun and Bradstreet Corporation (1977). Some sectors could be related to specialized data sources such as the Census of Housing (U S Department of Commerce, 1970) for owner-occupied dwellings and the Census of Governments (U S. Department of Commerce, 1977(c)) for government-related sectors All data was adjusted to the 1977 base year and unreported data was estimated utilizing the RAS procedure

Final demands were estimated consistent with control totals from the National Income and Product Accounts, by updating the 1963 Multi-Regional Input-Output data (Polenske, 1970) using the RAS procedure as suggested by McMenamin and Haring (1974) The three components of value added were allocated on the basis of gross outputs. Both final demand and final payment estimates were disaggregated using the 'downward movement approach

In its entirety, the IMPLAN data base provides a comprehensive, nation-wide set of input-output information which can be used to construct non-survey based regional tables The national technology matrix is maintained at the highly disaggregated 466-sector level of detail which greatly reduces aggregation errors caused by using 1- or 2-digit SIC (Standard Industrial Classification) industry groupings. Consequently, the industry-commodity relationship is much more consistent than in highly aggregated models. The hierarchical nature of the data base, achieved by the use of published control totals at each level of disaggregation, results in a data base that permits the construction of models that are consistent both in terms of definition and activity These principal aspects result in significant improvements over the data used in many previous non-survey input-output studies.

DATA REDUCTION

The IMPLAN software system was designed to serve three functions (1) data retrieval, (2) data reduction and model development and (3) impact analysis The first two functions are discussed in this section and the third in the following section

5/ Bureau of Economic Analysis input-output sectors 3 00 through 77 05, excluding sectors 11 00, 12 00, 65 01 and 71 01 (U S Department of Commerce, 1979(b)).

The data retrieval system was designed so that the user could have access to input-output data for any U S state county or combination thereof The study area data is referenced via a standard set of state and county codes with the extracted data treated as control totals for the region being analyzed Modification of data, if desired by the user, is permitted

Utilizing the national technology matrix and the regional control totals, a data reduction method is employed to develop a regional input-output table The method used exploits the property of "openness" displayed by regional economies compared with the national economy (Richardson, 1972) Regional economies exhibit much greater propensities to import and export than is observed at the national level Based on the assumption that trade balances are the principal difference between national and regional purchase patterns (that is, industry production functions are identical but regional imports and exports make local interindustry transactions different), the supply-demand pool technique (Schaffer and Chu, 1968) for data reduction was adopted.

This method for constructing a regional table begins with the national technology matrix and regional data for gross outputs, final demands and final payments Regional data for all 466 sectors is sorted with respect to gross outputs. If the sectoral gross output is greater than zero (firms producing the commodity exist within the region), the corresponding column of direct coefficients is extracted from the national matrix. Using regional gross outputs and the abbreviated matrix of national direct coefficients regional purchase transactions are computed This transactions matrix is then scanned row by row. If the industry represented by any row has zero regional gross output (the industry does not occur within the region) the estimated purchases of that commodity are assumed to be non-competitive domestic imports and are shifted from the regional transactions matrix to final payments If the gross output is positive and the commodity balance shows a surplus[6/], the domestic import purchases are assumed to be zero, the regional transactions estimated with national direct coefficients are left unchanged, and the surplus assumed to be domestic exports If the commodity balance indicates a deficit, the regional final demands and transactions estimated with the national coefficients are proportionately reduced across the row to obtain a balance, and the differences assumed to be competitive domestic imports The result of this process is a matrix of local transactions between regional industries plus estimates of both competitive and non-competitive imports as well as exports

The data reduction procedure used in IMPLAN produces a complete table of regional input-output accounts including a transactions table, the final demand and final payments quadrants, and the fourth quadrant

6/ Regional gross output is greater than regional final demand plus intermediate demand estimated with national direct coefficients.

In addition to this typical table of accounts, detailed reports of sectoral competitive and non-competitive import purchases are given. Based upon the regional accounts, the predictive input-output model can be derived by computing the standard Leontief-type inverse and calculating various income and employment multipliers If appropriate, the number of sectors in the model can be reduced through aggregation prior to inverting the matrix

Several limitations to non-survey data reduction techniques have been noted (Richardson, 1972, Fisch and Gordon, 1978) and the supply-demand pool procedure likewise has limitations. One principal limitation of the supply-demand pool technique is that cross-haul conditions are ignored while evidence suggests that this may be a common occurence in regional economies. This arises from the technique's method of allocating local production to meet local requirements before imports or exports are estimated Through the use of a highly disaggregated technology matrix and a consistent data base, the IMPLAN system has mitigated though not eliminated many limitations noted by others For example, Richardson (1972) commented that the use of the national technology matrix may overestimate the interdependence of a regional economy. Similarly, Miernyk (1976) criticizes the supply-demand pool technique assumption of proportionate imports by all purchasing industries. Continued improvements are being sought to enhance the system

ANALYSIS

The analytical capabilities of the IMPLAN system can be classified into two broad categories (1) the estimation of impacts originating from changes in final demands, and (2) the evaluation of constraints upon sectoral gross outputs Estimating the regional economic impacts of disturbances in the final demand vector caused by resource management actions is the most frequently used form of input-output analysis employed in Forest Service planning studies. These demand disturbances arise from such activities as timber harvesting, grazing and recreation, as well as direct budgetary expenditures for goods and services. Economic impacts are expressed by the changes in regional income and earnings, employment, gross output and various other parameters

Input-output models are typically used in Forest Service planning studies to estimate the regional economic effects of implementing optional management plans These plans describe the intended management activities on a National Forest along with the expected outputs, resource uses and budgetary expenditures Economic impacts are characterized as changes (increases or decreases) from current conditions. Planning teams frequently employ input-output models in other ways The models provide excellent descriptions of regional economic structure, giving planning teams valuable information for formulating Agency policies regarding economic growth or stabilization Opportunities for developing markets for forest products can often be identified through the use of input-output

accounts. Major structural changes in an economy, caused by such events like mine construction or ski area development can be investigated by generating hypothetical models that characterize the introduction of new industries Input-output models have become integral components of the formal planning models employed by the Forest Service

The linkages between Forest Service management actions and corresponding estimates of net changes in regional final demands are critical components in the use of input-output analysis for impact estimation These disturbances in final demand arise from two principal sources public expenditure effects and private sector output effects (Cartwright, 1979) Public expenditure effects arise from demand disturbances caused by government purchases of goods and services For example, timber stand improvement projects or the construction of recreational facilities involve purchases for labor, materials and so forth which can directly be transformed into a demand disturbance vector Private sector output effects are somewhat more complex These effects stem from the use of forest resources and indirectly (from the viewpoint of the Forest Service) result in demand disturbances For example, the Forest Service's provision of various factors of production such as stumpage for wood products water for municipal and domestic uses, and forage for red meat production must be traced to its final regional economic use, either directly to exports or via forward linkages and "stemming-from effects (see, for example, Roesler, et al, 1968) The effects of the use of forest resources for recreation can be directly transformed into demand disturbances by deriving a typical "bill of goods purchased locally by the recreationist during the pursuit of such activities In all cases the demand disturbances represent regional market transactions expressed in purchaser's prices with appropriate transportation and trade margins

Traditional applications of input-output models utilizing demand disturbances as the source of interindustry effects, contain an implicit assumption of sufficient resource supply to permit attainment of an equilibrium economy. As is often the case with forest resources, some of the primary resource supplies may be restricted within a regional economy (for example, the amount of water may be restricted) If the change in forest output is used, under these circumstances, to derive a disturbance in demand and the model used to estimate the resultant multiplier effects, the backward linkages would usually indicate a total demand for the resource exceeding the original change The IMPLAN system has been designed to perform analyses under these conditions by permitting the user to link the change in resource output directly to a change in sectoral gross output rather than a change in final demand The input-output model is then used to estimate the maximum level of delivery to regional final demands attainable given the constrained level of gross output. This kind of analysis is often applicable to economies that are highly dependent upon primary resources

The economic effects estimated with IMPLAN are described by parameters typical of input-output studies. They are structural in nature permitting multiplier effects to be traced throughout the various regional sectors Direct, indirect and induced changes in gross outputs and final demands, employment and import requirements, income and earnings are the most representative parameters used to describe impacts The availability of a complete table also permits calculation of gross regional product Induced effects are computed using a modified "Type III" multiplier procedure (Miernyk, 1965), iteratively solving the open model to capture the effects of induced consumptive spending. Detailed employment analysis is possible by tracking employment requirements among various occupations and accounting for the effects of either in-migration of workers or re-employment of unemployed local labor In combination, this information provides a comprehensive, detailed account of potential regional economic impacts

IMPLICATIONS AND EXTENSIONS

The IMPLAN system provides the user ready access to detailed non-survey based input-output models of regional economies. The availability of an extensive data base permits construction of detailed models that portray the structure of the regional economy under study The data reduction technique takes explicit account of the open" nature of these economies, tracing both intra-regional flows as well as imports and exports The models also permit analysis of Forest Service activities, either individually or in combinations such as a management program The construction and use of these models are relatively rapid and inexpensive, and the system is available throughout the Agency via distributed computer network A major advantage of the system is to permit resources to be devoted to the utilization of input-output models in planning rather than to model construction.

Possible extensions in the use of IMPLAN data and models involve more extensive uses of impact models in Forest Service planning To date, most impact analyses have focused upon local area studies In the context of a multi-level planning system (see the article by Hof in this volume), the usefulness of input-output models will certainly become apparent State and regional models will likely become closely linked to the planning model to estimate the economic implications of various Forest Service policies Similarly, structural analyses of timber policies investigated by the Timber Assessment Market Model (Haines and Adams 1980) may also be possible It appears that the availability of input-output models on a regional basis will permit a wide breadth of innovative uses in natural resource management

LITERATURE CITED

Adams, D M and R D Haynes 1980 The 1980 softwood timber assessment market model structure, projections and policy simulations Forest Science Monograph 22

Alward G S and W L Stewart 1979 Economic impact assessment for land management planning Proceedings Land Use Planning Workshop University of Kentucky Lexington Kentucky, pp. 123-128

Bourque, P.J and G. Hansen. 1967 An inventory of regional input-output studies in the Unites States University of Washington, Seattle, Graduate School of Business Administration, Occasional Paper No 17

Cartwright J 1979 Estimating the regional economic impact of Forest Service programs. Regional Analysis Division, Bureau of Economic Analysis U S Department of Commerce (mimeograph).

Connaughton K P and W McKillop 1979 Estimation of "small area" multipliers for the wood processing sector - an econometric approach Forest Science 25(1) 7-20

Czmanski, S and E E Malizia 1969 Applicability and limitations in the use of national input-output tables for regional studies. Papers and Proceedings of the Regional Science Association 23 65-77

Dun and Bradstreet Corporation, 1977 Employment data (computer tapes)

Elrod R H K N Sheshai and W A Schaffer 1972 Interindustry study of forestry sectors for the Georgia economy Georgia Forest Resource Council Report 31, Macon Georgia

Fisch O and S Gordon 1978. An evaluation of three approaches to input-output The economic submodels of Fruk, Jameson and Northrup in NSF-RANN Funded Regional Environmental Systems Projects Report to the National Science Foundation.

McMenamin, D.G and J.E Harring. 1974 An appraisal of non-survey techniques for estimating regional input-output models Journal of Regional Science 14(2).

Miernyk, W H. 1965. The elements of input-output analysis. Random House New York

Miernyk, W H 1976 Comments on recent developments in regional input-output analysis International Regional Science Review 1(2) 47-55.

Palmer C.J and G D. Keaton. 1978 Economic input-output analysis an approach to identifying economic and social impacts of land use planning Proceedings Land Use Planning Workshop, University of Kentucky, Lexington Kentucky, pp 96-105

Polenske, K 1970 A multiregional input-output model for the U S Report #21, Economic Development Administration, U S Department of Commerce, Washington D.C.

Richardson H W 1972 Input-output and regional economics John Wiley and Sons, New York.

Roesler, T W , F.C. Lamphear, and M D. Beveridge 1968. The economic impact of irrigated agriculture on the economy of Nebraska Nebraska Economic and Business Reports Number Four, Bureau of Business Research University of Nebraska Lincoln Nebraska

Schaffer, W A and K. Chu 1969 Nonsurvey techniques for constructing regional interindustry models. Papers of the Regional Science Association 23 83-101

Schallau, C., W Maki and J. Beuter. 1969. Economic impact projections of alternative levels of timber production in the Douglas-fir region Annals of Regional Science 3 96-106

Stone R and G. Brown 1962 Behavioral and technical change in economic models Papers of the Second Congress of the International Economic Association Vienna

Troutman, F.H and R L Porterfield 1974 The role of Arkansas forests in the State's economy. Ind Res. and Ext Center, University of Arkansas Publication D-16 Little Rock, Arkansas

U.S Department of Agriculture 1979 Agriculture Statistics Washington, D C

U.S. Department of Commerce, Bureau of the Census. 1970. Census of Housing, 1970. Washington D.C

U S Department of Commerce, Bureau of the Census County Business Patterns, payroll and employment data, 1977(a) (computer tapes)

U S Department of Commerce, Bureau of the Census 1977(b) Census of Agriculture, 1977 Washington D C

U S Department of Commerce, Bureau of the Census 1977(c) Census of Governments, 1977 Washington, D.C

U S. Department of Commerce, Bureau of Economic Analysis 1979(a). The detailed input-output structure of the U S economy Volumes I and II.

U S. Department of Commerce, Bureau of Economic Analysis. 1979(b). National Income and Product Accounts 59(7)

LITERATURE CITED

Adams, D M and R D Haynes 1980 The 1980 softwood timber assessment market model structure, projections and policy simulations Forest Science Monograph 22

Alward G.S and W L Stewart 1979. Economic impact assessment for land management planning. Proceedings Land Use Planning Workshop University of Kentucky Lexington Kentucky, pp. 123-128.

Bourque, P J. and G Hansen 1967. An inventory of regional input-output studies in the Unites States University of Washington, Seattle, Graduate School of Business Administration, Occasional Paper No 17.

Cartwright, J 1979 Estimating the regional economic impact of Forest Service programs. Regional Analysis Division, Bureau of Economic Analysis U S Department of Commerce (mimeograph)

Connaughton K P and W McKillop 1979 Estimation of "small area' multipliers for the wood processing sector - an econometric approach Forest Science 25(1) 7-20

Czmanski, S and E E. Malizia 1969 Applicability and limitations in the use of national input-output tables for regional studies. Papers and Proceedings of the Regional Science Association 23 65-77.

Dun and Bradstreet Corporation, 1977 Employment data (computer tapes)

Elrod R H K.M. Sheshai and W A Schaffer 1972 Interindustry study of forestry sectors for the Georgia economy. Georgia Forest Resource Council Report 31, Macon Georgia

Fisch O and S Gordon 1978 An evaluation of three approaches to input-output The economic submodels of Fruk, Jameson and Northrup in NSF-RANN Funded Regional Environmental Systems Projects Report to the National Science Foundation.

McMenamin, D G and J.E Harring. 1974. An appraisal of non-survey techniques for estimating regional input-output models Journal of Regional Science 14(2).

Miernyk, W H 1965. The elements of input-output analysis. Random House New York

Miernyk, W H 1976 Comments on recent developments in regional input-output analysis. International Regional Science Review 1(2) 47-55.

Palmer C J and G.D. Keaton 1978. Economic input-output analysis an approach to identifying economic and social impacts of land use planning. Proceedings Land Use Planning Workshop, University of Kentucky, Lexington Kentucky, pp 96-105

Polenske, K 1970 A multiregional input-output model for the U.S Report #21, Economic Development Administration, U S Department of Commerce, Washington D C.

Richardson H W 1972 Input-output and regional economics John Wiley and Sons, New York.

Roesler, T.W , F.C. Lamphear, and M.D. Beveridge. 1968 The economic impact of irrigated agriculture on the economy of Nebraska Nebraska Economic and Business Reports Number Four, Bureau of Business Research University of Nebraska Lincoln Nebraska.

Schaffer, W.A. and K. Chu 1969. Nonsurvey techniques for constructing regional interindustry models. Papers of the Regional Science Association 23 83-101

Schallau, C , W Maki and J Beuter. 1969 Economic impact projections of alternative levels of timber production in the Douglas-fir region Annals of Regional Science 3 96-106

Stone R and G Brown. 1962. Behavioral and technical change in economic models Papers of the Second Congress of the International Economic Association Vienna

Troutman, F H and R L Porterfield 1974. The role of Arkansas forests in the State's economy. Ind. Res and Ext. Center, University of Arkansas Publication D-16 Little Rock, Arkansas

U S Department of Agriculture 1979 Agriculture Statistics. Washington, D C.

U S Department of Commerce, Bureau of the Census. 1970. Census of Housing, 1970. Washington D C

U.S Department of Commerce, Bureau of the Census County Business Patterns, payroll and employment data, 1977(a) (computer tapes).

U.S. Department of Commerce, Bureau of the Census 1977(b) Census of Agriculture, 1977. Washington D.C

U S Department of Commerce, Bureau of the Census 1977(c) Census of Governments, 1977. Washington, D.C.

U S. Department of Commerce, Bureau of Economic Analysis. 1979(a). The detailed input-output structure of the U.S economy Volumes I and II.

U.S. Department of Commerce, Bureau of Economic Analysis. 1979(b). National Income and Product Accounts. 59(7)

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Sectoral Output Multipliers for Rural Counties

Lessons from Oregon's Input-Output Studies

People interested in economic development in rural communities are often faced with the need to estimate impacts of economic changes (such as plant openings or closings or expansions) or to forecast population employment business activity, or public service demands

An economic tool that is often used to assist in this task is the multiplier This circular is designed both as an introduction to multipliers for the practitioner (planner, public official business person, citizen) and as a guide to help them select the appropriate multiplier for a given application

The circular is divided into four sections The first explains what a multiplier is distinguishes several important types of multipliers and discusses how multipliers are estimated The second section (page 3) identifies two principal uses of multipliers

The third section (page 4) summarizes what we have learned about multipliers for 13 sectors from 11 survey based input-output (I O) models that agricultural and resource economists at Oregon State University have constructed for nine rural Oregon counties during the past two *decades*

Average sector multipliers and measures of variation in multipliers across counties are then presented to give practitioners a feel ' for the size and variation in multipliers for different sectors

The final section (page 7) is a guide for practitioners who wish to use sectoral multipliers from existing I O models in areas where no input output model has been constructed or where the existing I O model may be inappropriate because the structure of the economy has changed

What are multipliers?

Multipliers are measures of the degree to which the various firms and households in an economy are interrelated They measure the impact of a given external change (new investment export expansion influx of dollars from outside governments) on total economic activity in a given economy through the respending of the new dollars within that economy

Aggregate versus sectoral multipliers

Two types of multipliers are commonly *used by economists aggregate and sectoral* Aggregate multipliers measure the interrelatedness of the entire economy These multipliers are usually estimated for regional economies using an economic base technique The economic base method divides the economy s income or employment into basic (export serving) and nonbasic (local serving)

Dividing total income or employment by basic income or employment yields multipliers which estimate the change in total employment or income generated by a one unit change in export income or employment

Because some types of business tend to purchase more locally per export dollar *than others different sectors of an econ*omy have different multipliers Economists, therefore also estimate *sectoral multipliers*, which indicate the change in total economic activity (employment, income, or output) generated by a one unit change in exports of a given sector

A *sector* is a group of firms engaged in the same general type of business *Households and governments* are also considered sectors because they are relatively homogeneous units that respend income locally

The multipliers discussed in this circular are sectoral rather than aggregate multipliers They were estimated using input output models, which are mathematical descriptions of the purchases and sales among businesses, households, and government agencies in an economy

Sectoral multipliers are estimated for all sectors because all sectors generally have some export sales Grocery stores sell potato chips to tourists local dentists and doctors do emergency work on people from other areas realtors sell recreation property to Californians

The bulk of exports for most Oregon counties of course tends to come from the sectors that produce primarily for export lumber and wood products, agriculture fishing and fish processing other manufacturing lodging

How local respending multiplies the effect of export sales

How is the effect of a dollar of export sales multiplied in a local economy? Suppose a county s forestry industry increases export sales by $1 000 If the economy has a multiplier of (say) 1 66, total business sales throughout the county are expected to increase by a total of *$1 660 as a result of the $1 000 increase in* exports

Do you wonder how this additional $660 of business activity is generated? Figure 1 demonstrates how local respending of the export payment by businesses and households creates this multiplier effect

The process begins when a dollar enters the local economy in this case as the result of an export sale (column a) The dollar will be respent by the exporting firm in order to purchase inputs to meet the increased export demand (column b)

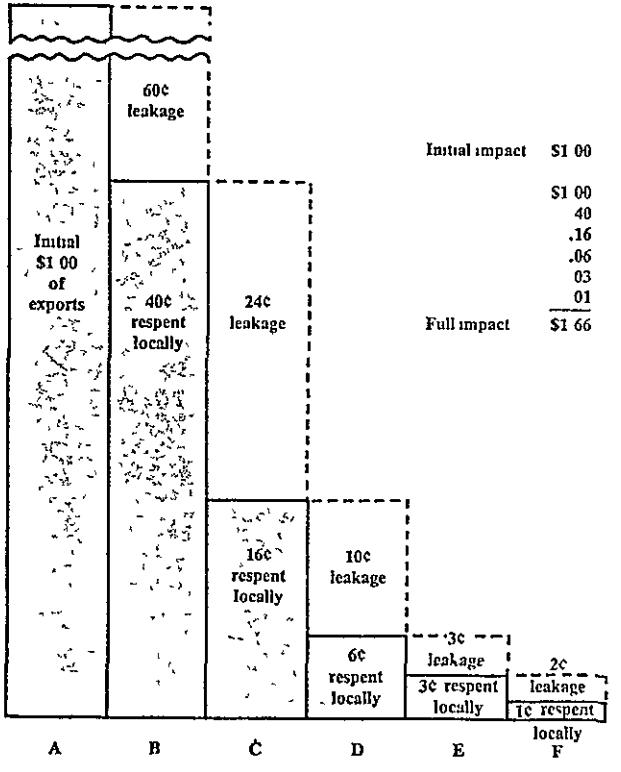


Figure 1 —*How local respending multiplies the effect of export sales (from Lewis, Eugene, et al , Economic Multipliers Can a Rural Community Use Them? Western Rural Development Center, Oregon State University WREP 24, Corvallis, 1979)*

Forty cents of the dollar will be received by local businesses and households but 60 cents will leak out in the form of nonlocal purchases savings and taxes Thus in addition to the initial dollar business respending has generated an additional 40 cents of business activity within the economy

Of the 40 cents that is locally received 16 cents will be respent within the county and the rest will leak out (column c)

This process continues until the amount remaining in the local economy is negligible (columns d e f) Thus greater leakage at any round of respending leads to a smaller multiplier

In order to determine the total multiplier value the initial dollar is added to the sum of local respending In this example the multiplier equals 1 66 ($1 00 + 40¢ + 16¢ + 6¢ + 3¢ + 1¢) Thus $1 66 of local business activity will be generated for each dollar that enters the local economy

Including households

Whether or not the household sector is included as part of the local economy influences multiplier size If households are *excluded* (that is if households are *exogenous* to the model) money flowing to households is considered a leakage and household respending does not add to the multiplier effect

If the household sector is *included* in the local economy (that is considered endogenous) local respending of household income increases the multiplier effect

To the extent that firms make payments to local households and that households respend their income locally multipliers based on a model including households (households endogenous) will be larger than multipliers derived in models with households excluded

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Since household respending has a significant effect on economic activity in an economy multipliers estimated from models with households exogenous are of limited value in impact analyses and forecasting

The multipliers in this circular are all estimated with models that *include* households (household endogenous *models)*

Output, income, and employment multipliers

The multipliers presented in this circular are business *output* (sales) multipliers *measuring the total change in local sales* generated by a one dollar increase in export sales Economists sometimes compute other kinds of multipliers in order to measure changes of other types

The most common types of multipliers other than the business output multiplier, are the employment and the income multipliers

Employment multipliers measure the total change in employment generated in the local area for each unit change in employment in a local export sector

An *income multiplier* indicates the total change in local household income from a one dollar change in household income payments by an export sector

For many forecasting and impact analysis applications total employ*ment and in*come are more important indicators of community well being than total sales With additional analysis and additional information input output models can be used to derive income and employment multipliers This circular however reports only business output *multipliers*

Using multipliers

Impact analysis

The most straightforward application of the multipliers is their use in estimating economic impacts of small changes in existing industries For example if a *Morrow County sawmill increased* its exports by $1,000 this year, the Morrow County lumber and wood products sector multiplier of 1 383 indicates that total business sales in the county should increase by approximately $1 400 ($1,383 more or less) as a result of the initial change in export sales

This assumes that the county s economic *structure has not significantly changed* since 1979—the year for which the Morrow County input output model was constructed (An entirely new industry or other major change in the economy may sufficiently alter the county s economic structure to necessitate modification of the multiplier values)

It is important to note that the multiplier merely indicates the impact *per dollar of* change not the total amount or impact that will take place For example a yogurt stand may have a higher multiplier than a large sawmill but the sawmill would have a greater economic impact due to its greater volume of sales

Those sectors with the highest multipliers are not necessarily those that have the greatest potential economic impact on a community

Remember too that sales is often not the most important measure of community well being Sectors with the greatest impact on sales may not have the greatest impact on income or employment

Forecasting

Another important use of multipliers is in making forecasts of business activity, employment or income If you have estimates of export sales (or employment or income) for a given future year, or series of years you can use multipliers to estimate total business sales (or employment or income) in the economy for these *years—if you make appropriate adjust*ments for structural changes expected in the economy over the forecasting horizon

If you have estimates of export sales, for example, by sector and also sectoral multipliers from an input output model, you can make forecasts that reflect the diverse local purchasing patterns of different sectors

Let's say you have a simple county economy with only three sectors that export agriculture, wood products and fishing Output multipliers for the sectors are as follows

	Multipliers
Agriculture	2 25
Lumber and wood products	1 92
Fishing and fish processing	2 03

You wish to forecast 1990 business sales in the county, and you have forecasts of *export sales for each of the three sectors*

	1990 forecast of export sales
Agriculture	$ 5,000 000
Lumber and wood products	10,000 000
Fishing and fish processing	1,000 000
Total	$16,000,000

You expect no structural changes in the economy that would change the multipliers in any major way

To estimate total business sales in the economy, multiply the forecast of export *sales for each sector by the sectoral* multiplier and sum as in table 1

Table 1 —*Forecast of total business sales, 1990*

	Forecast of export sales ($)	Multiplier	Business sales generated in each sector ($)
Agriculture	5 000 000	2 25	11 250 000
Lumber and wood products	10 000 000	1 92	19 200 000
Fishing and fish processing	1,000,000	2 03	2 030 000
Total business sales			$32 480 000

Sectoral output multipliers for nine rural Oregon counties with I-O models

During the period 1963 to 1982 agricultural and resource economists at Oregon State University constructed 11 input output models for 9 Oregon counties *based on surveys of firms local govern*ments, and (in one case) households in each county Two counties, Grant and Clatsop were surveyed twice, with several years between the surveys in each case

Figure 2 shows the location of the counties with survey based input output models These counties (called 'I O counties in this report) are located in all *parts of the state except for the Willamette* Valley Tillamook, Lincoln (Yaquina Bay region), and Clatsop counties in the northwest coastal region Douglas and Klamath counties in southwest Oregon and Grant Morrow, Union and Baker counties in northeast Oregon

More detailed information on the construction interpretation, and uses of *the 11 models on which the information in* this report is based is contained in the publications listed at the end of this report (see ' References, ' section 1, page 10)

Table 2 presents information about two economic characteristics of each county The counties are listed in order of the year for which the input output model was constructed, with the oldest models listed first

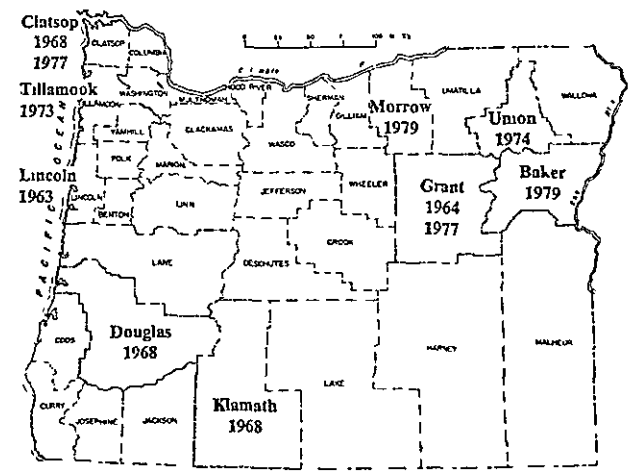


Figure 2 —*Oregon counties with survey based Input Output models (date indicates year for which model was constructed)*

The gross sales column points out the diversity of size in economies of the I O counties The largest Douglas shows sales more than 18 times as great as the smallest Grant County

The other column in table 2 shows the percentage of total county exports from the lumber and wood products and agriculture *sectors All the I O counties depend* heavily on these sectors for exports Along with other manufacturing and fishing (in coastal counties) these four sectors represent the major basic sectors in most rural Oregon counties

Table 3 shows the output multipliers for 13 sectors in each of the I O counties Table 4 which summarizes the informa*tion in table 3 indicates the average* multiplier for each sector and the variation in multiplier values

Table 2 —*Economic characteristics of counties with survey based Input Output models*

County	Year of model	Gross sales ($)[a]	Lumber and wood products and agricultural dependency (%)[b]
Lincoln (Yaquina Bay)	1963	351 300 000	78
Grant	1964	144 168 000	79
Clatsop	1968	1 390 250 000	46
Klamath	1968	1 713 724 000	78
Douglas	1968	2 709 304 000	82
Tillamook	1973	593 379 000	51[c]
Union	1974	930 894 000	59
Grant	1977	380 550 000	86
Clatsop	1977	1 844 158 000	63
Baker	1979	513 793 000	57
Morrow	1979	309 122 000	74

[a] 1980 dollars

[b] Lumber and wood products and agricultural exports as percent of total county exports This is a measure of export dependency (not total economic dependency) in that it indicates the contribution of agriculture and lumber and wood products to export sales It does not measure the importance of these sectors to total business activity on the county since multiplier effects are not included Exports for Lincoln Tillamook and Union counties include sales to state and Federal governments as well as capital and inventory accumulation

[c] Exports of cheese excluded

The multipliers in tables 3 and 4 are calculated in a way that *includes* the effect of household respending within the economy (households are endogenous to the models from which the multiplier estimates are obtained)

Different county I O models defined sectors at different levels of aggregation *Therefore it was necessary in some cases* to group sectors so that all models had common sector definitions This process described in Wood (References ' section 1 page 10) yielded models with 14 sectors, the 13 listed in table 2 plus households

The average *(mean)* sectoral multipliers range from 1 555 in the wholesale products sector to 2 244 in the lodging sector The large multipliers are for the labor intensive sectors (lodging cafes and taverns professional and retail services) and the agriculture sector which purchases a high proportion of inputs locally

The smallest multipliers are for those sectors (communications and transportation, automotive and wholesale products) that import heavily

Table 3 —*Sectoral multipliers for the 11 Oregon county I O models*

Sector	County										
	Lincoln[a] 1963	Grant 1964	Clatsop 1968	Klamath 1968	Douglas 1970	Tillamook 1973	Union 1974	Grant 1977	Clatsop 1977	Baker 1979	Morrow 1979
Lumber and wood products	1 576	1 990	1 601	2 312	2 007	1 843	2 367	2 004	1 487	2 077	1 383
Agriculture	1 550	1 941	2 295	2 627	2 572	2 610	2 698	2 012	2 341	2 169	1 423
Fish and fish processing	1 878	--	1 653	--	2 573	2 267		--	1 972	-	--
Other manufacturing	2 226		1 787	2 765	1 786	2 599	1 697	1 591	1 702	1 988	1 455
Construction	2 278	1 695	1 723	2 181	2 057	2 027	1 654	1 901	2 330	2 096	1 279
Lodging	2 947	2 060	2 011	2 511	2 523	2 418	--	2 038	2 129	2 533	1 265
Cafes and taverns	2 141	1 862	2 031	2 793	2 301	2 657	--	2 190	2 269	2 421	1 521
Communication and transportation	2 017	2 099	1 537	1 717	1 765	1 900	1 641	1 408	1 909	1 761	1 325
Automotive	1 383	1 442	1 581	1 606	1 424	2 653	-	1 638	1 479	1 832	1 427
Professional	*2 502*	*2 032*	*1 220*	*2 389*	*2 565*	*2 751*	*2 753*	*1 267*	*2 517*	*2 586*	*1 650*
Financial	1 752	1 309	1 499	1 815	1 341	2 853	1 923	1 769	2 759	1 784	1 941
Wholesale products	1 485	1 293	1 491	1 747	1 608	1 691	2 191	1 356	1 419	1 594	1 235
Retail services	2 461	1 969	1 961	2 180	1 748	2 153	1 575	2 420	2 386	2 539	1 855

[a] Yaquina Bay region

Table 4 —*Summary statistics sectoral multipliers for rural Oregon counties*

	Mean	Rank of means	Median	Range	Standard deviation
Lumber and wood products	1 877	10	1 990	1 383 2 367	329
Agriculture	2 203	3	2 295	1 423 2 698	435
Fishing and fish processing	2 069	6	1 972	1 653 2 573	359
Other manufacturing	1 960	7	1 786	1 455 2 765	436
Construction	1 929	*8*	2 027	1 279 2 330	316
Lodging	2 244	1	2 273	1 265 2 947	455
Cafes and taverns	2 219	2	2 229	1 521 2 793	369
Communication and transportation	1 734	11	1 761	1 325 2 099	244
Automotive	1 647	12	1 530	1 383 2 653	379
Professional	2 203	4	2 502	1 220 2 753	573
Financial	1 886	9	1 784	1 309 2 853	503
Wholesale products	1 555	13	1 491	1 235 2 191	265
Retail services	*2 110*	*5*	*2 153*	*1 575-2 539*	*318*

Another measure of the average multiplier is the *median* This is the middle value above and below which lie an equal number of observations Generally there is little difference between the mean and median values for the multipliers

Two measures of variation in the multipliers are shown in table 4, the *range* and *standard deviation* The range in multiplier values among counties for each sector is considerable in some cases Multipliers in the lodging sector for example range from a low of 1 265 to a high of 2 947 The range in the communications and transportation sector is half as large 1 325 to 2 099

The standard deviation because it is less sensitive to extreme values, better reflects variation in multipliers With this measure the professional and financial sectors show the greatest variation in multipliers across counties communication and transportation and wholesale products sectors, the least

This implies that the import patterns of the latter sectors tend to resemble each other more across counties than those of the professional and financial sectors

Figure 3 graphically summarizes the information in table 4 on the multipliers for the major sectors of the surveyed Oregon counties For each sector the average multiplier of the 11 economies is depicted by the center point Each mean value is flanked by two line segments reflecting the variation in multipliers among surveyed counties Each line segment represents the size of one standard deviation

Accuracy of the multipliers

Multipliers are estimates The primary data upon which the I O models and multipliers are based are obtained through interviews with a sample of the firms in each sector, leading to two possible sources of error

First although firms usually refer to tax or accounting records in providing purchases and sales information incomplete records sometimes mean that estimates must be made

Second because not all firms in every sector were interviewed the possibility exists that the sample was not truly representative of the entire sector For a more complete discussion of the accuracy of the results see Ives and Youmans ('References, section 1 page 10)

Each I O model reflects the structure of the county economy in the year of the model To the extent that the buying and selling patterns in any county have changed since that time a model (and the multipliers derived from it) will not accurately represent current economic structure

You can observe the amount of change that has taken place in multipliers of two Oregon counties by comparing the values of those counties in which two models were completed several years apart Clatsop and Grant

Carroll has offered the opinion based on his research in Clatsop County that regional I O models become outdated rather quickly "Though some variation would be expected among regions present results indicate that a regional model may not be good for more than ten years and more likely not for more than five years See References, page 10 section 1, Carroll 1980 (page 80)

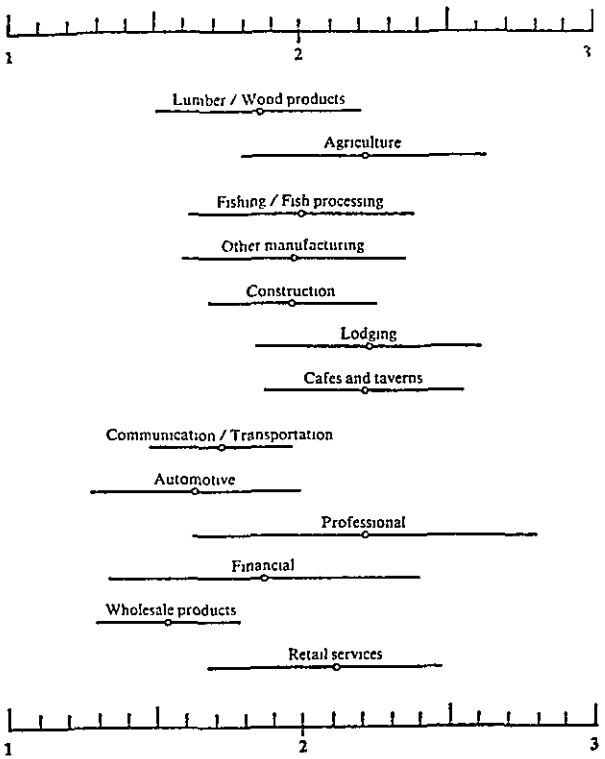


Figure 3 —*Sectoral output multipliers (in each case the dot represents the mean and the lines extending in both directions represent the standard deviation)*

Guidelines for using existing sectoral multipliers

Survey based I O multiplier estimates are presently available only for nine Oregon counties What if you want to estimate economic impacts in other rural Oregon counties or in counties where the I O model is 15 years old?

There are several ways to approach this problem One is to arrange for a survey for the county that interests you—let's call it "Cascades County However time and money constraints may rule out the survey your objectives may not require the accuracy of a multiplier based on a county survey

A different way to approach the problem is to use one of several semisurvey or nonsurvey methods you'll find them listed under References section 3 page 11

Another nonsurvey approach is to use multipliers from previously surveyed counties (or larger areas) that appear to be similar in economic structure to Cascades County

You can judge this similarity in economic structure (a matter of key importance) by comparing these surveyed counties with Cascades County Look for the characteristics that affect multiplier size

Factors affecting multiplier size

The most important of these factors is the degree of leakage Sectors that import a large share of their first round purchases (that is, have large leakages) generally have smaller multipliers than those that purchase a larger share of inputs locally

Other things being equal, the greater the leakages at any round of respending the smaller the multiplier The extent of leakages, however is very difficult to determine without a survey

In the absence of information about the extent of leakage in a given sector or economy you must look for characteristics of sectors or economies that tend to be related to the degree of leakage—and hence the size of the multiplier

Wood using an econometric model identified several factors that help explain the differences in multipliers between Oregon counties (References ' section 1 page 10)

Four factors that influence multiplier size along with the nature of their influence are identified in table 5

The three county characteristics are county population, income per capita and geographic isolation Since more populous counties provide larger markets and tend to develop more diversified economies with more opportunity for local respending of export dollars more populous counties tend to have larger multipliers

Income per capita is inversely related to multiplier size This relationship may reflect the tendency of households in high income counties to purchase more outside the county perhaps for luxury items and recreational activities

Greater geographic isolation (that is a longer distance to the nearest major trade center) leads to more local purchasing as a means of avoiding travel costs—hence larger multipliers

The age of an input output model also affects the appropriateness of using its multiplier estimates in a current analysis In the past 25 years, the service sector in the United States has grown *relative to the rest* of the economy providing opportunities for greater local spending and respending

Table 5 —*Some characteristics that influence multiplier size*

Type of characteristic	Nature of relationship between characteristics and multiplier
County related	
Population	The larger the population the larger the multiplier
Income per capita	The larger the income per capita the smaller the multiplier
Geographic isolation	The greater the distance to major trade centers the larger the multiplier
Model related	
Age of model	The older the model the smaller the multiplier

Table 6 —*Characteristics of the Oregon counties with Input Output models*

		Characteristics of county		
County	Year of model	Distance of the county seat from an SMSA (miles)[a] (+)	Population of the county in year of model (+)	Per capita income of the county in year of model (1980 dollars) (–)
Lincoln[b]	1963	83	24 971	$ 6 858
Grant	1964	193	7 434	6 514
Clatsop	1968	95	28 254	8 635
Klamath	1968	172	49 512	8 176
Douglas	1970	71	71 743	7 934
Tillamook	1973	74	18,902	8 944
Union	1974	176	21 200	9 189
Grant	1977	193	7 850	10 863
Clatsop	1977	95	31 269	9 565
Baker	1979	133	16 005	7 821
Morrow	1979	191	7 219	11 932
Mean	1972	134	25 851	$ 8 766

[a] Portland Salem and Eugene were the three Standard Metropolitan Statistical Areas (SMSA s) in Oregon during the period in which the input output models were constructed These are the three SMSA s used to determine distance along with Boise Idaho

[b] Yaquina Bay region

Thus multipliers based on older model probably understate today s multiplier effects in most counties The older the model therefore the more the multiplier understates the current multiplier effect

There are sector characteristics that probably also affect the size of the sectoral multipliers including size of plants in a sector degree of local ownership and labor intensity Sectors dominated by large plants tend to have smaller multipliers than those with many small plants for example

And sectors with a high degree of local ownership or that are labor intensive may be expected to have larger multipliers than capital intensive sectors or those dominated by absentee owned firms

Since data on these sectoral characteristics are not readily available however the next section focuses on the county characteristics and age of the model as factors that affect the appropriateness using existing multipliers as estimates of sectoral output multipliers in new applications

Using existing sectoral multipliers

Generally the more closely a county *resembles an I O county and the more* recent the I O model the more appropriate it is to use the I O counties sectoral multipliers We can judge similarity in terms of the characteristics identified in the previous section particularly the three county characteristics in table 6

The 1981 values of these characteristics for each of Oregon s 36 counties are presented in table 7 to help you make these judgments We cannot offer firm guidelines on the extent of bias introduced by using existing multipliers as estimates of multipliers in non I O counties

However we can presume for example that Tillamook County s 1973 lodging multiplier would underestimate Coos County s 1981 lodging multiplier because Coos county is larger is farther from a metropolitan area and has a lower per capita income in 1981—and because Tillamook County I O model is 8 years

Coos County s 1981 lodging multiplier would likely be larger than 2 4 the 1973 Tillamook County lodging multiplier

It will not always be the case of course that the three county characteristics all work in the same direction For example if you want to use Douglas County s 1970 *construction multiplier (2 1) to estimate* Josephine County s 1981 construction multiplier it would not be clear whether this Douglas County multiplier overesti mated or underestimated the true Jose phine County multiplier

Douglas County is larger than Josephine (*which would suggest that its multiplier* would overestimate Josephine s) however Douglas County has higher per capita incomes and is closer to an SMSA—and the model is 11 years old (which suggests that Douglas County s multiplier would *under estimate* Josephine's multiplier)

As *a general guideline* the less closely a county resembles the I O counties the greater the potential bias involved in using I O county multipliers for that county

In some cases it may be advisable to

- identify a range of multiplier values (perhaps the mean value plus and minus the standard deviation shown in table 4) or
- select several multipliers from similar counties and examine the sensitivity of impact estimates or forecasts when you use different multiplier values

Table 7 —Characteristics of Oregon s counties affecting multiplier size

	County	Distance to SMSA[a]	1981 Population	1981 Per capita personal income
1	Baker	133	16 300	8,315
2	Benton	35	70,050	8,776
3	*Clackamas*	—	*245,100*	*10,811*
4	Clatsop	95	32,600	9,559
5	Columbia	29	36 150	9,355
6	Coos	134	63 300	8,561
7	Crook	144	13 200	8,763
8	Curry	194	17 300	8,798
9	Deschutes	128	63,650	8,475
10	Douglas	71	92,300	8 644
11	Gilliam	151	2 025	10 219
12	Grant	193	8,150	8,447
13	Harney	191	8 000	8,560
14	Hood River	62	15 725	10,851
15	Jackson	166	133,700	8,676
16	Jefferson	118	11,950	8,473
17	Josephine	138	61,200	7,441
18	Klamath	172	58,625	8,704
19	Lake	261	7,600	8,713
20	Lane	—	275 000	9,026
21	Lincoln	83	35,530	9,462
22	Linn	24	90,300	8 744
23	Malheur	61	27 225	7 774
24	Marion	—	209 230	9,277
25	Morrow	191	7,375	10,917
26	Multnomah	—	561,900	12,548
27	Polk	—	46,650	7,826
28	Sherman	120	2,225	8,282
29	Tillamook	74	21,100	9 193
30	Umatilla	208	59,900	8,707
31	Union	176	24,450	8,353
32	Wallowa	239	7,300	8 972
33	Wasco	83	22,400	10,568
34	Washington	–	255 000	10,970
35	Wheeler	171	1,425	9,982
36	Yamhill	26	56,300	8,956

[a] Portland Salem Eugene and Boise (Idaho) SMSA s See Footnote a in table 6

Summary

Multipliers can be used (1) to estimate the total economic impact on a region of a proposed or current economic change, such as a plant expansion, plant closure or government investment, and (2) to make forecasts

Business output multipliers, as outlined in this circular measure the total change in sales resulting from a one-dollar increase in exports Sectoral multipliers for nine Oregon counties from 11 input output models have been presented

Significant variation was observed among sectors as well as among counties Several factors have been found to be systemati cally associated with this variation

If a nonsurveyed county is similar to a surveyed county in terms of these factors you may with some confidence use the surveyed county's multiplier as estimates of multipliers for the nonsurveyed county

In the more usual case (where the survey and nonsurvey counties are dissimilar) you will use your knowledge of how the counties differ to identify the reasons why the survey county multiplier may over or underestimate the nonsurvey county multiplier

In any case, the information about the average sectoral multiplier and variation in sectoral multipliers among surveyed Ore gon counties should be of help to practitioners in putting bounds on multiplier estimates

References

1 Oregon survey-based county Input-Output models and associated research

There is no charge for single copies of the Oregon State University Agricultural Experiment Station Bulletins and Circulars of Information, order from Bulletin Mailing Office, OSU, Corvallis 97331

For information about availability and ordering procedure of other Oregon State University publications (some of which may be out of print) contact the Depart ment of Agricultural and Resource Econom ics at Oregon State University

Bromley, D W , G E Blanch and H H Stoevener, *Effects of Selected Changes in Federal Land Use on a Rural Economy* Oregon State University Agricultural Experiment Station Bulletin 604 (Corvallis 1968)

Carroll T M , "Tests of the RAS and Modified RAS Updating Techniques on a Regional Input Output Model," unpub lished masters thesis, Oregon State University (Corvallis, 1980)

Carroll, T M and H H Stovener, *A 1977 Input Output Model for Clatsop County Oregon* Oregon State University Agricul tural Experiment Station Special Report 525 (Corvallis 1978)

Collin T R Youmans and H H Stoevener, *Impacts of a Major Economic Change on a Rural Coastal Economy A Large Aluminum Plant in Clatsop County, Oregon*, Oregon State University Agricul tural Experiment Station Bulletin 614 (Corvallis 1973)

Haroldsen A and R Youmans, Grant County Oregon Structure of the Local Economy Oregon State University Exten sion Service Special Report 358 (Corvallis 1972)

Ives, E , and R Youmans *Business Interrelationships of the Tillamook County Economy A Study for Analysis of Economic Change*, Oregon State Univer sity Agricultural Experiment Station Circular of Information 672 (Corvallis, 1978)

Miller L F , Jr , ' Grant County Oregon *Impacts of Change in Log Flows on a* Timber Dependent Community ' mas ters thesis Oregon State University (Corvallis 1981)

Obermiller, F W , K Boyle, and D K Lambert Morrow County, Oregon, *Input Output Model* Oregon State University Department of Agricultural and Resource Economics (Corvallis, 1981)

Obermiller, F W L Eppley, and D K Lambert Baker County, Oregon Input Output Model ' Oregon State University, Department of Agricultural and Resource Economics (Corvallis 1981)

Obermiller, F W , and P G West 'The Structure of a Resource Dependent Economy Wallowa County Oregon," Oregon State University Department of Agricultural and Resource Economics (Corvallis, 1983)

Reiling S D , K C Gibbs and H H Stoevener, *Economic Benefits from an Improvement in Water Quality* Socio economic Environmental Studies Series EPA R5 73 008 Office of Research and Monitoring U S Environmental Protec tion Agency (Washington D C U S Government Printing Office, 1973)

Schmisseur, W E , and F W Obermiller, *Economic Effects of Future Growth Alternatives in a Rural Oregon County*, Oregon Alternative Futures Growth Center Project Working Paper No 3, Oregon State University in cooperation with the Pacific Northwest Regional Commission (Corvallis, 1976)

Stoevener H H J B Stevens H F Horton A Sokoloski L P Parrish and E F Castle, *Multidisciplinary Study of Water Quality Relationships A Case Study of Yaquina Bay Oregon* Oregon State University Agricultural Experiment Station Special Report 348 (Corvallis, 1972)

Wood S G Estimating Import Substitution Potential and Multiplier Effects of Basic Sectors in Rural Oregon Counties ' unpublished masters thesis Oregon State University (Corvallis 1982)

Youmans R C D R Darr R Fight and D L Schweitzer *Douglas County Oregon Structure of a Timber County Economy* Oregon State University Agricultural Experiment Station Circular of Information 645 (Corvallis 1973)

2 Input Output models

Miernyk William H *The Elements of Input Output Model Analysis* (New York Random House, 1965)

3 Nonsurvey techniques for estimating multipliers

a Economic base multipliers

Braschler C J S Kuehn and J A Croll ' How to Compute, Evaluate and Use the Community Economic Base, *Considerations for Community Decision Making* DM 3005 (Columbia, Mo University of Missouri, Columbia Extension Division, 1982)

Kuehn, J S , C Braschler, and J A Croll Economic Base Multipliers and Community Growth *Considerations for Community Decision Making* DM 3006 (Columbia Mo University of Missouri Columbia Extension Division 1982)

Gibson L J , and M A Worden "Estimating the Economic Base Multiplier A Test of Alternative Procedures *Economic Geography* vol 57(2) 146 159 (1981)

b Input output multipliers

McMenamin D G and J E Haring, "An Appraisal of Nonsurvey Techniques for Estimating Regional Input Output Models ' *Journal of Regional Science*, vol 14(2) 191-205 (1974)

Morrison, W I , and P Smith, Nonsurvey Input Output Techniques at the Small Area Level An Evaluation," *Journal of Regional Science*, vol 14(1) 1-15 (1974)

Schaffer, W A , and K Chu, ' Nonsurvey Techniques for Constructing Regional Interindustry Models " *Papers of the Regional Science Association*, vol xxiii 83 101 (1969)

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This publication was prepared by Thomas B Mandelbaum graduate research assistant Department of Agricultural and Resource Economics Oregon State University Stephen B Wood regional economist Bonneville Power Administration Portland and Bruce A Weber Extension community resource development specialist Oregon State University The authors acknowledge constructive review of an earlier draft by S anley Detering regional economist Washington Oregon office Bureau of Land Management U S Department of the Interior Portland Donald Farness associate professor of economics Oregon State University and Frederick W Obermiller Extension community resource development specialist Oregon State University

Extension Service Oregon State University Corvallis O E Smith director This publication was produced and distributed in furtherance of the Acts of Congress of May 8 and June 30 1914 Extension work is a cooperative program of Oregon State University the U S Department of Agriculture and Oregon counties

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00079

GRANT COUNTY COURT
COURTHOUSE
CANYON CITY OR 97820
503 575-0059

24 November 1986

Mr Earl Layser
Ochoco National Forest
Box 490
Prineville, Oregon

Dear Mr Layser,

Thank you for your appearance before the Grant County Resource Council last month At our meeting the other night we agreed on comments in response to the proposed forest plan We grouped these a little differently from your reponse sheet, so please bear with us

1 The proposed plan and supporting documents are too big and much too complicated We realize you are trying to cover all your bases, but the product we have now discourages people from trying to wade through it. Perhaps alternatives could be worked out in general terms rather than fine detail, pending a decision on direction to work

2 We proposed that anyone who has the opportunity to participate in this planning process, and does not, should not then have the option to come in on appeal and hold up the implementation of the plan To allow this is to essentially say that the planning process is not sufficient, and negates the purpose of having a plan in the first place

3 Are the numbers accurate? One comment concerned an error in a grazing fee (sorry, I can't find page number now)

4 Related to #3--we believe the value of wilderness use is greatly exagerated

5 Related to #3--variation in big game use days ref B-72, B-64,65

6 In the interest of good timber management, with the interest of the sustained forest the primary goal, we think thinning and other management practices are not sufficiently emphasized We would urge a total resource management objective, including soil, water, and air as well as products such as grass and timber

7 The effects of various alternatives on school and county budgets needs to be followed

8. Costs of various alternatives was laid out, but the practical question of whether the funding was available was not addressed It seems there is a good possibility that an alternative could be chosen and then not followed if funding were cut off

9 We have a real concern for timber harvest. Are we over cutting on the short term and will find a sustained yield impossible? Have the cumulative effects on the regions timber supply of this plan and other forest plans been considered? Certainly we need to be aware of the capacity of the local mills, but we also need to think 20, 50 and 100 years into the future Here on the Malheur we are getting the effect of a reduced cut on the Wallowa-Whitman--mills in NE Oregon are coming in here for sales The regional timber supply should be sustained with the entire region in mind, considering haul time, reforestation potential, and all the other factors that go into meshing a timber harvest with a sustained yield

Thank you for the opportunity to comment

Sincerely,

Lorene Allen
County Judge

01085

CROOK COUNTY

Soil and Water Conservation District

889 North Main Street
Prineville Oregon 97754

December 17, 1986

Forest Supervisor
Ochoco National Forest
Box 490
Prineville, OR 97754

Supervisor:

The Crook County Soil and Water Conservation District would like to comment on the proposed Forest Plan.

1. Protect the land economy.
2. Protect natural resources but use them in a wise manner. Grass and timber are both renewable resources and are in better condition when they are in an active growing state than in a dormant stagnant one.
3. Cut down on permanent road building. Use temporary roads and seed them over. Paved hard surface roads contribute a lot to run off during storm. This can contribute to an undue amount of erosion.
4. Provide for 32,000 acres of old growth, and preserve the core of Lookout Mountain and Silver Creek as roadless areas
5. Provide more tree thinning in stands that will respond.
6. Use the present level of firewood availability.
7. Use a combination of B Plus and E Departure Round off the edges and make it work.

We emphasize the need for proper soil and water stewardship. We also emphasize the need for man to utilize these and not just sit on them.

Thank you for your consideration, and Good Luck!

Crook County SWCD

Richard Breese, Secretary
Richard Breese

01156



HARNEY COUNTY COURTHOUSE

450 N BUENA VISTA - BURNS OREGON 97720

December 17, 1986

Forest Supervisor
Ochoco National Forest
P.O. Box 490
Prineville, OR 97754

Dear Forest Supervisor:

The Harney County Juvenile Department wishes to convey our concerns to you regarding the forthcoming decision for the Ochoco National Forest Management Plan.

We are concerned about possible cutbacks in the lumber industry and the effects this would have on families and youth in Harney County. Our recent past experience has proven that high unemployment rates cause family disintergration and increased Juvenile delinquency Only recently has Harney County begun to climb out of the economic depression we have endured since early 1980. We believe the forest is big enough for all users without negatively impacting any of them if it is managed properly.

We urge you to carefully consider the impact a decrease in lumber production would have on Harney County families. We further recommend that present firewood availability remain at the present level

Thank you for your consideration in this matter.

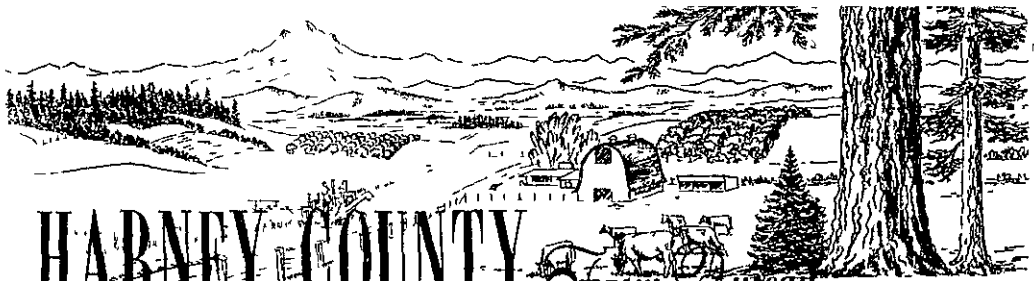
Sincerely,

Mary Hanneman

Mary Hanneman, Court Director

cc: Jim McClain
Donald G. Witte

LIVESTOCK -- RECREATION WILDLIFE LUMBERING



HARNEY COUNTY Farm Bureau

Riley, Oregon 97758

01205

Box 1193
Burns, Oregon 97720
December 18, 1986

Dear Forest Supervisor

Please consider these comments to the Ochoco Forest Plan:

First and primarily it must be recognized you are a National Forest As such you are not designated as a park. Your responsibility should not be preservation as in wilderness, but rather preservation as in production. Production takes many forms including, but not limited to, recreation opportunities of all kinds, wildlife habitat, firewood, Christmas trees, grazing AUMS and commercial timber sales. Of these the last two probably have the most impact on the economy of the area

Jobs are the key to judging the successful management of the Ochoco Other benefits will continue regardless, if the highest possible production is obtained By all means, erosion and other man caused activities must be managed. Only through such careful measures can production be perpetuated Allowed harvest must not exceed the capacity of the land to reproduce

However, no creature can look far enough into the future to determine what limits of timber cutting or grazing will be desired to maintain a perpetuating production There are absolutely too many variables that cannot be accurately predicted Weather, fire, disease and insects all will have their effect.

Therefore, it makes no sense to establish a timber cutting program that is not flexible, that is not now in production and at or near the prime harvest stage Due to economics, timber that is ripe for harvest may not always be saleable; as witness the very recent past.

It makes no sense to overgraze forage and it makes no sense not to graze available feed. Under-harvest does nothing to improve the grass or the economy, also true of rotting trees. True, an attempt to average should be made, but in the case of grazing, an annual evaluation is critical; which is somewhat different than a timber crop that takes many years to produce.

Studies now appear to indicate riparian areas should be stocked with livestock or game to maintain their natural condition as has gone on for eons. Nature should be allowed to take its course along streams although upstream impoundments do appear to be highly beneficial from all aspects.

Firewood is a desirable side product of the forest and there is no reason all local need cannot continue to be met. We would estimate ten times as much wood rots or burns in the forest every year than is ever used domestically

To summarize·

1. AUMS should be increased to utilize all forage to a degree that perpetuates its production and be under constant review to avoid erosion.

2. Timber harvest can be more easily determined on long range projections and should not be increased even temporarily unless such increase can be sustained over a long period of time.

3. Upstream impoundments should be constructed to improve water quality, improve game habitat, improve riparian areas and improve recreation with little if any effect on production of timber or game

4 Domestic uses should receive highest priority for accommodating the needs of surrounding residents

5 No management plan should adversely affect the economy or lifestyle of communities nearby

Sincerely,

Harney County Farm Bureau Board of Directors

Herb Davis

Herb Davis, President

Donna Hurlburt

Donna Hurlburt, Secretary

CROOK-WHEELER COUNTY Farm Bureau
417 North Main Prineville, Oregon 97754

01479

December 19, 1986

To. Forest Supervisor
Ochoco National Forest

From Crook-Wheeler County Farm Bureau

Subject Proposed Plan Ochoco National Forest

The Board of Directors of the Crook-Wheeler County Farm Bureau on behalf of its 336 members in Crook and Wheeler Counties wishes to respond to the proposed Forest Plan for the Ochoco National Forest.

Farm Bureau at the county, state and national level solidly supports the multiple use concept of federal land management We do not support the addition of any lands for wilderness designation Furthermore, we do not support the set-a-side of any lands for wildlife habitat.

We believe that a plan can, and should, be selected that would maximize the utilization of the renewable resources without endangering any one phase of the multiple use concept. We feel at this time, none of the proposed alternatives meet this criteria. The final plan should blend certain elements of the several proposals to achieve the multiple use concept

Signed Greg Merritt, President
CROOK-WHEELER COUNTY FARM BUREAU

Greg Merritt

01481

Crook County Court

PHONE (503) 447 6555
DICK HOPPES, Judge
FRANCES BURGESS Commissioner
VERN ATWOOD, Commissioner

CROOK COUNTY COURTHOUSE
PRINEVILLE OREGON 97754

December 18, 1986

Forest Supervisor
Ochoco National Forest
Box 490
Prineville, Oregon 97754

Statement of the Crook County Court in response to the proposed Ochoco National Forest Plan - preferred alternative.

Dear Mr. Rittersbacher,

It would occur to the members of the Crook County Court that to reply in depth and specific detail to a study of the Ochoco National Forest which has been undertaken for the past several years, would be quite impossible in this short review period.

However, we consider the potential consequences of the final adoption and implementation of the plan, to be so highly significant to the local long range economy and quality of life in this area that we must address those areas of most questionable affect.

Since you will be receiving documents from more technical sources on specifics, we would submit a more philosophical approach.

The Court questions the wisdom of implementation of any of the plans. Rather it would appear to us that the multiple use, sustained yield concept under which the forest has been managed for the past several years is still the most viable plan. This is not to say it has been perfect, nor that the term multiple use may be misconstrued, but why burn the barn down to rid the mice, when the management system has been quite effective over the past several years.

We would remind all involved that it is interpretation and quality of personnel which makes a process effective, rather than the plan itself.

The Court would encourage the Forest Service to maintain and if possible, increase the amount of intensively managed land for timber production.We feel also that the area of land should be

left whole, for all useable purposes, rather than having set aside areas for specfic purposes. Proper management of the whole will provide for all uses, rather than inferior management by property lockup.

We feel that there should be greater emphasis on reforestation, on bug control and on salvage, none of which appeared to be well addressed, if addressed at all in any of the plans.

The two areas which would be most manageable would be to plant more trees and develope a creditable system for salvage of timber from bug kill, blow down, lightning strike, fire and other types of disease.

In the past thirty years I have failed to hear the charge that from "30 to 50 million board feet of lumber is lost annually in our forest", disputed by members of industry or Forest Service personnel.

Appropriate provisions for a consistant salvage program could have a profound effect on maintenance of sustained yield and at the same time reduce that element of our wastefulness and lack of stewardship

We do feel that a few reasonable corridors should be protected, such as, Highway 26, the road to Walton Lake and possibly two or three more, where travel is or probably will become significant

Finally, we would submit that we have three wilderness areas in the Ochocos, none of which met the federal criteria for wilderness designation, however, they are set aside and we believe the future will prove the wisdom of the designations in spite of the political motivations.

In this context, however, it is the unanimous opinion of the County Court that we can ill afford any further roadless areas, or large areas set aside for single purpose situations.

There does not appear to be any unchallengeable, factual evidence that the existence of the pileated woodpecker or continued existence of other forms of wildlife or the management of game animals cannot be dealt with in harmony and compatibility with the harvest of timber throughout the entire Ochoco range.

We would encourage the re-opening of the road to the top of Lookout Mountain even if on a controlled basis for the enjoyment of the view for the elderly and handicapped.

We would encourage a selective cut harvest of the Forest, rather than even or clear cut.

In spite of periods of controversy over the years, it is our opinion that the Ochoco National Forest has been competently managed. We feel that drastic changes as proposed by the E departure plan are wrong, unnecessary, detrimental to the economy and would not serve the best long range interests of any of the various factions.

It is our belief that those involved in the forest products industry, the cattle rancher, environmentalist, hunter, game biologist and those for recreation can co-exist, utilizing the entire forest. We believe that the U.S. Forest Service has both a policy and a moral obligation to continually seek procedures which will protect the long term economic stability of our Community.

Respectfully submitted,
Crook County Court

by Dick Hoppes, Judge

DH/cm

00057

C1464



Jefferson County

Courthouse
657 C Street
Madras, Oregon 97741
Telephone (503) 475-2317

December 19, 1986

David Rittersbacher, Forest Supervisor
U. S. Department of Agriculture
Ochoco National Forest
P. O. Box 490
Prineville, Oregon 97754

Dear Mr. Rittersbacher:

After studying the Economic Impact Analysis, submitted by Brian Long, and attending the December 12, 1986 C.O.I.C. meeting and hearing testimony regarding this analysis we, the Jefferson County Court, would like to go on record that we oppose the Ochoco National Forest, E - Departure, plan.

It is our opinion that if 50,000 acres must be set aside, then this should be for the use of selective logging and not for any other purposes.

In conclusion, the economic impacts that this plan would have would adversely affect Central Oregon Industry.

Sincerely,

Herschel Read

HERSCHEL READ
Jefferson County Judge

City of Prineville

400 EAST THIRD STREET
PRINEVILLE OREGON 97754
447 5627

The following endorsement was adopted by the City Council on December 17, 1986.

"The City Council of the City of Prineville hereby endorses any modifications to the Ochoco Management Plan which would maintain or increase timber related employment through:

A. Intensively managing a balanced timber base suitable for all uses of the forest.

B. Increasing salvage programs to maximize timber production.

C. Stewardship of land be included in grazing application.

We feel that a major factor to be considered in managing the forest is economic stability of the local community and our quality of life."

Henry Hartley
City Administrator

01485

PRINEVILLE-CROOK COUNTY CHAMBER OF COMMERCE
LEGISLATIVE COMMITTEE

699 Ochoco Ave , Prineville, Ore 97754

JIM HOWARD Chrmn
CHUCK BOYDEN V Chmn

EDYTHE NEWELL Sect Treas

December 18, 1986

FRANCES BURGESS
County Commissioner
ALTA CHALFANT
Senior Citizens
RICK CHRISINGER
County Librarian
LASELLE COLES Retired
Water Dist Mgr
ARLENE DEITZ
Accountant
CHARLES DEITZ
Banker
ELAINE DONNELL
Cable TV
DAVE DOTY Prin
C C High School
GERI ELICH
School Librarian
BOB FICKARDT
Retired Rancher
H B FOWLER Retired
Railroader
BOB GERLACH Mgr
Pacific Power
DICK HOPPES
County Judge
LANNY LYLE Vice Pres.
Les Schwab Tires
TERI LOWRY
News Reporter
GERALD MAGNUSON
B L M
DAVID MANLEY Supt
Crook Cty Schools
GEORGE NEWELL
Farmer
JAMES PETERSEN
Dentist
GEORGE PIFER Admin
Hospital
JERRY PIMENTEL
Teacher
TOM POWELL Owner
Mobile Trlr Court
ELINORA REAL
Retired
DAVE RITTERSBACHER
U S Forest Service
PAUL ROWAN Retired
Cable TV
LINDA SHELK
Central Ore E D
M D SINCLAIR
Realtor
DR IRV SMITH
Chiropractor
GARY THOMPSON
Dist Attorney
ED VAN WINKLE Retired
Insurance Broker
B J WIGGS Gen Mgr
Railroad
MYRTLE WILLIAMS
Homemaker
CLAUDE WILLIAMS
Rancher
GEORGE WITTMER Retired
Feed Store Owner
ELON WOOD M.D
Retired

Mr. Dave Rittersbacher
Ochoco Forest Supervisor
Federal Building
Prineville, Oregon 97754

Dear Mr. Rittersbacher:

It was voted unanimously to convey to you the following resolution passed by a recent meeting of the Legislative Committee of Prineville-Crook County Chamber of Commerce:

"Be it hereby resolved by the Prineville-Crook County Chamber of Commerce Legislative Committee that we support any modification to the Ochoco National Forest Plan which would maintain or increse timber-related employment through

(a) intensively managing the land base suitable for commercial production and

(b) increasing the salvage program to maximize timber production. "We feel that the most important factor to be used in managing the forest is the economic stability of the local community and our quality of life"

There were 35 members of the committee present and voting.

Sincerely,

Jim Howard, Chrmn.
Legislative Committee

01742

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
975 S.E. Sandy Boulevard Suite 202, Portland Oregon 97214 Telephone (503) 238-0667

RECEIVED
DEC 23 1986
7TH Floor Support Group

December 19, 1986

Mr. James Torrence
Regional Forester
Pacific Northwest Region
319 S.W. Pine
P.O. Box 3623
Portland, OR 97208

Dear Mr. Torrence,

The Columbia River Inter-Tribal Fish Commission appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and the proposed Ochoco National Forest Plan. The Commission is composed of the Fish and Wildlife Committees of the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakima Indian Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe. These four tribes have rights reserved by treaty to take fish that pass their usual and accustomed fishing places. Among these fish are the anadromous species that originate in the Ochoco National Forest.

The Nature of the Treaty Right

The tribes' right to take fish that pass their usual and accustomed places is a right confirmed by numerous court decisions. See e.g., Sohappy v. Smith, 302 F.Supp. 899 (D. Or. 1969), aff'd, United States v. Oregon, 529 F.2d. 570 (9th Cir. 1976); Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979) (Passenger Fishing Vessel). In addition to binding state governments, See Passenger Fishing Vessel 443 U.S. at 682 and n.25, the treaties are also binding on private citizens, See e.g., United States v. Winans, 198 U.S. 371 (1905), and, of course, the federal government. Passenger Fishing Vessel, 443 U.S. at 682; See also Confederated Tribes of the Umatilla Reservation v. Alexander, 440 F. Supp. 553 (D. Or. 1977). Absent specific authorization by Congress, Indian treaty rights cannot be abrogated. Id., citing Menominee Tribe v. United States, 391 U.S. 404, 413 (1968)).

In Passenger Fishing Vessel, the Court painstakingly examined the circumstances surrounding the negotiation of the treaties in an attempt to define the parties' long-term intentions. The Supreme Court emphasized that Governor Stevens invited the Tribes to rely on the United States' good faith efforts to protect their right to a fisheries livelihood. Stevens specifically told the tribes: "This paper [the treaty] secures your fish." Id. at 667 n.11. During the treaty negotiations, "the Governor's promises that the treaties would protect that source of food and commerce were crucial in obtaining the Indians' assent." Id. at 676 (emphasis added). As the Supreme Court stressed:

> *It is absolutely clear, as Governor Stevens himself* said, that neither he nor the Indians intended that the latter "should be excluded from their ancient fisheries," . . . and it is accordingly inconceivable that either party deliberately agreed to authorize future settlers to crowd the Indians out of any meaningful use of their accustomed places to fish.

Id. The Supreme Court also mentioned that the treaty guaranty of "the right of taking fish" was meaningful only if fish were available for the taking. Id. at 678 (emphasis added).

The 130 years since the treaties were signed have witnessed a truly startling number of methods by which the quantity of fish available for the taking could be reduced -- if not decimated. The courts have responded to these threats to the treaty right by declaring a policy that the treaty right cannot be defeated by technology or other methods not anticipated by the treaty signatories. For example, in United States v. Winans, 198 U.S. 371 (1905), the defendant constructed a fish wheel (a device capable of destroying an entire run of fish) and excluded the Indians from one of their usual and accustomed fishing places. *Commenting on the effects of improved fishing devices, the Court* noted that:

> wheel fishing is one of the civilized man's methods, as legitimate as the substitution of the modern harvester for the ancient sickle and flail . . . It needs no argument to show that the superiority of a combined harvester *over the ancient sickle neither increased nor* decreased rights to the use of land held in common. In the actual taking of fish white men may not be confined to a spear or crude net, but it does not follow that they may construct and use a device which gives them exclusive possession of the fishing places, as it is admitted a fish wheel does.

Id. at 382. Thus, although improved technology may be brought to bear on the fishery, that technology cannot be allowed to imperil the rights secured to the parties to the treaty.

This result was reaffirmed by the Supreme Court in Passenger Fishing Vessel. There the Court declared that "[n]on-treaty fishermen may not rely on property law concepts, devices such as the fish wheel, license fees, or general regulations to deprive the Indians of a fair share of the relevant runs of anadromous *fish in the case area.*" *Passenger Fishing Vessel, 443 U.S. at* 684. The Court's intent is clear: absent specific treaty abrogation legislation from Congress, (Menominee Tribe v. United States, 391 U.S. 404, 413 (1968)), no one may use any method to deprive treaty fishermen of their fair share of the anadromous fish.

Federal Duty to Protect Subject Matter of Treaties

In addition to their obligation to not destroy Indian treaty rights without specific Congressional action, federal agencies must use their authority to safeguard that which is the subject matter of federal treaties. In Kittitas Reclamation District v. Sunnyside Valley Irrigation District, 763 F.2d 1032 (9th Cir. 1985), the Ninth Circuit affirmed a district court order to operate a Yakima water project in a manner that would preserve spring chinook salmon redds. Federal project operators had originally sought to reduce water releases in order to store water for the next irrigation season. The proposed flow reductions would have left the redds high and dry. Testimony at the district court hearing indicated that the proposed water storage would be possible if twelve redds were transplanted or if berms were constructed. Id. at 1035. However, the district court judge was "unsure of the effect of these measures, so he continued the watermaster's authority to release water as necessary." Id. Expressly declining to decide the scope of the Yakima Indian Nation's treaty fishing rights, Id. at n.5, the Ninth Circuit found that the district court judge had fashioned a reasonable remedy. Id.

The message in Kittitas is clear. Federal agencies are obligated to exercise their authorities in a manner that will protect -- not degrade -- the habitat needed to support anadromous fish. In addition, when addressing anadromous fish habitat needs, various measures may be utilized, but the final choice turns not on traditional notions of agency expertise, but on the biological needs of the fish.

Magnitude of Fisheries Reserved by Treaty

The Forest Service's duty to protect and enhance anadromous fish habitat does not cease once a fish run becomes viable. The tribes did not reserve a right to take a few fish from a meager run struggling for survival. Some might argue that the Columbia River treaty tribes reserved the right to continue harvesting that number of fish that they had traditionally harvested.

Obviously, that harvest level is not yet possible given the contemporary depleted fisheries. The Supreme Court has held that both Indian and non-Indian fishermen possess a right, "secured by treaty, to take a fair share of the available fish." Passenger Fishing Vessel, 443 U.S. at 684-85. The Court determined that Indian harvest allocation should not exceed 50% of the harvestable fish. Id. at 685-86. The Court then declared:

> It bears repeating, however, that the 50% figure imposes a maximum but not a minimum allocation . . . [T]he central principle here must be that Indian treaty rightsto a natural resource, that once was thoroughly exclusivelyexploited by the Indians, secures so much as, but no more than, is necessary to provide the Indians with a livelihood -- that is to say, a moderate living. Accordingly, while the maximum possible allocation to the Indians is fixed at 50%, the minimum is not, the latter will, upon proper submissions to the district court, be modified in response to changing circumstances. Id. at 686-87.

Perhaps the reason why this "moderate living standard" unearthed by the Supreme Court has not proven to be a truly thorny problem in Pacific Northwest fisheries management is because no one can reasonably contend that the Indians' harvest presently yields a moderate living. This fact was implicitly acknowledged by the Supreme Court in Passenger Fishing Vessel when it stated that the 50% ceiling on the Indians' harvest allocation was necessary "to prevent their needs from exhausting the entire resource and thereby frustrating the treaty right of 'all [other] citizens of the territory.'" Id. at 686.

Regardless of what the term "moderate living standard" means, it will eventually be defined by the judiciary -- not a federal agency See Id. at 687. As discussed earlier, the Ninth Circuit has already determined that federal agencies must refrain from taking actions that will reduce the number of fish in a depleted run. See Kittitas, 763 F.2d at 1035. Nor does this duty cease when an anadromous fish run manages to increase its numbers beyond the dangerous level of minimum viability. In United States v. Adair, 723 F.2d 1394 (9th Cir. 1984), the Ninth Circuit stated that:

> Implicit in this "moderate living" standard is the conclusion that Indian tribes are not generally entitled to the same level of exclusive use and exploitation of a natural resource that they enjoyed at the time that they entered into the treaty reserving their interest in the resource, unless, of course, no lesser level will supply them with a moderate living. Id. at 1415 (emphasis added).

Here the Ninth Circuit has indicated that the Klamaths must be allowed to achieve their "moderate living." No one knows what that is. The court explicitly stated the possibility that the

"moderate living standard" may only be achieved by allowing the tribe to enjoy the "same level of exclusive use and exploitation" it had at the time the treaty was concluded. Id. The purport of this holding is clear. Federal agencies owe a duty to refrain from activities that will interfere with the fulfillment of treaty rights. Moreover, this duty cannot be performed by engaging in an "accommodation" or "balancing" process between Indian treaty rights and a competing economic interest such as timber harvest. Any such "accommodation" reached by the Forest Service would amount to a de facto abrogation of Indian treaty rights. In the context of forest management, unless the Forest Service can demonstrate that the tribes' treaty rights are presently being fulfilled, it cannot justify approving activities in the forests that will cause further degradation of anadromous fish habitat.

The National Forest Management Act Mandates Coordination

The Forest Service is only one of the many entities involved in the complex interactions that have caused the diminution of anadromous fish runs to their present state. Columbia River hydroelectric development and other downstream problems have done grievous harm to the basin's fish runs. While the Forest Service can rightfully blame downstream problems for much of the harm inflicted on anadromous fish, such blame does not obviate the Forest Service's responsibility to protect anadromous fish and the need for all parties with management authority that affects these fish to work together to improve the fishery resource.

In dealing with anadromous fish, the Forest Service must look beyond the boundaries of a given national forest. Columbia River stocks of anadromous fish migrate as far inland as the Bitterroot National Forest and as far north as Alaska. As the Pacific Northwest has come to realize, the anadromous fish runs can only be restored if state, federal, and tribal land, water, and wildlife managers adopt a coordinated "gravel-to-gravel" management approach to this valuable and mobile renewable resource.

This approach is reflected by the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. The Fish and Wildlife Program, mandated by the Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. Section 839b (1982), encompasses the Columbia River and its tributaries and will be financed by Pacific Northwest ratepayers. This comprehensive protection, mitigation, and enhancement effort does not appear to be integrated into the DEIS or proposed plan. Nor were the increased fish returns made possible by the recently concluded United States/Canada Salmon Interception Treaty, See 16 U.S.C. Section 8396 (1985 Supp.), mentioned in either document.

These efforts, along with the Salmon and Steelhead Enhancement Act, have changed the complexion of fisheries management in the Columbia Basin. The success of both the Salmon Interception Treaty and the Fish and Wildlife Program turn upon maximizing utilization of the anadromous fish habitat in Columbia River tributaries. A large percentage of these tributaries run through national forests. The Forest Service must acknowledge its responsibilities to act in concert with these policies. The Forest Service cannot make a reasoned decision with respect to anadromous fish habitat if it does not factor these activities into its decision-making process. The Pacific Northwest cannot afford to spend money enhancing fisheries that are simultaneously being degraded by timber harvest, road-building, and grazing.

Forest Service coordination with Pacific Northwest fisheries enhancement activities is not only sound policy; it is also required by law. Forest Service regulations declare that a review of state, federal, and tribal planning and land use activities shall be included in the forest plan EIS. See 36 C.F.R. Section 219.7 (a)-(c) (1984). In addition, the regulations provide that this review shall consider the objectives of federal, state, local, and tribal governments, inter-related impacts of these plans, and a decision by the Forest Service on how each forest plan shall address these inter-related impacts. Id. at (c)(1)-(4). Among the objectives of federal, state, and tribal governments are the fish production plans currently being formulated under the auspices of United States v. Oregon, the Fish and Wildlife Program, and the Salmon Interception Treaty. The Ochoco National Forest DEIS and proposed plan do not reflect the consideration of these processes required by the NFMA.

Anadromous Fish Assessment

As a consequence of its federal mandate to protect, mitigate, and enhance fish and wildlife while assuring the Pacific Northwest an adequate and economical power supply, the Northwest Power Planning Council is currently estimating the location and extent of anadromous fish in the Columbia Basin. This assessment will:

> estimate the resource value by characterizing the productivity of each stream reach. Productivity is defined to be comprised of three factors: smolt production, migration use and upstream geography which may, through sedimentation, affect downstream anadromous fish areas. This study will quantify the smolt productivity of each stream reach. Migration will be accounted for by including in any estimate of smolt production for an individual stream reach upstream productivity as well, i.e, the productivity will accumulate as one moves down a stream. Stream reaches upstream of anadromous fish areas which have the potential to adversely affect downstream use will be identified quantitatively.

See Northwest Power Planning Council, Proposed Work Plan Pacific Northwest Hydro Assessment Study (August 1, 1984) at 3. The results of this study will provide the most current and comprehensive examination of Columbia Basin anadromous fish production capability available. This study will be used to identify areas and stream reaches that, due to their value to fish, should be protected from hydroelectric development. It would be wasteful and expensive indeed to invest money in habitat enhancement and protection only to have those efforts smothered by sediment generated by logging and roadbuilding. The Forest Service and anadromous fish managers from federal, state, and tribal governments should coordinate to make sure that the information generated by this study will foster the most judicious resource utilization possible.

Cumulative Impacts

There are 17 national forests in the Columbia basin that produce anadromous fish. These are: the Clearwater, Nezperce, Bitterroot, Boise, Challis, Payette, Salmon, Sawtooth, Umatilla, Wallowa-Whitman, Mount Hood, Malheur, Ochoco, Gifford Pinchot, Okanogan, Willamette, and Wenatchee. All of them are going through the forest planning process. Approximately 50 to 70% of all remaining anadromous fish habitat is contained in these forests. Events on these forests will have a profound impact on the anadromous fish resource that is vital to the welfare and existence of the four treaty tribes.

Unfortunately, the Forest Service does not seem to realize that each forest is an important cog in the machine that will either revive the fish runs or slowly log, road, graze, or mine them into oblivion. To adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 forest plans listed above on the Columbia River anadromous fish runs and the four Columbia River treaty tribes. It is simply not adequate for each forest to merely look at the impacts of its activities within the borders of the forest or in the surrounding communities and counties. Nor is it adequate for the Forest Service to baldly assert that it has assessed cumulative impacts while offering absolutely no evidence that it has made any such consideration. Fish production precluded by activities within each forest and in conjunction with other forests affects not only surrounding communities, but also downstream Indian tribes and other fishers both inriver and in the ocean.

Adequate assessment of cumulative impacts requires a certain management worldview. It requires that managers of land, water, or fish realize that even though they may only have management

authority over a relatively small aspect of the anadromous fish lifecycle, their management decisions may have a decisive impact on other fishery management decisions or the fishery resource itself. This is by no means a revolutionary concept. In fact, the Forest Service avails itself of this management approach every time it asserts that the reason that basin fish production is not any higher is because of downstream passage mortality and harvest management. The Forest Service is correct when it states that harvest and passage considerations are important to the *overall health of the Columbia basin* anadromous fishery. However, fish production, both natural and hatchery, is also equally important. The Forest Service is directly responsible for natural fish production occurring on national forest lands. Pointing accusatory fingers at other entities does not relieve the Forest Service of its duty to ensure that its management will not adversely affect already depleted naturally producing *stocks*.

The idea that proper fishery management requires coordination of harvest, passage, and production needs has been around for a number of years. It is embodied in the Pacific Northwest Electric Power Planning and Conservation Act enacted in 1980. See 16 U.S.C. Section 839b(h) (1982). It is also an integral aspect of the Northwest Power Planning Council's efforts to coordinate restoration of Columbia basin fisheries to the extent affected by hydroelectric power production. See e.g. Northwest Power Planning Council, Salmon And Steelhead Planning, *Staff Issue Paper (June 3, 1986)*:

> A gamut of potential problems may result from uncoordinated actions. Fish production investments may be in conflict. Power system operations may diminish production or offset increases in production. *Harvest practices could prevent* escapement in adequate numbers to ensure sustained increases in yield. The mixed-stock harvest could undermine passage actions designed to protect or enhance certain stocks of fish. Harvest and power needs may not be sufficiently defined to guide production efforts. Production decisions may be made without full regard to harvest needs and to power system constraints with respect to passage. Land and water management actions may undermine fish production investments.
>
> When actions are taken in the absence of a system perspective, there also may be too little recognition of the spectrum of choices among production, passage and harvest actions. Actions may be taken without consideration of the full range of alternative means to achieve objectives. Actions may be taken with inadequate analysis of their likely effectiveness. As a result, there is no assurance that a given action achieves sound biological objectives at the minimum economic cost.

> Moreover, in the absence of a system perspective, monitoring and evaluation of actions may be uncoordinated, lacking, short-term, sporadic, or narrow in focus.

Id. at 8.

There are many who consider the need to provide for increased natural fish production to be a major constraint on anadromous fish harvest regimes. The tribes have foregone harvest of fish, to which they are legally entitled, for the purpose of providing increased escapement of naturally spawning adults. Despite these efforts, and despite the increasing numbers of returning adults (many of which are hatchery fish), the tribes are under pressure to further forego harvest opportunities. *Forest management that will cause reduction in* natural fish production will further exacerbate this situation. Reductions in natural fish production directly conflict with the tribes' treaty rights.

The Forest Service has often informed CRITFC and tribal staff that the Forest Service is only *responsible for supplying* smolt habitat capability and that there is far more capable habitat than there are smolts. The Forest Service's responsibilities include more than merely furnishing a given amount of habitat. The Forest Service must identify that which is being utilized by fish and, to the extent it can, that which will be utilized through either United States v. Oregon or Fish and Wildlife Program enhancement. Part of the concern behind protection of naturally spawning stocks is the desire to protect unique gene pools that will be needed to restore the basin's fisheries. For a recent discussion of the role of genetics in *Columbia basin fisheries management, see Northwest Power Planning* Council, Salmon And Steelhead Research, Staff Issue Paper (June 3, 1986).

Mitigation

The Forest Service has often relied upon mitigation in the hope that mitigation will compensate for the damage inflicted on fish habitat by timber harvest. However:

> Mitigation of fish habitat losses is often presented as a panacea and substitute for maintenance of habitat quality. The concept of "fisheries mitigation" is more myth than substance. It seldom materializes and when it does, it only *partially compensates for substantial losses.* There is no history of fisheries budgets sufficient to mitigate substantial losses of quality habitat. Recent and projected budget trends indicate a status quo situation.

See Espinosa, Background Paper Fisheries Resources Analysis of the Management Situation Clearwater National Forest (undated) at 56-57 (emphasis in text). The Commission is unfortunately acutely aware of the vagaries and inadequacies of fisheries mitigation. Thus, we are extremely skeptical of vague promises of best management practices, implementation of standards and guidelines, and reliance on enhancement to mitigate management impacts on fish habitat.

Given the importance of the anadromous fish resource, very little reliance should be placed on mitigation measures that do not have a proven record of effectiveness. The Forest Service must be careful to not ask more of a mitigation technique than it can give. New or untested mitigation techniques should be thoroughly evaluated before being widely used and relied on. Monitoring should be vigilant, stringent, and should include all entities that are involved in the management of anadromous fish. Finally, mitigation methods should be chosen on the basis of the protection they will provide the fishery resource, not how much they will affect the cost/benefit analysis of commodity resources such as timber, range, and mineral extraction. See e.g., Pacific Power & Light Co., Opinion No. 381-A, 30 F.P.C. 499 (1963), aff'd in part, rev'd in part on other grounds, 333 F. 2d 689 (9th Cir. 1964), cert. denied, 379 U.S. 969 (1965) (where it is declared that it is the policy of other federal agencies to require complete recompense for fisheries damage.) The DEIS should be revised to include analyses of known mitigation techniques. These analyses should include evaluations of effectiveness, standards for application, and any other information that might be of aid in deciding whether a given mitigation technique is appropriate. Is reliance on habitat enhancement as mitigation appropriate in the face of the current federal budget crunch? The Commission will be happy to contribute its expertise towards evaluating the use of various mitigation methods on a case-by-case basis.

Trust Responsibility

The trust responsibility is that special relationship between the United States and Indian tribes that originated in Cherokee Nation v. Georgia, 30 U.S. (5 Pet.) 1 (1831) where the Supreme Court described Indian tribes as "domestic dependent nations" and declared that "their relation to the United States resembles that of a ward to his guardian." Id. at 17. This relationship is part of the very fabric of federal Indian law and it imposes stringent fiduciary standards of conduct on federal agencies in their dealings with Indian tribes. See United States v. Creek Nation, 295 U.S. 103 (1935). See also Northern Cheyenne Tribe v. Hodel, Civ. No. 82-116-BLG (D. Mont. May 28, 1985) at 23.

In Northern Cheyenne Tribe, the court declared that "a federal agency's trust obligation to a tribe extends to actions it takes off a reservation that uniquely impact tribal members or property on a reservation." Id. at 27. In an attempt to save its coal leasing EIS from invalidation, the Secretary of the Interior alleged that there was no specific statute or treaty that required the Department to consider the impacts of coal leasing on the tribe as an entity. Id. The Secretary also alleged that his decision to lease the coal was in the "national interest" and "vital to the nation's energy future." Id. at 29. The court declared that:

> The Secretary's conflicting responsibilities and federal actions taken in the "national interest," however, do not relieve him of his trust obligations. To the contrary, identifying and fulfilling the trust responsibility is even more important in situations such as the present case where an agency's conflicting goals and responsibilities combined with political pressure asserted by non-Indians can lead federal agencies to compromise or ignore Indian rights.

Id. at 29-30 (citations omitted). Similarly, the Forest Service must not allow its obligations to the Columbia River treaty tribes to become lost in its concern for the local citizenry. It must accord the treaty right special consideration and scrupulous safeguards. Unfortunately, the DEIS did not devote this consideration to the tribes' interests.

The Forest Service owes a duty to not only discuss the effects of forest management activities on the tribes, but also a duty to safeguard resources of crucial importance to the tribes. This duty is not fulfilled by actions which sanction degradation of fish habitat needed to re-build the Columbia River runs.

Sales Below Cost

Over the years, fish and wildlife concerns have often been subordinated to the needs of allegedly more economically valuable, but environmentally damaging commodities such as timber harvest, irrigated agriculture, grazing, and hydrolectric power production. Thus, it is not without some ironic amusement that the Commission observes the current controversy over unprofitable timber sales. Those who have advocated resource decision-making primarily on the basis of short-term economic gain suddenly find themselves "hoisted on their own petard." Perhaps this role reversal will convince all those involved in natural resource decision-making that cost/benefit analysis is at best an "unfaithful lover" and that resource decisions are best grounded on other bases.

The Commission is not automatically opposed to "sales below cost" per se What concerns us is that the DEIS contains no assurance that any of the timber sales proposed for the next 50 years will actually recover its real costs. The NFMA regulations require that the Forest Service "shall compare the direct costs of growing and harvesting trees, including capital expenditures required for timber production, to the anticipated receipts to the government...". See 36 C.F.R. Section 219.14(b) (1984). "Direct costs" are defined to "include the anticipated investments, maintenance, operating, management, and planning costs attributable to timber production activities, including mitigation measures necessitated by the impacts of timber production. Id. at Section 219.14(b)(2) (emphasis added).

The Commission is concecned that the Forest Service will respond to the "sales below cost" controversy by artificially "improving" its timber sale balance sheet by shortchanging mitigation needs. The DEIS should disclose the manner in which mitigation measures and levels of mitigation funding are chosen and applied. This information may demonstrate that the timber production envisioned by the proposed alternative fails to include all mitigation costs and is therefore even more cost ineffective than it presently appears. Bland assurances that the Forest Service will implement mitigation measures which it alone determines are necessary frustrates the policies behind both NEPA and NFMA. Both of these statutes demand disclosure, public scrutiny, and public input.

In attempting to justify "sales below cost," the Forest Service should explain where it intends to find the funds to pay for mitigating the effects of timber management on fish and wildlife It is our understanding that Knutsen-Vandenberg funds for fish and wildlife are not generated by "sales below cost" whereas a sale that covers its costs also yields mitigation money. In other words, fish and wildlife are much more adversely affected by a below cost sale than by a sale that is financially sound.

Community Stability

Despite the utter dearth of statutory authority, the Forest Service appears to believe that the "maintenance of community stability" is the primary constraint on forest management. In addition, "maintenance of community stability" also appears to mean perpetuation or increase in commodity outputs to the detriment of non-commodity outputs and an attempt to artificially maintain lifestyles which would not otherwise be economically feasible. In essence, the Forest Service seems to perceive its mission as being the guarantor of the local timber and range industries.

The Ochoco National Forest is a national forest and should not be managed as a private woodlot for a handful of local mills. If the trends for sustainable flow from surrounding lands are on a declining trend in the local area, the intentions of the Forest to match past levels of harvest may in the long run fail to support local mills. The Forest Service is not charged with the obligation to insure community stability. Its true mission is to ensure that the resources it controls will be productive into perpetuity. It fails that standard if it allows timber harvest that reduces the productive capacity of forest fish habitat.

Budget

Given the present domestic spending trends, it is extremely unlikely that the Forest Service will be able to count on receiving budgets of equal or greater amount than what it currently gets. The DEIS should include a complete explanation of how the Ochoco National Forest will respond to budget cuts, which programs will be cut and the amount of the cuts. Region IV national forests in Idaho have a 25% constrained budget alternative in their DEISs. The Ochoco would be wise to initiate planning that would anticipate substantial budget cutbacks.

Water Quality

The NFMA and its implementing regulations explicitly require the Forest Service to ensure protection of streams and fish habitat. Plans must "insure that timber will be harvested from National Forest System lands only where -- ...protection is provided for streams, streambeds, shorelines, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat...." NFMA at Section 6(g)(2)(E)(iii). The NFMA regulations parrot this language. See 36 C.F.R. Section 219.27(e).

The Forest Service is also obligated to abide by state water quality standards adopted pursuant to the Clean Water Act. Unfortunately, the Ochoco National Forest appears to have adopted a rather lackadaisical attitude towards these provisions. For example, the Forest spends one and a half pages (DEIS at 172-174) discussing Oregon State Forestry Program Projections for the Forest. In stark contrast, the Forest spends one and a half inches (DEIS at 175) discussing how well the Plan meets Oregon's water quality standards. One would never know that Oregon's water quality standards, not Oregon State Forestry Program Projections, are binding on the Forest Service. In addition, the Forest does not appear to be able to comply with state standards for temperature and turbidity. ID. Does the Forest anticipate

continuing management activities on those drainages where standards are being violated? And if so, on what legal basis does the Forest justify activities that will either increase or perpetuate violations of the law?

The purpose of the Clean Water Act is to protect and maintain the beneficial uses of water. Fisheries are one of these beneficial uses. The Forest states that it is using a habitat capability index ranging from 1-100 to measure fish habitat. The Forest states that habitat capability ranging from 15-60 is "fair to good." (DEIS at 69). In every other national forest plan that we have examined (2 in Washington, 5 in Idaho, and 1 in Oregon), habitat capability ranging from 15-60 is considered to be poor. For example, the South Fork of the Salmon River has an existing habitat capability of approximately 55%. This river is often cited as a prime example of a drainage that has been severely impacted by past logging. The DEIS does not contain enough information to determine whether these habitat standards are in compliance with state water quality standards. However, from what we see, it appears that in no way can beneficial uses be fully protected even by the Forest's "excellent" standard (which claims that achieving a rating of 41 out of a possible 100 is "excellent").

Hydroelectric Applications

The Secretary of Agriculture has an important role to play in the licensing of hydroelectric projects that will be located in national forests. Section 4(e) of the Federal Power Act, 16 U.S.C. Section 797(e) (1982) declares that the Federal Energy Regulatory Commission is authorized:

> To issue licenses...for the purpose of constructing dams...or other project works...upon any part of the public lands and reservations of the United States...Provided, that licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose jurisdiction such reservation falls shall deem necessary for the adequate protection and utilization of such reservations....

It is the Forest Service's duty to impose terms and conditions that will assure adequate protection for national forest lands from the harms resulting from hydroelectric development. See Escondido Mutual Water Company v. La Jolla and Rincon Bands of Mission Indians, 104 S. Ct. 2105, 2114-15 (1983). It is also part of the Forest Service's trust responsibility to the tribes to ensure that it exercises its duty to impose terms and

conditions so that the tribes' treaty rights are protected. The tribes possess considerable expertise in this area and would welcome further consultation with the Forest Service to ensure adequate protection.

The Northwest Power Planning Council is in the process of developing a list of potential hydro sites with the least potential for adverse impacts on other resources. Forest Service activities related to hydroelectric power should be coordinated with these efforts.

Forest-Wide Standards and Guidelines

Mining

Management plans for mineral developments include reclamation requirements but there is no indication of monitoring requirements by the mining company (Plan p.49). Is monitoring of mining the sole responsibility of the ONF? What is the forest-wide goal for reclamation; does it imply restoration to natural appearance?

Range

Transitory range management will be coordinated with timber management (Plan, p.50). What factors are considered in the tradeoff between range and timber management? It often seems that the ONF will go to extreme efforts to extend grazing systems even to the detriment of timber production. The most productive bottom lands bordering streams are generally already clearcut and after becoming incorporated into grazing allotments, these lands are never returned to productive forest management. Why are the most productive lands allocated soley to range, a commodity output which costs the ONF far more to administer than it generates in receipts?

When other management strategies will not protect the integrity of riparian communities in active allotments, fencing will be used to control utilization (Plan, p.50). It seems that the predominant lesson from grazing studies near riparian areas is that salt blocks and watering structures are inadequate in luring cattle away from riparian areas. What is the record of compliance of cattlemen with requests to frequently move their herds out of riparian zones? In which instances will fencing be required and how many miles of fencing would be needed per year? Would anadromous fish streams be fenced when found in allotments? What is the condition of particular anadromous fish streams?

Riparian Management

For projects which could impact water quality, objectives for management of riparian areas will be developed under the NEPA process through the project's environmental analysis (EA). Will

riparian zone treatments only be considered after EAs are done for timber management projects? That is, will any riparian evaluations and treatments be done independently of timber projects? What part does range evaluation play in inventory and improvement of associated riparian areas?

How was it established that 40 to 60% ground cover is sufficient to prevent significant water quality degradation? What level of degradation is considered significant? On which streams flowing through allotments does ground cover exceed 60%.

--Water Quality

Management activities "may involve some temperature increases, provided the standards for class I and II streams continue to be met" (Plan, p.52). What are the standards for the different classes? How much temperature increase is allowed? Considering the extreme temperature problems downstream of the ONF, how can any more temperature increase be considered not to have adverse cumulative effects?

State water quality standards will be met by limiting timber harvest to "no more than 25 to 35 percent of suitable land base at any point in time". What factors were considered in sediment modeling? Did sediment modeling include timber harvest, road construction, grazing, and mining (including all the methods for conducting each activity)? Relative watershed sensitivities correspond to 25, 30 and 35% limitations (Plan, p.52). There seems to be very little difference in limitation between stable and unstable watersheds. In calculating equivalent harvest what age stand is considered to be a closed stand and what is the minimum size watershed to which the standards apply?

Bank stability is generally provided by tree roots for a distance of 5 to 10 times the diameter of the trunk (Plan, p.52). Merchantible trees may be removed if sufficient trees remain to provide root strength. If bank stability and sufficient shade can be provided by the trees within 5 to 10 trunk diameters, will riparian zones be essentially clearcut outside this near-stream area?

Enough trees "should be" left to meet shade requirements and supply sufficient amounts of large woody debris (Plan, p.52). Is this statement made by assumption or calculation? What is considered a sufficient amount of large woody debris? Fuzzy language such as "should be" and "if possible" needs to be reworded to <u>will be</u>.

--Wetlands

Riparian areas "should be" managed to maintain upper streambanks in stable condition along at least 80% of the stream's length (Plan, p.53). In addition, in riparian areas normally dominated by trees, 80% of potential tree crown cover "should be" retained. Will the ONF provide a map of the

potential tree covers assigned to all riparian zones so that the public can determine whether the standards (80% of potential) are being met?

If 20% of a stream length can be unstable, 20% can have no tree cover, and 40 to 60% could have no ground cover, how can this be considered to be adequate to provide excellent riparian zone conditions?

--Transportation

Road crossings will not alter stream characteristics (Plan, p.53). How frequently will roads cross streams--every 100 ft., every 1000 ft?

Soils

No more than 20% of an activity area can be compacted to a degree which degrades vegetative productivity (Plan, p.55). Cable logging is estimated to increase soil bulk density on 10% of activity areas and tractor logging on 30% (DEIS, p.177). Since the forest plan calls for predominantly tractor logging, how can a maximum of 20% compaction be assured? How much reduction in vegetative productivity from soil compaction is required before it is considered a significant? Are the miles of permanent road network included in calculations of compaction? Is this surface area subtracted from the productive forest land base when calculating future production? Is the reduction in productivity from all sources factored into future timber production calculations and the estimated LTSY? What length of time is required for various degrees of compaction to be reversed naturally? What percentage of soils will be ripped to reduce compaction? How much will this increase soil erosion? Are sediment output rates calculated on the basis of watersheds (if so, which size watersheds) or on a forest-wide basis? Much more drainage specific information should be provided on sediment output and erosion as well as on other characteristics of the watershed systems.

Timber Management

Clearcut units should be prepared for planting within 2 years after harvest. Planting occurs within 1 year of site preparation and the stand is hopefully certified 3 years after planting (Plan, p.57). This process appears to take 6 years although sites are supposed to be certified within 5 years. What happens if a site cannot be certified as revegetated? Will it be replanted and are funds available for the usual frequency of second efforts at revegetation? What is the success rate of revegetation on different site types on the ONF?

--Reforestation

Stocking standards are based on trees 4.5 ft tall (5 to 10 years old). If 30% of a watershed can be in a harvested

condition at a time, then it appears that 60% could be less than 4.5 ft tall by the second decade. Would this rate of harvest in a watershed be allowed and would it automatically be assumed to meet water quality standards if the watershed sensitivity rating indicated the watershed should be stable? Could wildlife demands for thermal and hiding cover be provided under these circumstances? What average stocking density has been achieved in the past on the various site types on the ONF? If only the minimum stocking level is achieved, this apparently will be considered sufficient. If minimum levels become common how would future allowable harvests be adjusted? What percentage of recommended stocking levels are assumed when projecting forest productivity?

--Precommercial thinning

Precommercial thinning will only be performed when expected return exceeds the cost of the action (Plan, p.58). How much does the projected timber yield depend on precommercial thinning.

--Harvest Schedule

Total timber sold (ASQ plus salvage) for the decade will not exceed the planned level by more than 5% although it is also stated that in case of a catastrophic event this may be increased to 10%. What is the distinction between normal operations and catastrophic conditions? It is commendable to require reductions in the ASQ above this level but what keeps the planned ASQ plus salvage level from being exceeded by 10% each decade. Are adjustments anticipated from decade to decade to compensate for over harvest in any decade?

--Low Productivity Lands

Why is timber harvest contemplated on sites with less than 20 cu.ft./acre/year production? Other forests forbid harvest of trees on low productivity sites.

Wildlife

-- Pileated Woodpecker

How many pairs of pileated woodpeckers can be supported on the remaining old growth outside of wilderness areas? What percentage of maximum densities can be sustained with 2 snags per acre? The minimum tree diameter (10 inch) allowable is far too small to support the pileated woodpecker which depends on trees of greater that 30 inch DBH. In addition, they prefer ponderosa pine. What are the realistic chances that the preferred species of snag with the necessary DBH will be provided? If old growth areas will be harvested at 200 year rotation is it possible that the preferred tree diameter can be achieved on these sites?

--Primary Cavity Excavators

Snag habitat will be provided by clumping acres of timber managed for snag retention within managed stands (Plan, p.61). Will this uneven distribution of snags really counteract losses of snag density in managed stands? Have the spatial requirements of snag dependent species been considered relative to all the species which use the snags? True, some species may benefit from clumping (Thomas 1979) but this does not imply that all would. How does the species territory size requirements match the distribution of preferred snag trees. Given the large number of wildlife species which depend on large diameter standing or down dead trees, how can the requirement of 2 snags/acre and 10 inch DBH satisfy their needs? Thomas (1979)(Appendix 20) lists many birds and mammals that depend on tree cavities in trees larger than 15 inch DBH. In addition, wildlife use of downed logs is given in his Appendix 24. Numerous species, including many rare species and big game, have various life history requirements centered on use of downed logs. It is doubtful that 10 inch DBH material would satisfy the needs of many of these species.

It is stated that "large snags, greater than 20 inches dbh is no longer a requirement because only the pileated woodpecker requires the large snags and their MMR's will be met with the benchmark old growth allocations" (Plan, Appendix M1). What is the MMR for the pileated woodpecker? Will its populations remain viable with the dispersed nature of the proposed old growth areas? For reasons discussed more fully below, calculations of forest-wide habitat potential for this woodpecker are erroneous. As noted previously, Thomas lists many species which depend on large snags. Among these are the barred owl which is listed in the "Oregon Non-Game Wildlife Management Plan" (ODFW, 1986) as being in danger of extinction in Oregon. The ODFW Plan also lists Lewis's Woodpecker as being vulnerable and it requires snags greater than 12 inches DBH. The fisher requires large snags and is also listed by ODFW as vulnerable. The status of the Canada lynx is questionable and the wolverine is vulnerable; both species require large downed logs for cover. The tendency to minimize the quality of fish and wildlife might be expedient for logging companies but shortchanges the entire forest ecosystem.

Have population trends been estimated for any of the species listed in Thomas (1979) taking into consideration the size of downed logs? Large snags become large downed logs. If large snag management is inadequate, so too will be management of downed logs. Large snags also create the most favorable instream habitat upon entering a stream channel. Rotation ages of 200 years in riparian zones with removal of snags during harvest would not provide the most effective habitat formation and will necessitate continuing investment in artificial structures.

--Rocky Mountain Elk and Mule Deer

The ONF will maintain at least 10% of all winter range in thermal cover (Plan, p.61). What standards are there for hiding cover? What plans are there for increasing thermal cover on winter range where it is deficient?

--Dead and Downed Logs

"Wherever possible", 2 uncharred logs/acre should be left for wildlife habitat. Where is it not possible to leave 2 logs/acre after logging? The minimum size log identified is 12 inches and 20 ft long. What is the value of even 2 ponderosa pine logs of good quality of these dimensions compared to the value of the wildlife species which depend on this material? What percentage of maximum densities of all dependent species could be supported by such levels of dead and downed logs if these guidelines were employed forest-wide? *What are the* densities of this kind of material in various old-growth forest types on the ONF? Have snag inventories ever been done?

Management Area Prescriptions

General Forest

On 58% of the ONF the largest trees will be 16 to 18 inches DBH. The only snags present will be those needed to meet the cavity nesters requirements (Plan, p.65). Does this mean that any snags beyond the minimum requirements will be eliminated? The General Forest prescription commits a very large percentage of the forest to small maximum size. As the old overstory is removed and the understory is thinned, the forested range lands will be found more frequently in fair and good forage condition class (Plan, p.65). This is a rather sad commentary on range management if it is necessary to convert the remaining old timber stands to thinned tree farms to provide new transitory range that does not suffer from over a century of overgrazing so that the forest-wide average range condition can be shown to be improving.

Range utilization standards will not exceed an average of 50% on meadows and on slopes less than 30%. *Is this a new* standard or has it been used before? If this standard has been used for some time why are the ranges predominantly in poor to fair condition still? What is new about management or enforcement that will assure a departure from the declining range conditions that the ONF has experienced until now? What grazing seasons are *allowed for meadows?*

Big Game Winter Range

50% of big game winter range will be managed in thermal cover (Plan, p 68). Is the ONF distinguishing thermal and hiding cover. *It appears that much of the vegetation* termed thermal

cover is shrubs. What proportion is dense forest cover?

The Green Dot System will be used to regulate temporary road closure. It has been our experience in reviewing success of road closure policies that a system of signs does not work. We *suggest that the ONF is not a public roads agency* and does not need to keep a large number of roads open after logging has ceased. Wildlife would benefit from lower road densities and less sedimentation of streams from road travel would occur. The Nezperce Forest has been successful in instituting permanent closures with concrete barricades in cooperation with timber *companies and the Idaho Department of Fish and Game.*

Forage utilization standards on winter range are the same as for General Forest. Since winter range has largely been incorporated by private cattle ranch operations, wouldn't it be wiser to give big game a break on habitat critical to their *survival. If there is such resentment* by cattlemen to wildlife use of their hay, maybe the ONF should consider much greater reductions in the heavily subsidized use of forage on national forest land. Virtually the only place where grazing is not permitted is on administrative sites.

Big Game Summer Range

Optimum summer range will be created by timber harvest to reach a 40/60 ratio of thermal cover to open range. What is the present ratio on summer range? What is the average distance from forage areas to thermal cover?

Old Growth

Only 3% of the ONF will be retained as old growth (Plan, p.74). Why is it that when the ONF is already one of the most heavily managed forests and has lost more old growth than most other forests that it cannot plan to leave the remaining old growth? It seems that present degraded *conditions always set* a framework for the future and the future will be the present minus 50% regardless of what the starting point was. It is difficult to see how the ONF can meet requirements for dispersion of seral vegetative stages and ecosystem diversity by limiting old growth to 3%.

Why is the minimum snag size given as 10 inches DBH when much larger sizes are required? If the old growth area is capable of producing trees of 21 inches DBH or more, why is it too much to require larger size snags? Are 2 snags per acre expected to provide 100% of potential population sizes for pileated woodpecker?

Retention Foreground

Is it legitimate to assume that cavity nesting species can be found at 100% of potential in the linear patches created by retention foregrounds when these are found near roads, trails,

and campgrounds? It seems that the viability of many species is resting on shaky biological assumptions which are based more on multiplying total areas by assumed wildlife densities than by considering the spatial relations among management units.

Wilderness

Only 4% of the ONF is planned to be retained as wilderness. Forage utilization standards in wilderness are the same as those found on General Forest areas emphasizing grazing. Why is grazing intensity just as high in wilderness as in intensive allotments? What seasonal restrictions apply to wilderness areas? Do these restrictions prevent the kind of soil compaction found on allotments?

Riparian in Acceptable Condition

On streams where the desired condition is not met the stream will be improved to an acceptable condition (Plan, p.93). What is the time frame for improvement from poor to acceptable condition? Which classes of streams are placed into the management category for attainment of acceptable condition?

The minimum requirement for shade is 75%. What is the average percentage shade on this class of stream (riparian in acceptable condition) presently and on specific streams of this class? If 75% shade is unattainable, the standard will be 100%. What does this standard mean? If 75% is truly unattainable, then 100% would be also.

On the John Day River, temperatures at or below 66 F may be raised a maximum of 2 F (Plan, p.93). Since high stream temperatures are such a severe problem in the John Day system, how can any further increase in temperature be allowed? If temperatures are raised on one tributary, will they be reduced on another by an equal or greater amount. Overall temperature reductions should be the rule if the ONF is trying to improve shade. Why is 68 F chosen as the maximum allowable? Is this considered to be an optimum for fish? Why is 58 F the maximum in the Deschutes River if both the John Day and Deschutes are steelhead streams? How would the potential temperature increase be determined before harvest? For how long after harvest will stream temperatures be monitored to determine whether temperatures are within acceptable limits and which flow conditions do the standards apply to? What are maximum temperatures currently on the streams in this class?

If the goal for riparian shade in this management unit is 75%, why are cavity nesters to be managed at 40% of potential?

Only one pasture per allotment will be scheduled for improvement during a five-year period (Plan, p.94). How many pastures are there per average allotment? Why is the rate of improvement so slow? After one pasture is improved, will it be returned to its previous level of grazing?

Timber management in the riparian zone features a 200 year rotation. The Wenatchee National Forest uses a more conservative value of 260 years. Harris (1984) recommended 320 years rotation in riparian zones for Region 6 forests. Even in western Oregon it requires 260 years to produce trees of 30 inch DBH. How would old-growth dependent species fare in riparian stands of 200 years old? Maintenance of older age riparian cover would reduce disturbance to streams and also provide more effective habitat for old growth dependent species and integration of the entire forest.

It is obvious that in the ONF a greater proportion of timber production occurs in riparian zones compared to other management areas than one finds west of the Cascades. This fact implies that proper riparian zone management for multiple-use would be more restrictive to the timber industry in the ONF. This, however, should not dictate what is environmentally acceptable. Control of water temperatures by conservation of riparian cover in eastern Oregon is even more critical than in western Oregon.

What is the planned width of riparian zones? If a riparian zone is nothing more than a picket fence it cannot assume a role as a real functional unit.

Riparian in Excellent Condition

No activities that degrade water quality in perennial and fish-bearing streams will be allowed (Plan, p.95). Will streams which were formerly fish-bearing be rehabilitated to fish-bearing status? In which anadromous fish streams have activities occurred which have degraded water quality? The statement that no activities which cause degradation will be allowed is good but what kind of commitment will the ONF make to realize this standard? If grazing is causing degradation in streams and riparian zones will it be discontinued or will out-of-riparian zone watering devices simply be installed?

How much of the riparian zone assigned to excellent management condition is presently in excellent condition and how much will be elevated to this condition? Drainage-specific information would be needed for public understanding of the goals for specific streams. Otherwise, no one will ever know whether he is following or meeting guidelines. How many of these streams meet the 80% shade guideline presently? If this guideline is not now met how can 5% be cut per decade? If trees reach 4.5 ft in a decade it would seem that little shade would be provided a decade after harvest. If 2 decades are required before sufficient shade is provided by riparian regrowth, the present riparian shade in these streams should be about 90% presently for 5% to be cut per decade, thereby reducing shade to a sustainable 80%. How much timber harvest has occurred in the past on anadromous streams? Has this timber regenerated?

Monitoring Plan

Wildlife

If priority stands are lost then land designations would be modified. What are priority stands? Does land designation modification mean that other mature forest land would be allowed to grow into old growth condition?

If snag habitat is not sufficient to meet objectives, output schedules would be revised and the management practice would be modified. What help would be provided by revising output schedules? If the objective is to provide various percentages of potential habitat, why is the monitoring unit simply acres (or even snag numbers)? The ONF should be inventorying wildlife populations to determine whether snag numbers meet the objectives for the populations and not just whether an index such as snag numbers is met.

For fish and wildlife improvements what does it mean to have methods of evaluation commensurate with permittee? In fish improvement projects what would the objectives be? It appears that counting of fish is not considered as part of evaluation. To determine whether variability thresholds are exceeded, one must know what the objectives of projects are. Habitat improvements may be valuable assuming they are engineered correctly out without evaluation of projects and general evaluation of fish numbers in streams throughout the forest, the only thing that may result is "project completion" (i.e. installation of structures) as listed in the monitoring plan.

The only monitoring dealing with anadromous fish appears to be macroinvertebrate sampling. Will the ONF provide any funds for this sampling? How extensive a program would this be; how will the data be used; why are there no thresholds of variability; why are fish not actually counted? Macroinvertebrate sampling is worthwhile as an index of health of aquatic systems but it seems unlikely that enough sampling would be done to be effective.

Any management projects involving potential effects on anadromous fish streams (especially projects in their scoping and EA stages) should involve the Umatilla and Warm Springs Tribes as co-managers. These tribes plus the other CRITFC tribes have treaty-secured rights to a portion of the fish originating on the ONF. Any management activities enhancing or degrading this resource directly affect the success of the US government in meeting its responsibility to the tribes under the treaty.

Range

Which allotments are in poor or fair condition and what would be done on each to correct the situation? As part of the monitoring of trend in range condition, will utilization surveys

be done on all allotments? The variability threshold for range condition is any change which would affect AUMs. What change would really require a reduction in AUMs? How often have AUMs been reduced from the planned allowable levels due to severe climatic conditions? Will rainfall or forage productivity measurements be made throughout the grazing season to determine when cattle should be removed?

The objective in planning range improvements is to gain a desired cattle distribution and use pattern. If this is the objective, it would seem that cattle distribution would be measured. If specific levels of forage production were the objective, then production analysis would be appropriate.

Timber

Have any measurements been made on the ONF of tree growth rates in second growth areas vs. previously uncut areas of the same site type? It would be interesting to know the likelihood of future growth variations caused by harvest.

Riparian areas will be evaluated every 5 years. Will permanent stations be established to determine a trend? What would these sites be? Can more precise data be given at this time for riparian condition--i.e. by drainage? If the threshold of variability is 20% from predicted, how is the prediction made? Does this statement mean 20% degradation from the previous measurement? What percentage of total riparian area would be sampled every 5 years?

Physical and biological sampling in riparian zones is noted for riparian areas. These data will enter STORET but no action is indicated if changes are noted. What is the value of monitoring when nothing will be done in case of a deviation? Will changes in stream bed sediment or fish habitat be periodically evaluated? Why isn't aerial photo surveying done on all riparian area instantaneously to determine every 3 years what the trend in percentage shading is rather than relying on the solar pathfinder method?

Soil

It was previously stated that a forest-wide average of 20% soil compaction would be allowed for activity areas. Does this degree of compaction constitute the predicted compaction level. If so, with a 20% threshold of variability from the predicted level, compaction would have to affect 24% of the activity area before action is taken. If an area is primarily tractor logged, the predicted compaction could involve 30% of the activity area (predicted value). With a 20% variance the critical compaction would be 36%. It would seem this areal extent of compaction is extreme. For a given area compacted, what degree of increase in bulk density has been shown to reduce tree growth? What degree of increase in bulk density would be allowed? Is compaction considered to be an irretrievable loss in production? What

degree of compaction would be necessary before the loss is essentially permanent?

In water quality sampling will there be long-term stations established for determination of baseline data for cumulative effect analysis? How many streams will have thermographs? What are the state standards for water quality which will be followed? What procedure would be followed for determination of a deviation in water temperature or suspended sediment? If there are currently no baseline data forest-wide or for individual streams, what standard values would be used in the interim? Will water quality evaluations be made only in association with specific logging projects? Will evaluations also be made of grazing, mining, and road building compared with control areas?

Cultural Resources

Monitoring to determine whether cultural resources are being protected and inventoried shows no plan for consultation with the Umatilla or Warm Springs Tribes. This should be corrected. A point is definitely made about consulting ranchers regarding whether forage utilization standards are being met.

General Comments

Land Allocation

The DEIS (p.XII) states the "alternative E-departure emphasizes a combination of timber production, roadless recreation, and big game habitat." This statement seems to be quite misleading. Only 4% of the ONF is to remain in wilderness at the end of the planning period and a total of less than 4% will remain in semi-primitive condition. Although 8% of the ONF is classified as big game winter range and 16% *as summer range*, these areas could just as easily be called cattle grazing allotments. The justification for removing old-growth from winter range is to produce an optimal ratio of timbered to forage areas. However, elk are managed at far below their potential so the additional forage produced is evidently destined for the cattle.

The Plan identifies the major management decisions proposed (p.1). Alternative E-departure is the preferred alternative. The basic tone of the plan is set by two major decisions. The first is to harvest 123 MMBF of green timber during the next decade and the second is to gradually increase grazing from 75,000 to 83,100 AUMs. Other management decisions seem incidental by comparison with these because the areas involved are so small. And because the time frames for change to occur are so indefinite, one might guess that the status quo would be acceptable. When guidelines call for maintaining present conditions "or" improving trends and there is no clearly identified baseline condition, one would never know if

improvement were occurring. It seems to be taken for granted that things are better now than they ever will be in the future. Regardless how much habitat loss has occurred on the ONF from past management, we must be willing to accept more. While we are being conditioned to accept the liquidation of the remaining old growth ponderosa pine, we apparently should be content to have parklike retention stands near campsites.

Timber

The preferred alternative (E-departure) calls for an ASQ of 123 MMBF in decade 1 declining to 118 MMBF in decade 2 and 89 MMBF by decade 5 (Plan, p.22). 69% of the harvest volume in the first 2 decades would be ponderosa pine (Plan, p1). The volume of ponderosa pine harvested in decade 1 will be 97 MMBF/yr and could decline to 47 MMBF/yr by decade 3. The timber industry has apparently convinced the ONF that it can survive only if it releases the majority of the remaining old growth ponderosa pine. After this material is gone the industry will be faced with lower volume harvest, smaller diameter timber, lower quality timber, and lower value species. Satisfying the short-term goals of mills which may close a decade from now when the prime timber is gone might look good on paper to those concerned with meeting RPA goals or those who want to sidestep criticism of the industry but the forest's other resources must absorb the brunt of this kind of management. It seems unfair that under MUSY management that timber can be harvested at high levels or departures but that non-valued outputs are assigned to MMR levels.

The ONF has sold an average of 136.1 MMBF/yr for the last 20 years. Now that some calculations have been made of the LTSY of timber (19.3 mmcf or approx. 115 MMBF), it was decided that harvest in excess of LTSY should continue for two more decades. There is presently 280.5 MMBF of timber which was sold but is uncut. There will be 5 MMBF of salvage logging in decade 1 and if a catastrophic event occurs an additional 12 MMBF (Plan, p.59) could be harvested as salvage. This brings the total potential harvest to 140 MMBF/yr in decade 1 (green volume plus salvage). It appears that in addition to this, total timber harvest can be within + or -5% of the planned value (Plan, p.104). Why is harvest of salvage timber not counted toward satisfying the LTSY volume? The amount of timber produced in a period is irrespective of whether it is alive or dead at the end of the period.

Based on timber inventories conducted in 1973 and 1982 the ONF timber base has declined 14% in this short time period (Plan, p.32). If this trend continues how can future planned harvest volumes be realized? What is the expected *standing volume after* decade 5? It also appears that ponderosa volumes have declined by 18% in this same time period? Why have subalpine fir inventories declined by up to 33%. It seems that the kind of forestry practiced on the ONF may not qualify as site conversion but could be termed total forest conversion. Radical changes in *forest species composition should not be tolerated any more* than

site conversion.

A point is always made about how the decadent stands need to be removed because of their low growth rates. Why, then, does the mature ponderosa pine have a net growth rate of 23.6 CF/acre and the two-story and immature stands have lower net growth rates (Plan, p.31)?

Old growth forest will be represented by 26,377 acres of old growth management and 23,500 acres in wilderness. The total available old growth on the ONF is 80,000 acres (Plan, p.24). This should mean that 30,123 acres will be placed into the timber base. Compare with the Plan on p.28 where only 22,300 acres was available to the timber base. If old growth in the timber base had been cut on a 300 year rotation previously, why has this been reduced to 200 years? Considering the minute amount of old growth remaining and the importance to the ecosystems in the ONF of safeguarding genetic and species diversity, why should the 22 to 30 M acres of old growth be harvested on such a short rotation schedule. Very little time is allowed for old growth characteristics to become established before harvest.

Grazing

Grazing will be increased by 11% in the first decade (Plan, p.22). Of the 19,000 acres of riparian area on the ONF, 12,300 acres are slated for improvement. On almost all allotments there appears to be little room for increase in AUMs. Most allotments are stocked to capacity. Why are there so many allotments having obligated AUMs exceeding carrying capacity? For example, Wind Creek, Wolf Creek, Allen Creek, Silver Creek, Buck Mountain, Lower Nicoll. Will grazing be reduced on these allotments? How is carrying capacity calculated? Is this capacity the maximum capacity assuming the range is restored to healthy condition? Are the obligated AUMs the sum of AUMs for cattle and wildlife or only cattle? Is the use of forage by wildlife other than deer and elk considered? Increasing the total obligated AUMs so that it equals the estimated total carrying capacity would be a 3.8% increase (Plan, Appendix F-5). How is an 11 % increase calculated?

The total range budget for 1985, including range protection and management and range improvement was $309,000. The range receipts for this year were $50,400. The amount spent to administer the range program was 6 times the receipts at a minimum. The costs to the environment in lost production of fish and wildlife, soil erosion and compaction, vegetation loss, and reduction in tree production are tradeoffs which are not accounted for when evaluating the wisdom of such extensive programs, let alone increasing the AUMs. The minimization of the importance of the ONF fishery resource in the Plan is covered below. The Forest Service is lucky that the BPA has invested in stream enhancement but if the Forest Service itself had to mitigate the losses in fish habitat caused by its grazing, roading, and forestry programs and repay the cumulative losses in

fish production over the years, it might reconsider whether maintaining or increasing the grazing program made sense. The ONF plans to spend only $80,000 of KV funds in 1988 on "fish and wildlife" projects. How much does it expect BPA to spend? What fraction of these funds are destined for fish enhancement? Are wildlife enhancement funds basically range enhancement funds?

Over-obligation of range resources, over-allocation of water from streams and groundwater supplies, and over-harvesting of old-growth and favorite tree species has been a way of life for the John Day and Deschutes River Basins for a century. Lumber mills in the vicinity of the ONF have never operated to capacity but supposedly it is the responsibility of the ONF to meet their demands. Maybe they overbuilt for the available resources. Overconsumption and waste of water out-of-stream angers junior water users and affects senior users in drought years. Provision of adequate water of high quality (low temperature, nutrients, and sediment) is essential in maintaining healthy fisheries. The ONF must do its job to ensure the rebuilding of this resource. Supposedly, allotments have been fully occupied for years and the survival of ranching operations depends on using forage on the ONF (DEIS-84). If allotments are already filled to capacity, the demand is increasing for more, and range conditions are poor to fair on 70% of the ONF, then perhaps a reduction and not an increase would be appropriate if the Forest really hopes to meet the needs of other resources. The "demands" of the timber and grazing interests are described as ever-increasing. The Plan does not address the Forest's obligation to the tribes for restoration of fish and wildlife resources and sufficient water of high quality to sustain these resources. If the "demand" is not apparent, the obligation of the Forest Service to do much more than just maintain a presently degraded fish and wildlife resource should be. Treaty obligations must be treated as hard constraints and not discretionary items.

Fish and Wildlife

The budget for fish and wildlife is planned to go from $102,000 in 1985 to $288,000 in 1988. If the need is identified for this amount of money to protect the fish and wildlife resource and funds are cut eventually, will all expenditures be cut equally or will fish and wildlife simply be funded at historic levels? Is the ONF committed to make funding for the necessary fish and wildlife programs as solid as roading and range administration has always been?

Soils

Under the Plan, 156,000 acres will be logged between 1986 and 1995, 80% of this by tractor harvest and 20% by skyline. Tractor skidding and machine piling will result in 25,000 acres of compacted soil (Plan, p.26). This would result in 16% of the project acres being compacted. The maximum compaction allowable is 20% (Plan, p.55). However, if compaction by tractor yarding with haul roads is 33% and cable yarding with haul roads is 18%

total (DEIS, p.115), the weighted average or 80% tractor/20% skyline is 30% compaction. If compaction of haul roads is eliminated, assuming that haul roads will become permanent losses to the forest base, then weighted average compaction of future forest base soils would be 23%. This means that 36,000 acres will be compacted rather that 25,000 forest wide and the effect on slopes less than 30 degrees will be much greater than average. How can compaction be limited to 20% in an activity area when tractor yarding with haul roads can cause 33% soil compaction?

Total existing soil compaction amounts to 102,000 acres. Based on 495,005 acres of land suitable for timber production, this amounts to 21% of the forest base already being compacted. What is the rate of reversal of this effect? How are the cumulative effects of compaction being dealt with? If a minimum of 25,000 acres are being compacted each decade, the total acres compacted after decade 1 will be 127,000 (DEIS, p117). Table IV-11 shows a constant level of total existing compaction from decade to decade in alternative E-departure. The implication is that only 10 years are required to reverse the effects of each decade's compaction, but that the present level of compaction lasts throughout the next 5 decades.

Calculation of tons of sediment produced among alternatives seems to be only logging related (DEIS, p.117). What are the effects of different amounts of road building, cattle grazing, and mining? Tractor yarding with haul roads can result in 47% bare soil. This effect seems to be accounted for in sediment calculations; however, the loss in vegetation cover and root strength caused by grazing is not included. Why? The methodology for calculations of sediment production and delivery to stream channels should be made very clear, including the formulas and references.

Fisheries

A fish habitat capability index was developed by sampling various streams on the ONF ranging in condition from poor to excellent. It would seem that unless a complete inventory is accomplished that it would be difficult to know the mean state of streams with any certainty. What characteristics were measured in samples of stream condition? Was the biological potential of the streams evaluated with respect to physical potentials? It has been common for many Forests to determine a habitat index based on a degraded channel or riparian structure as a standard. This kind of analysis would possibly calculate the fish potential given a channel type with broken down banks and a low percentage pools. Without a means of determining what the stream used to be there is no way to determine how far the present condition is from its potential (see our Appendix on monitoring plans).

A habitat index of 41 to 60 is supposed to represent good conditions. This index should be associated with 1000 to 3000 2" to 9"+ fish per mile (DEIS, p.108). Since steelhead juveniles spend two years in freshwater habitats, the mere presence of

numerous 2" long steelhead may not indicate good habitat conditions. Conditions leading to successful smolting and outmigration are essential if the ONF is to meet its production goals. How well is this index correlated with smolt output, not just spawning and emergence success?

A present habitat capability index for rainbow trout (including steelhead) is 14%. Alternative E-departure is reported to be able to raise this to 58% (DEIS, p.108). Elsewhere, it is reported that E-departure will increase the index to 43% (DEIS, p.137). Why is there this discrepancy? Minimum viable populations are listed as being supportable by a 9% habitat capability. If one can be comforted by calculations such as this, we should be grateful for 1.6 times minimum viable levels presently.

In an attempt to determine how the ONF Plan is coordinated with other public planning efforts under 36 CFR 219.7, the Warm Springs Indian Reservation Comprehensive Plan was studied (DEIS, p.172). It was found to contain "no references to the Forest or the Grassland." "Concerns expressed included availability of access to the Forest and Grasslands, being able to gather vegetative materials, support of prescribed burning, protection of archaeolological sites, and the general availability of forest and Grassland resources." The ONF appears to be taking a management plan developed for use on the Reservation, which is outside the boundaries of the Forest, as an indication of the full range of constraints the Tribe might place on management of the Forest. Although there were meetings between the ONF staff and representatives of the Tribe, we wonder whether most of these meetings were confined to the Culture and Heritage Committee as most of the acknowledged tribal concerns focused on these features. It should not be construed that a lack of reference to anadromous fish on the ONF in the Reservation Comprehensive Plan means a lack of concern for this resource or indicates no need to consult the Tribe on fisheries issues on the ONF. Although the ONF is outside Reservation boundaries, it is clearly within the tribal ceded area. If the ONF were to meet with the Tribe to discuss fish and wildlife issues, there is no doubt that the issues addressed within these forest plan comments would also be among the areas of concern discussed at that meeting. As explained earlier, the Warm Springs Tribe, along with the other Columbia River treaty tribes, have taken a Columbia basin-wide approach towards managing fisheries.

The Deschutes and John Day Rivers have 42 miles of spawning area and a total of 87 miles of perennial tributaries on the ONF (Plan, Appendix M3). Although plans are presented for riparian zones on anadromous fish streams, it is unclear how the intermittent and ephemeral streams that are tributary to these anadromous fish drainages will be treated. These types of stream courses are important sources of high quality water for downstream reaches and also serve as sites of temporary sediment and organic matter storage. During high flow periods this accumulated material is transported downstream to spawning and

rearing areas and can be deposited. The Plan should reveal what the treatment of the stream source areas is. Can unrestricted logging and accumulation of logging debris occur in these source areas? What level of grazing control is applied to these areas in comparison to the perennial waterways designated as spawning areas?

Our review of Plan Appendix M2 (Inventory of Anadromous Fisheries Habitat) gives us cause for concern about both the quality of data used to generate potential management options and the resulting options themselves. While the appendix appears to accurately list stream systems supporting anadromous species, data delineating extent of fish-use within those systems are frequently suspect. Conversations with ODFW staff lead us to question how Ochoco NF derived mileages of steelhead spawning habitat and adult steelhead escapement numbers cited in the appendix. Spawning habitat mileages appear understated (or are, at best, minimums) as are the numbers of spawners indicated as typically using the areas. On some of the listed creeks, ODFW's spawner index areas stop short of the Ochoco NF border. On at least one stream (Rock Creek) ODFW conducts no annual spawner surveys. What, then, was the source of Ochoco's data? How were the adult escapement figures estimated?

If appearances are correct and minimum steelhead values are being used, then the end result is that the forest's importance as a steelhead producer is downplayed. The management implications of this action are that, relative to steelhead, other resource values are made to appear greater than they actually are, thus it becomes easier to justify management choices favoring those inflated values. Such deliberately introduced biases thwart any meaningful assessment of total forest resource values and serve only to denigrate both forest planners and the planning process in general. Ochoco National Forest is charged with producing a forest plan that adequately and fairly presents management options available to it given its actual resource base. So long as that resource base is inaccurately portrayed, and particularly so if the misportrayal is knowingly made, the planning documents will be fatally flawed and begging for appeal. A more realistic assessment of the forest's anadromous fish resources (as well as other fish and wildlife species) is needed in the Plan.

Further, to be useful any habitat inventory must recognize the species' habitat needs at <u>each</u> of its life stages. Steelhead require more than just spawning habitat. Where is the inventory of juvenile rearing habitat? Where are the references to juvenile and adult migration corridors? What is being done to assure that these important areas are maintained? Providing for less than a species' total habitat needs is a futile gesture.

Finally, if it should be found that major rearing areas or migration routes for Ochoco-produced steelhead do lie outside the forest's boundaries, what efforts is the Forest making to help insure that this resource, which it is legally charged with

maintaining in a viable condition, is not being wantonly destroyed elsewhere?

Snag Management

Pileated woodpeckers are reported to presently enjoy 55% of their habitat potential forest-wide (Plan, p.15). Despite the liquidation of the majority of the remaining old-growth, they are expected to have a habitat capability index of 51 by year 2030 (DEIS, p.137). Although ONF planners can easily multiply 0.5 or 1.0 snags/acre by a standard woodpecker density for excellent habitat, the formula does not necessarily obey ecological principles. Snags in the middle of young regenerating stands or clearcuts do not necessarily have the same value to wildlife as the same density of snags in pristine habitat. Figures such as 55% habitat capability probably are very deceptive when applied forest-wide. Although it is admitted that 10 inch snags are inadequate for the pileated woodpecker, these would be the rule for management area 1 (General Forest) where trees will be harvested at 80 to 90 years age. Although recommended snag levels here are reported as 40%, they are effectively 0% for pileated woodpecker. The 40% level is a level at which the ability of a species to maintain self-sustaining populations becomes tenuous (Thomas 1979, p.72). Reducing snag levels does not necessarily produce linear declines in wildlife levels and it *is doubtful that these kinds of ecological effects are reflected* by the seemingly precise percentages of potential habitat capability reported.

Since 58% of the ONF will be in the General Forest category having essentially no value for pileated woodpeckers, the forest-wide capability for the pileated woodpecker is certainly not 55% now or in the future. Use of the pileated woodpecker as a MIS and then monitoring the number of snags of 10 inch DBH is a ridiculous exercise in meeting goals on paper. Reporting erroneous habitat capabilities is merely an attempt to make the public believe that we can keep all our fish and wildlife while still increasing timber and grazing programs.

It seems doubtful that with the complete roading of the ONF, the practice of summarily dispatching all snags during logging, and the demand for firewood, that the ONF's policy of green dot systems to limit access to parts of the forest will prevent snags and down wood from being pulled from wildlife habitat, riparian corridors, and stream channels. Although all standards for snags relate to hard snags, maintenance of soft snags is not specified. Will recruitment and preservation of soft snags be assured outside of wilderness? Permanent closure of many areas must be accomplished to provide security areas for wildlife and safeguard impoverished streams. A good inventory is needed of the distribution, species composition, size frequency, and condition class of snags existing on all management units to establish a baseline for accurate estimate of present potential. This should be related to actual estimates of population densities of dependent wildlife. Such inventories are needed for all

resources, not just green timber volumes.

Cumulative Effects on Soils

The Forest was divided into 24 major watersheds and each was assigned an index of Equivalent Clearcut Acres (ECA) "based on its soil, slope, channel stability, riparian values"(DEIS, p.133). This index supposedly represents a watershed's sensitivity to disturbance. Even though watershed stabilities are described as ranging from stable to very severe erosion hazard, thresholds of erosion are assumed not to be exceeded if ECA, as a percentage of basin area, is not greater than 25 to 35%. This narrow range of ECA values does not seem to correspond to verbal descriptions of the range of landscape sensitivities.

It is stated that "exceeding a threshold value does not in itself limit management options on the Forest. It does, however, indicate the need to undertake other specific mitigation measures to offset potential reduction in site productivity or long-term impairment of water quality" (DEIS, p.133). The Plan should clearly list all the coefficients of mitigation efforts which would be used. The idea that threshold values are set up and that they can then be exceeded if something positive is done somewhere else in the basin is unacceptable. Mitigation factors are some of the most tenuous management tools the ONF is dealing with. These coefficients work well in FORPLAN runs when a coefficient is called for to complete the analysis or to balance high sediment outputs on activity areas. The validity of mitigation factors is very site-specific. Unless extensive monitoring accompanies a large share of the mitigation efforts, mitigation is apt to be primarily an office excercise with no connection to reality. The ONF does admit that "after the fact" mitigation is often not as effective as preventing degradation on a site in the first place (DEIS, p.134). Despite this admission there appears to be little hesitation to apply mitigation while exceeding thresholds. If thresholds of slope stability are exceeded, leading to excessive loss of topsoil, the sediment might be deposited in settling basins but it is not clear how this can counteract the loss in soil productivity on the slope.

How many factors are really considered when calculating ECA values. Does it include all management related efforts such as logging, road building, grazing, and mining?

Soil compaction from harvesting may mean "that a future stand to be regenerated in 100 years may need more time to achieve the outputs normally projected for 100 years" (DEIS, p.120). Soil compaction is "readily measurable 16 years after cutting" (DEIS, p.120). It was shown that reductions of tree growth rate by 12% over a 16 year period are possible from soil compaction. Establishment of new tree seedlings could be even more severely affected. Since it appears to be well accepted that soil compaction is a reality and that reduction in growth rate is to be expected, what average percentage reduction in growth is used in FORPLAN runs and what natural rate of recovery

of compacted soils is used?

Timber

Stumpage prices received for old growth ponderosa pine commonly range from $100 to $300/MBF (DEIS, p.91). High value old growth ponderosa has done an adequate job in the ONF to keep most timber sales out of the "below cost" category. When the old growth is gone in the next decade or two, will sales tend to be below cost? Assuming that the forest will be fully roaded soon, how will timber receipts balance against timber management, administration, and road maintenance costs?

If the stumpage prices are typically high for ponderosa pine, why do Forests sometimes virtually give away this timber. For example, the advertised rate for ponderosa pine in the Wallowa Whitman Forest on the Top-Skook sale in the Hells Canyon NRA was $12.94/MBF. Does the ONF ever provide these incentives for getting the old growth removed?

Of the 544,303 acres of forested land on the ONF outside of wilderness and RNAs, only 0.47% is classified as unsuitable due to regeneration difficulty. Is it reasonable in an arid environment that so little area is classified as having regeneration difficulty? What classes of soil and slope gradient are considered as unsuitable because of regeneration problems? What are the stocking success records which accompany these site classes?

If you would like further information regarding our interpretations of Ochoco National Forest plans, please feel free to contact any of our staff, Jim Weber (policy assistant), Dale McCullough (biologist), or Alex Heindl (biologist), at (503)-238-0667.

Sincerely,

S. Timothy Wapato

S. Timothy Wapato
Executive Director

APPENDIX

Drainage Specific Monitoring

Both CRITFC and the EPA have pointed out in their comments on proposed national forest management plans that the Forest Service needs to produce more drainage-specific information and do more drainage-specific monitoring. Forest-wide averages of fish populations and watershed conditions tend to camouflage drainage-specific problems. Unique fish stocks found in single drainages do not necessarily maintain viable populations on the basis of forest-wide averages of bed sediment or fish numbers per mile.

Because of the fact that many agencies have monitoring responsibilities and that the Forest Service and BLM have responsibilities for maintainance of habitat for many critically weak fish stocks wielding great leverage on national and international economies, there is abundant reason for inter-agency planning for monitoring programs, sampling, evaluation, and review. This type of inter-agency overview has been in effect on the South Fork Salmon River for several years. In the past this committee has been effective as a board of professionals charged with insuring the survival of the summer chinook population found only in this area. Without this committee, intensive timber harvest would have resumed in the South Fork despite the precarious state of this irreplaceable stock. There could be large scale regional direction in planning of monitoring and assessment but sub-regional committees of agency, tribal, and university experts could be assembled to provide advice on drainages which are unique, sensitive, or mismanaged. Typical Forest Service monitoring plans call for reports every five years but action is not indicated until "trends" have been established. This means that an entire planning period would elapse (10 to 15 years) before enough information is available to warrant change in management. The problem is that the level of monitoring to date has been minimal both geographically and in terms of variables considered. Monitoring often includes little more than records of municipal watersheds, incidental records on a few streams and long-term (e.g., five to 10 years) on one stream. Baselines do not exist for the majority of streams. The Forest Service has a duty to assess the condition and continued health of its aquatic resources. A good monitoring plan created with overview by an inter-agency monitoring committee is the best way to protect these resources which have historically been the first to be dispensed with in conflicts between multiple-use options.

Development of a Monitoring Plan

A good monitoring plan requires a good system of classification of land. Such a classification should be hierarchical. Land units should be defined by similar sets of variables at each level. Variables express a greater degree of heterogeneity, the higher the level in the regional hierarchy.

Selection of sites for monitoring is often done by the paired watershed approach. This is typically done without reference to any superstructure. Basins are selected which are close geographically in the hopes of being as similar as possible. Often single variables such as drainage area are the sole insurance of similarity. One watershed then becomes a representative of pristine conditions for the other "managed" watershed. Another approach is to observe one watershed over a period of years to note the series of performances in relation to management treatment. In order to allow instantaneous observation of performances of a given watershed type under different states of management requires a classification. This permits identification of a set of watersheds of similar capacity which only vary by present state of management.

Classification systems provide the theoretical grounds for planning scientific investigations and in effectively managing tracts of land. Many stream classification systems rely on single variables to identify stream types. For example, a stream supporting steelhead may be said to be different from one with coho. A stream with a riparian zone dominated by alder may be said to be different from one covered by Douglas fir. A stream on alluvial deposits may be said to be different from a bedrock controlled one. Stream width, depth, gradient, substrate composition, water velocity, temperature, etc. have all been used singly or in combinations to describe stream types. However, seldom do a few haphazardly picked variables significantly identify types. Riparian vegetation type may describe conditions for a brief period of vegetative succession. A manager would have very little use for a stream classification which would require a stream be reclassified each time vegetation changed; likewise, for changes in velocity, width, etc. Variables must be selected which represent long-term potential of a system. Daily, seasonal, or annual changes can only be understood against a backdrop of understanding of the capacity or potential of the system. Capacity of a system (e.g., a stream, watershed) is basically a theoretical concept, representing all possible performances or states. Variables can be selected to act as proxies for capacity at any level in a hierarchy of classification.

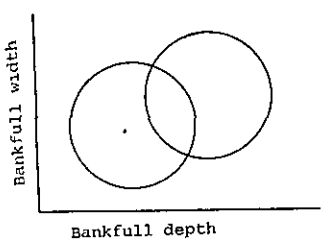
Definition of terms used to this point:

Capacity: Theoretical term for a potential of any system; this represents all performances of which the system is capable.

Performance: Any state of a system -- this is an observed event such as a current velocity at a point in time, a certain species composition in a riparian zone, etc.

Systems should be defined by capacity because if performances are used the basis for applying a given management strategy to two systems may be superficial similarity. Any two systems may look alike at some point in time but this does not mean that their capacities (long-term potentials) are equal. For example, two streams may have fish communities dominated at present by steelhead. For one of these streams, steelhead may be the species best adapted to all states of the watershed system in which the stream is embedded. For the other stream, steelhead may be found under a limited set of watershed states. Likewise, the mere lack of fish in any stream at present does not indicate lack of capacity to support fish. In fact, the stream may have had great fish production potential which was altered by poor logging practices. Poor management on top of this may assure that fish never return if the stream is classified as a non-fish stream. A good classification system should recognize long-term potentials and not just present state. The difference between two systems may be shown diagrammatically below. The zone of overlap represents points in time for which the systems had similar performances. X and Y axes represent two performances of a stream such as mean annual width and depth.

Figure 1.



Hierarchical land systems could be given labels such as region, zone, sub-zone, watershed system, watershed, stream network, stream segment, reach, and habitat type. Each land system subsumes the capacities and performances of all systems within it. The class of any system (i.e. at any level in the hierarchy) is defined by the capacity of the system itself and the environment it is found in. The environment of a system is the next higher hierarchical level. That is, a stream network system has a watershed as its environment. A watershed has a system of watersheds as its environment. Two watersheds classified by hierarhical classification would be said to be fundamentally different if found in two different zones even

though they have the same drainage area and fish species. For example, they may have different rock types, climates, hydrologic characteristics, etc.

Definitions to emphasize:

System: A land system of any size which can be defined by its unique capacity.

Environment: The higher level system which subsumes the collection of lower level systems within its geographic bounds. The environment is a single geographic unit and not a collection of discontinous spatial units. Environment is the framework in which any system evolves biologically and geologically. It is not just climate but the entire set of capacity determinants. An environment for a given system is just a system in its own right but at the next higher level.

What are the components of capacity which must be represented by sets of variables? These can be categorized as climate, substrate, biota, water, and culture. Substrate may also be decomposed into geology, soils, and topography. Some variables such as climate may be easily understood in broad geographic terms but data for specific locations are rarely available. Culture represents land use decisions; such decisions are often dependent on climatic, vegetational, geological, and other zonations, especially in primitive cultures.

Examples of variables representing each of these components of capacity are given in Table 1. Most of the variables can represent systems at any level in the hierarchy; the degree of generality becomes greater at higher levels.

Robert Bailey (USFS, Ft. Collins) has classified the entire United States into eco-regions. This systems emphasizes potential natural vegetation, Koeppen's climatic classification, and physiographic regionalization. This system does not utilize the full set of variables illustrated above. For example, culture or detailed descriptions of topography are not employed. At the scale at which eco-regions are drawn, the simplicity of deleting some variables may be convenient considering the fact that the remaining determinants of classification are broad capacity-type concepts.

Robert Hughes, James Omernik, and Mostafa Shirazi at USEPA in Corvallis, Oregon have developed a system of land classification which starts from Bailey's eco-regions. The heterogeneity of eco-regions is then described in a regionalization which identifies frequency distributions of facets of land units using features such as potential vegetation and soil types.

The type of classification emphasized in this document was initiated by Charles Warren in Oregon State University Department of Fisheries and Wildlife. Warren's classification contains all

components of a complete classification by capacity. Frissell et al. (1986) present ideas on stream classification at the lower levels in the hierarchy described above based on Warren's concepts.

McCullough (Columbia River Inter-Tribal Fish Commission) used Warren's theoretical concepts of system classification but started with Bailey's eco-regions. Identification of watershed types (pre-classified by drainage area and downstream slope) was done within eco-regions by utilizing soil series, slope, aspect, altitude, and solar radiation (calculated for winter solstice and equinox). These variables were determined for all facets of 0.014 mi2 size from a regular grid laid over each watershed. All variables except soil series were determined based on altitudes read from the grid system into computer programs which calculated characteristics of land facets. Multivariate statistical programs determined similarities between watersheds using the detailed descriptions of all facets comprising the watersheds. These similarities were displayed in multivariate space, allowing clustering of basins on the basis of many variables at a time. This procedure does not require predetermination of priority of any variable although only variables considered to represent capacity were used. This type of system for classification on any scale is useful and efficient given the ready availability of digital topographic map data from USGS. More information about applicability of computer classification of land systems can be obtained from Dale McCullough at the Columbia River Inter-Tribal Fish Commission.

Classification of all watersheds must start with selection of a given drainage area. With every change in drainage area proceding downstream, the character of the watershed changes. Also, the average stream bed slope changes downstream. Drainage area and map-derived strean slope for the half mile upstream from the basin mouth set the framework for further attempts to classify watersheds. These variables set the bounds for system capacity. Change in basin capacity with change in drainage area is reflected in the "river continuum" concept of Vannote et al. (1980). Management principles vary likewise on a continuum down a drainage network (i.e. longitudinally). It must also be recognized that management should vary from region to region, zone to zone, etc. (or laterally). A classification system sets up a regionalization on theory and experience. Future experimentation and monitoring help confirm the utility of the classification and suggest possible changes. This framework establishes logical units for management. Experience will dictate whether adequate management of a national forest can occur using a given hierarchical level or a lower one.

Given any national forest, classification systems such as Bailey's, McCullough's and Frissell's in sequence could be employed to work down through large to small spatial systems. A national forest should be broken down into eco-region and at least to zones at the next lower level. At its simplest level geology could be used to identify zones in an eco-region. The

full set of capacity determinants can be referred to if a more complete zonal classification is indicated. Classification of watersheds within these zones could utilize all variables specified above.

By using the previously mentioned systems to regionalize the forest and to find stream reaches of a given class, sampling sites are obtained. Within a reach (i.e. a stretch of stream within a stream segment having a homogeneous overall bed slope and geology which contains series of habitat complexes) samples for monitoring will be taken to represent a portion of the capacity of the reach, the watershed, zone, and region in relation to present state and history of management in this hierarchical framework. Fish sampling, for example, can take place by logical habitat clusters. These are repeating units containing riffles, pools, backwaters, side channels, etc. Riffles and pools act as units for species which can move sufficiently between them such as fish. The spatial organization of these habitat types can form logical sampling units for fish. Sample sites would not be simply a randomly chosen 100m reach but would be selected to include a habitat cluster. Replicates of these kinds of clusters could be sampled.

The stream reach is classified by the class of network in which it is embedded plus the capacity of the reach. The reach capacity (C) should be used in its classification. Proxy variables are given below. Reach performance (P) should be established as a baseline and then periodically monitored.

Reach classification

(A) upper bank condition (above mean annual peak flow line outward horizontally 100 ft)
- C: slope gradient; slope form
  bedrock
  soil type
- P: overstory vegetation type and cover density
  understory vegetation type and cover density
  % bare soil; evidence of erosion; classes of mass wasting

(B) lower bank condition (from mean annual peak flow line to channel edge)
- C: bedrock type
- P: substrate type and size composition
  % bedrock exposed
  % of overhanging banks by habitat type

(C) stream
- C: bedrock type
  mapped gradient of stream bed over 0.5 or 1.0 mile
- P: substrate type; size composition
  % bed fines by depth
  % embeddedness (in riffles, pools)
  % bedrock exposed by habitat

% surface area and volume of reach in habitat types (see Bisson's habitat classification)
depth distribution by habitat
mean height of boulder size classes above bed
discharge--flow frequency distribution; peak flows
sediment discharge in relation to water discharge
water chemistry
%of overall drop in bed elevation over 0.5 miles due to falls over bedrock, logs, chutes, cascades, riffles

(D) *biology*
C: species pool (fish, invertebrates, algae, aquatic macrophytes, beavers, other aquatic vertebrates)
P: juvenile fish counts
smolt counts plus spawning ground surveys
invertebrate species composition
fish species composition

(E) morphology, structure
C: sinuosity
proximity to reaches in network of different stream order
potential solar radiation analysis of reach accounting for topographic shading
P: calculation of solar radiation accounting for shading by riparian zone

Stream network classification

C: class of watershed
network structure
potential solar radiation analysis of network accounting for topographic shading
aerial photographic analysis of distribution of major pools
spatial analysis by gravity model of distribution of soil types in watershed relative to downstream study reach. This methodology is a framework for cumulative effects analysis
P: calculation of solar radiation accounting for shading by riparian zone
aerialphotographicanalysis(1·12000) of vegetation cover density, height, species;
degree of damming of reaches in network by beaver activity or log jams
aerial photographic analysis (1:2000) of mainstem to determine whether reach is representative of series of reaches in mainstem; distribution of large wood

Watershed classification

C: watershed is classified by class of watershed system, zone, region, etc. in which it is embedded
drainage area
gradient of stream bed in downstream 0.5 to 1.0 mile
also see explanation above of additional variables used in description of capacity of watershed
P: aerial photographic analysis (1:12000) of vegetation cover density, height, species
use timber stand types, stocking density available in mapped surveys
aerial photo analysis of % bare ground; degree of erosion hazard from watershed; evidence of mass failure hazard and historical failures

Integration of Physical, Chemical, and Biological Systems Provided by Classification

A good classification system is the proper basis for a good monitoring plan. A good classification system which is *progressively validated and refined with experience* will be a good framework for future monitoring and land management as system performances change through the years. Such a framework provides the means for effective management at minimal costs. Other types of monitoring schemes could reduce costs even more but at a loss of understanding of the systems and a loss of predictive ability.

Use of a classification system would allow a cost savings through its broad geographic scope. That is, some watersheds or streams in one national forest could represent behavior of a class of system found predominantly in an adjoining national forest. Duplication in monitoring efforts is then reduced.

The type of general classification system proposed also lends itself to adoption by many different agencies with interest in environmental monitoring. For example, one primary capability determinant used in classification is geology. The mixture of rock types of a watershed set the general chemical regime for surface and groundwater on the watershed. This is a partial determinant of aquatic productivity, sensitivity to acid rain, and to nutrient enrichment. Therefore, a classification system is an appropriate framework for monitoring of acid rain by EPA, nutrient problems by a State Environmental Quality agency, and management of watersheds and their resources by the USFS.

The combinations of rock types found in watersheds above a given reach plus overall bed slope of the reach are determinants of system capacity for aquatic macrophyte distribution. Scientific studies by aquatic botanists become more significant ecologically by enabling linkage of the physical and biological systems on small as well as large geographic scales. Ability to

use a general classification system as a monitoring framework on a large regional basis would be considerably aided by geographic computer analysis. These methods allow overlaying maps of many resources and production of integrated maps. Such capabilities have been explored by many agencies such as Forest Service, USGS, and EPA.

Provision for Adequate Monitoring

If a regionalization or classification system were developed to adequately represent watershed/stream types, an important benchmark for monitoring would be established. The Forest Service's point of origin in discussions of monitoring is what it chooses to budget for monitoring and not what is adequate. It is our position that we must first determine what is necessary for proper management of resources and then determine how this can be achieved. Monitoring funds should be linked to the receipts from major land disturbing activities -- timber, grazing and mining. Unfortunately, grazing, which is a major cause of non-point source stream degradation, is a money-losing venture of the Forest Service which cannot provide funds from receipts for use in stream protection and monitoring. The US Government, if it considers it in the interest of the few ranchers to subsidize grazing, should also consider the interests of other users of public rangeland who enjoy streams and range in good condition. This necessitates adequate funding for protection, rehabilitation, and monitoring.

Some Investigations which can be Facilitated by a Good Monitoring Framework

A good monitoring framework provides the basis for a refined understanding of many biological and physical relationships of importance to land managers. Among the questions which can be explored are

Biological

What is the carrying capacity of streams of different classes and states within a class (zonal or sub-zonal level study)?

What is the relationship between carrying capacity and stream flow and temperature regime (regional level study)?

What is the relationship of carrying capacity to extent of watershed and riparian zone management (i.e. spatial organization of timber stand history and erosion sources in relation to the downstream study reach)?

What is the threshold of biological response for fry emergence from gravel in relation to percentage of bed fines?

Physical

What is the average natural erosion rate from watersheds of a given class?

What percentage over natural erosion rate is due to different degrees of management in watersheds of a given class?

What are the rates of recovery of stream reaches of different classes in terms of reduction in bed fines, depth distribution, % surface area by habitat type, surface substrate size composition, mean channel width, riparian vegetation density?

What is the effectiveness of mitigation methods?

What is the relationship between quantity of sediment delivered and increase in embeddedness or fines?

What percent over natural erosion rates can be handled by different classes of reach without changing % bed fines?

What is the extent of downstream impact (e.g., sediment, temperature increase) to the mainstem from a disturbance originating at a given reach. This type of study is necessary to establish the appropriate scale for measurement of cumulative effects throughout a large basin?

Implementing the Monitoring Plan

In the development of a network of monitoring stations, consideration must be given to the kinds of variables and intensity of sampling given to each station. Because some types of monitoring are more labor intensive, it may be better to do a good job sampling in a few carefully chosen stations than to dilute the effort by extensive sampling without a real plan formulated. For example, stream hydrograph stations are expensive to run and maintain. The USGS may or may not have adequate coverage to represent watershed classes. Usually their stations do not well represent small drainages. Hydrographic regimes can often be correlated to other systems with similar climate, geology, and soils. Most invertebrate sampling programs are labor intensive but provide a good biological index of year-round environmental conditions not as clearly afforded by migratory fish, which are subject to downstream and oceanic effects. Meaningful studies on anadromous fish can be performed but the best of these may require careful monitoring of redd counts associated with smolt output. Smolt output measurement requires investment in weirs. Juvenile fish counts may suffice for general monitoring on most streams. However, a certain stream class may be represented by an index stream for which more intensive studies such as smolt output can be done. Such streams may be those important in the US/Canada Pacific Salmon Treaty negotiations because of the opportunity to track production of significant anadromous stocks and their contribution to ocean fisheries.

Some of the monitoring variables can be handled by

experienced crews of two to four covering extensive reaches on numerous streams per summer. Fred Everest and James Sedell (USFS Forest Science Lab, Corvallis, OR) have had stream survey crews covering physical and biological parameters on numerous streams for years. McCullough (CRITFC) also has extensive experience measuring physical characteristics of long stream reaches in Northwest Oregon.

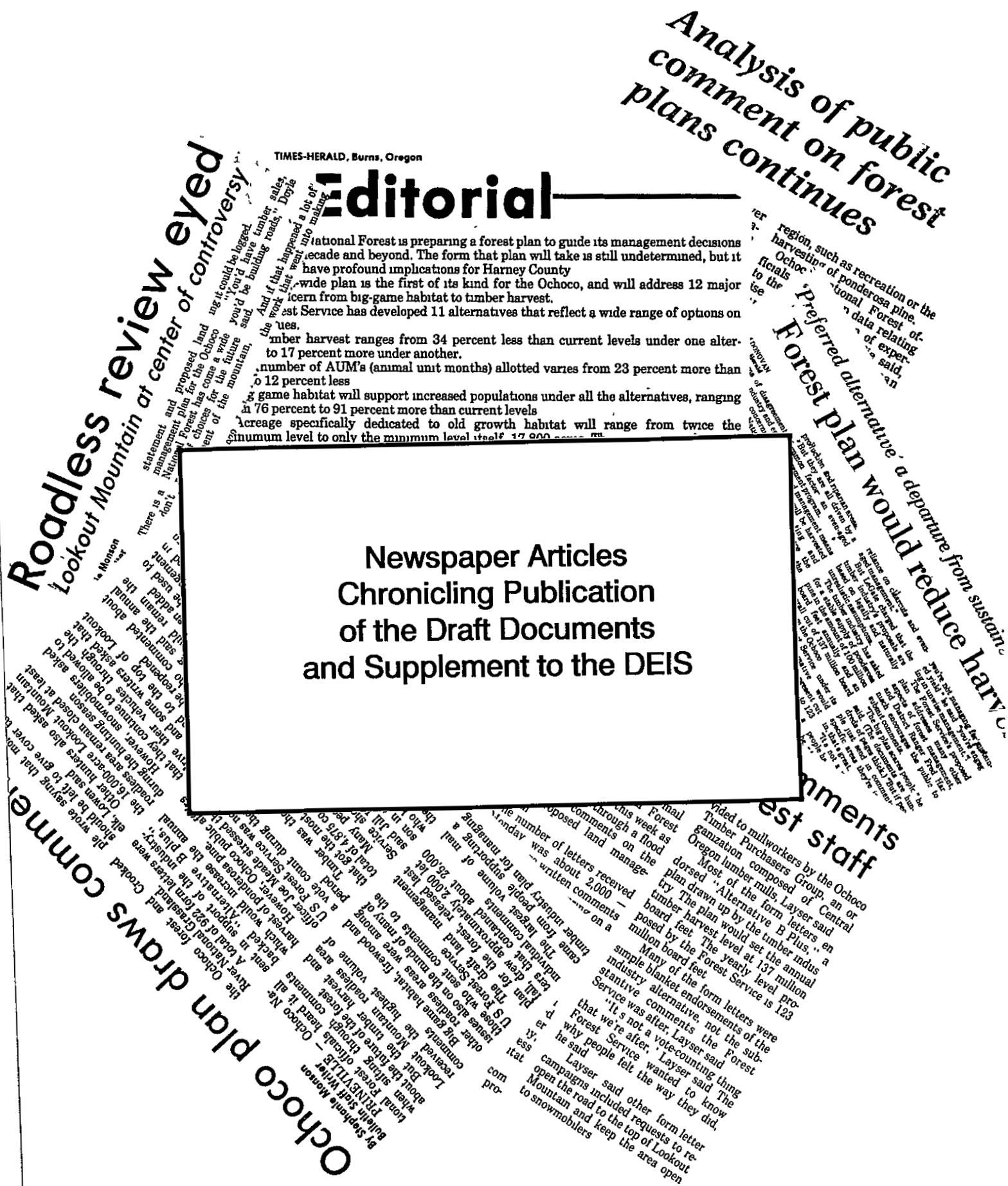
There are a lot of advantages in having some degree of monitoring on a large percentage of streams. This would enable confirmation of the utility of the classification and would provide an extensive baseline from which to assess further change. Adequate monitoring also requires long-term sampling of streams which are key indicators because of their fish stocks or representative bio-physical conditions. Both intensive and extensive monitoring should be based on a good watershed/stream classification and an inter-agency monitoring committee should be established to guide planning and review of monitoring in the Northwest.

Appendix I

Response to Public Comment

Section 5

Newspaper Articles Chronicling Publication of the Draft Documents and Supplement to the DEIS


Analysis of public comment on forest plans continues
Roadless review eyed
Lookout Mountain at center of controversy
TIMES-HERALD, Burns, Oregon
Editorial
Forest plan would reduce harv
'Preferred alternative' a departure from sustain
Ochoco plan draws comme
Newspaper Articles
Chronicling Publication
of the Draft Documents
and Supplement to the DEIS

Forest Service prepares 15-year resource plan

A guide to the management of resources on the Ochoco National Forest and Crooked River National Grassland is now available for public review and comment through Dec. 20, 1986, said Dave Rittersbacher, forest supervisor.

"For the first time in the history of the Ochoco, planning documents are available for review which display alternative choices for integrated management of all the natural resources on the Forest and Grassland," he said. The forest plan is being prepared at Congress's request as part of the National Forest Management Act of 1976.

A reviewer's guide, draft proposed forest plan, the draft environmental impact statement which includes information on a Wilderness proposal, alternative mats and appendices are available at all offices of the Ochoco National Forest. Additionally, copies will be available for loan from the Crook, Jefferson, Harney and Deschutes County Libraries.

"We will be hosting open house public meetings to help show folks how to find what they may be interested in and assist them in understanding the planning documents," Rittersbacher explained. "We plan to meet with interested groups and organizations and will arrange such meetings at their request. Each person's thoughts, ideas, concerns along with their reasons, will be invaluable. they will be used to help fashion the final forest plan for the Ochocos," he added.

Public meetings are scheduled in Prineville for Tuesday, Oct. 14 at the Prineville Fire Hall from 4 p.m. to 7 p.m. A public meeting will be scheduled in Paulina with the date and location to be announced later.

Forest officers and planning team members will be available at the open house to answer questions. Displays will be used to give an overview of the plan and each of the 11 alternatives. No formal presentations are planned.

"The meetings will be informal and relaxed," Rittersbacher said. "They are designed to provide an opportunity for individuals to get an overview of the issues and alternatives and discuss how they might best prepare any comments."

The Ochoco National Forest has been working on the development of this plan for the past four years. The intent of preparing a comprehensive land and resource management plan is to consider all resources under that one plan. "Forest planning is not new. However, in the past, resource planning has generally looked at one resource at a time, not considering important integrated interrelationships," Rittersbacher explained.

The life of the plan is 10 to 15 years, but it projects the effects of management for up to 150 years.

The documents under review

(See FOREST, page 3)

center around key issues the Ochoco received from the public early in the planning process. Alternatives were designed to respond to the key issues which provide varying levels of goods and services.

Some of the alternatives will emphasize certain resources over others in order to address specific concerns. When one resource is highlighted, trade-offs occur. For example, if wildlife habitat is emphasized, then other resources such as timber sales, roadless areas and big game will be affected, some positively, some negatively.

"Integrated forest planning more clearly demonstrates the actual complexities involved in managing the National Forest for multiple benefits. Relative differences between alternatives are highlighted so choices can be made," Rittersbacher noted.

Public Information Officer Joe Meade suggested that the public review the forest plan in steps and not become overwhelmed with the stack of information provided.

The plan provides a letter from Rittersbacher that introduces the plan and the intent of the planning team. A a reviewer's guide and response form highlights the plan and provides a jumping-off place for the review.

The proposed land and resource management plan for the Ochoco focuses on the prefered alternative and how it will be implemented. The first few pages of the volume has a record of major decisions and offers comparisons to current practices.

A second volume, the draft environmental impact statement, gives detailed descriptions of all 11 alternative plans. The summary gives an overview of the alternatives. Details on the plans can be found throughout the book. Every book has an index that will lead reviewers to specific issues of interest, Meade said.

The alternative maps show the impact of each alternative on research tool that can study on the shelf, Meade said. "Most people won't need that level of detailed information to form their response."

Comments on the forest plan will be solicited nationally and comments from local residents won't have any more weight than those that come from New Jersey, Meade explained. "Because the Ochoco is a national forest, every citizen is considered a stockholder. We do expect to get a large number of comments from [illegible] groups. The timber interests, gr and people who use the for their livelihood or recrea he said.

"All public comments re ed will be analyzed and sidered in the preparati final documents," Rittersb said. "It's important tha receive comments prior to 20." A final forest plan i ticipated within a year public comments are rece For additional information, tact offices of the Ochoco tional Forest.

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 9-16-86
Sent by: Tracy Cuvelier
Stationed at: Ochoco N.F.

Forest Officers:
You are requested to clip any important newspaper article concerning forestry or the work of the Forest Service. Attach this gummed slip to the article and after filling in the blanks, forward it to the Regional Forester in accordance with Regional instructions.

FS 1600-8 (11/80)

Federal Register Notice
p. 32533 9/12/86
Vol. 51 No. 177

EIS No. 860367, Draft, AFS, OR, Ochoco National Forest and Crooked River National Grassland, Land and Resource Management Plan, Due: December 20, 1986, Contact: David Rittersbacher (503) 447-6247.

Ochoco forest plan open for comments

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE – A proposed land management plan for the Ochoco National Forest would increase the timber harvest slightly over the next 10 years, improve 19,000 acres along streams and provide 13,000 cords of firewood annually.

The proposed plan plots the future of the 947,567-acre forest over the next 10 years and looks 150 years into the future. It contains 11 alternatives, one of which is preferred by the Forest Service.

Joe Meade, public affairs officer for the Ochoco forest, said the plan is only a proposal and the Forest Service is looking for comment on all the alternatives and on the draft environmental impact statement.

"In no way is that work cast in stone," Meade said.

Highlights of the Forest Service's preferred alternative include:

–An increase in annual timber sales from 124 million to 133 million board feet. About 123 million board feet would include green saw-logs, 71 percent of which would be ponderosa pine.

The remaining timber to be sold would include logs in the Forest Service's salvage program and firewood.

–The protection or improvement of 19,000 acres of land along 800 miles of streams, with special emphasis on anadromous (spawning) fish streams.

–Enough land to support 2,980 elk in the first decade. By the fifth decade of the plan the number would decrease to 2,550 because of the timber program.

–The protection of 26,350 acres of old-growth forest not in wilderness areas.

–The management of 20 developed campgrounds and the expansion or development of four.

–The cutting of about 13,100 cords of firewood annually.

–A recommendation that Congress classify 5,000 acres of federal lands in the Deschutes-Steelhead Falls study area as a wilderness area.

–The construction of 130 miles of recreation trails and the maintenance of 80 miles of existing trails.

The plan was written in response to the National Forest Management Act of 1976, which requires every national forest to develop a comprehensive plan to manage its land.

Copies of the plan and its accompanying draft environmental impact statement have been sent to those on a U.S. Forest Service mailing list and are available at all Ochoco forest offices and at the Crook, Jefferson, Harney and Deschutes county libraries.

The public may comment on the proposed plan and environmental impact statement until Dec. 20. After that date comments will be analyzed and a final plan drawn up.

A series of open houses to answer questions about the plan is scheduled to begin in mid-October, with the first meeting set from 4 to 7 p.m. Oct. 14 in the Prineville Fire Hall.

An Oct. 15 meeting is scheduled from 4 to 7 p.m. in the commons room at Obsidian Junior High School in Redmond, and a meeting during the same hours will be held at Madras High School Oct. 30.

An open house also will be held from 6:30 to 7:30 p.m. Nov. 19 at the Pau Mau Club in Paulina. A discussion for those holding permits to graze cattle on the forest will follow.

Earl Layser, Ochoco forest planning staff officer, said forest officials will also be available to give presentations on the plan to groups in the area.

He said people reading the plan should use the reviewer's guide, which outlines where specific information can be found in the documents.

For more information or to arrange a presentation on the proposed plan, call Meade or Layser at 447-6247.

USDA – FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend OR.
Date of issue: 9-18-86
Sent by: Inez Cullan
Stationed at: Ochoco N.F.

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FS 1600-2 (11/80)

* GPO: 1984 O 524-540

Senators' vote on forest funds causes ripples

By Stephanie Monson
Bulletin Staff Writer

A Senate vote Tuesday to increase the Forest Service's road-building budget by $68 million next year won't produce a flurry of activity in Central Oregon forests.

Despite the vote, agency officials say there are no immediate plans to build roads on roadless areas in the Deschutes and Ochoco national forests.

But another section of the legislation has a local environmentalist upset.

Lawson LeGate, vice chairman of the Oregon chapter of the Sierra Club, is criticizing a provision that would prohibit the public from filing appeals on timber sales bought back under a federal buyout plan last year and scheduled to be resold in upcoming years.

"A lot of things have happened since those sales were made," said LeGate, of Bend. "It exempts all of those buyback timber sales from any kind of review."

The Senate voted 53 to 42 Tuesday to increase the Forest Service's road-building budget from the $178 million requested by the agency to $246 million and to increase next year's timber sales volume to 11.2 billion board feet.

The vote followed one last week in which the Senate narrowly rejected a proposal to increase the road budget to $254 million and the timber sale program to 11.4 billion board feet from 10 billion.

The amendment containing the revised budget and sale provisions approved Tuesday was proposed by Sen. James McClure, R-Idaho, and supported by Sen. Mark Hatfield, R-Ore.

In contrast, the House Appropriations Committee voted in late July to reduce the budget by about $44 million. The differences between House and Senate bills must be resolved in conference committee before the budget finally is approved.

A spokeswoman for Hatfield's office said the senator approved of the increased road budget because he believes it is necessary to increase the harvest level.

It is important to have enough money to reach lands released for multiple uses following resolution of the 1984 Oregon Wilderness Bill, the spokeswoman said.

The Forest Service is "not uncomfortable" with an increased road budget, said Chad Olsen, staff director for program development and budget for the Forest Service's Region 6 office in Portland.

Olsen said there are areas on some national forests where more roads are needed.

However, Larry Mullen, planning staff officer with the Deschutes National Forest, said his office has no plans to enter roadless areas for the next five years, except perhaps for geothermal exploration.

Joe Meade, public affairs officer for the Ochoco National Forest, said there currently are no plans to build roads into roadless areas in that forest either.

Under a proposed management plan for the forest, about 127 miles of roads would be built into roadless areas in the next 50 years, Meade said.

While local officials may have no plans to build into roadless areas, LeGate said such decisions are political and if Congress orders the Forest Service to build the roads, they will be built.

If people want to see changes in the budget, LeGate said, they will have to pressure Congress.

LeGate argued that not allowing the public to appeal timber sales scheduled to be resold "violates the notion that these [forests] are public resources."

He said timber companies get a second chance to buy the sales, but the public will not get a chance to object.

LeGate also objected to another provision of the bill directing the Forest Service to manage national forests under current plans pending completion of long-term land-management plans.

He said environmentalists have interpreted that language to mean the Forest Service does not have to follow land-management laws – including the wilderness bill – passed since those plans were written in the 1970s.

NEWSPAPER CLIPPING SLIP

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Debate on Ochoco plan heats up

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — A proposal to cut more timber on the Ochoco National Forest in the next 10 years than in each of the four decades after that has drawn opposition from some of those studying the plan.

"We are concerned about the departure aspect," said John Morgan, logging manager at Ochoco Lumber Co in Prineville Departure is the practice of cutting more timber annually than the number of board feet that can be grown back

"Departure is a real short-term look at natural resource management," said Don Tryon, southeast field coordinator for the Oregon Natural Resources Council.

Timber industry officials, environmentalists and those who depend on tourists visiting the 950,000 acre Ochoco forest, and Crooked River National Grassland all have a stake in the proposed land management plan, it all

The plan includes the level of logging that will be allowed on the forest as well as plans for sustaining big game, revitalizing stream banks, road building, wildlife habitat and recreation.

The U S Forest Service released the plan and accompanying draft environmental impact statement a month ago, giving the public until Dec. 20 to comment on the contents

Ochoco forest officials will be on hand to answer questions about the documents at an open house from 4 to 7 p m. Tuesday in the Prineville Fire Hall, 500 N Belknap St Another open house has been scheduled from 4 to 7 p m Wednesday in the commons room at Obsidian Junior High School in Redmond.

The environmental impact statement contains 11 alternatives or managing the forest over the next 10 to 15 years One of them is preferred by the Forest Service

The proposed plan outlines how forest officials would implement the preferred alternative

The plan, which is similar to the one released last winter on the Deschutes National Forest is in response to the National Forest Management Act of 1976 requiring each national forest to develop a land management plan.

While Morgan said he and other timber officials have not had much time to look at the plan, he said issues that concern them include the logging schedule and timber supply.

The plan would allow a harvest of 133 million board feet over the next 10 years A total of 123 million board feet of that would be included in the allowable sale quantity, defined as green timber suitable for sawing

The total allowable sale quantity would decrease to 89 million board feet after 50 years

If the Forest Service implements its preferred alternative a drop in the sale quantity over time is necessary to provide the forest with things such as visual corridors and recreation, said Joe Meade, Ochoco forest public affairs officer

Meade said the sale quantity is kept high in that alternative over the next 10 to 15 years to give the community time to adjust to a reduced harvest

However, Morgan said a declining timber supply has industry officials concerned Having a stable timber supply is important he said

Those in the timber industry think the Forest Service has underestimated by about 10 percent the amount of timber that may be cut annually, Morgan added.

Ochoco forest public affairs officer

However, Tryon said the plan calls for seriously overcutting the Ochoco forest.

Employees in the Forest Service's timber program and loggers long have said that the forest is being overcut, Tryon maintained.

The proposed plan also would have a severe impact on big game such as deer and elk because not enough land would be left for winter range he added

The plan would increase the acreage set aside for winter range from 32 672 to 72 881

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
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Date of issue
10-13-86
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FS 1600 2 (11/50)

Mill stays in local hands

After nearly a month of negotiations the Louisiana Pacific mill in town is now Prineville Sawmill Company The mill, which was recently assessed at $2,958 600 for the tax rolls was purchased by local lumberman Craig Woodward

Papers finalizing the sale were signed Sept 25 and Woodward took over the next day He had no comment on the price he paid for the facility and said he had no major changes in mind. "We want the change-over to have as little impact as possible" he said. We ll stay with one shift until things pick up If we start hiring, we ll give former Louisiana Pacific employees who were laid-off when the mill cut back a chance to work '

Woodward has been an independent logger since 1968 He and his wife Lucy are both natives to Central Oregon both going to high school in Prineville The couple formerly owned a sawmill in Burns which they sold in 1980 He is also the owner of Evergreen West Inc a logging company

Louisiana Pacific purchased the Prineville mill in 1973 and was employing 52 people on one shift A fire Aug 17, 1985 destroyed the planer complex and 1 million board feet of pine lumber The planer was completely rebuilt in November of 1985

The company currently has eight other mills in the state. The sale takes the nation-wide company out of the Prineville area although they have retained their Forest Service timber contracts said Jim Beldin industrial relations manager for the corporation

As part of the sale agreement, Woodward has an agreement with Louisiana Pacific to buy delivered logs from those contracts That flow of timber should keep the Prineville Sawmill Company in logs for the near future ' I don t see a short-term shortage Woodward said But, it depends on future allowable cuts in the forest. '

Woodward will be keeping an eye on the new proposed forest plan being developed by the Forest Service, as will every other timber concern in the area. "My idea of multiple use is

BLM proposes land exchange

A land exchange proposal that would transfer approximately 5,000 acres of private land into public ownership will be the subject of a discussion at an open house in Mitchell, said Dick Cosgriffe Central Oregon area manager for the Prineville District of the Bureau of Land Management (BLM)

"The purpose of the open house is to answer questions and provide information to interested members of the public regarding the land exchange that would take place in Wheeler County, he said

The swap would exchange approximately 20 000 acres of scattered isolated tracts of public land, most of which is timbered but lacks public access, for a 5 000 acre block of private land which has public access

The lands included in this exchange are located in and around Sutton Mountain which lies between Mitchell and Twickenham located next to the John Day River

"The open house will be held from 4 p m to 7 p m on Oct 14 in the Mitchell School Cafeteria Cosgriffe added.

red meat and timber "I be said. "I appreciate the forest as much as anyone but some of the people supporting wilderness don't see the bug kill or decay A well managed stand is a beautiful stand. An unmanaged stand is a jungle."



Central Oregonian
10/9/86

THE OCHOCO NATIONAL FOREST
& CROOKED RIVER NATIONAL GRASSLAND

****
*
* WILL BE HOSTING *
* PUBLIC MEETINGS ON THE *
* PROPOSED FOREST PLAN *
* AND DRAFT ENVIRONMENTAL *
* IMPACT STATEMENT *
*
****

SCHEDULED MEETINGS:

PRINEVILLE
OCTOBER 14TH—4 PM TO 7 PM
PRINEVILLE FIRE HALL

REDMOND
OCTOBER 15TH—4 PM TO 7 PM
OBSIDIAN JR HIGH SCHOOL—CMMS RM

MITCHELL
OCTOBER 23RD—7 PM TO 9 PM
MITCHELL COMMUNITY HALL

MADRAS
OCTOBER 30TH—4 PM TO 7 PM
MADRAS HIGH SCHOOL—RM 12A & B

BURNS
NOVEMBER 6TH—4 PM TO 7 PM
MUSEUM CLUB ROOM

PAULINA
NOV 19TH—6 30—7 30 PM GEN MTNG, 7 30 PERMITTEES—PAU—MAU CLUB

For Additional Information Contact:
Earle Layser, OCHOCO NATIONAL FOREST—447—6247

Issues considered in forest plan affect Prineville

Information on the future of the Ochoco National Forest and Crooked River National Grassland will be presented to the public at a series of open houses held by the U S Forest Service

The Forest Service is in the process of preparing its Draft Proposed Plan and Draft Environmental Impact Statement for the Ochoco and Crooked River National Grassland Information about the alternative plans will be presented Oct. 14 at the Prineville Fire Hall and Oct. 15 in Redmond at Obsidian Junior High

"Forest personnel will be available from 4 p m to 7 p m to discuss the Forest planning documents and we encourage everyone who has an interest in the Forest and Grassland to attend one of the upcoming information meetings " explained Dave Rittersbacher, forest supervisor "We will have displays to help provide a simplistic overview of the Forest planning process and highlight the key issues which the plan is designed to address Additionally, maps and information will be posted illustrating 11 alternative ways the Forest and Grassland could be managed."

There will be no formal presentations, the session is for individuals with concerns or questions, said Joe Meade forest public information officer "We're not expecting a lot of feedback from the meetings [illegible] that people will [illegible]

explained

The planning documents, when finalized will guide management of the Forest and Grassland for the next 10 to 15 years "The alternatives which have been developed offer choices on how different areas of the Forest and Grassland could be managed," Rittersbacher said.

The following are key issues or questions which the plan addresses

To what extent should firewood be provided to meet demand? Currently, about 2000 permits are issued annually for poles posts and firewood As the demand for firewood increases, conflicts between commercial sales snags for wildlife and scenic corridor management are developing

What should be the level of timber production? Over 80 percent of the forested land in Crook and Harney Counties is public land Maximum mill capacity in the two counties is approximately 385 million board feet annually, which exceeds timber volumes actually processed in the past The preferred plan alternative E-Departure, calls for a five percent decrease per decade in timber harvests for the first five decades, then an increase in decades six through 10

Should habitat be provided for increased population of big game? How much roadless recreation opportunity should be provided? This issue also considers a Wilderness recommen[illegible]

(Continued from page 1)

dation for the Deschutes Canyon-Steelhead Falls area on the Grassland To what extent should the Forest provide for winter sports activities? The Forest has received requests to manage Bandit Springs at Ochoco Summit primarily for cross country skiing opportunities and use is high on Lookout Mountain

How can activities on the Forest and Grassland benefit social and economic wants and needs of local communities? Receipts from the Forest exceed 40 percent of some counties total annual county revenues with the timber industry, livestock grazing and recreation vital to the areas economic base

What is the appropriate level of livestock grazing and intensity of range management? How should riparian areas be managed to meet various resource needs? Approximately 14 000 cattle and 3,500 sheep are grazed on the Forest and Grassland

Though riparian areas occupy only two percent of the land base, they offer the greatest areas of conflict between livestock and scenic, recreation, and wildlife needs

What road system should be provided to meet public commercial and administrative access needs? Should the Forest and Grassland limit the emphasis placed on scenic resources? How much old growth habitat should be provided? How much habitat should be provided for wildlife species dependent upon snags?

The upcoming meetings will provide the public with a better understanding of the Forest planning documents hopes Rittersbacher This is where we are asking for the public to help us by affirming or identifying a mix of choices they would like to see reflected in the final Forest plan ' he explained It is our hope that folks will give us written comments on how they feel about the draft documents which we can then incorporate into the final Forest plan As people respond to our planning documents it will be very helpful for them to include supportive reasons for their thoughts This will help us incorporate the public comment into the final plan '

Comments must be received by Dec 20

Public information meetings will also be held in the following communities Mitchell Oct 23 at the Community Hall from 7 p m to 9 p m Madras Oct 30 at Madras High School Room 12a and 12b from 4 p m to 7 p m Burns Nov 6 at the Museum Club Room from 4 p m to 7 p m and Paulina Nov 19 at the Pau Mau Club general meeting 6 30 p m to 7 30 p m , permittee meeting 7 30 p m

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of Paper: Central Oregonian
Where published: Prineville OR
Date of issue: 10-1-81
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NEWSPAPER CLIPPING SLIP

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Date of issue: 10-24-86
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FS 1800-8 (11/80)

Roadless review eyed

Lookout Mountain at center of controversy

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — There is a saying in Prineville that you don t plant your garden until the snow melts from the top of Lookout Mountain

With an elevation of about 7 000 feet, the steep-sided mountain is one of the highest and most imposing peaks east of Prineville

You can see this (mountain) from Redmond said Big Summit District Ranger Don Doyle, surveying the land around the mountain from atop the summit.

The Lookout Mountain roadless area, a tree-covered landscape about 25 miles from Prineville that is home to deer elk, hawks and other animals recently has come into a crossfire involving cross country skiers, loggers, environmentalists and hunters.

With the release in September of the draft environmental impact statement and proposed land management plan for the Ochoco National Forest has come a wide range of choices for the future management of the mountain Doyle said

Since 1979 Lookout Mountain has been at the center of a 16 580-acre roadless area. Snow mobiles were the only motorized vehicles permitted in the area.

It also was studied for inclusion in the 1984 Oregon Wilderness Bill.

The draft environmental impact statement contains five alternatives for the future of the roadless area ranging from keeping it the same size to shrinking it to 2 950 acres

The U S. Forest Service a preferred alternative would reduce the roadless area to the 2 950 acres encompassing the top of the mountain The rest would be allocated for general forest use, meaning it could be logged.

You d have timber sales you d be building roads,' Doyle said.

And if that happened a lot of the work that went into making Lookout Mountain what it is today would be lost said Don Tryon, southeast field coordinator for the Oregon Natural Resources Council

Tryon who in 1979 was instrumental in getting Lookout Mountain designated as a roadless area said the rationale back then was that some roadless areas other than wilderness should be set aside

By not being designated a wilderness area, Lookout Mountain could be a place where some trails and perhaps some rough facilities for cross-country skiers hikers and hunters could be built Tryon said

It could be a place where you really could gear it to some of the (recreational) activities he said

However the Forest Service now is planning the future of the mountain around the timber harvest level Tryon charged and has set aside earlier goals of making it a recreation area

Tryon contended that the area that would be left roadless contains little merchantable timber

Dave Mayfield president of the Ochoco Elk Hunters also disapproves of Forest Service plans for the mountain.

Mayfield who emphasized that his organization has not yet taken a position on the plan argued that if the area around Lookout Mountain is logged critical deer and elk winter range would be lost.

There is a very large number of hunters who like to hunt road less areas,' he said A lot of real, true hunters like to get in there, where they can t hear the rigs or see the rigs

If the roadless area around the mountain is reduced Mayfield predicted, fewer hunters will come to the Ochoco forest meaning a loss of revenue for Prineville businesses he said

However, John Morgan logging supervisor for Ochoco Lumber Co in Prineville said logging would not necessarily hurt Lookout Mountain

I think that you can have a balance of everything he said

If the area was logged gradually rather than being clear-cut all at once the impact of harvesting around the mountain would barely be felt Morgan argued

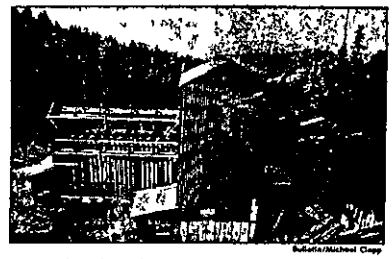
The ticket to it is moderation he said

Doing a good job of logging could make cutting timber on the mountain feasible, said Pat Wick, a Prineville conduct who is a state representative to the Oregon Nordic Club

As long as they do a good job of managing the timber I don t have any objection he said.

Joe Meade public affairs officer for the Ochoco forest emphasized that no firm decision has been reached on how the area will be managed That will come after the public comment period on the plan ends Dec 20

There is no specific cast in stone treatment for Lookout



Bulletin/Michael Clapp

Abandoned mine site marks trailhead



Bulletin/Michael Clapp

Doyle left and Meade walked top of Lookout Mountain

Forest plan comments asked

Open house public information meetings for the Ochoco National Forest Draft Proposed Plan and Draft Environmental Impact Statement began in Prineville and Redmond on Oct 14 and 15

A public information meeting on the Ochoco plan will be held in Burns on Nov 6 at the Museum Clubroom from 4 to 7 p m

"Forest personnel will be available to discuss the forest planning documents and we encourage everyone who has an interest in the Ochoco forest and grasslands to attend one of the meetings Dave Ritter sbacher forest supervisor, said

"We will have displays to help provide a simplistic overview of the forest planning process and highlight the key issues which the plan is designed to address Maps and information will be posted illustrating 11 alternative ways the forest and grassland could be managed," he said

When finalized the planning documents will guide management of the Ochoco National Forest and Crooked River National Grasslands for the next 10 to 15 years

Interested persons are invited to submit written comment on how they feel about the draft documents

"As people respond to our planning documents it will be very helpful for them to include supportive reasons for their thoughts This will help us incorporate the public comment into the final plan ' Riottersbacher said

Written comments must be received by the Ochoco National Forest supervisor by Dec 20

Copies of the draft plan can be obtained from the Snow Mountain District office in Hines or can be seen at the Harney County Library

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1800-8 (11/80)

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NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville-OR
Date of issue: 10-28-86
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FS 1600-2 (11/76)

*GPO 1984 D 524 560

Forest Service to hold information

The U S Forest Service will be holding an open house in Madras to discuss with the public its proposed plan for Ochoco National Forest and Grassland The session will be Thursday, 4-7 p m at Madras High School, room 12a and 12b

Public Information Officer Joe Meade encourages those who missed the meeting in Prineville to attend The session is to discuss the Forest Service's planning documents, which will guide management of the Forest and Grassland for the next 10- to- 15 years, Topics include habitat for wildlife and big game, the Forest Service's role in providing winter recreation, the appropriate level of livestock grazing and intensity of range management

For more information, call Joe Meade at 447-6247

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend OR
Date of issue: 11-18-86
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Owl plan suggested

SALEM (UPI) — Gov Vic Atiyeh entered the battle over spotted owls Monday by offering a compromise that involves trading wilderness land for harvestable timber land to provide adequate habitat for the birds

"I would agree to set aside unreserved suitable timber harvest land for the spotted owl only if a corresponding amount were traded from existing wilderness," Atiyeh wrote in a letter to James Torrence, Pacific Northwest regional forester

Burns, OR 11/6/86

Forest Service holds info meeting

Representatives of the Ochoco National Forest will hold an open house Nov. 11 from 4-7 p.m. at the Harney County Museum Club Room to discuss the Ochoco National Forest Plan. District Ranger Fred Harnisch and other forest employees will explain the plan and solicit comment from visitors.

11/12/86

Page 4 TIMES HERALD, Burns, Oregon

Editorial

The Ochoco National Forest is preparing a forest plan to guide its management decisions into the next decade and beyond The form that plan will take is still undetermined, but it will certainly have profound implications for Harney County

The forest-wide plan is the first of its kind for the Ochoco, and will address 12 major areas of concern from big-game habitat to timber harvest

The Forest Service has developed 11 alternatives that reflect a wide range of options on the 12 issues

The timber harvest ranges from 34 percent less than current levels under one alternative, to 17 percent more under another

The number of AUM's (animal unit months) allotted varies from 23 percent more than now to 12 percent less

Big game habitat will support increased populations under all the alternatives, ranging from 76 percent to 91 percent more than current levels

Acreage specifically dedicated to old growth habitat will range from twice the minumum level to only the minimum level itself, 17,800 acres There are currently about 80,000 acres of old growth habitat on the forest

The alternatives offer a range of choices for the amount of roadless area ranging from only that now in wilderness to several additional roadless areas and more wilderness

Firewood taken from the forest is tied closely to the timber harvest, as most firewood is provided by logging residue It may vary from high levels to low, depending on the plan

Other issues addressed by the alternatives are social and economic effects, riparian management, the transportation system, scenic qualities, snag management, and winter sports

By law, the Forest Service must name a preferred alternative, but Fred Harnisch, the ranger for the Ochoco's Snow Mountain District, said that does not mean that the preferred alternative will become the chosen plan In fact, he said, maybe none of the 11 alternatives will be chosen Public comment and response may lead to the formulation of an entirely new plan

The people of Harney County have a lot at stake in the forest's plan Written comments will be received until Dec 20 Send them to Forest Supervisor, Ochoco National Forest, P O Box 490, Prineville, Ore , 97754 All documents are available at the Hines office

Paulina to hear grazing plans

Ochoco National Forest officials will be in Paulina Wednesday, Nov 18 to discuss the U S Forest Service's Draft Forest Plan and Draft Environmental Impact Statement

The meeting, open to the public will be held in the Pau Mau Club with a discussion of the forest plan from 6 30 7 30 p m Grazing issues will be addressed afterward, said Joe Meade, Ochoco National Forest Public Information Officer

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 11-18-86
Sent by: Inez Cuellar
Stationed at: Ochoco N F

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FS 1600-2 (11/76)

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NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend OR
Date of issue
11-19-86
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FS 1600-2 (11/80)
☆GPO 1984 O 524 560

Land plan review slated

PRINEVILLE — The last scheduled open house on the proposed land management plan for the Ochoco National Forest and Crooked River National Grassland will be held tonight in Paulina.

The open house begins at 6 30 p m in the Pau Mau Club A meeting to discuss grazing leases on the forest will follow at 7 30 p m

The U S Forest Service will be available to speak to other groups about the plan For information about scheduling a presentation, call Joe Meade at 447 6247

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend. OR
Date of issue
11-20 86
Sent by
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Pro-economy forest plan support asked

Central Oregon cities and counties have been asked to oppose any management plan for the Ochoco National Forest that would cut jobs income or government revenue derived from timber sales

The request isn't aimed specifically at the recently released U S Forest Service plan for managing Ochoco, according to Bill Hemingway, executive director of the Central Oregon Economic Development Council.

Rather, Hemingway said, the COEDC is asking for a "generic' resolution opposing any forest plan that would hurt the economy

The COEDC sent letters Friday to virtually every government body, chamber of commerce and intergovernmental agency in the tri county area asking them to pass such resolutions

Hemingway said there are "arguments on both sides" about the impact the U S Forest Service's plan for the Ochoco might have on Central Oregon's economy To get an opinion not skewed by lumber company or Forest Service bias, COEDC has hired Brain Long, a consultant from Seattle, to study the plan, Hemingway said

"We are deeply concerned with ensuring that our currently operating (lumber) mills have the continued supply of raw materials to maintain their activities and even grow some more,' Hemingway said

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
United Oregonian
Where published
Prineville OR
Date of issue
11-20-86
Sent by
Inez Cuellar
Stationed at
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FS 1600-2 (11/80)
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Mill manager prefers alternative B

By TERRI LOWRY

John Shelk, general manager of Ochoco Lumber Co , spoke to the members and guests of the Crook County Chamber of Commerce Legislative Committee Tuesday morning on behalf of the mill industry and it's stand on the possible implementation of the Ochoco Forest Plan

"The issue at hand is a local issue, and if it is put into effect, the forest service plan will have a direct effect on the community," Shelk said

He stressed the importance of community members getting as much information about the plan as possible and then making known their opinions by writing to the forest supervisor by Dec 20

The forest service's plan, which is concentrating on what what it refers to as Alternative E E Departure, is a preferred alternative by the forest service for managing the national forest for the next 10 years That alternative entails reducing the 850,000 acreas currently harvested for timber to 260,000 acres

Because of the reduced number of acreage from which to cut and select trees, the quality of timber will not be the same, Shelk said The yield of ponderosa pine will be reduced 40 percent

The new plan would also reduce the availability of firewood, which is perhaps one of the most important impacts on the community, Shelk said

Conservative estimates by the state show the personal income of county residents will drop by at least $25 million dollars, Shelk said It is also projected that a loss of 200 jobs will occur under the new plan because the Ochoco Forest service is reducing its planned timber target

According to Shelk, the mill industry has devised Alternative B-Plus, which "is the better alternative for the Ochoco Forest "

Jim McClain of Bend said he is assisting the local mill industry in an attempt to make the community aware of both the forest service's plan and the mill industry's alternative

"This is definitely a community issue, and you can bet I'll be knocking at doors to make people of the community aware of the issue," McClain said

"Alternative B comes closest to maintaining the existing sale program and economic contribution from the Ochoco Forest," McClain stated

Under this plan, there will be less emphasis placed on clear cutting, and more emphasis given to the salvaging of dead and dying trees, he said The plan also will enhance and expand campground facilities and provide 32,000 acres of old growth forest while leaving about that much over the next ten years, he said

Furthermore, McClain stated, the Alternative B plan will maintain the current planned potential timber yield

USDA FOREST SER CE

NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend
Date of issue
11-11-86
Sent by
Inez Cuellar
Stationed at
Ochoco NF

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FS 1600 2 (11/80)

Forest Service accused of overcutting

By Stephanie Monson
Bulletin Staff Writer

The U S Forest Service is cutting timber like there s no tomorrow and allowing grazing at the public s expense on the Ochoco National Forest environmentalists charged Thursday

It s tree farming and ranching on the public land said Don Tryon southeast field coordinator for the Oregon Natural Resources Council

About 45 persons met in Bend to comment on the draft environmental impact statement and proposed land management plan for the Ochoco forest

The Forest Service should leave more wildlife habitat and not reduce the size of the Lookout Mountain roadless area speakers also said

It is unwise to cut more trees now and fewer in 50 years as the plan calls for said Lawson LeGate of Bend vice chairman of the Oregon Chapter of the Sierra Club

In a chart he titled Cutting Timber like There s No Tomorrow LeGate pointed out that the proposed plan calls for cutting above the sustained yield level for the next couple of decades and then drastically reducing logging

The sustained yield principle means that the timber harvest must be even each decade and the amount cut must not exceed the number of board feet that can be grown back annually

When the timber industry faces a reduced cut — the plan calls for reducing logging from 123 million board feet in the first decade to 89 million board feet in the fifth — it will cast covetous eyes at timber in roadless and wilderness areas, LeGate said.

Tryon and retired habitat biologist Harold Winegar of Prineville also charged that the grazing program on the Ochoco forest is unprofitable

Winegar said grazing last year brought in $65 000 in receipts but the program cost taxpayers $420 000 to run.

This is not an economical thing Winegar said

Tryon said the plan fails to consider the impact livestock grazing has on stream banks and the forest floor

If grazing was not allowed for five years Tryon maintained the watershed would be greatly improved and forest streams would produce more fish which would mean more fishermen visiting the forest and more money pumped into the local economy

Dianne Rivard of Prineville a former Forest Service employee said her number one concern is the Lookout Mountain roadless area.

The proposed plan would shrink the 16 580 acre roadless area to 2 950 acres encompassing the top of the mountain The rest would be allocated for general forest use meaning it could be logged

The area contains critical habitat for deer and elk and is a prime hunting destination Rivard said

Alice Elshoff of the Central Oregon Audubon Society expressed concern about the smaller animals that inhabit the forest

She said the area left for the pileated woodpecker — a species used by the Forest Service to gauge the health of the animals with which it shares habitat — should be enlarged with each pair of woodpeckers allocated 600 acres rather than the 300 acres proposed and the nesting grounds placed closer together

Shelling begins in battle over Ochoco forest future

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — After about two months of quiet action is heating up in the battle over the Ochoco National Forest plan

The timber industry has taken a vitamin approach and come up with a supplement to a U S Forest Service alternative contained in the draft environmental impact statement The timber interests claim the agency s preferred alternative for managing the forest could destroy 200 jobs

Meanwhile a coalition of environmental groups will meet tonight at Central Oregon Community College to outline what they think should be done with the forest plan, said Lawson LeGate of Bend vice-chairman of the Oregon Chapter of the Sierra Club.

The meeting will begin at 7 in Room 140 of the Ochoco Building Representatives from organizations including the Sierra Club Oregon Natural Resources Council and Audobon Society will attend

The timber industry and the environmentalists are getting set to square off over the Forest Service s proposed plan for managing the 950 000 acre Ochoco forest and Crooked River National Grassland over the next 10 to 15 years.

In September the Forest Service released a draft environmental impact statement containing 11 alternatives for managing the forest Accompanying it was a proposed land management plan outlining how the agency would implement its preferred alternative

The public has until Dec 20 to comment on the documents and so far the comments have only been trickling in said Joe Meade Ochoco forest public affairs officer

But that trickle could become a torrent in the next month as environmentalists and timber industry officials release their opinions on the plan

The industry plan would save jobs by increasing and stabilizing the annual timber harvest provide adequate habitat for deer and elk and enhance campgrounds said John Morgan, logging manager at Ochoco Lumber Co. and a spokesman for the Ochoco Timber Purchasers Group a coalition of mill operators in Prineville Deschutes County and the Burns area

The timber industry s plan adds to Alternative B in the draft environmental impact statement and also incorporates some elements of the preferred alternative

We took the vitamin approach I guess and called it Alternative B Plus Morgan said

Morgan said the industry s plan would set the annual timber harvest level at 137 million board feet with 100 million board feet of that total composed of ponderosa pine

The Forest Service s preferred plan would set the annual level at 123 million board fee in the first decade That level would decline to about 89 million board feet per year after 50 years

Forest Service officials are calling the harvest schedule a departure because the allowable cut rises above the sustained yield level and falls below it before leveling off after 90 years

The principle of sustained yield is tied to the non-declining flow policy of the Forest Service

That policy says roughly speaking that logging must not outpace tree growth The amount of timber harvested must be even each decade and annual logging must not exceed the number of board feet that can be grown back annually

Meade said the range of alternatives in the draft environmental impact statement allows for sustained annual timber harvests ranging from 84 million to 144 million board feet

What a person needs to recognize is that there are trade-offs in that spectrum Meade said

For example if more timber is marked for harvest then plans to preserve stands of old growth and corridors of trees lining highways might suffer Meade said

The ideal is to find some balance in there Meade said

However Morgan said the Forest Service s plan to allow a greater harvest now than 50 years later is unpopular among timber industry officials

We would like a good steady predictable cut each year he said

Having a higher cut also will save 200 jobs threatened by the Forest Service s plan he claimed

Morgan maintained that the industry's alternative would provide adequate deer and elk habitat and improve the watershed through better streamside management

We are very multiple-use-oriented he said

The industry s plan would reduce the number of clear cuts — logging all but a few trees in a timber sale — by stepping up the forest s salvage program the practice of harvesting clumps of dying trees throughout the forest Morgan said

The idea is to cut few r trees over a greater portion of the forest, he explained.

Morgan said some timber industry employees are sending a form letter to the Forest Service voicing support for the alternative

Personally I d like to see more involvment than just a form letter he said

Meanwhile LeGate of the Sierra Club said the logging level proposed in the industry alternative is much too high if the forest is to provide for such things as recreation wildlife and hunting

It sounds to me as though the timber industry bases their figures as if the forest produces only one resource LeGate said That of course is illegal under federal law

He said the National Forest Management Act of 1976 directs the Forest Service to develop forest plans based on the concept of multiple use

The timber industry is not the only business that benefits from the forest LeGate added noting that people employed in recreation and hunting related businesses also depend on it

Get facts about the forest plan

To the Editor

Alternative B—Irresponsible and shortsighted

The proposed land and resource management plan of the Ochoco National Forest and Crooked River National Grassland contains eight (8) options plus three (3) departures from Plans B, E, and H In addition, Northwest Resources, a business entity hired by local woodproducts companies has proposed a "B Plus" plan for a grand total of twelve (12) plans to select from Information regarding the contents of these plans is contained in three volumes and eight maps that would require months of study to understand well We have until December 20, 1986 to make our opinions regarding these plans known to the Forest Supervisor and I urge all residents to do so The USFS will then make a decision that may well affect all of us for the next 300-400 years, so let's hope that they make a good one

So, where did Alternative B come from and why am I against it? The Resource Planning Act requires that a spectrum of plans be developed ranging from maximum commodity (timber and cattle) production to maximum amenity management of the forest considering all users including the animal and plant communities residing there Alternative B is the minimum management maximum commodity production alternative There would be no scenic corridor left along Highway 26 or anywhere else Riparian (stream bank) management in acres is the lowest of all the plans Roads will be constructed into roadless areas Indeed, there will be no roadless recreation outside wilderness areas There are no provisions for winter and summer range for deer and elk Snags left would support only 20 percent of the potential population of cavity nesting animals In addition to the above, the B-departure guarantees economic disaster for Crook County in 50 years due to increased current cut and the B Plus plan selectively logs old growth everywhere in the forest allowing low value Douglas and White Fir to predominate in the future The sustained yield in the Ochoco National Forest is 78 million board feet per year Cutting more than this will lead to a drop in production in the future The average annual cut from 1975 through 1984 was 110 1 million board feet Plan B proposes to increase the volume by 10 percent now At this rate, I have been told, the old growth Ponderosa Pine will be gone from the Ochocos in 18 years

In summary, Alternative B was never meant to be taken seriously It is a planning requirement, a "worst possible" case If B is selected, when the timber is gone from the Ochocos, those of us still alive and our children and children's children will be left holding a very empty bag Those who have profited at the expense of the forest and future generations will probably be long gone Alternative B and its departures and its B Plus alternative get an F in my book Don't let yourself be fooled by a small portion of the woodproducts industry who are only looking at the short term economic advantage of proposition B Those of us in the trenches have to be concerned about the future of this area and our livelihood for more than 20-50 years Get the facts and write the Forest Supervisor with your opinion

Harry H Rinehart M D ,
Fellow AAFP
Prineville

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 11-27-86
Sent by: Inez Cuellar
Stationed at: Ochoco N F

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NEWSPAPER CLIPPING SLIP

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Date of issue: 11-26-86
Sent by: Inez Cuellar
Stationed at: Ochoco N F

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NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend OR
Date of issue: 11-20-86
Sent by: Inez Cuellar
Stationed at: Ochoco N F

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Mills' spokesman rips Ochoco plan

By David Braly
Bulletin Corresponent

PRINEVILLE — Prineville lumber mill operators oppose the U S Forest Service's favored plan for future management of the Ochoco National Forest a representative for the mills told the Prineville City Council Tuesday

Jim McClain, speaking for the Crook County timber industry and wood remanufacturing firms, told the council that the proposed management plan would adversely affect the firms, and through them the entire community

McClain said 85 percent of Prineville s jobs were dependent upon the timber industry and that 2 3 other jobs were dependent on each timber job, although the Forest Service has asserted that only one-half a job results from each timber job

If the Forest Service's "preferred alternative" for managing the Ochoco is enacted McClain said it would harm merchants, professional people and governments as well as the lumber and remanufacturing industries He noted that schools alone drew $1 1 million last year from taxes on timber firm properties

The timber industry jobs that would be lost, McClain said, would be better paying than the 63 recreation related jobs the Forest Service claims will result from its preferred alternative

McClain said 79 percent of the timbered part of the forest was now being managed for full timber yield, but under the preferred alternative the area would be cut to 49 percent

He challenged Forest Service claims that timber cutting was incompatible with other forest uses and that clear cutting yielded thicker regrowth than selective cutting

'This is not a wilderness issue," said McClain This is a multiple-use issue The wilderness issue has already been decided by Congress"

He urged the city as an entity and council members individually to write to the Forest Service before the Dec 20 deadline for public comment to voice their opinions on the issue

'The Forest Service really does want to hear from you McClain said

City Administrator Henry Hartley told the council that the Central Oregon Economic Development Council also was examining the 11 alternatives in the Forest Service management proposal and was preparing a draft resolution

Supervisor speaks on forest plan

By TERRI LOWRY

Ochoco Forest Supervisor Dave Rittersbacher said he has two concerns about the proposed Ochoco Forest plan.

"One is the lack of community understanding of the complex issue, and two is the realism that there is to manage the national forest," he said "The issues at hand are very emotional and very real issues, and we must address those issues in an open, tactful and forthright manner"

Those were the opening remarks of Rittersbacher during the Tuesday breakfast meeting of the Crook County Chamber of Commerce Legislative Committee as he briefly addressed members and guests

Rittersbacher went on to explain some of the issues in the plan

"Under the forest service plan the numer of acres planned for actual timber harvest would be 495,000," he said, continuing to detail the plan by outlining an editorial from the Times Herald of Burns, with which Rittersbacher said he agreed

The editorial stated the timber harvest ranges from 34 percent less than current levels under one alternative and up to 17 percent more under another alternative

Big game habitat will support increased populations under all proposed alternatives, ranging from 76 91 percent more than current levels, he said

Acreage specifically designated for old growth habitat will range from the minimum level of 17 percent to twice that amount, Rittersbacher said

Firewood taken from the forest is tied closely to timber harvest as most firewood is provided by logging residue, he said It may vary from high to low levels depending on the plan

Other issues addressed by the plan alternatives are social and economic effects, riparian management, the transportation system, scenic qualities, snag management and winter sports

Rittersbacher pointed out that "by law, the forest service must name a preferred alternative, but this does not mean the current Ochoco Forest Plan will become the chosen plan"

There are choices, he said "We are not locked into any plan at this point, This is just the beginning of a process of analyzing all groups (environmentalists, timber, etc), plans and concerns

Economic and social issues of the community are the primary concerns of the forest service and will be considered, Rittersbacher said Community input on any alternative will have an impact on the final outcome

"It isn't going to be easy," he said "Not everyone will be satisfied, but everything will be looked at for consideration"

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NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 11-27-86
Sent by: Inez Cuellar
Stationed at: Ochoco NF

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NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend, OR
Date of issue: 12-4-86
Sent by: Inez Cuellar
Stationed at: Ochoco N.F

Stand on forest plan stalled

By Mike Freeman
Bulletin Staff Writer

The Bend City Commission has sidestepped — at least temporarily — a controversial request to put itself on record against any changes in the Ochoco Nation Forest management plan that might hurt local industry

The commissioners postponed taking action on the request brought forward by the Central Oregon Economic Development Council until they read a summary of the U S Forest Service s plan for Ochoco

'I d rather give no opinion than give an uninformed one ' said Commissioner Ruth Burleigh

The Forest Service has come up with 11 different options for regulating roadless areas timber harvesting wildlife habitat and other matters in the Ochoco One of these plans is the preferred alternative recommended by the Forest Service

City commissioners received a letter from Bill Hemingway, executive director of COEDC, asking them to pass a resolution opposing any 'modifications to the Forest Service plan which would reduce timber related employment, income or local government revenues ' derived from timber sales

COEDC has hired an consultant to study the economic effects of the plan and the consultant's report should be finished sometime this month Hemingway said

Lawson LeGate of the Sierra Club testified Wednesday that the Forest Service's plan strays from the principle of 'sustained yield" timber harvesting

According to LeGate the Forest Service is recommending a 5 percent reduction in the allowable timber cut in Ochoco each year for the next five years The staggered reduction LeGate said, is designed to give the timber industry time to prepare for reduced harvests in the future

The Sierra Club and the timber industry disagree about how much timber should be cut in the Ochoco to insure that the forest can provide a steady flow of logs for several decades, LeGate said

"History is overcutting," LeGate said ' You manage for sustained yield You don t cut more than the forest can reproduce) now and then make up for it sometime in the future by making drastic (reductions in the haves t)"

The commissioners plan to consider the resolution again before the end of the year

Forest Service officials said they hope to have a new plan for the Ochoco adopted by 1988 After that the timber industry or environmental groups can file lawsuits challenging the plan

In other business, the commissioners approved a proposal to ask the state for $155 000 to build sewers streets and water lines in the west end of town

But John Hossick city planning director said the city s chances of getting the grant are poor The last time the city applied for state funds for the neighborhood — bordered by NW 15th and 17th streets and Elgin and Galveston avenues — the application came in 12th out of a list of 30

The city competes with other cities and counties throughout the state for the funds

The city also will ask the state for $55 000 in lottery money so developer Lee Blake can improve Neff Road from NE 27th Street to Tucson Way Blake proposes to build a retirement center at the corner of 27th and Neff

Hossick said the chances of winning that grant also are poor

Have you bought any lottery tickets lately? he quipped

Forum nears on Ochoco plan

PRINEVILLE — A public forum to discuss the proposed land management plan and draft environmental impact statement for the Ochoco National Forest will be held Wednesday in Prineville.

The one-hour forum begins at 6 p m in Our Saviours Lutheran Church, on the corner of Third Street and Harwood Avenue

Jim McClain a representative of the timber industry, will give a presentation on the plan Officials from the Forest Service state departments o Fish and Wildlife and Forestry also will be at the forum

Representatives of the Ochoco Elk Hunters Association and possibly the Sierra Club also will attend

Meanwhile, Dave Rittersbacher Ochoco forest supervisor will be on hand to answer questions about the documents until 7 p m Thursday and Friday at forest headquarters 230 Sixth St in Prineville

The public comment period on the plan ends Dec 20

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend - OR
Date of issue: 12-2-86
Sent by: Inez Cuellar
Stationed at: Ochoco NF

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Ochoco officials dispute forest industry job claims

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — The timber industry's prediction that a U.S. Forest Service plan for the Ochoco National Forest threatens 200 jobs is one of several industry claims based on mysterious numbers, a U.S. Forest Service official said Monday.

Earl Layser, Ochoco forest planning staff officer was referring to claims in Alternative B-Plus,' a timber industry plan to manage the Ochoco forest.

"Some of their figures, I don't know where they came from,' Layser said.

The industry alternative says, "A loss of over 200 jobs is expected because the Ochoco is reducing their planned timber (harvest) target from 137 (million) to 123 million board feet per year.

Forest Service figures estimate that eight jobs are connected to each million board feet of timber. If there was an annual decrease of 14 million board feet in the amount of timber cut, then 96 jobs directly related to the timber industry would be lost, according to its figures.

Jim McClain, a consultant representing the Ochoco Timber Purchasers Group, claimed that more than 200 jobs would be lost under the Forest Service's proposed plan because each job in the timber industry supports another 2.3 jobs in other businesses.

If those calculations are correct, then about 791 more jobs should have been created in fiscal year 1986, Layser said. That's because a total of 158 million board feet of timber was sold last year, compared with 115 million board feet in 1985.

The increase in sales occurred when the Forest Service began reselling contracts for timber that the timber industry had returned under the federal buyout program, which allowed some mills to return unprofitable contracts purchased in the early 1980s, Layser explained.

The timber industry's job calculation just doesn't track, Layser said, unless industry officials figure that most of the new jobs were created outside of Central Oregon.

McClain said the increase in timber sales didn't create more jobs because Prineville mills aren't running at 100 percent capacity and new jobs aren't created in the mills but rather in remanufacturing plants dependent on local lumber.

However, Layser said Crook County remanufacturing plants aren't using lumber from the Ochoco forest.

Layser also said it is easy to blame the land management plan for a loss of jobs in the timber industry, but studies have shown that modernization of mills is the primary culprit.

That (automation) could be one of the key factors in (declining) job numbers,' Layser said.

Meanwhile, Layser said that the industry misused other information in a flier outlining its preferred alternative.

For example, the timber industry plan said county revenue and wages would be lowered because of reduced harvest levels in the proposed Forest Service plan.

We're not intending to take millions of dollars from county residents, Layser said.

He said the amount of timber receipts returned to the county depends not only on the amount of timber sold, but also on the price it brings.

Layser also questioned the timber industry's statement that only 263,000 acres on the forest would be available for intensive logging.

While that figure is correct, Layser said the timber industry doesn't note that some logging would be allowed on about 232,000 more acres under the proposed plan.

The additional acreage has been set aside for such things as wildlife habitat, meaning that logging will be curtailed but not prohibited, Layser explained.

McClain claimed however that there would be a loss in the volume of timber cut under the Forest Service's plan.

The timber industry proposal also asks that 100 million board feet of ponderosa pine be sold annually less than the average of 105 million board feet that has been sold each year for the past decade.

Industry officials claim the 100 million board foot level would meet sustained harvest level goals. The principal of sustained yield says that annual logging should not exceed the number of board feet that may be grown back annually.

McClain said the industry also realized that part of the forest must be set aside for other uses.

We're perfectly willing to share the forest with everyone out there, he said.

McClain said the timber industry proposed to reach that volume by increasing the practice of selectively logging trees throughout the forest and decreasing clear cutting.

Layser said the idea had some merit, but noted there was some question" of whether that much timber could be selectively logged each year.

We really are open to that method of logging, he said.

Layser added that while an average of 105 million board feet of ponderosa pine had been sold annually only about 71 million board feet had actually been cut each year.

The largest annual yield proposed in the Forest Service alternatives in the plan is 92 million board feet, Layser said.

The Forest Service's preferred alternative would allow the sale of 87 million board feet of ponderosa pine over the next 10 years. The total volume of timber that would be sold is 123 million board feet.

Layser added that each Forest Service alternative called for a reduction of the ponderosa pine harvest over time because there was only so much pine out there.

Nowadays, Layser added, it's a new ball game for planning the future of the forest, because the Forest Service must take things such as wildlife and recreation as well as timber yields into account.

Bend Bulletin
12/3/86

E Departure is mismanagement

To the Editor:

The Proposed Forest Service Plan "E Departure" — A Departure from Sanity

As I mentioned last week, there is a smorgasboard of 12 possible Ochoco National Forest Land Management plans (LMP) for us to comment on by December 20. Theoretically, the Forest Service will then select one plan and use it to continue mismanaging the forest and grasslands for the next ten years. Or, they will modify some of the plans and come up with a "consensus" plan and do the same thing.

More on that later. Right now, let's evaluate the Forest Service preferred plan, E-Departure.

Timber harvest would increase by 1 percent in the first decade then slowly drop to 29 percent below the current sale level. Remember the sustained yield of the Ochoco National Forest is 78 million board feet per year. The current sale level is 132 million board feet per year, or almost 1.7 times the sustained yield — reducing it 29 percent would still be 1.2 times the sustained yield. In essence, we're eating our seed potatoes. Bon appetit.

Livestock grazing would increase by 11 percent. Now this is really preposterous to anyone who understands the need for riparian recovery and the fact that cattle grazing is by far and away the overwhelming cause of riparian devastation on our forest.

The Riparian (streambank) management goal is listed on page 19 of the environmental impact statement as "Excellent condition in all areas with anadromous fish (salmon-steelhead) or high valued trout fisheries." There are 800 miles of stream sides on the forest and grasslands. Eighty-five miles, or about 10 percent, currently have a salmon-steelhead population. Twenty miles support brook trout, and 195 support no trout now, but they once did. (There were steelhead in McKay Creek as late as 1959 prior to construction of Pelton Dam.) However, there are almost no funds to support this goal by conventional means, i.e. fencing streams at $2,500 per mile, as well as placing rip-rap, dams, dikes, jettys at several thousand more dollars per mile. So, this is a hollow goal. Furthermore, the 1979 LMP called for "excellent" management on far more miles of streams than E-Departure, and a reduction in animal use months (AUM's) if the goals were not met! So, historically, the Forest Service has not implemented measures pertaining to Riparian habitat recovery in its last plan — the credibility gap begins to reveal itself.

Speaking of history, the U.S.F.S. was initiated in 1877 by the Organic Act which established two purposes: 1. Watershed protection and 2. Timber management. The U.S. Supreme Court in 1978 reaffirmed that there were only two purposes for the reserves, favorable conditions of water flows and to furnish a continuous supply of timber. Is the 1986 LMP beginning to sound like parts of it may be illegal?

Snowmobilers take note — the top of Lookout Mt. would be closed to you! Only us nincompoops, the x-country skiers, would be allowed up there. There would be 60 more miles of roads for you to ride on the lower slopes of Lookout — logging access roads, that is, into a current roadless area.

Picking at parts of the plan, however, serves little purpose. The Forest Service, like all large governmental regulatory bureaucracies, will continue to aid and abet those special interest groups (timber and cattle) that it was supposed to regulate, because that is the side their bread is buttered on.

Like Willy Sutton, who robbed banks, because "that's where the money's at", the Forest Service is dependent upon their large timber receipts and miniscule grazing receipts to measure their value and justify their existence. Historically they haven't enforced the law of the land and it will take major confrontation for them to change, why else would they promulgate documents containing provisions which are predictably illegal and others which are nonfunded? Why do they spend hundreds of thousands cleaning up after cattle and allow our riparian areas to be destroyed when simply keeping the cattle off the forest would allow nearly complete recovery in 10 years? And cattlemen need not suffer — we could afford to pay them many times their current profits per cow not to graze their cattle on the forest with the savings realized from not managing the range and forage for grazing.

As useless as it may seem, I urge you to write to the Forest Supervisor and express your views. Only an overwhelming volume of mail will allow reasons to have an equal voice along side the well funded special commodity interest groups — timber and cattle.

My view is that not one of the 12 plans has any substantial merit, mainly because none of them address the riparian problem in any depth or detail.

I would like to see the environmental and economic impact statement on the forest grasslands based on a plan calling for the elimination of cattle grazing on the Ochocos. My sources tell me that the increased run-off would nearly fill both Prineville and Ochoco Reservoirs (194,000 acre feet), with late season flows alone supplying continuous winter flows, and reduce ice damage as well as allow all the streams to heal to "excellent" level (not just the proposed 10%) in three to five years. The increased filtration would not only keep those reservoirs from silting in, but allow much more logging activity and still meet State water quality requirements. Of course, the grazing permittees would need to be compensated as a portion of their livelihood is dependent on the forest roughage. But the cost of this would be a few percentage points of the costs of current management and loss of revenue from fisheries and recreation. The data is available, mainly from local studies, to produce such a statement, and to compute a fair compensation to the cattlemen. I know those are sacred cows but there they would have to be or they wouldn't have survived so long!

The forest and grassland belong to all of us. A few of us would destroy it for now and the future. The streams are already destroyed. What will it be, citizens' short term gains, or long term losses?

Sincerely,
Harry H. Rinehart, M.D.

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 12-4-86
Sent by: Ivan Cuellar
Stationed at: Ochoco NF

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FS 1600-2 (11/50)

Forest plan input to end

To the Editor:

The Ochoco National Forest Land and Resource Plan proposal has been available to the public for review for quite some time now. December 20, 1986 is the deadline for any written comments or proposals to this plan. I would like to urge all forest user groups and individuals to please take time to review the plan and respond. Your thoughts are needed.

Dave Mayfield
President
Ochoco Elk Hunter's

BLM land swap opens elk range

To the Editor:

There is a proposed land exchange in Wheeler County that has the possibilities of providing 60,000 acres of public hunting, fishing, and recreation. This proposed exchange would not only provide prime bird and big game range but also 80 miles of John Day River access for fishermen. I would like to urge all interested persons to contact the Prineville B.L.M. office for information or to attend the public open house meeting at the Prineville Fire Hall on Dec. 11, 1986 at 7 p.m.

Dave Mayfield
President
Ochoco Elk Hunter's
(Chapter O.H.A.)

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR
Date of issue: 12-4-86
Sent by: Ivan Cuellar
Stationed at: Ochoco NF

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FS 1600-2 (11/50)

*GPO 1984 O 524 560

Applauds letter on forest plan

To the Editor:

It was indeed refreshing to read Dr. Rinehart's letter in the Nov. 27 issue of the Central Oregonian. It's heartening to know that there are some within the community willing to let their opinions be known on the issue of forest planning, even when those opinions may go against the commodity interests within the community. I applaud Dr. Rinehart for being so forthright and honest.

Jim Myron
Canby

P.S. Also a part time resident Riverside Ranch.



Photo By JIM DONOVAN

District Ranger Fred Harnisch, center, talks with a contractor discing a clearcut on the forest. Discing helps alleviate the soil compaction caused by heavy logging equipment, and can speed up reforestation. It is not a widely used practice on the Ochoco National Forest

Bend Bulletin 12/7/86

Nordic club meets Tuesday

The Central Oregon Nordic Club will meet at 7 p m Tuesday at First Methodist Church on Bond St with David Foster of Tri Mountain Sports giving a presentation on the new line of cross country ski equipment

Also, representatives of the Ochoco Nordic Club will discuss the new Ochoco National Forest plan as it pertains to winter recreationalists

On Saturday, Bob Woodward will give a ski skating clinic. For information call Woodward at 389 9816

And next Sunday, Tracy Reynolds of Blue Lake Resort will lead a tour of his trail system Interested skiers should meet at 10 a m in the Mirror Pond parking lot The fee is $3.20

Name of paper
Central Oregon
Where published
Prineville OR.
Date of issue
12-11-86
Sent by
Ray Cullen
Stationed at
Ochoco N F

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FS 1600-2 (11/50)
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Bend Times-Herald 12/10/86

Bend Times-Herald 12/10/86

'Preferred alternative' a departure from sustained yield

Forest plan would reduce harvest

By JIM DONOVAN
The Times Herald

Vast chasms of disagreement divide the forest industry and environmental groups concerning management of our National Forests But there may be some areas of concordance as well

Timber interests and conservationists were bound to clash over the proposed plan for the Ochoco National Forest and they have But they may find common ground in a challenge to the Forest Service's most basic assumptions

A draft environmental impact statement issued months ago by the Forest Service outlines 11 different options for managing the Ochoco They vary widely regarding their treatment of timber harvest, roadless areas big game product on and riparian areas

But they are all driven by a common factor an even aged management program

Even aged management means timber stands will be harvested through clear cutting and reforestation will replace the trees with new ones all about the same age and size

"We don't think it's necessary to cut everything that's merchantable in a stand Don Witte log yard supervisor at Snow Mountain Pine said "Our position is if you can continue to manage as you have for the past 75 years which is basically selective cutting why change?"

Lawson LeGate of Bend the chairman of the Sierra Club's Oregon chapter said "We agree that there is probably an over reliance on clearcuts and even-aged management."

But LeGate charged that the timber industry's proposals are based on legally and naturally unrealistic assumptions

The timber industry has asked for a stable supply of ponderosa pine in the amount of 100 million board feet annually and an overall cut of 137 million board feet from the Ochoco

The Forest Service under its preferred alternative would slightly decrease the present cut of 126 million board feet to 123 million for 10 years and a decreasing amount over 50 years to satisfy requirements of a sustained yield

LeGate objects to the departure from a sustained yield harvest level for the first few decades "If you're not managing for sustained yield " he said "you're engaging in unwise management."

The Forest Service's proposed plan addresses many other aspects of forest management, and District Ranger Fred Harnisch encourages the public to submit comments

"The big plan scares people he said (The documents are hundreds of pages thick) "But if people just send in comments on specific areas they're interested in that's great.

"It's not a vote count But if people have concerns we want to hear them he said

The comment period ends Dec 20 Send comments to Forest Supervisor Ochoco National Forest Box 490 Prineville Ore 97754

Wants Lookout road open again

To the Editor

Last night I spent about an hour and a half talking to Dave Rittersbacher, "Head man for our Forest Service " And I do think it is "ours "

Dave assured me that there is no plan yet Only their ideas and they need us to tell them what we want Boy! am I glad what they suggest is not for real — any of it

I have had hundreds of people talk to me about the forest plan as I have been involved in this from the start

I know nothing about logging except there are some very rich, selfish timber owners around here Also, out-of-work loggers are mean and hungry ones are worse

I do know of a lot of trees in what is now closed areas that could be logged to the better of everyone

As for grazing, cows are stupid, stink leave a mess and taste good when cooked right They are owned by rich selfish land owners too From the grass left where there was no grazing, there could have been quite a bit of it

Since these rich selfish land owners have taken away the recreation from hundreds of thousands of acres from ordinary people then we have to count on public land

Now recreation I know about I like to play

I worked with the Forest Service and agreed on the three wilderness areas we have I worked with the original skiers on laying out the ski area by Bandit Springs Then I thought the rest of the public land should be for the rest of the public, not excluding but including those who use the four set aside areas

I am for all types of recreation on all of the Ochoco National Forest except the four set aside areas, "three wilderness and Bandit Springs "

I hike, fish hunt, four wheel, horseback motorcycle snowmobile, and just camp out a lot I do not x-country ski because I don't know how and am probably to clumsy and old to learn But more power to those who do

The moral of this story is ' Let's not be like those mentioned before Let's share what we have "

For 40 years that I know of there was a primitive road going across a few miles of the most beautiful part of the Ochoco National Forest It was passable to all types of vehicles as long as you used a little caution

Thousands of people traveled this road because of its scenic beauty Nowhere in our forest were you as likely to see big game You could drink from several springs and see all the rest of the Ochoco's from there

In 1979 this road was ripped out and the mountain was scored worse than it had ever been before It was taken away from 95 percent of those who used it The people who used this road were not told this was going to happen After it did happen, about 2,000 people said they wanted the road put back like it was That is 2 000 local people

Those who want to hike, backpack or cross country ski up there can always do so Let's not keep it from the rest of us For everyone who goes up there now a hundred more would like to and would if they could Dr Rinehart can give you a long list of those who can't hike or x-country ski there, and a list of reasons why They all deserve to enjoy this beautiful scenic drive

So, if you feel as I do about this, please help yourself as I and others have tried to help you

The road we want back goes across the top of Lookout Mtn north and south road 4205, connecting road 42 to 4220

If you want this but have different reasons or ideas or plans, say it in a letter to the Ochoco National Forest P O Box 490, Prineville, Ore 97754

Respond before 12 20-86

Thank you

Wanting to share the ONF

Bob Fox

Prineville

P S If I have stepped on some toes think nothing of it, you have stomped on mine

Consultant says wrong plan will jeopardize economy

By Tami Brucker

The forest service s preferred alternative to the management of the Ochoco National Forest would if implemented reduce area employment opportunities according to Jim McClain spokesman for the timber in dustry

McClain executive director of Northwest Resources in Bend says 85 percent of the jobs from retail to logging in Crook Coun ty are affected by what the forest service does And if the forest service s E Departure Plan is put into effect about 200 jobs will fold he said

The employment economics of E Departure are linked with the amount of timber that can be cut under that plan McClain said

If you don t have enough timber to cut then what happens to all the jobs dependent upon the timber industry? he asks

To explain the link between jobs allowable cut and land allocations McClain recited statistics from the Draft En vironmental Impact Statement

There are 850 000 acres of forest of which 533 000 are forested Presently 423 000 acres are managed for full timber yield

Under the E Departure Plan the 423 000 harvestable acres



JIM McCLAIN

would be reduced to 262 500 acres and this reduction in allocated land would greatly af fect the amount of allowable cut McClain said

Last year the timber industry bought 148 million board feet from the forest service and now the timber operators are asking for 137 million board feet which would be the sustained yield level of the land allocation re quested he continued But under E Departure only an average of 87 7 million board feet would be available annually to the timber industry during the next 10 decades he said

"There is no way you can grow 137 million board feet on 263 000 acres so you ve got to keep your land allocations on the fores up he said

Do not be fooled by the chart on page 74 of the Draft En vironmental Impact Statement which shows 495 000 acres would be available for harvest under E Departure he cautioned The forest service wants to increase the current partial yield of 88 500 acres to 232 000 acres

The effect is going to be a net loss in available volume of harvestable timber because (the forest service) took 143 500 acres from full timber yield and put it in partial timber yield Mc Clain said

The forest service says it will use the 147 500 acres taken from full timber yield acreage and use it for scenic natural and wildlife areas McClain said

And any of those uses by itself is a very laudable goal but when you total the whole package up and look at the ac cumulative effect of it that s a price this community can t af ford to pay he said referring to the alleged economical im pact

Another flaw in the forest ser vice s alternative plans is that no matter what alternative is chosen multi age selective cut ting would be eliminated and in tensive forest management would be continued McClain said Intensive forest manage ment, also known as even age management, is often perceived as clear-cutting in that it often entails logging only those trees larger than nine inches in diameter which leaves large patchy areas he said

And he continued even age management makes logging in compatible with other uses of the forest

Timber operators want to go back to multi age selective cut he said Now that s the way this forest has been managed for the last 50 years We ve got a beautiful forest out there and logging can exist side-by-side with other uses of the forest

McClain said the best alter native for the community and timber industry is the B Plus Alternative Plan Under that plan there would be enough timber to meed demands and maintain jobs he said

If 85 percent of the jobs in Crook County are dependent upon the forest industry and that industry is severely im pacted because of the drastic decrease in allowable cut this community not just the sawmills is going to suffer for it

Basically our plan is an ex pression of what we are concern ed about he continued We maintain there will be about 200 jobs lost under the E Departure Plan The forest service said there would be a net gain of 63 jobs

Brian Long who was hired by the Central Oregon Economic Development Commission to evaluate forest plans says 289 jobs in Crook and Harney Coun ties will be lost McClain said

Now if an independent economist looks at the issue and says basically the same thing as us then whose credibility should be questioned?

McClain said one of the reasons the forest service has come up with such a plan as E Departure is that it is reacting to input from environmental groups The forest service he said perceives the frequent and plentiful input from en vironmental groups as public in put whereas the community and timber industry has done a terri ble job of expressing their opi nions he said

It s time for the environmen tal groups to stop looking at the timber industry as the enemy and it s time for the timber in dustry to stop looking at en vironmental groups as left wing radicals McClain said

There s a lot of common ground and we can no longer af ford to fight over it

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

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Where published

Date of issue

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FS 1600-2 (11/50)

Plan would reduce jobs —

Study finds 'E-Departure' flaws

The U S Forest Service estimate of economic im pact of its preferred alternative for the management of the Ochoco National Forest (ONF) is flawed according to a report released today by a Seattle economist

Brian Long and economist and consultant from Seattle was commissioned by the Central Oregon Economic Development Council to study the Forest Ser vice s preferred E Departure forest management plan

Long stressed that ONF employees made a sincere effort to use the best information available at the time and did an excellent job of preparing their study He explained that the ONF economic impact evalu tion was based on a model using figures based on 1977 industry relationships Since that time figures from 1982 reveal that forest industry employment has substantially recovered in the Central Oregon area and that the economic impact will be greater than would be indicated by use of the older model

In addition using the old model Forest Service planners are estimating an increase in recreation related jobs when in fact the new figures show a substantial decline in Crook County in recreation related jobs

Long s study predicts that under the E Departure alter native timber harvest in the Ochocos would decline by 39 per cent over a period of 50 years That equates to an annual job loss of 317 jobs and $6 5 millior in annual income (in 1981 dollars) In addition he predicts a corresponding loss of Federal payments to counties due to the decreased timber harvest

The most important reason for the Forest Service to update its model for the study before mak ing a final decision Long stress ed is to correct an assumption based on the older figures which showed an anticipated increase in recreation related jobs to off set the loss in timber related jobs and to show the economic ration between the two different forms of employment

Comparing average wages for 1980 for the lumber and wood products industry with the recreation oriented industries gives a ratio of 2 4 ($22 706 and $9 296 respectively) for Crook Grant Harney and Wheeler counties Thus he says each job lost in the lumber and wood products industry must be replaced by 2 4 recreation oriented jobs to offset the loss of income

Instead of there being increas ing numbers of recreation oriented employment in Crook County Long s figures reveal that the actual number of recreation related jobs has

(See ECONOMIST page 2)

(Continued from page 1)

declined from 967 to 763 for Crook Grant Harney and Wheeler Counties between 1978 and 1985 The only significant in crease indicated in tourist related employment was in Deschutes County according to Long s study

The reduction in timber harvest on federal lands a 16 percent reduction in the first decade from current levels ac cording to Long will come at a time when there has been in creasing dependence on federal ly owned timber and a decline in harvests on private lands

This loss in anticipated timber harvest may generate a quicker decline in employment op portunities in Crook County than estimated by the Forest Service if mills don t modernize to re main competitive Long said

The economic impact of the E Departure alternative con cerns Central Oregon Economic Development Council since it would hamper its ability to at tract new lumber remanufactur ing jobs to Central Oregon

Long s study was commission ed by COEDC and funded by grants from Prineville Economic Promotions and Pacific Power and Light Com pany Other contributions are also expected from local business people

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper

Where published

Date of issue

Sent by

Stationed at

Forest Officers

Opposition forms to forest plan

By David Braly
Bulletin Correspondent

PRINEVILLE — Opposition is crystallizing in Crook County to a proposed Ochoco National Forest management plan that would re duce the timber cut by 28 percent

Judge Dick Hoppes said Wednesday that the Crook County Court would almost certainly pro pose modifications to the Forest Service plan

Hoppes statement followed a presentation on the plan by Seattle economist consultant Brian Long to a joint gathering of the county court and the Prineville City Coun cil

Long was hired by the Central Oregon Economic Development Council which is asking local gov erning bodies throughout Central Oregon to oppose any forest plan that might lead to job losses or hurt the local economy

State Sen Gene Timms and other interested people also attend ed Wednesday s session

COEDC chief Bill Hemingway said Long s complete report would be available in several days The Forest Service s deadline for public comment on the plan is Dec 20

Long said that despite dire predictions in the early 80s that the timber industry would never completely recover from the reces sion Central Oregon mills are now outproducing their peak perform ances of the pre-recession period

However Long said that em ployment had failed to recover with only 2 5o0 people employed in the forest industries in Jefferson Grant Crook Harney and Wheeler counties now compared to 3 300 in 1976 The Forest Service s pre ferred plan for the Ochoco would result in even greater job losses according to Long

Long said the Forest Service had projected the loss of 20 to 30 jobs in Crook and Harney counties with 94 recreation jobs gained But his own calculations showed that 2o9 jobs would be lost (85 8 million in income) in Crook and Harney, 28 jobs in Deschutes ($700 000 in lost income), and only 89 jobs picked up in recreation most of them in Deschutes County Long estimated that one non lumber job would be lost as an indirect result of each lumber industry job lost

Long said that because the average lumber industry employee earns $22 706 a year and the aver age recreation employee $9 296 a year, it would take 2 4 recreation jobs to replace just one lumber job

Forest Service officials have challenged the timber industry s forecasts of job losses and environ mental groups argue that a long term slump in mill employment is mainly the result of automation not decreased timber cutting

In his report, Long warned that reduction of the allowable timber cut would "make it difficult, if not impossible, to attract new remanufacturing plants or for firms to modernize existing plants Because of this it may promote the shipment of logs west of the Cas cades These developments would have the effect of setting Central Oregon s economy back to an ex tractive stage '

Name of paper
The Bulletin
Where published
Bend OR
Date of issue
12-11-86
Sent by
Stationed at
Ochoco N.F.

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FS 1600-2 (11/50)

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Charges forest plan creates defacto wilderness areas

By James O Smith

Local timber operators have announced firm opposition to the Forest Service choice of a long range plan for the Ochoco National Forest John Shelk general manager of Ochoco Lumber Company in Prineville, says the "E-Departure Plan' favored by the local supervisor s office creates defacto wilderness areas, which reduces the land base of harvestable timber, thereby dictating a reduction in the allowable cut

In round figures, Shelk says that the land base set asides in the E Departure will reduce the area in which timber harvests will be allowed from 425 000 acres to 260 000 acres The designated roadless areas will become defacto wilderness areas because the only thing allowed there will be snowmobiles ' But the snowmobilers won t be able to get there because the roads to these closed areas will not be plowed, ' he predicted 'There will be no logging no grazing, no roads '

These areas are being held out for "dispersed recreation Shelk explains ' Recreation and land management for protection of old growth sensitive species of animals and/or rehabilitation are the primary factors behind Forest Service withdrawals of land from grazing and logging " The four primary reasons, according to Shelk, are the creation of the roadless areas which he calls defacto wilderness the old growth retention areas big game management areas and riparian (stream bank) management areas The last three protect various animals including old growth sensitive species such as the pileated woodpecker and provide thermal cover in winter range areas for big game

"I don t disagree with their goals for riparian management ' Shelk said We shouldn't be logging stream banks and dragging logs down the creek bottom That s (logging practices) out of the 1930 s He points out, however, that eastern Oregon is different from western Oregon "We don t have the steep canyons they have in western Oregon We re asking the Forest Service Are you going to allow any logging at all or are you going to make another defacto wilderness for 300 feet on each side of every class one creek?' '

Ochoco Lumber Company has already conducted some riparian reclamation and research on its own private property We took cattle off of the forest for a year It didn't make much difference We found that the wild horses do three times the damage to stream banks, that they use more forage, and that removing the cattle provided enough extra forage to improve foal survival," Shelk said

I don't think people have any idea how many wild horses there are running loose up there '

In determining the use of the forest Shelk says that the Forest Service is moving from applying economic values to applying amenity values But he points out that when Senator Mark Hatfield signed off on the wilderness



JOHN SHELK

bill that created wilderness areas in Crook County he specifically instructed that the remaining so-called Rare II roadless areas be put back into the land base

When the Rare II wilderness study was completed, timber operators thought that the roadless area issue had been settled Senator Hatfield had signed off on the bill with the understanding that the remainder of the areas under consideration be returned to the multiple use land base ' The Forest Service delivered the second half of the one two punch when they said We don t think so Shelk says

He notes that the final agreement on the wilderness areas was " three Regional Foresters ago It was before Jim Torrance who is the best we've had in the past 10 years"

Even though opposed to the additional roadless areas Shelk at least, is willing to compromise Leave Lookout Mountain and Silver Creek as roadless areas, but not Rock Creek and Cottonwood Canyon They are too large and there is too much timber in there, ' he says

Although Shelk admits that the Forest Service is telling him that the withdrawal areas will not necessarily be closed to all logging he says that the plan contains no commitment in writing and that he questions the direction of the the Forest Service

Their management goals are inconsistent he says Twenty years ago we had to cut all of the snags on a sale Now the Forest Service is girdling green trees to make wildlife snags

An unfortunate aspect of the system according to Shelk is that it is causing divisiveness among forest users who can really operate better through cooperation The snowmobilers have the entire forest open except for Bandit Spring (designated cross country ski area) and the wilderness areas However, it's the loggers who keep open the roads that the use during the winter Loggers plow the parking areas for snowmobilers at Lookout Mountain The Forest Service doesn have the budget and they aren going to plow forest roads for recreational use '

As far as big game management is concerned, there are factors other than logging that determine the population of deer and elk, Shelk says Those factors, like the weather, are out of control—or—those factors, like the number of hunting tags sold by the state fish and wildlife department and/or the amount of winter grazing available on Keystone and Bonnie View ranches, are in the control of those other than either loggers or the Forest Service

"The Forest Service is saying Vote for us on the E Departure and trust us '," Shelk laughs "But, if they restrict the land base by 40 percent, that determines the allowable cut It's a simple mathematical formula That's correct But, why restrict the land base? '

High on the list of better ideas that Shelk would suggest for Forest Service consideration is better salvage sales of dead and dying or high risk trees While remembering an excellent salvage sale program conducted by the Forest Service in the mid 1970 s, he allows that the present salvage management program ' stinks '

Refering to roamer" salvage sales the Forest Service held in the mid 1970 s Shelk called those a win win situation for everyone "The Forest Service got top dollar for its dead and dying trees and the timber company got a valuable product. What tree dies and falls over? A large old tree A high value tree to the timber company '

He pointed to one salvage sale in which Ochoco Lumber Company got five to seven times the advertised volume over the two-year life of the sale taking only

"Leave Lookout Mountain and Silver Creek as roadless areas "

dead dying or marked trees

If we could harvest 60 per cent of the salvage in the Ochocos it would be a great value he commented

He would also like to see better timber sale layout realistic road systems without having to build super highways into a timber sale realistic logging system requirements that do not increase the cost of logging and reduce the revenue from those sales that is returned to the county and school district

We should also be doing more selective cutting to provide for a diversity in the timber stand rather than being required to cut everything down to an eight inch tree That s a mass production form of administering a timber sale It takes less work for the Forest Service It also removes a lot of good growing stock from the forest he complains

Shelk stresses that he is arguing against any tim management program tha be substantiated If after the U S, Forest Service exercises good management of the existing land base the Forest Service says it has to reduce the allowable cut – if it provides data to support that – I d be the first to say reduce the allowable cut. But let s see some good management first.

In Shelk s view the Ochoco National Forest now provides a

' eastern Oregon is different from western Oregon"

wide range of activities for citizens He classifies it as a national treasure that provides 1 Wilderness set asides for the people in Florida and Maine 2 The remainder in the multiple use concept for recreation and timber which he says provides for the livelihood of this community

To take away a part of that without well founded well reasoned background information for doing that is to me not reasonable not responsible

As a part of the logging economy in Prineville Ochoco Lumber company employs 120 people at the mill and another 50 in contract jobs That doesn t count the people employed through such contract work as roadbuilding erosion seeding slash burning and fence building It also doesn t count the company s contribution to the local economy by delivering a large amount of its product to local remanufacturing plants which provide more timber related employment

Shelk and other timber operators would like to see the Forest Service drop its preferred E Departure plan and embrace instead what they call the B Plus alternative It would essentially leave the land base at its present 420 000 acre level even though it would still leave the Lookout Mountain area roadless and and enhance deer and elk populations with seasonal road closures and more habitat improvement projects provide for 32 000 acres of old growth forest maintain the current plan s potential timber yield maintain the core of the Silver Creek roadless area and stress the highest amount of watershed improvement projects

This he said would not have the detrimental effect of the E Departure plan which would create some dramatic reductions in county and school district receipts from timber sales nor would it have the effect of changing high value Ponderosa Pine to low value Ponderosa Pine or as dramatically change the makeup of the timber cut to associated species such a Douglas Fir White Fir o Tamarack at $10 to $25 per thou sand board feet instead of $10 per thousand board feet fo Ponderosa Pine

The bottom line of course remains one of economics Without the land base in effect prior to the designation of wilderness areas in the Ochocos and without the current land base in effect for timber harvesting Shelk points out This community would be a different place

The deadline for receiving public comment on the Ochoco National Forest Plan is Dec 20 Shelk suggests that this is an issue of tremendous importance to the community not just timber companies and that he would encourage all citizens of the community to respond in writing to the Ochoco National Forest Supervisor before Dec 20

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville OR.
Date of issue: 12-11-86
Sent by: Inez Cuellar
Station and: Ochoco N F

Forest Officers
You are requested to clip any important newspaper article concerning forestry or the work of the Forest Service

State Sierra Club head hits ponderosa report

By David Braly
Bulletin Correspondent

PRINEVILLE — The state chairman of the Sierra Club described as shocking a recent report that there is nearly 40 percent less ponderosa pine on the Deschutes National Forest than the U S Forest Service originally believed

Lawson LeGate chairman of the 6 300 member Oregon Chapter of the environmentalist group commented on the recent Forest Service findings Monday

LeGate also criticized a recent timber industry study that predicts a large loss of jobs if the Forest Service s preferred alternative for the new Ochoco National Forest Management Plan is adopted

In a prepared statement LeGate called for reductions in the amount of ponderosa pine logged in the Deschutes National Forest annually

These revelations about sharply reduced volumes of ponderosa pine probably s goal the deathknell for timber industry efforts to greatly increase logging levels on both the Deschutes and Ochoco national forests said LeGate

He said that the inventors confirmed environmentalists assertions that national forest lands have been subjected to overcutting for years

If this overcutting continues LeGate said the diminishing supply of mature trees would have a negative impact on employment in the timber industry itself

You can spend thousands of dollars on all the number crunchers you want to tell you what you want to hear but it still won t help the forest grow trees any faster LeGate said referring to the timber industry s study supporting what he called an inflated level of timber-cutting on the Ochoco

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend, OR
Date of issue: 12-10-86
Sent by: Inez Cuellar
Station and: Ochoco N F



james o. smith

Major changes may n ɔt be needed to fix forest

In the opinion of John Shelk general manager of Ochoco Lumber Company the Ochoco National Forest is a national treasure In the local vernacular it s a bonanza It puts meat and potatoes on the table for a big group of people in Prineville

It i. the primary source of income for millworkers log gers truck drivers and others in associated in dustries In addition it is the primary source of income for a substantial number of management people employed by the Ochoco Na tional Forest Supervisor's Office

Their wages spent locally spin off to provide a source of revenue for everyone from shoe salesmen to meter readers

The Ochoco basin is the source of irrigation water that fills both Ochoco and Prineville reservoirs pro viding water to most of the agricultural enterprises in the valley Ranchers graze their livestock on the forest during the summer

The thousands of acres of National Forest also provide recreational opportunities for local residents and at tract large numbers of tourists who come here to dig rocks catch fish hunt camp or just generally take themselves out among the trees for whatever personal reasons they have for it

Timber harvesting agriculture and tourism are basic industries that bring money from outside into the local economy This revitalizes an economy that would quickly stagnate if we were just passing dollars around here among ourselves

We could pretty safely say that there is hardly anyone in Prineville who isn t touched by the forest in one way or another

We ought to be pretty unanimous then in our ef forts toward establishing sound goals for the forest's management We ought to be pretty careful to avoid choos ing up sides locally in an us against them fight over what to do with the national forest We ought to be very careful to think for ourselves

I ll be the first to tell you that after looking at all of the alternatives offered by the Forest Service I don t know which is best I couldn t even tell you if it was reasonable for the Forest Service to offer that many there But that s OK I like most of those guys Most of them are neighbors

Secondly I can tell you that the majority of the peo ple who drive into the forest choose previously logged areas to recreate They don t park their vehicles very far from a logging road and they choose the open spaces that are left after logging and thinning operations

I ve only been cross coun try skung one time and on that occasion we were on a skid road from start to finish I can t imagine what it would have been like to abandon the skid road and try to get through the pole patches on a pair of six foot skis Most of the people I know who cross country ski follow skid roads and logging trails through previously logged areas

The same is largely true of snowmobilers They gravitate toward the open spaces and skid roads were it is possible to get up a little speed without debarking a tree

I ve camped in the forest and ridden horseback in the wilderness areas I can tell you that you don t haul a horse trailer cross country to get to the jumping off place I also didn t pay a fee to the forester who keeps the wilderness trails open and marked His salary probably came around and about from some logging operation somewhere sometime in the recent past

I ve hunted in the national forest and, if anything, the loggers have been compelled to build too many roads If we could close a few more roads we would eliminate half of the road hunting ac tivity and would probably not need a permit system for tags But, those roads were built over the objections of the loggers and to satisfy past multiple use goals established on a national basis to get people other than loggers in to enjoy the benefits of the government woods

A lot of w ldlife habitat in the Ochoco, owes its survival many times over to the fire fighters who were on the scene at the drop of a bolt of lightning because logging roads were there for transportation

I ve seen all weather roads built for a logging operation where the timber company would have done as well with a skid road that could have been returned to its natural and only one of those a modification in Alternative B (proposed as the B Plus Plan by timber operators) calls for intensive reforestation

One of those plans is a con tinuation of the current management plan, Alter native A This is its timber management plan Timber harvest is scheduled at a nondeclining yield basis Current direction is to inten sively manage timberland stands to the degree consi tent with other resource requirements identified in the Unit Plans This inv s planting harvested units with genetically superior seedlings planting at increased stocking levels precommer cial thinning to control the spacing of trees one to three commercial thinnings both to harvest trees early and con centrate growth on the re maining trees and manag ing for a rotation age close to the point in time where average annual growth is highest This type of management is planned for the majority of the Forest s acres Other resource re quirements for some lands may either prohibit timber harvesting (old growth and roadless recreation manage ment) lengthen rotations (riparian areas and scenic corridors) or alter thinning practices (big game em phasis areas) The allowable sale quantity (ASQ) in the first decade that results from this mix of practices is 125 million board feet

Now on the surface that sounds reasonable Which makes us wonder if it s not broken why are we fixing it?

Too often it seems that the trees are largely left to fend for themselves while loggers spend large amounts on roads fences bridges and manicuring the multiple use forest We tend to spend all of our time changing and reshaping the forest we have without putting enough effort into developing new forests in areas where trees would grow if they were planted

Meanwhile back at the ranch maintaining a na tional forest at the pleasure of the public is an ever changing program for foresters and planners We are always changing our minds about what we want and none of us want the same things There have been times that the only way that foresters could satisfy oppos ing demands was to cut the baby in half Cutting the baby in half then brought in previously disinterested par ties who have entirely dif ferent agendas

This is supposed to be a plan that reaches out there 20 years into the future That means it is to be a plan that all of us will have to live with or without for the next 20 years If it is done right, we will enjoy the use of the forest for the next 20 years If it isn t the survivors may en joy the use of the forest for he next 20 years and/or they may just see it from a distance if the roads are not open

The Forest Service operates in response to legislation and public pressure They are still pro specting for a plan that we can all like if you can im agine that ever happening

We will only benefit if we can develop that plan through some program other than an an adversarial pro cess even though that seems to be what the system design calls for To the contrary the foresters and loggers and recreationists and ranchers need to decide that they are all on the same side if the special needs of a very special piece of public real estate are to be satisfied

That special piece of real estate is what attracted many of us here I question how many of us can and will continue to be as happy with the product if we continue at efforts to change it around

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend, OR
Date of issue
12-15-86
Sent by
Inez Cuellar
Stationed at
Ochoco N.F.

Ochoco plan claims disputed

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — U S Forest Service officials are challenging a Seattle economist s claim that 317 jobs will be lost because of a proposed land management plan for the Ochoco National Forest

Brian Long, hired by the Cen tral Oregon Economic Develop ment Council to do the $3 000 study presented his findings at a press conference and several meet ings with Central Oregon govern ment officials held last week

In his study which took about three weeks Long concluded that the proposed plan calls for timber harvest levels that are too low, causing 'unacceptably high losses in jobs and income

The plan also would make it difficult to attract new remanufac turing plants because it does not provide for a stable timber supply and because it permanently limits supply the study said

Long also said at a Thursday press conference that the timber industry has recovered from the recession of the early 1980s and that production is back up

However, Long said employ ment in the timber industry is still down by about 750 positions in Crook Grant, Harney and Wheeler counties when compared with 1976 job figures

Long admitted the loss of jobs is caused in part to automation of sawmills but he said a decrease in the timber supply coupled with modernization of mills would cause an even greater job loss

The establishment of remanu facturing businesses is one way to employ workers displaced by mod ernization of mills he said

Meanwhile Paul Cuddy Ocho co forest plan analyst said the harvest levels on which Long based his study are unrealistic

Long said 317 jobs would be lost if the Forest Service dropped its harvest level from the current average of 147 million board feet a year to the proposed 123 million board feet

Cuddy explained that 147 mil lion board feet was the average amount of timber sold annually between 1984 and 1986 but that amount is much larger than the 10 year average

That s because the Forest Serv ice has been reselling contracts for timber that the timber industry returned under the federal buyout program which allowed some mills to return unprofitable contracts purchased in the early 1980s Cud dy explained

The 147 million board foot fig ure ' represents an extreme point Cuddy said

The plan under which the for est currently operates sets annual timber sales at 125 million board feet slightly more than the 123 million board feet proposed in the draft plan

Cuddy added that the annual average timber harvest from 1975 to 1984 was 106 million board feet

Dave Rittersbacher Ochoco forest supervisor said Long s study is helpful because it points out the need for the plan to consider the needs of the remanu facturing industry

Findings made by Long and others who comment on the plan will help the Forest Service decide how to manage the forest s re sources Rittersbacher said

Forest Management plan may take year to prepare

By Tami Brucker

Some have pressed for more timber some for more roadless and scenic areas some for more firewood and wildlife habitats

Different individuals and groups have varying ideas about the way the Ochoco National Forest should be managed and it will be virtually impossible to fully accommodate every interest in the upcoming forest management plan said Forest Supervisor Dave Rittersbacher

We know whatever alternative we select won't please everybody he said referring to the 11 alternatives outlined in the Proposed Land and Resource Management Plan and Draft Environmental Impact Statement documents

What we d like to do is please as many as possible to the extent that resource information is matched he said

But it will be at least a year maybe longer before anyone will see a forest management plan Rittersbacher said Analyzing hundreds of public opinions and preparing a 10- to-15-year forest management plan that addresses 12 major issues and concerns is going to take some time and effort he said

This will be the first time we've had the opportunity to prepare a fully integrated forest plan he said. We used to have separate timber management plans separate fire management plans separate wilderness management plans and so forth

All that changed however, with the National Forest Management Act of 1976 which mandates that each forest will have an integrated plan one in which every major issue or concern voiced by the public will be addressed collectively in the next long term management plan

It s taken almost five years to gather public opinions identify key issues of the Ochoco National Forest and prepare the two hefty documents that explain in great detail 11 alternative ways the forest can be managed

Each alternative focuses on a



DAVE RITTERSBACHER

theme and each theme is highlighted at the expense of another theme Rittersbacher said For example H Departure Alternative would allow maximum timber harvests but would further restrict roadless recreation On the other end of the spectrum C Alternative focuses on amenity values such as roadless recreation wildlife habitat and the like but decreases the quantity of timber allowed for sale

In compliance with Congressional law the Forest Service has identified a preferred alternative It selected E-Departure because it would provide the best mix of benefits based on the issues and concerns identified, Rittersbacher said. It does this by providing for a mix of amenities while also providing for near-current levels of timber harvest for the next 20 years

By providing more available timber in the early decades (of the future management plan), the forest could continue to maintain its current contribution to local economies while allowing communities time to adjust to a gradual decline in timber harvest he said

E Departure has sparked a considerable amount of criticism from timber operators as well as an independent economist hired by the Central Oregon Economic Development Council They have stated jobs in Crook County will diminish as a result of a reduced timber harvest if the Forest Service s preferred alternative is implemented

Crook County could Rittersbacher said lose an estimated 69 timber related jobs if E Departure is selected but an estimated 59 recreation oriented jobs would be created here

"We know what ever alternative we select won't please everybody"

On a forest wide basis however E Departure comes up with a net job increase of 63 he said and what that means is that the other counties are sharing in an increased number of jobs

Modernization within the wood products industry and new resource data for example could cause an economic fluctuation also he said

More importantly Rittersbacher stressed is that all the figures associated with the alternatives such as the number of jobs created or reduced are estimates based on the 1984 economy And he added the Forest Service must consider the whole forest not just one of five counties over which the forest is located

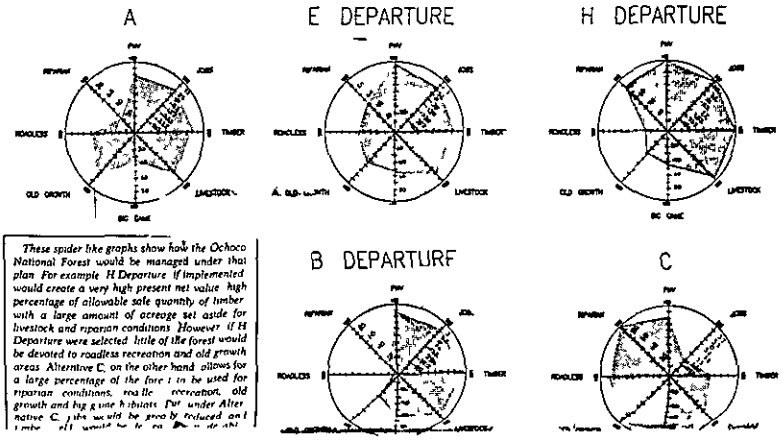
A brighter aspect of E Departure he continued is that when compared to the other 10 alternatives it has the third highest present net value (PNV) at $463 million

The PNV of the forest is greatly affected by the amount of timber harvested, he said For example if the timber industry s B Plus Alternative is put into effect It could be less efficient than other alternatives

If we intensified timber management on every acre we can reach the point where the costs far exceed the benefits, he said

Rittersbacher said the B Plus plan which was created by the timber operators and not the Forest Service would be considered along with the other alternatives

We re not locked into our preference Rittersbacher said We will consider every opinion and we hope our final plan will have public support, even though it will not please everyone



These spider like graphs show how the Ochoco National Forest would be managed under that plan For example H Departure if implemented would create a very high present net value high percentage of allowable sale quantity of timber with a large amount of acreage set aside for livestock and riparian conditions However if H Departure were selected little of the forest would be devoted to roadless recreation and old growth areas Alternative C on the other hand allows for a large percentage of the forest to be used for riparian conditions roadless recreation old growth and big game habitats For under Alternative C jobs would be good by reduced an [illegible]

Ochoco plan review set

PRINEVILLE — The Prineville City Council Wednesday will hold a special meeting to discuss the comments it will submit on a proposed management plan for the Ochoco National Forest

The meeting begins at 7 p m in Prineville City Hall

City Administrator Henry Hartley said the meeting was called to give the council time to respond to the plan before the 90 day public comment period ends Saturday

In other business the council will hold the second of two public hearings on an ordinance that would tighten the rules for collecting back payments on city residents water bills

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend, OR
Date of issue: 12-16-86
Sent by: Lnee Cuellar
Stationed at: Ochoco N.F.

Please send comments

To the editor

We are rapidly approaching the deadline for comments concerning the Ochoco National Forest plan Within the past week an abundance of information has come out from different groups supporting various alternatives within the draft environmental impact statement.

While there is a great difference between the user groups concerning amounts of roadless areas old growth management, and allowable timber harvest levels there are two common threads in everyones opinion The first is that no one believes that clearcutting and even aged management are the proper methods of managing ponderosa pine The second is that there should be an even flow and sustainable yield of timber from the forest.

The preferred alternative requires a departure or accelerated cut in the early years with a drastic reduction in later years

Within the timber industry we believe that the harvest level should establish at the level which the forest is growing We don t want more than can be grown but on those lands currently classed as commercial forest land the harvestable crop should be available for use

Multiple use to us means managing each area with consideration being given to each use which could be imposed on that acre

Timber harvesting is compatible with other uses within the forest if everyone does his job It just doesn't make sense to me to establish different blocks of forest for different uses

The important thing is that we all let the Forest Service know how we feel There are not many of us that do not use the forest for one thing or another be it a picnic at Delntment Lake firewood cutting or hunting in the fall

If we do not let the Forest Service know how we want the forest to be managed, it will be managed the way the people in Los Angeles and New York think they want it managed I don't believe any of us that work or play in the forest would like the results.

Please take 10 minutes and let the forest supervisor know how you feel Comments should be addressed to Forest supervisor Ochoco National Forest, Box 490 Prineville Ore 97754

Don Witte
Timber manager Snow Mountain Pine

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: TIMES-HERALD
Where published: BURNS, OR
Date of issue: 12/17/86
Sent by: F HARNISCH
Stationed at: SNOW MTN
Forest Officers

Proposed forest plan flexible, says ranger

By JIM DONOVAN
The Times-Herald

The proposed Ochoco National Forest Plan is flexible enough to incorporate uneven aged management according to the head of the forest's Snow Mountain District

Some observers are not as sanguine believing that the even aged assumption is a serious perhaps even fatal flaw in the planning

District Ranger Fred Harmsch affirmed that the Ochoco's planners assumed even aged management in every option considered in a recent draft environmental impact statement But he said that should even aged management prove feasible on the Ochoco the Forest Service's preferred alternative (E departure) could accommodate that form of management

"Whatever plan we decide on" Harmsch said last week "it's not like the Ten Commandments It's a very flexible plan"

Even aged management means that timber is harvested through clearcutting where all or nearly all the trees in a stand are cut. Reforestation results in a stand of trees all about the same age and size

The new stands would be harvested in about 50 years before the trees reach the size of the larger trees now on the forest. Timber firms dislike the practice because it first requires them to use smaller less suitable trees and later decreases the size of all trees cut With even aged management mills will have to retool for smaller trees

Lawson LeGate the newly elected chairman of Oregon's chapter of the Sierra Club believes the Forest Service plans place an undue emphasis on clearcutting and even-aged management

Don Witte the timber manager for Snow Mountain Pine Co in Hines believes the alternatives including that chosen by the Forest Service as its preferred alternative are all rendered invalid by the even-aged assumption

"I don't know why the entire plan is based on even-aged management," Witte said in a recent interview except that I have a suspicion that's the only computer model they've got"

Harmsch acknowledged that the Ochoco's plans have all been based on a computer model that uses only even aged management. But he said that the Deschutes National Forest has been using a computer model that incorporates uneven aged management. "We're looking into that" he said

Mike Znerold the forest silviculturalist (tree cultivation specialist) for the Deschutes National Forest confirmed that his forest is indeed using such a model

"It's called Prognosis" Znerold said "It was developed in the 1970s by the Forest Science Laboratory in Moscow Idaho and has recently been calibrated for the central Oregon plateau

"It has some ability to model uneven-aged management, or a variety of tree sizes and to understand inter tree relationships better than other models We feel after literally hundreds and hundreds of runs that it seems to model multi-aged stands *satisfactorily*"

Znerold said that will ponderose pine Prognosis unlike most other Forest Service models uses actual data from actual stands "We're not growing imaginary trees with this model" he said "These are actual figures"

Using that data Prognosis has modeled six different strategies, he said One is clearcutting some are shelterwood strategies and one is a multi aged management strategy

"The results in ponderosa pine" Znerold said "show that multi aged management produces the same over 150 years as clearcutting

"It's what we call 'biological potential'" he said "A piece of ground has only so much in nutrients You can put it in a different configuration — fewer fast-growing trees or more slower growing trees — but it doesn't change much"

But Znerold cautioned that multi aged management may not work as well on the Ochoco as it does on the Deschutes.

"We're blessed with forgiving soils (on the Deschutes)" he said "On the Ochoco there are some very sensitive soils and compaction could be a problem We would be worried about that."

Harmsch agreed that soil compaction is a concern on the Ochoco "We've been into some areas two or three times" he said, adding that the soils there are becoming too compacted "Every 20 years could be too often" he said

But he also said that most of the Ochoco's logging takes place in the winter when the ground is frozen and compaction is not as likely to occur

"Soil moisture enters into it," he said "Springtime is really our most critical time (for soil compaction)"

"Eighty percent of the Ochoco's forest is two-story (varying sizes) ponderosa pine Harmsch said "With the E-departure Alternative (the preferred alternative) that will be gone within 20 years." Harmsch added that he would not like to see that happen

USDA—FOREST SERVICE
NEWSPAPER CLIPPING SLIP
Name of paper TIMES-HERALD
Where published BURNS OR
Date of issue 12/17/86
Read by E Harmsch
Stationed at SNOW MTN
Forest Officers

NEWSPAPER CLIPPING SLIP
Name of paper The Central Oregonian
Where published Prineville, OR
Date of issue 12-18-86
Read by Inez Cuellar
Stationed at Ochoco N.F.

Keep forest on sustained yield

To the Editor

When I moved to Prineville in 1981 I was dismayed to see the numerous empty buildings throughout the whole town Unemployment was over 20 per cent and a pessimistic attitude filled the minds and hearts of local people All of this was due to the severe timber recession that was affecting virtually every resident of Crooked County How many of you remember that?

Right now you each have the power to prevent a similar economic downturn from occurring again The U S Forest Service is asking for comments from the public about the management of the Ochoco National Forest

Each of you can voice your opinion *You do not need to* understand every aspect of the plan You may write I wish to retain sufficient timber for our mills to operate or I want you to manage so that we can cut trees selectively and still have scenic roadways or please cut old trees which have great dollar value before they die so that they won't be wasted Your letter need not be long a paragraph or two is sufficient The more letters received the better so both husband and wife *should write separate letters*

Now at Christmas think about what you have to be thankful for and whether the timber industry in Crook County affects your life or not If you are directly employed in the industry then it is obvious But if you are a merchant or small business owner do your customers earn their living from the Ochoco National Forest? U S Forest receipts are paid to the Crook County School District and to the local county government to help keep our taxes lower than if that income source was absent

Those of us involved in the timber industry want and need the Ochoco National Forest to be managed on a sustained yield basis That means cutting only enough trees than are continually replaced with younger healthy trees We plan to be in Prineville for many years to come

So please take the time right now to protect your economic future and that of your children The deadline for letters is December 29 Voice your desire about the *management of the* Ochoco National Forest by writing to the Forest Supervisor Box 490 Prineville OR 97754

If you could take a few extra minutes to send me a copy of your letter I will forward it to Senator Mark Hatfield and to Representative Bob Smith both of whom are vitally concerned with the Ochoco National Forest Plan

Mrs Linda Sheik
37 Pokegama Dr
Powell Butte OR 97753

USDA—FOREST SERVICE
NEWSPAPER CLIPPING SLIP
Name of paper Central Oregonian
Where published Prineville, OR
Date of issue 12-18-86
Read by Inez Cuellar
Stationed at Ochoco N.F.

State ownership best ONF plan

To the Editor

The forest nurtured by the three basics of survival the sun the soil and water is a living dynamic and extremely complex system A system which provides for us a multitude of surface renewable resources as well as access to those which are non renewable and therefore *depletable In addition to the* consumptive and commodity resources are numerous ones of human experience

How to manage and utilize the treasures of the forest for the greatest good of the greatest number in the long run is the ever controversial question This is and has been the quest of the Forest Service since 1905 This is their charge their primary purpose for existence

What is the greatest good for the greatest number in the long run? Now here is where things start to get a little sticky! I am sure that we are talking about the greatest good for people and not woodpeckers spotted owls or side hill gougers — but there are lots of folks who would argue otherwise

I've read the Draft Environmental Statement and the proposed management alternatives Then I weighed them on my bathroom scales I got more comprehension from the latter From where I sit departures from prudent management have already been made that are far too numerous and single-interest oriented to be considered a balanced approach

The people of Crook County and the adjacent counties are the ones who will derive the most benefit from a balanced *management approach for the* Ochoco National Forest We hold that aspect in common with all citizens who live near a forest regardless of where they are located. In other words local folks need more consideration.

Under current law it is probably illegal to use a common sense approach to a common problem In the last two decades Congress has passed so many laws which effect the management of National Forests that decisions based on common sense and good judgement have been taken out of the hands of Foresters and Rangers

Keep in mind that the same process of National Forest land use planning and *management is* occurring for all National Forests in the system I'll lay you odds that our local dissatisfaction with the proposed plan has plenty of parallels After all how many worthwhile projects can you think of that get better under the management of the Federal Government?

To get to where we need to be we should back up first! Have a different departure alternative One that departs from federal ownership of any land within the boundaries of a sovereign state

Peter's Principle prevails The Forest Service as a bureaucracy like a bureaucrat has been promoted and processed to and beyond it's level of incompetency Killed by Congress and special interest groups it no longer has the professional integrity latitude or sensitivity to respond to local needs

We need to gain title to all federal lands in the name of the State of Oregon. Then we can *make* a plan which is responsive to realistic local needs for the greatest good for the greatest number of area dependent people in the long run.

Jack C Kerr
U S F S Retired
Prineville

NEWSPAPER CLIPPING SLIP
Name of paper The Central Oregonian
Where published Prineville, OR
Date of issue 12-18-86
Read by Inez Cuellar
Stationed at Ochoco N.F.

Council backs Ochoco plan resolution

By David Braly
Bulletin Correspondent

PRINEVILLE — Members of the Prineville City Council endorsed a "generic and broad based resolution Wednesday on the proposed land management plan for the Ochoco National Forest

The sole dissenter was council member Hugh Dragich who said that members should express opinions as citizens, not together He said he planned to write his own letter to the U S Forest Service about the plan

Mayor Wallace Boe disagreed saying, 'If we could collectively represent the best interests of the city I think we should do that

Several other council members also were reluctant to take a stand on the issue, but agreed to do so because the resolution they were asked to endorse was so mild

The resolution states that the council endorses any modification to the Ochoco management plan which would maintain or increase *timber related employment* through intensively managing a balanced timber base suitable for all users of the forest (and) increasing salvage programs to maximize timber production

We feel that a major factor to be considered in managing the forest is economic stability of the local community and our quality of life

An amendment by council member Ann Graf was added calling for grazing rights to be managed in such a way as to benefit both the grazer and land use

Council member Ron Jay said he felt he lacked enough knowledge of the complex issue So did council member Joe Strauss who said he *knew nothing at all about the* timber industry before he moved to Prineville, but that the resolution was so generic and broad based' that it could do no harm

City Administrator Henry Hartley said the resolution was based on a similar one passed by the Prineville Crook County Chamber of Commerce's legislative committee

Council member Steve Uffelman said he was disappointed that the resolution was not stronger since the Forest Service's plan would have a major long term impact on the community

Earl Layser a member of the Ochoco National Forest planning *staff said the reduction of the* timber yield under the plan would amount to about 5 percent a decade and that timber from private lands would make up the difference

The resolution passed 5 1 Council member Gerald Blank was absent

No representative of local timber companies or mill employees appeared at the meeting

USDA—FOREST SERVICE
NEWSPAPER CLIPPING SLIP
Name of paper The Bulletin
Where published Bend, OR
Date of issue 12-18-86
Read by Inez Cuellar
Stationed at Ochoco N.F.

Keep Lookout roadless area

To the Editor

Lookout! I yelled as my skis plunged down the narrowing trail off the summit of Lookout Mountain Somewhere close to a hundred miles per hour I selected quite by accident an ample old Fir tree to collide with. It had lost its limber qualities centuries before our in timate meeting I learned an im portant concept The trees you select are critical

Lookout! I screamed as my mountain bike left the horse trail on Lookout Mountain for un charted turf The bike stopped suddenly of its own volition leaving me catapulting toward impending doom Luckily I had worn my helmet I learned another important concept Use your head

At critical times like these it pays to remember simple con cepts The two above apply also when it comes to Lookout Mountain and the Ochoco Forest Plan Critical issues face our community because of the lumber we depend on the en vironment we live in, and the recreation we enjoy

If Prineville is to diversify its economy recreation is the most feasible direction Maintaining the visual appearance of Lookout Mountain is vital if we are going to pursue or even maintain that economic avenue toward prosperity Snowmobilers and cross-country skiers are working together towards shared use of this moun tain Mountain bikers are discovering its trails Hunters are well aware of the elk herds and grouse coveys I believe we can maintain timber industry jobs and develop recreation jobs To do this Lookout must re main roadless

More than half of the current Lookout Mountain Roadless area exhibits severe erosion hazards To open the road to the summit would be a drastic measure The large relatively flat open terrain in the center of the area is the favorite for winter sports enthusiasts It is an extremely fragile ecological environment Soils are very thin Motorized vehicles other than snowmobiles could destroy this fragile habitat The timber industry has supported main taining the summits roadless status Leave Lookout roadless

Four wheel-drive rigs motor cycles three wheelers four wheelers and any other ATVs have a mountain with a road to the top Round Mountain Leave [illegible]

Lastly when snowmobilers and skiers can get together to convey a spirit of compromise, the timber industry the en vironmentalists and the diver sified recreational enthusiasts can do the same in such a way that all can benefit. The quality of life is as important as main taining our standard of living It can happen on Lookout Moun tain We can maintain the scenic splendor by careful manage ment. The mountain must be left intact so our children can Lookout and see what we have preserved The trees we select are critical Let s use our heads creatively and cooperatively so that our com munity can reap the benefits of cautious use rather than thoughtless abuse

Casey Callan
84 86 President
Ochoco Chapter of the Oregon Nordic Club
Prineville

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Central Oregonian
Where published: Prineville, OR
Date of issue: 12-18-86
Sent by: Inez Cuellar
Stationed at: Ochoco N.F.
Forest Officers

Logger endorses the B-Plus plan

To the Editor

Taking into consideration the various proposals offered by the Forest Service for the manage ment of the Ochoco National Forest, I m in favor of the B Plus plan proposed by timber operators as a modification to the F S alternative B Plan Among other things the B Plus plan sets the area to be harvested at their present level which is vital to the economy of Central Oregon This proposal would also leave the Lookout area roadless as it is now It calls for intensive reforestation which is urgently needed and recommends seasonal road closures which would be beneficial to wildlife I would further suggest that there is lit tle need for all logging roads to be constructed as major high ways In many cases a dirt road would serve the same purpose at a greatly reduced construc tion cost to the logging operator And at the termination of timber harvests the existing road could revert to a natural state Anyone who has observed old logging roads knows they soon become covered with new growth that is if any seed trees are left standing in the area

However the current practice of clear-cutting and over thinn ing of immature timber stands does little to encourage natural re seeding

Supposedly reproduction is seedlings and small trees up to seven inches in diameter But it is the 9-inch to 14-inch in diameter trees now being harvested that have the poten tial for survival and rapid growth Normally natural selection will thin the saplings The policy of thinning young growth on a 100-foot radius often defeats its own purpose of pro viding room for the leave trees to grow Trees in a thicket sur vive through competition and the ones which become taller and less covered with limbs become chosen leave trees But, when the competition is remov ed observation will confirm that many leave trees have become dependant upon and protected by their less desirable neighbors to the extent that they are too weak to stand the shock of being isolated Within a year, heavy snows wind and other natural forces bend them as a source of wood-fiber-for future generations Ideally the thinning pro cess should consist of two or three less harsh cuttings until the desired spacing is attained over a period of perhaps 10 years

Likewise, the concept of clear-cutting Ponderosa Pine in Eastern Oregon is questionable Not only does it remove old-growth timber but it is the destruction of all desirable-vegetation leaving a lasting scar on the land, subject to wind and water erosion It seems like poor management to remove all the existing trees and attempt to reforest when young vigorous trees are already established The planting on new seedlings in the Ochoco environment is risky at best. With nothing left to maintain soil moisture or reduce soil temperature the newly established plantations are at the mercy of the elements The bulk of Eastern Oregon is desert Because of little rainfall seedl ings will not survive or put on growth as fast as they do on the west side of the Cascades A good example of what can hap pen when all vegetation is removed is the Marks Creek Burn It is going on 20 years since it burned in 1968 and even with intensive management it will be many years into the future before it once again pro duces merchantible timber perhaps it never will The burn is comparable to a clear cut It seems to make more barren areas in the Ochoco National Forest which may be and pro bably will turn into a desert landscape I think it would be more reasonable to selective cut and salvage log At least in this manner there would still be healthy growing trees in the area and if done correctly it could supply the allowable cut for decades to come

Also think about the wildlife Under contract stipulations I have cut many trees that were home to a variety of birds and animals For instance when a whole area is clear cut and then prescribed burned, it destroys the remaining snags food and ground shelter The rotten logs and root wads are where most of the small animals live and it also provides protection for larger game Prescribed burning is a needed tool in forest manage ment but broad-cast burning of everything is no different than wildfire which in the present state of forest conditions is com plete destruction Also we are required to kill trees that are still putting on growth to provide new shelter for wildlife That doesn t make much sense either

The proposal to construct roads no doubt they would be high standards into the Lookout Mt. roadless area for timber harvest is difficult to justify I have lived at the base of the mountain most of my life and have walked almost every foot of the mountain. I hunt Lookout and camp up there Lookout Mt. is a beautiful place and I love it up there

As for those who would like to have the road over the top of Lookout Mt. re-opened I believe what they really want is just a high place to look at the surround ing country Thus can be done by driving to the top of Round Mt. or Pisgah, which are not closed to vehicle traffic

I would hate to see Lookout Mt. clear-cut, but I also see millions of board feet of over mature timber that is going to waste. I know the trees could be salvaged and done in a manner that would not severely impact the environment if efficient operators were allowed to do the job But, if it s going to be another clear-cut, just leave it alone And that goes for all the roadless or wilderness areas on the entire forest.

I hate to see the forest gutted for the sake of short term gains and I m a logger In the past 10 years I ve seen the government waste money in resources from the lack of using a little common sense All loggers are not stupid as some would like to believe Neither is the F.S manual any more than a guideline to aid in the sensible administration of a timber sale contract

We loggers know how to do our job right and like anyone else we take pride in our work It creates a very difficult work relationship when someone un skilled in the production end of logging is constantly telling us how to perform a job that is our chosen profession It would be a pleasant change if loggers and Forest Service personel would work together to get something worthwhile accomplished in stead of arguing over rules and regulations With a little cooperation and understanding on both sides it could be done

This plan is of vital concern to everyone in Central Oregon All interested people should express their opinion on this important issue

Stephen D Ontko
Timber Faller
Prineville

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Central Oregonian
Where published: Prineville, OR
Date of issue: 12-18-86
Sent by: Inez Cuellar
Stationed at: Ochoco N.F.

Ochoco plan comments overwhelm forest staff

By Stephanie Monson
Bulletin Staff Writer

PRINEVILLE — The mail room at Ochoco National Forest headquarters is awash this week as forest staffers sort through a flood of last minute comments on the Ochoco s proposed land manage ment plan

The number of letters received by Monday was about 2 000 — almost 400 more written comments than were received last spring on a proposed plan for the Deschutes National Forest

The 90 day public comment period on the proposed plan and draft environmental impact state ment ended Saturday

Burt Lavser planning staff offi cer for the Ochoco forest reported that letters about proposed timber harvest levels the local economy the Lookout Mountain roadless area grazing and wildlife habitat are leading the pack

About 60 percent of the com nts have been form letters pro vided to millworkers by the Ochoco Timber Purchasers Group an or ganization composed of Central Oregon lumber mills Lavser said

Most of the form letters en dorsed Alternative B Plus a plan drawn up by the timber indus try The plan would set the annual timber harvest level at 137 million board feet The yearly level pro posed by the Forest Service is 123 million board feet

Many of the form letters were simple blanket endorsements of the industry alternative not the sub stantive comments the Forest Service was after Lavser said

It s not a vote counting thing that we re after Lavser said The Forest Service wanted to know why people felt the way they did he said

Lavser said other form letter campaigns included requests to re open the road to the top of Lookout Mountain and keep the area open to snowmobilers

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: The Bulletin
Where published: Bend, OR
Date of issue: 12-23-86
Sent by: Inez Cuellar
Stationed at: Ochoco NF

—Editorial—

The Ochoco National Forest Plan, whatever shape it takes when it becomes final, will have profound effects on Harney County For that reason, and because public comment has been slow in getting started, we believe that the comment period, which expired Dec 20, should be extended

Some timber industry spokesmen claim that the proposed plan, E-departure, will reduce by 40 percent the acreage designated for full timber harvest

A Seattle economist claims that the plan would cost 317 jobs in Grant, Wheeler, Crook, and Harney counties, the four that contain parts of the Ochoco

Conversely, a recent timber inventory on the Deschutes National Forest reveals that the amount of ponderosa pine growing there is 39 percent below what was previously thought Lawson LeGate, president of the Oregon Sierra Club, believes that the revelation "probably signals the death knell for industry efforts to greatly increase logging levels on the Deschutes and the Ochoco national forests"

The timber industry believes it is not asking for increased harvests, just a continuation of those of the past The Sierra Club claims that the past levels have resulted in "rampant overcutting"

Whether a reduction is justified or not, it seems certain that adoption of the Forest Service's E-departure Alternative would result in decreased timber harvests on the Ochoco Forest Service planners say that they must do so to satisfy federal requirements for a sustained yield (cutting timber at the rate at which the forest is growing) and for adequate wildlife habitat

E-departure would triple the acres of roadless area, more than double the acres devoted primarily to wildlife habitat, and nearly double the acres managed for excellent riparian conditions The difference between E-departure and current practice in all three areas amounts to some 160,000 acres not devoted to timber harvest

Many of these are now available for timber production, and while some of them would still be managed (harvested), their rotation schedules would be much longer, and timber harvests in them would drastically decrease

E-departure calls for slight decreases in timber harvest in the first decade, and greatly reduced harvests thereafter The first decade's harvest levels are held higher than sustained yield levels to soften the blow on counties and lumber mills In later decades harvests are reduced below sustained yield levels to make up for the first decade's harvests

Because of the inevitable reductions in timber harvests, which would considerably reduce the revenues to Harney, Grant, Wheeler, and Crook counties in the future, and because of the many other important aspects of the forest plan, the citizens of the four counties mainly effected deserve more time to submit their comments to the Forest Service

To request an extension of the comment period, write Dave Rittersbacher, Ochoco National Forest Supervisor, Box 490, Prineville, Ore , 97754

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper The Bulletin

Where published Burns, OR

Date of issue Dec 23 1987

Sent by SMKB/KKB

Stationed at Burns, OR

NEWSPAPER CLIPPING SLIP

Name of paper [illegible]

Where published Burns OR

Date of issue 1/1/87

Sent by [illegible]

Stationed at [illegible]

Forest Officers

You are requested to clip any important newspaper article concerning forestry or the work of the Forest Service. Attach this gummed slip to the article and after filling in the blanks, forward it to the Regional Forester in accordance with Regional instructions.

Multiple use concept is valid

To the Editor

Naturally having been associated with the lumber business and logging all my life, I am in favor of the multiple use concept for our Ochoco forests and I firmly believe this can be accomplished with the cooperation of all factions

Back in the late 30s and early 40s we logged in many areas of these forests Right now you can hardly tell where we had been except for occasional stumps that have not decomposed The roads were pushed in with an old TD 14 or 4T with no rock added and these old roads have grown up with reproduction and grasses all on their own with no man or mechanized seeding I maintain that loggers can go into the roadless area and get the old growth with very little disturbance No fancy roads just a dirt track then push the soil back so there are no highly visible scars and reseed Then there would be no more entry into these forests for another 20 to 40 years or longer

As far as the compaction from skidding or hauling with the fall and early winter moisture then the freezing and swelling of the ground and eventual thaw and settling make these areas good for reseeding How many of you have traveled a natural dirt road in the Ochocos in the summer that was well packed and then returned in the spring to travel the same road and fell into your proverbial axles or worse?

In the 40s the USFS started requiring us to rock the roads The method of doing this was with cat and can and eventually loaders and dump trucks and all with pit run rock with close access to the roads These are some of the best roads still in use in the forest At this time the forests needed opening up for fire protection

Then, a little later in time along came your recreationists and another group the gravel crushers The recreationists wanted more access better roads etc and now they want less roads and no access areas Our stand has always been the same - The recreationists and preservationists are continually changing forcing us to fight for survival every year day by day The gravel crushers went to politicking to gravel the forest The first wave of them came in and went into competition with each other for what they thought were lucrative jobs and all went bankrupt or had to pull out because they could not afford to compete All of this was a great loss to Crook County coffers because it devalued the timber by raising the costs and the monies the county was to receive for their schools and roads decreased measurably because of all the additional costs to remove the timber

Then along came the recreationists and threw most of the gravel off the roads with their pickups and cars Then when the next sale is put up in that same area there are more costs for replacing the crushed rock and again the county suffers dollar losses. Regardless of what people think logging trucks are not the culprits that throw the rock from the road and cause the washboard effect it is the pickups and cars driving at excessive speed etc

Another way to reproduce trees is to have the tree farms in areas close to where you want to replant Then instead of replanting open scab flats plant the seedlings on the north side of the stumps recently removed This gives the new tree more moisture and more protection from wild and domestic animals and a much better chance for survival It is tough for a seedling to survive when taken from a nursery where it has been fertilized and pampered at the 3 000-foot elevation and replant it at 5 000 or 6,000 feet to fight for its life

The farmers and ranchers here in the Prineville Valley should be very concerned about water supplies in the future The Wheat area drains into the Ochoco Reservoir and 3/4 of the Lookout run-off goes into Ochoco Creek with the balance draining into the Prineville Reservoir The large pine tree drinks at least 8 gallons per day the large fir tree approximately 13 gallons per day Multiply this out by the number of big trees that should be removed and there are millions of gallons of water not coming off these watersheds Through the years we have logged several areas similar to Lookout and Upper Mill Creek In just about all cases new springs have sprung up in these areas where no water had previously existed. This new water creates better grass and water for your wildlife and domestic animals and in many cases makes your riparian along the stream banks not look so important due to decreases in animal travel

Then there is the forest fire hazard Over a period of time these roadless areas will be like a jungle You will need to be Tarzan to get through The large old trees will eventually fall and in the falling process will take many smaller trees with them and create a jackstraw effect where even Mr Rinehart with all his athletic prowess would not be able to travel with any enjoyment Then comes the lightning a dropped cigarette a spark from a preservationist s bonfire and wham there goes the whole big mistake up in smoke since no mechanized equipment can go in to fight the fire Also can you imagine the lawsuits where the fire jumps onto private land"

What I have been trying to say is that we can all get along with the proper management by the USFS The loggers are professional people too learning something new every day and spending their entire lifetimes in the woods

We in the lumber business need the big old trees to survive We need the volume and land base which help keep more jobs in the county so the stores uptown get more business and the county gets more funds to help keep taxes down to support the county schools and road

The recreationists still get what they want roadless areas after the overstory is removed a cleaner forest for all recreational needs more water for wildlife and reservoirs less fire hazard etc

Let s work together to accomplish what we all want and need I am sure the big man in the heavens did not mean for any one group to control the natural resources he put on this earth

Even though the December 20th deadline has passed I am sure the USFS would be interested in your comments especially if you are not directly associated with the lumber industry Urge them to keep to a minimum the costs on roads skidding methods etc so that the value of timber is higher By doing this you as taxpayers will ultimately benefit and there will be considerably more money in the coffers for schools and county roads

Jack Rhoden
Prineville

Appeal was sure for plans

By Stephanie Monson
Bulletin Staff Writer

If the timber industry hadn t filed an appeal on the proposed land management plans for the Deschutes and Ochoco national forests environmental groups would have – although for different reasons

The Northwest Forest Resources Council, a timber industry trade group objected to the way the land management plans under which forests currently are operating were outlined in draft forest plans

The timber industry appeal may result in another 90 day public comment period on draft plans released for the Central Oregon forests and five other forests in Oregon and Washington (See related story Page A 1)

Each proposed forest plan contains an array of alternatives for managing the forest one of which is supposed to show the results of continuing to manage the forest as it has been in the past

Don Irvon southeast field coordinator for the Oregon Natural Resources Council said today that the current alternative contained in at least the Ochoco forest plan understates the amount of land set aside in past years for such things as forage and cover for deer and for streamside management

Meanwhile John Shelk general managing partner for Ochoco Lumber Co today said he is pleased that Forest Service officials have decided to resubmit the plans to the public

However Shelk said I think it s a good call if and only if the people responsible for making the decisions on the various national forest will pay attention to additional public comment

I would hope they have their ears open and their minds open Shelk added

Ochoco forest supervisor Dave Rittersbacher said he was not sure if his forest s plan would again be submitted to the public

I m not sure that it (the order) applies to all the forests although I think that it does he said

Rittersbacher said he thought the opportunity for forest officials to again touch base with the public before writing a final plan could be very positive

However Larry Mullen chief forest planner on the Deschutes forest predicted that reopening the public comment period would have a negative effect

We got a little shook about it because we were so close to being done with the final plan he said

Mullen predicted that reopening the comment period would delay getting the Deschutes and Ochoco plans

The Bulletin
Where published Bend, OR
Date of issue 1-27-87
Sent by Inez Cuellar
Stationed at Ochoco NF

Comments deluge Ochoco planners

By JIM DONOVAN
The Times Herald

The response to the Ochoco National Forest's proposed plan has been overwhelming, according to Earl Layser, a planner for the Ochoco

"We have three or four people working full time on the comments, and two part time," Layser said in a telephone interview Dec 29 "And we're going to get some more "

The Forest Service has received more than 2 000 comments — one day it got more than 600 letters, Layser said "The mail room has just been swamped "

"I think we can say there's been excellent response," he said, adding that the Deschutes National Forest received about 1,600 responses during the recent comment period for its proposed plan

Layser said that more than half of the comments received have been form letters — some from the timber industry, some from snowmobile groups, and others He expressed disappointment that these letters offered little substantive information to Forest Service planners "We know that 1,000 people voted for the timber industry's B plus alternative But that doesn't really tell us much It's just counting votes "

Layser said that though the Forest Service is not interested in vote counting, the fact that many people in the affected area feel strongly one way or another will be taken into consideration by planners

But he said that there were also many comments from people asking for more roadless areas and greatly reduced timber harvest "It's very polarized," he said

Layser also said that he had received the letter from Harney County Judge Dale White and

Continued on Page 5

Continued from Page 1

the county court concerning the Ochoco plan He said the letter would carry exactly the same weight with planners as a letter from an individual He added that the Forest Service has received letters from the county courts of three of the five counties affected by the proposed plan

The Harney County Court expressed the desire for multi aged management, and a continuation of current timber harvest levels, among other things

The plan supported by the timber industry, which it calls B plus, is similar to the Forest Service's Alternative B, but has some additions It calls for a timber harvest of 137 million board feet each year, and a sustained ponderosa pine harvest of 100 million

The Forest Service's preferred plan, Alternative E-departure calls for a timber harvest of 123 million board feet for 10 years, and greatly reduced harvests thereafter, in order to achieve a sustained yield Current annual timber harvest levels are about 133 million board feet

Layser said that the forest is incapable of producing 137 million board feet per year to perpetuity "The timber industry will either have to bite the bullet now or bite it later " he said He added that E departure allows timber harvests at near current levels for 10 years to soften the blow of managing for sustained yield The industry, and the cities and counties that rely heavily on timber revenues would see little change for a decade After that, significant reductions in revenue would occur

Layser said that the forest is simply not growing fast enough to accommodate a cut of 137 million board feet a year "The average growth per year is really about 80 million board feet, he said "

Industry representatives such as Don Witte of Snow Mountain Pine Co in Hines cite the Forest Service's own benchmark figure of 144 million board feet The benchmark refers to the maximum amount of timber the Ochoco could produce if all its available acres were devoted primarily to timber harvest This would not mean harvesting wilderness areas or other currently exempt areas

Layser said that the Forest Service is required by federal law to manage the forest for multiple use, and to incorporate the state's goals for wildlife habitat Managing for sustained yield (cutting timber at the rate the forest is growing), is also a statutory requirement

In fact he said the Ochoco National Forest has been working for years on its plan because such a plan is required by the 1976 National Forest Management Act

He said that the final plan should be completed in about a year "We will try to keep the public informed about our progress," he said "It's not a process that just terminates with the close of the public comment period (Dec 20) "

He said that the planners will try to reconcile the many competing interests before the plan is issued "We would much rather publish the final with agreement on most issues than to issue it with controversies unresolved "

He said that the controversies may be resolved through consensus groups, private and public meetings, and informal communication among interested groups and the Forest Service

One issue Layser said may not be difficult to resolve is that of uneven aged management as a majority of writers were opposed to it Layser said

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper [illegible]
Where published [illegible]
Date of issue 1/7/87
Sent by SPIRE/PAA
Stationed at [illegible]

Forest plans may change

By Stephanie Monson
Bulletin Staff Writer

Proposed plans that chart the future of the Deschutes and Ochoco national forests may have to be subjected to public scrutiny again because of timber industry objections

That means people will have another 90 day period — tentatively set to begin in a month — to comment on draft plans first released last year for the Central Oregon forests and five other forests in Oregon and Washington

However this time the plans will contain supplemental information requested by the Northwest Forest Resources Council said John Butruille deputy regional forester for the Northwest region

Larry Mullen chief planner for the Deschutes forest this morning said officials of the Deschutes forest will ask to be exempted from the new order Mullen said the draft plan for the Deschutes already contained information similar to what the timber industry requested

Officials with the Ochoco forest could not be reached for comment this morning

The latest twist in the almost 11 year old forest planning process which is mandated by the National Forest Management Act of 1976 stems from an appeal filed last fall by the forest resources council an association of timber industry groups

While the appeal has been dismissed by Forest Service Chief Max Peterson Peterson last week agreed that proposed forest plans should contain some of the information the council requested

That means the national forests in Oregon and Washington that have released plans will have to publish a supplement to the documents Butruille said The 12 forests that have not yet released plans will incorporate the data in their draft plans he said

The supplement will contain figures showing logging levels for the past several years and predict what harvest levels would be if current land management plans were followed Butruille said

Each draft forest plan examines a number of alternative strategies for long term management Butruille said the council maintained that the alternative that was supposed to show current harvest levels did not

The alternative instead outlined current land management plans that were rewritten to incorporate laws passed since they were written said Wallace Shiverdecker public affairs officer for the region

The alternatives as a result show lower logging levels and less land in the timber base Shiverdecker said

Butruille added that comments in this next 90 day period will not be restricted to the supplement All of the 1 000 plus pages in the documents will be open for comment

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper The Bulletin
Where published Bend, OR
Date of issue 1-27-87
Sent by Inez Cuellar
Stationed at Ochoco NF

Could mean longer review period

Supplemental forest info a possibility

A big question mark is hanging over the Ochoco National Forest and it will be at least two more weeks before the question is answered

That's because regional Forest Service officials are awaiting an evaluation to determine if Northwest forest offices need to provide supplemental information to draft environmental impact statements, said Ochoco National Forest Supervisor Dave Rittersbacher

Should the evaluation team determine that supplements are needed public comment periods will be extended for another 90 days or so, Rittersbacher said

The evaluation stems from two appeals filed with the forest service by the Northwest Forest Resource Council in April and August of 1986. The NFRC, an association of timber industry groups, did not approve of the way the current management plans were displayed and characterized in the Draft Environmental Impact Statements and contended the forest service should have provided more of an opportunity for the public to comment on the use and development of minimum management requirements (MMRs), Rittersbacher said

MMRs are factors necessary to maintain minimum viable populations of forest species such as the amount of old growth and snags necessary to sustain woodpeckers, Rittersbacher explained

The NFRC in its appeals said the forest service did not comply with the National Environmental Policy Act (NEPA) as it failed to prepare an environmental impact statement for the MMRs and that the forest service failed to comply with the planning requirements of the National Forest Management Act, Rittersbacher said

The NFRC "wanted us to show what current direction would produce without the constraints of MMRs," Rittersbacher said explaining more timber would be available for harvest without the constraints of MMRs

Currently the forests are managed without MMR constraints, however the NFMA of 1976 requires new forest management plans to incorporate MMRs, Rittersbacher said

J. Lamar Beasley, deputy chief of the United States Department of Agriculture, dismissed the NFRC's appeals

(See 'Forest Service,' page 2)

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: Central Oregonian
Where published: Prineville, OR
Date of issue: 1-29-87
Sent by: Inez Cuellar
Stationed at: Ochoco NF

★Forest service—

(continued from page 1)

on procedural grounds but said the appeals had some merits and would be considered

The forest service still feels the need to clarify how we categorize and display the current direction and alternative and feels that there should be some public input on the development, effect and use of MMRs, Rittersbacher said

Consequently, a team has been developed to determine if supplemental documents should be prepared for national forests in Oregon and Washington that did not include MMR constraints under the present management plans, Rittersbacher said. The 12 forests that have not prepared their Draft Environmental Impact Statements will incorporate that information in their documents, he said

The question now remains whether or not the Ochoco National Forest will have to prepare supplemental information to its Draft Environmental Impact Statement and extend the public comment period

"We think we've met the requirements, but that has to be determined by the regional team," Rittersbacher said

A supplemental document "could help our efforts in determining what our final plan would be."

Rittersbacher said he would like to think this new turn of events will not delay the development of a forest manage-

Group reacts to forest issues

To the Editor

The long range plans for the 19 national forests in Oregon and Washington now being issued for public comment by the U.S. Forest Service are extremely important to the people of these two states, especially those who live and work in the scores of small, timber dependent communities. These plans can be blueprints for economic stability by providing high levels of timber output while protecting wildlife, watershed and recreational values. However there is a gut level fear spreading through these communities that our way of life is instead threatened by major reductions in the wood harvests from national forests – 25 percent or more – that sustain logging and mill jobs and the local businesses they support.

We've heard a lot lately about setting aside huge acreages of forest for the spotted owl, a bird that isn't even on the federal threatened or endangered species list. We're going to hear even more about new minimum-management requirements that were adopted without any opportunity for public comment and they are already having a drastic effect on harvest levels.

It's important for all of us to make our voices heard on the Forest Service planning process before it's too late. We need to organize at the community level to do this. A few such community organizations already exist, and we're tying ourselves together into an umbrella group called CPR — Citizens for Perpetual Resources. Your community needs to be a part of this effort, and we'll be glad to share ideas with you. You can contact us by writing to CPR, P.O. Box 33, Florence, Oregon 97439.

Sincerely,
Del Phelps
President

Name of paper: Central Oregonian
Where published: Prineville, OR
Date of issue: 1-29-87
Sent by: Inez Cuellar
Stationed at: Ochoco NF

—Editorial—

About a month ago, a *Times-Herald* editorial called for an extension of the public comment period for the proposed Ochoco National Forest plan because of slowly building public interest.

It now appears that the comment period may be re-opened, but for different reasons.

A forest industry group, in an appeal to the regional forester, said that the public should be given certain information about current management practices and about minimum management requirements.

The appeals were rejected, but the regional forester has ordered all future plans to incorporate the kind of information asked for in the suit.

It also appears that those seven forests that have already come out with their plans will have to issue suplements to them, and re-open public comment.

Ochoco Forest Supervisor Dave Rittersbacher believes that his forest may not have to issue the supplement, because, he said, the information is already included in the plan.

But it is still uncertain whether a supplement will be required, and a decision is due next week. That decision will be made by a panel of forest planners meeting in Seattle. They will decide whether all seven forests need to publish supplements, or whether each may be considered individually.

If a new public comment period is opened for the Ochoco, it will provide an opportunity for people to give the kind of responses that the Forest Service is looking for — thoughtful and well-reasoned.

During the initial comment period, most of the comments received were form letters, according to Ochoco Forest Planner Earl Layser. Many of them supported the timber industry's proposal for continued high timber harvests. Others were from snowmobile groups, and from environmentalist organizations.

This new period would give people the chance to more fully outline their concerns and to give the reasons for their views.

The plans for our local forests will, in a large measure, determine the mix of economic value, aesthetic qualities, and recreational opportunities that provides the tenuous economic stability and the bountiful quality of life that we find in eastern Oregon. That concerns every citizen in Harney County. We encourage every citizen to take an interest in the matter.

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper: [illegible]
Where published: Burns OR
Date of issue: [illegible]
Sent by: [illegible]
Stationed at: [illegible]

Analysis of public comment on forest plans continues

You labored for hours over your letter to the Ochoco National Forest Supervisor You carefully expressed your concern for more wildlife habitat or a larger timber harvest. Or perhaps you wrote a five page *commentary on the need for* more livestock grazing land

Now you are wondering what has happened to your correspondence or signature on a petition or form letter Was it filed away? Was it read? Was it placed in the pile for consideration?

According to Ochoco National Forest officials all the above are true Every piece of correspondence about the Draft Environmental Impact Statement and future management of the forest is being read considered and filed.

Approximately 2 140 letters postcards and other types of commentary materials on the future management plan has been received officials said. Some range in length from a few short paragraphs to 80 pages whereas others are signed form letters some with a few additional comments

The process of coding these *comments is now underway* with more than 2 000 of them evaluated and sent to the computer room where they ll be entered into a sophisticated data base said Jann Bodie who is heading the coding process

Once all comments have been logged the data base can be utilized for a multitude of purposes she said

For example the regional forest supervisor can query the data base to examine issues affecting the 19 forests in the region such as recreation or the harvesting of ponderosa pine

Ochoco National Forest officials can pull up data relating to their specific area of expertise For example Bodie said rangeland managers can evaluate grazing issues and timber managers can evaluate comments on allowable cut or preferred percentage of old growth

Once the coding process is completed forest service officials will have access to comments by specific groups such as school teachers conservation groups or timber experts, Bodie said.

Preferred alternatives can also be queried as can new ideas not presented in forest service documents she said 'We also have a section for new issues for when people write in and say hey I feel you missed the boat completely ' '

Channeling the stack of correspondence into this data base is a task in itself and not an easy one

It may take one person all day to decipher a letter and prepare it for the coding process Bodie says Some comments such as the one by Gov Neil Goldschmidt, will take several days

Six people sit in a small conference room in the Federal Building with dozens of magic markers and highlighters at their fingertips In each hand is a comment on the management of the forest embellished with bright pink dull gold sky blue or grass green colors

Each color is directly cor

(See Comments page 2)



Photo by Tami Bowker

Comment analysis center

This group of Ochoco National Forest Service employees has *spent almost a month reading evaluating* and coding the 2 140 public comments on the future management of the forest Jan Lee pictured third from the left is directing the coding process which is nearing completion Once all the comments have been logged into a data base office s will evaluate the information pertinent to their field of expertise Bodie said

related to a code which sounds easy enough, but there s more to it, Bodie said

Members of the coding group 'read the letter all the way through and get a feel for what that person is trying to say They look for the main points,' she said 'The concern is to track a person s thought, their total concern not a vote '

In some cases an individual has signed a form letter, written a personal comment in a modified form letter When this happens the coders take all three responses and treat them as one in order to track that person s thoughts, Bodie said

Personality stuff,' such as how long the person has lived in Prineville and owns irrelevant factors are not considered in the coding process she said

Instead what is logged is the issue such as wilderness recreation, or roadless areas whether the author is affiliated with an organization or not the type of response form it is such as a postcard individual letter modified form letter or an industry-associated form letter

Modified form letters "are treated differently because the person took the time to extend the thought, Bodie said

Coders take into account the number of signatures on a petition and always log the code area for each piece of correspondence so data can be *queried by area she said.*

The coding process is very time-consuming as each comment must be treated as the one before it, she said We have to keep it consistent. I want to make sure the same comments are going to the same place

Comments are weighed equally Bodie stressed, and the process does not put weight to one or the other

'It s a pretty cold and sterile process at this point she added

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper Central Oregonian
Where published Prineville OR
Date of issue 2-17-87
Sent by Inez Cuellar
Stationed at Ochoco N F

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FS 1600-9 (11/79)
☆GPO 1984 O 424 560

Local groups needed

To the editor

The long range plans for the 19 *national forests in Oregon and* Washington now being issued for public comment by the U S Forest Service are extremely important to the people of these two states, especially to those who live and work in the scores of small timber-dependent communities

These plans can be blueprints for economic stability by providing high levels of timber output while protecting wildlife, watershed, and recreational values

However, there is a gut level fear spreading through these communities that our way of life is instead threatened by major reductions in the wood harvests *from national forests — 25 per* cent or more — that sustain logging and mill jobs and the local businessess they support

We ve heard a lot lately about setting aside huge areas of forest for the spotted owl, a bird that isn t even on the federal threatened or endangered species list

We re going to hear even more about new minimum management requirements that were adopted without any opportunity for public comment They are already having a drastic effect on timber harvest levels

It s important for all of us to make our voices heard in the Forest Service planning process *before it s too late We need to* organize at the community level to do this A few such community organizations already exist, and we're tying ourselves together in to an umbrella group called CPR, Citizens for Perpetual Resources Your community needs to be a part of this effort and we'll be glad to share ideas with you You can contact us by writing to CPR, Box 13 Florence, Ore 97439

Del Phelps
President, CPR

NEWSPAPER CLIPPING SLIP

Name of paper [illegible]
Where published Burns, OR
Date of issue Feb 4 1987
Sent by Shirley
Stationed at Burns OR

Citizen input aids legislator

To the Editor

The nuts and bolts of what happens in the legislature is committee work It is here that the final form of legislation is hammered out, and in order for this process to run smoothly, we rely on the testimony of those from both the public and private sectors We in the Joint Committee on Trade & Economic Development enjoyed an interesting and enlightening meeting Wed , Jan 21

John Shelk, President of Ochoco Lumber Company in Prineville and Malheur Lumber Company in John Day gave testimony before the committee on the forest industry's past and future

John addressed the Forest Service's Ochoco Plan which includes a 20 percent projected decrease in the allowable cut Aspects of this plan are complicated and John did a great job of discussing its merits and problems

Our forests, in large part are the economic base of District 30 The only way we can make informed, accurate decisions is by those involved in the industry or any industry, presenting their side of the story I welcome and encourage, business people to be involved with the decisions we make in Salem Once again thank you to John Shelk

Sincerely yours
Sen Gene Timms
Burns

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper Central Oregonian
Where published Prineville, OR
Date of issue 1-29-87
Sent by Inez Cuellar
Stationed at Ochoco NF

Ochoco Forest may issue supplement to forest plan

By JIM DONOVAN
The Times Herald

Seven Northwest national forests may have to issue supplements to their proposed forest plans and re open public comment on them pending a decision by the regional forester's office

Ochoco National Forest Supervisor Dave Rittersbacher said that the Ochoco may not be required to issue a supplement

An appeal brought by the Northwest Forest Resources Council alleged that the draft environmental impact statements issued by seven northwest forests understated the current timber harvests in their "current direction alternatives

Each forest plan outlines many alternatives for managing the forest One of those called the 'no action' alternative must show the results of taking no action and continuing current management practices

The NFRC said that in many plans, the public was not made aware that the current direction alternative incorporated the requirements of a 1976 law not now being fully implemented

Current plans would show that we have more timber available than shown in the current direction plan with these requirements incorporated

Another contention of the NFRC was that those incorporated requirements, called minimum management requirements, were adopted without the opportunity for public comment

The group felt that the public should have the information about the current direction alternatives and the MMRs made more understandable in the drafts

According to Rittersbacher, the appeals were rejected by the regional forester on procedural grounds But, he said, 'it was felt that there was some merit to the appellants' claims, and that they needed to be looked at"

The NFRC and Sen Mark Hatfield have asked the secretary of agriculture to review the rejection of the appeals That decision is due in about a week

Rittersbacher said that those forests that have aleady issued plans or draft environmental impact statements may have to publish supplements Those that have not will have to incorporate the information in their future documents

He said also, "I believe that the information is there, (in the Ochoco's draft environmental impact statement)" He said that it may be debatable "whether it s in the appropriate format or location to be understandable"

Rittersbacher added 'I think we're in good shape with Alternative A It substantially meets the requirements the (regional) office has come out with '

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper The Bulletin, The News Rev
Where published Bend, OR
Date of issue Feb 4, 1987
Sent by SMR & BRC
Stationed at Bend, OR

Ochoco plan draws comments

By Stephenie Monson
Bulletin Staff Writer

PRINEVILLE — Ochoco National Forest officials heard it all when sifting through comments about the future of the forest

But the timber harvest and Lookout Mountain roadless area received the highest volume of comments.

Big game habitat firewood and other roadless areas were among issues also on the minds of many of those who sent comments to the U S Forest Service

The draft land management plan for the forest released last fall drew approximately 2 000 letters that contained about 25 000 individual comments

The largest volume of mail came from people supporting a timber industry plan for managing the Ochoco forest and Crooked River National Grassland.

A total of 922 form letters were sent in support of the industry backed Alternative B plus which would increase the annual harvest of ponderosa pine

However Ochoco public affairs officer Joe Meade stressed that the U S Forest Service was not taking a vote count during the comment period

Timber was the general issue that got the most attention with a total of 4 875 comments.

Many people said the Forest Service should stop clearcutting said Jill Lowen a data entry person in the forest s planning office who had the job of reading each of the 2 000 letters

The timber harvest also was on many hunters minds Several people wrote saying that more trees should be left to give cover to the elk Lowen said

Other hunters also asked that the 16 000-acre Lookout Mountain roadless area remain closed at least during the hunting season

However snowmobilers asked that they continue to be allowed to drive their vehicles through the area and some writers asked that the road to the top of Lookout Mountain be reopened

Those who commented about firewood cutting said the annual harvest level should remain the same or increase Lowen added

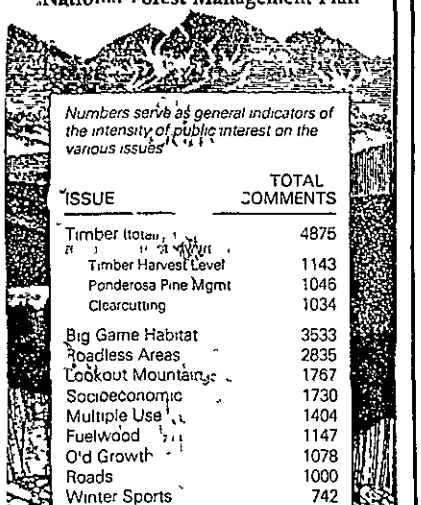
The comments will be used to prepare a final land management plan which should be released in about a year The plan will govern the forest for the next 10 to 15 years

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper The Bulletin
Where published Bend
Date of issue 5/21/87
Sent by Melissa Shaw
Stationed at Ochoco NF

Comments Received on the Ochoco National Forest Management Plan



Numbers serve as general indicators of the intensity of public interest on the various issues

ISSUE	TOTAL COMMENTS
Timber (total)	4875
Timber Harvest Level	1143
Ponderosa Pine Mgmt	1046
Clearcutting	1034
Big Game Habitat	3533
Roadless Areas	2835
Lookout Mountain	1767
Socioeconomic	1730
Multiple Use	1404
Fuelwood	1147
Old Growth	1078
Roads	1000
Winter Sports	742
Livestock Grazing	651

Source U S Forest Service

To show current direction

Forests to work up new alternatives

Ochoco National Forest planners are working on a supplement and a mock up display to provide information not included in the proposed forest plan issued last year, according to Burns District Ranger Fred Harnisch

The Northwest Forest Resources Council, a group that champions timber industry concerns, filed two appeals with the Secretary of Agriculture concerning Minimum Management Requirements, or MMR's

MMR's are guidelines that set a minimum level of resource protection below which forest management may not fall Some MMR's were developed nationally, others on a more local basis Those with which the NWFRC is most concerned deal with wildlife habitat, clearcut dispersal, water quality, and riparian areas

The NWFRC averred that the forest plan alternatives that dealt with current practices were inaccurate because they incorporated MMR's It asked that existing management practices be projected into the future, rather than projecting what they would be if MMR's were incorporated

The NWFRC also asked that different levels of MMR's be developed The Forest Service countered that there could be only one minimum level of resource protection legally and scientifically justifiable

Though the Agriculture Secretary denied both appeals he directed the Forest Service to address the concerns raised in them Therefore, forests that have not yet issued their plans will incorporate a current direction alternative that will reflect current practices projected into the future along with an alternative that shows current practices modified by MMR's

Forests that have already issued their plans will issue supplements explaining the current direction without MMR's

In addition, all forests will produce a display called a mock up by the Forest Service, that will show how variations in MMR's will affect timber harvests, wildlife, water quality, and old growth areas, and other resources The Ochoco's mock up will be on display at the Hines office in a few months, Harnisch said The supplement should be finished at the same time, he added

A public comment period will be allowed only on the supplement, Harnisch said Comments will not be accepted on elements of the plan that have already come under public comment

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NEWSPAPER CLIPPING SLIP

Name of paper The Bulletin
Where published Bend
Date of issue 5/21/87
Sent by SMR & BRC
Stationed at Ochoco NF

Public needs voice in management

By GOV NEIL GOLDSCHMIDT

Oregonians can and must have a decisive voice in determining how federal timber lands in the state are managed These timber resources are too important to the state's economic well being to be left to the federal government alone

Our state is the top lumber producer in the Unites States, we produce 24 percent of all softwood lumber in the country We are first in plywood production and 20 percent of the country's total soft wood sawtimber inventory is here

More importantly to Oregonians about 37 percent of all our manufacturing jobs are in the wood and paper industries That doesn't account for the fact that each timber industry job supports about two others

Many of these jobs are in the small towns and rural areas that have not yet benefitted from the diversification of Oregon's economy

Moreover, more than half of Oregon is federally owned and more than half the logs processed in Oregon come from federally owned lands

That's the reason we are becoming more involved in Forest Service and BLM forest planning And that's why some of you may have seen Norm Johnson and other representatives from my office in John Day, Grants Pass, Gold Beach and other towns and communities around the state

We are in the process of reviewing the federal forest management plans that are due out for each National Forest and many of the BLM lands in the state And we want to know what local residents see as their vital interests

My goal is to present a coordinated state response to each Forest Service and BLM plan

During the campaign I said that it is critical to the state's economy to maintain a healthy forest products industry, while at the same time maintaining our high environmental standards That s still the case and that s why we re working hard to develop plans that are both economically and environmentally sound

It bears repeating that Oregonians care passionately about their federal forests and the way those forests affect our future and not just over the short run

Oregonians care about a steady supply of logs to our mills sustained yields, well managed fisheries and high quality wilderness recreation areas And we care about long run stability in our timber based communities That's why we're finally making ourselves heard in the federal timber management process

FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
Bulletin
Where published
Bend OR
Date of issue
12 3 87
Sent by
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Stationed at
Ochoco NF

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Five Central Oregon rivers included in Hatfield proposal

Staff and wire reports

PORTLAND — Five Central Oregon rivers are included in legislation announced Friday by Sen Mark Hatfield to designate or study more than two dozen Oregon rivers for protection under the Wild and Scenic River Act

Hatfield, R Ore , said in Washington, D C , he intends to introduce legislation in January to designate or designate for study at least 27 rivers in Oregon as wild, scenic or recreational under the Wild and Scenic River Act

The legislation, which will include sections of the Deschutes, Metolius, John Day, Williamson and North Fork Crooked rivers, will be "the largest river protection act in the history of the lower 48 states," said Bob Doppeld of the Oregon Rivers Council

Oregon Democratic Reps Peter DeFazio and Les AuCoin announced Friday they plan to introduce similar legislation in the House

The Senate bill will include those rivers the U S Forest Service has indicated meet the minimum criteria for wild, scenic or recreational status in draft forest plans being released for the 13 national forests in Oregon, Hatfield said

My interest and love of Oregon s rivers runs as long and deep as the rivers themselves," Hatfield said 'Over the years, the inclination to dam, divert or develop these rivers has increased enormously While some of the needs leading to these efforts are real and understandable, others are not."

Andy Kerr of the Oregon Natural Resouces Council applauded the proposal, but said it doesn t protect as many Oregon rivers as his group would like

"Conservationists are extremely pleased in Senator Hatfield's interest in Oregon's free-flowing rivers," Kerr said "But the list that Senator Hatfield released is simply a list of those rivers the Forest Service has looked at The Forest Service owns only about 25 percent of the forest lands in Oregon, so they looked at only roughly 25 percent of the rivers"

The rivers to be included in Hatfield's bill are the Deschutes and Metolius in Deschutes National Forest, the Sycan, North Fork Sprague and Chewaugan in Fremont National Forest, the Clackamas, Roaring, Salmon and White in Mount Hood National Forest, the North Fork Crooked River Deschutes and Crooked Area in Ochoco National Forest, the Rogue in Rogue River National Forest, the North Fork Chetco in Siskiyou National Forest, and the Alsea, Nestucca and Siuslaw in Siuslaw National Forest

They also include the Grande Ronde, Tucannon North Fork John Day and Wenaha in Umatilla National Forest, the North Umpqua in Umpqua National Forest, the Lostine North Powder, Grande Ronde, Eagle Creek, Joseph Creek and North Fork John Day in Wallowa Whitman National Forest, the Williamson and Sycan in Winema National Forest, and the McKenzie in Willamette National Forest

"One of the most glaring omissions is the Klamath River, which includes the proposed Salt Caves dam," Kerr said Other rivers we feel should be on the list are the Donner und Blitzen in southeastern Oregon, the Nehalem River, North Santiam and Smith

' We're also concerned that Senator Hatfield avoided dam sites on the McKenzie and Nestucca rivers," said James Monteith of the Oregon Natural Resources Council "While portions of the Nestucca and McKenzie are on the list, the list does not include dam sites on the rivers — the Walker Creek dam on a Nestucca tributary and the Strupe Dam on the south fork of the McKenzie River

Nationally, 74 rivers have received wild, scenic or recreational status, including the Snake, Rogue Illinois and Owyhee in Oregon The North Umpqua River was designated a study river ' for recreational status in 1984 and 11 Oregon rivers are protected as scenic waterways by the state

The proposed legislation likely will bolster the efforts of a Central Oregon based group seeking to have sections of 11 rivers in Oregon included in the state Scenic Water way Program Supporters are gathering signatures to put the proposal on the ballot

USDA—FOREST SERVICE

NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend OR
Date of issue
12-6-87
Sent by
C-A
Stationed at
Ochoco NF

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NEWSPAPER CLIPPING SLIP

Name of paper
The Bulletin
Where published
Bend OR
Date of issue
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Sent by
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Stationed at
Ochoco NF

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Ochoco project tops list

A $7 million expansion of the Ochoco Lumber Co in Prineville topped the list of new industrial projects announced in Central Oregon during the third quarter of 1987

Construction of a new small log sawmill at the Ochoco Lumber Co began in September and is scheduled to be completed in April or May of next year, said John Shelk, managing general partner The addition to the mill is expected to create about 20 new jobs

Shelk said the new small log mill will allow the company to compete successfully with other mills in the region that process small logs

'We felt the definite need of automating the handling of small logs," said Shelk "This will bring us much more in line with some of the newer, more automated mills in the region as far as processing small logs "

In addition to the Ochoco Lumber project, Pine Products Corp announced a $5 million co-generation plant for Prineville, and the Precision Lumber Co revealed plans to build a new wood remanufacturing plant at a cost of $780,000

The three projects, with a total value of $12 8 million, were the only planned investments announced in Central Oregon from July through September, the Oregon Economic Development Department said

More than $386 2 million in planned investments were reported in Oregon during the third quarter said Richard Reiten director of the department That brings the year-to-date total to $950 million

The third quarter s total announced investment figure is about 96 percent of the previous quarter s total The planned investments for this third quarter amount to about three times the amount logged in the third quarter of 1986

Permanent job losses seen in forest industry

BOISE Idaho (UPI) — Most Idaho timber jobs lost in the 1980 1982 recession were replaced by machines and are gone forever an article in Boise State University s business journal says

The article cited statistics showing that while lumber production has largely bounced back from the recession employment levels have not.

When lumber production peaks out in 1987 the industry will likely employ no more than 16 000 workers the journal said "That's at least 2 500 less than in 1979 '

The journal said the popular perception has been that the industry is and continues to be in recession

But the cause of job loss in the state s timber industry is not high wages a restricted government timber supply the Canadians or the recession The fact is that the process of modernization has changed the industry and permanently reduced employment, the story said

Article author Andy Brunelle, who has a master s degree in public affairs from the University of Oregon and studied the effects of the changing timber industry on the Northwest, said mills built in the future will have the same productive capacity but will employ about 40 percent fewer workers

United States
Department of
Agriculture

Forest Service

**Pacific
Northwest
Region**

1989



Reprinted
1991

Appendices - Volume 2
B thru H

Final Environmentental Impact Statement

Land and Resource Management Plan

Ochoco National Forest and Crooked River National Grassland

Caring for the Land...

Appendices - Volume I A and I - Response to Public Comment

This volume of the appendices has not been included in this reprinting of the Ochoco National Forest Land and Resource Management Plan.

If you wish to view this document a copy is available at the Ochoco National Forest Supervisor's Office, 3000 East Third Street, Prineville, OR 97754.

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Appendix B

Description of the Analysis Process

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Appendix B

Description of the Analysis Process

Introduction (Section 1)

The Planning Problem

The National Forest Management Act and the implementing regulations (USDA-Forest Service 1982) require each National Forest to develop a comprehensive multiple resource land management plan. These regulations outline a complex, systematic process aimed towards the development and evaluation of alternative Forest plans designed to resolve public issues and management concerns, and to capture management opportunities in a cost efficient manner.

The complexity of this problem for the Ochoco National Forest and Crooked River National Grassland stems from several sources. First, potential management activities must be scheduled and evaluated over a long period of time, ranging from 50 to 150 years. Second, the entire National Forest and Grassland, approximately one million acres in size, need to be assessed simultaneously. A wide variety of conditions exists within this area. For resource plans to be effective management tools, the direction provided must be specific enough to enable project level planners to readily determine if contemplated activities contribute towards and are consistent with Forest-wide goals and objectives. In addition, potential activity schedules need to be assessed relative to multiple resource criteria. These resources include many types of fish and wildlife, recreation, range, timber, water, minerals, and cultural assets.

The need to ensure that the scheduled activities are cost efficient adds an additional complexity. Related to this problem is the fact that, in many cases, a proposed management regime that appears to be best for a specific site or timber stand will not be best from a Forest-wide perspective. Constraints placed upon timber harvest, which require harvest levels to remain at a given level, can cause this condition.

The scope, complexity, and cost efficiency orientation of this planning process led the Washington Office of the USDA-Forest Service to conclude that National Forests must use linear programming (LP) as the central analysis tool. The optimization characteristic of LP ensures cost efficient allocation of land, labor, and capital resources. Additionally, LP appears to effectively deal with the complexities described above.

The Planning Process

The planning process described in the NFMA regulations (USDA-Forest Service 1982) was conceived within the framework of systems analysis. That is, the planning process was seen as a rational, analytical means of solving the complex problems associated with multiple-use forest management. The ten step planning process described below is outlined in the NFMA regulations and is intended to meet the requirements of both NEPA and NFMA.

Step 1: Identification of issues, concerns, and opportunities - In any systematic approach to problem solving, the first step is to identify the problem In this step, the interdisciplinary team (ID Team) identifies and evaluates public issues, management concerns, and resource use and development opportunities. What does the public want? What does the Forest Service want? What needs to be done?

Step 2: Planning criteria - The issues, concerns, and opportunities (ICO's) collected and evaluated in Step 1 are be used to develop decision criteria for evaluating alternatives. Planning criteria are also used to guide the collection and use of inventory data and information, analysis of the management situation, and the design and formulation of alternatives. What tests, rules, and guidelines are needed to complete the plan and select the best solution?

Step 3: Inventory data and information collection - Based on the ICO's, data is collected which will allow analysis of the problems identified. What and where are the resources available? In what amounts?

Step 4: Analysis of the management situation - In this stage, the Forest estimates the range of various goods and services it can produce, the potential to resolve public issues and management concerns, and the technical and economic feasibility of providing various levels of goods and services. The primary purpose of this step is to provide a basis for formulating a broad range of alternatives.

Step 5: Formulation of alternatives - A broad and reasonable range of Forest Plan alternatives is formulated to provide a variety of ways of responding to the ICO's. Each major problem must be addressed in at least one alternative.

Step 6: Estimated effects of alternatives - This stage estimates and displays the physical, biological, economic, and social effects of implementing each alternative. What will happen if a certain set of management prescriptions is chosen?

Step 7: Evaluation of alternatives - The significant physical, biological, economic, and social effects of each management alternative are evaluated with respect to the decision criteria established in Step 2.

Step 8: Selection of alternative - Using the decision criteria, a preferred alternative is selected.

Step 9: Plan implementation - The preferred alternative will be used to develop multi-year program proposals. These proposals will be consistent with the standards and guidelines set forth in the Plan.

Step 10: Monitoring and evaluation - A monitoring plan is established to evaluate how well objectives have been met and how closely standards and guidelines have been applied. Periodic evaluation reports are required. Based on these reports the Plan may be revised or amended if necessary.

This process can be viewed more broadly as occurring in three phases:(1) judgmental phase, (2) analytical phase, and (3) execution phase. Planning Steps 1, 2, 7, and 8 make up the judgmental or selection phase of the process. In this phase, ICO's are identified, and decision criteria are established. Then, based on the analytical phase, alternatives are evaluated and a preferred alternative is chosen.

No one alternative will satisfy all goals and objectives better than all others. The decision maker compares the trade-offs between alternatives and decides which balance of outputs, conditions, and uses represented by an alternative maximizes net public benefits.

Planning steps 3, 4, 5, and 6 represent the analytical phase of the process. Appendix B is primarily concerned with this portion of the process. In this phase, data is collected which addresses the ICO's and objectives of the Forest. Estimates of the Forest's potential to address the ICO's are developed. Alternatives which focus on producing various combination of goods and services are developed and the effects estimated. This information is then provided to the decision maker to use in choosing a preferred alternative.

The final phase is implementation and monitoring (planning Steps 9 and 10). Planned actions will not

always produce the desired results. Through monitoring and evaluation, inconsistencies between desired conditions and actual results can be identified and corrected.

Changes Between the DEIS and FEIS

As a result of responding to comments received from public and organizations following the release of the Draft EIS, the following listing is a summary of changes made for this Final EIS. These changes are the result of a concerted Forest effort to respond to comments received during the Draft review process. The changes revolved around data and data sources, processes, additions of new issues, additional analysis, and the elimination or modification of DEIS alternatives or the development of new alternatives.

New and Expanded Issues

Between the DEIS and FEIS the timber issue was broadened to include uneven-aged management and large diameter ponderosa pine; four new issues were also identified: anadromous fish, historic trail preservation, off-road vehicle use (ORV), and Round Mountain. The following sections describe the changes made since the DEIS to deal with new or updated issues or new ways of addressing the old issues.

New Prescriptions and Yield Streams Applied in FORPLAN Model

Uneven-aged timber management applied to ponderosa pine on general forest (20" target size).

Uneven-aged timber management applied to ponderosa pine in special areas with 30-inch DBH target size:Lookout Mountain, Stein's Pillar, Deep Creek, North Fork Crooked River.

Uneven-aged timber management (group selection) applied to mixed conifer in some areas.

Extended rotation ages and new thinning cycles for ponderosa pine in general forest.

More reliance on mixed conifer to produce cover for big game.

Acres and Timber Yield Tables

Acres - Condition classes (i.e. the amount of pine sawlogs, saplings, etc.) have been updated from the 1983 information used in the DEIS. This was done to more accurately assess timber harvest scheduling and its associated outputs and effects.

Timber Yield Tables - Yield tables were updated to reflect the growth that has occurred in the last five years in order to more accurately determine outputs and effects.

Other

New elk coefficients.

New Habitat Effectiveness model for elk.

New mapping systems (Mount Hood Map, LIDES, Plot 7) installed for visual and analytical capabilities.

Standard view shed procedures eliminated in favor of set width (1200 ft)

New riparian analysis and scheduling based on updated stream condition inventory.

Potential water developments for livestock and wildlife re-evaluated.

Existing old growth inventory updated.

Anadromous fisheries identified. The analysis included resource production relationships and economic parameters.

Potential for mineral exploration and leasing, economic value of mineral leases incorporated.

Potential for capital investments concerning developed and dispersed recreation, including trails, re-evaluated.

Alternatives

Alternatives B-Dep, D, E, F, G, H, H-Dep have been dropped.

Alternatives B and C have been modified to incorporate new ICO's.

Alternatives A and E-Dep have been updated.

Alternative I has been developed based on ICO during the DEIS review process and is the preferred alternative.

Inventory Data and Information Collection

(Section 2)

Overview

Following the identification of ICO's and planning criteria, the Forest made some basic decisions concerning the types of inventory data to be used and the methods of organizing this information. Two different forms of information were recognized by the ID team as essential to complete the task. The first form consists of data tied to a map base. Timber stand mapping or potential big game management areas are examples of this form. The frequent and varied needs to relate these inventories to each other, and to aggregate or disaggregate massive amounts of data at several different levels, led the Forest to develop an automated geographic data base using the R2MAP software system at the Fort Collins Computer Center (FCCC). The second general type of data needed were items not tied to a map base. For example, forage yield data or cost data apply to certain categories without reference to a specific geographic location. Each of the individual ID team members and forest specialists organized this information in the most efficient manner for the intended use. The following page briefly describes data base development and some of the major uses of the Forest's inventory data.

At the time the Forest planning process was initiated, a new timber inventory was already underway on the Forest. This inventory was completed in 1982. The stand mapping completed for this inventory provided the most recent and accurate map of the Forest's timbered vegetation Consequently, this map was heavily relied upon throughout the planning process and was the basis for development of analysis areas (see Section 3, pages B-18 through B-20). For most other resources, the ID team felt that adequate data was already available or could be readily assembled. In some cases, better inventory data would have been very useful had time and dollars permitted major new inventories. In order to adequately address public comment to our DEIS, updates were made to our riparian, old growth, and range structural improvement data. Section 2, pages B-7 through B-9, gives a brief summary of the major data sources used and the general reliability of each.

Changes Between the DEIS and FEIS

The major changes discussed in this section are the new or updated data concerning old growth, riparian condition, water developments, and the installation of new computerized mapping systems.

Data Organization and Use

Data Base Development

The Forest considered use of several different geographic data bases before settling on R2MAP. R2MAP is a simple grid cell mapping system available to the forest through the FCCC. The system was thoroughly tested at the time this decision was made and had, in fact, been used previously on the Ochoco for a limited area in a unit planning effort. Selection of a grid cell size and map scale was neces-

sary to initiate data base construction. Three different scales were considered for use: 1" to the mile, 2" to the mile, or 2 64" to the mile. The latter scale, 2.64" to the mile, is the one used in the standard 7 5 minute USGS quad series which has been adopted by the Region for the primary base map series. Regional Office support and the suitability of this scale for most of the forest's mapping needs led the ID team to select this scale. The most convenient grid cell size for this scale is approximately three acres per cell. Given that several of our inventories were mapped to a 2-3 acre resolution, and the ID team wanted to retain as much accuracy as feasible, the use of a three acre grid cell size seemed appropriate and was adopted.

Many different layers of data were identified by the ID team as necessary for calculation of outputs, conditions, costs, and effects for the Forest Plan. In most cases it was apparent that use of the R2MAP data base would be an efficient method to provide the necessary data. Existing mapped data was gathered from several sources (TRI, specialist's maps, inventory records, etc.) Easily mapped information was prepared where none existed at the time. In most cases this information was placed on 2.64" to the mile quad maps or 4" to the mile quad maps.

Coding schemes were developed for each layer using two character codes for each attribute. An up-to-date code book containing all of these codes is maintained in the planning files. Each of the input layers was then coded, quad by quad, by placing an acetate grid over the source map and placing the appropriate attribute code on the grid. These maps were then entered onto floppy disks via a R2MAP data entry program (GRIDENT) available on TI-990 intelligent terminals, and transmitted to FCCC. The various programs of the R2MAP system were then available to format the data and perform the basic functions of a grid cell mapping system. Each of the layers input was overlaid against an ownership base layer to ensure that consistent boundaries were present on each layer. Updates, changes, or corrections to data already in the system were accomplished by either changing the codes, changing individual cells, or re-inputting affected quads.

The selection of layers to include in R2MAP followed from several criteria. The major need for forest planning was the ability to combine basic resource data and geographic locations into analysis areas and relate those acreages to potential land allocations. Therefore, basic resource data, geographic locators, and potential land allocations were selected for inclusion in the data base. Other layers were included to help provide data for the calculation of costs, yields, constraint values, or acreage adjustments. Additional criteria involved in the decision to include or exclude potential layers included: 1) time or costs to map, code and enter, 2) frequency of potential use, 3) stability of data, 4) importance of related ICO's, 5) complete current data available, and 6) potential for development of new applications. As needs and conditions changed new layers were added and/or revisions made to existing layers. Between the DEIS and FEIS, the Forest undertook an extensive effort in updating its mapping capabilities. Computer maps were produced with Mount Hood Map, LIDES, and Plot 7.

Major Uses of Inventory Data

Analysis Areas

In current planning processes the land and resource base is described in terms of a set of delineators that define analysis areas. Analysis areas represent aggregations of many individual mapping units that are identified with identical delineators. Without reference to these individual units, sometimes called capability areas, analysis areas lose site specificity. The fact that forest planning attempts to deal comprehensively with multiple resources across an entire Forest requires that analysis area delineators reflect fairly broad conditions. The selection of these identifiers is an important step, however, since the composition of an analysis area defines the range of management activities appropriate for a given objective and the resultant costs and yields. The analysis model FORPLAN does much of the assignment of prescriptions to analysis areas based upon these costs and yields.

Analysis areas were constructed by overlaying several resource inventories (District boundaries, unroaded areas, working groups, slope classes, timber size classes, and forage productivity classes) with the R2MAP data base and aggregating small units into larger ones. Verification of the spatial feasibility of the model results also requires that analysis areas be represented on a map. In addition to these functions, use of R2MAP has allowed the Forest to efficiently determine how each analysis area relates to broader land classifications.

Costs and Yields

In order to estimate various costs and yields, data was assembled from many sources. In some cases, data representing several years experience were averaged together (e.g. precommercial thinning costs). In other situations, historical data were not representative of anticipated practices, and estimates were constructed (e.g. reforestation costs). Another example of data usage to construct production coefficients involved using Forest plantation data to drive a simulation model (e.g. timber yields from PROGNOSIS). The Forest's R2MAP data base aided in the construction of production coefficients by providing the acreages of specific categories within other more general categories. More specific data could then be averaged together, using acreages as weights for use within the broader classifications (e.g. forage yields by fairly broad working groups). The derivation of production coefficients is discussed in more detail in Section 3, pages B-44 through B-45 (yields) and Section 4, pages B-51 through B-52 (costs). Section 2 contains a summary of major data sources used by the Forest.

Timber Suitability

The Forest followed a process to determine which timbered lands were unsuitable for timber management according to Regional and National direction This process included a screen for regeneration difficulty. The Forest's soil resource inventory was used to locate areas with potential regeneration difficulty. Field checking focused on those sites and, when completed, resulted in a new map of verified unsuitable areas. This inventory was entered into the Forest's data base and overlaid with the timber map, resulting in an updated suitable timber map. The timber suitability process and results are presented in more detail in Chapter 3 of the FEIS (pages 3-62 through 3-65).

Alternative Development

A basic need in the development of alternatives was inventory data describing the land base (analysis areas). Section 3, pages B-18 through B-20, contains a description of the Forest's analysis areas. Analysis areas provided the basis for the scheduling of activities and estimation of outputs, costs, and effects for each alternative As described above, data were also essential for estimation of the production coefficients used to drive the Forest's FORPLAN Model. Additionally, it was essential to relate the activities scheduled on individual analysis areas to broader land classifications suitable for implementation of management direction for each alternative (management areas). Potential management areas were inventoried for many of the management area prescriptions (big game, visual corridors, recreation areas, etc.) The Forest's R2MAP data base greatly facilitated this task.

Implementation and Monitoring

Inventory data will continue to be essential when the plan moves into the implementation and monitoring phases Activities will be scheduled for implementation by referring the analysis areas on which they are scheduled to management areas. Changes in analysis areas, primarily due to timber harvest activities, will be reflected in an updated inventory to guide future activity scheduling. Data collected to monitor activities will be stored to facilitate midcourse corrections and future analyses. More detail can be found in the Proposed Forest Plan document, particularly in the monitoring plan.

Summary of Major Data Sources

Major data sources used in the planning process are summarized below.

Recreation Information Management (RIM) - This system consists of two major components. The first of these, a facility condition inventory, identifies maintenance and reconstruction needs for all developed facilities on the Forest. The second aspect of RIM contains recreation use estimates for each recreational activity, within each Recreation Opportunity Spectrum (ROS) class. This data provided the basis for recreational use projections by alternative (1982, updated 1988).

Recreation Opportunity Spectrum (ROS) - This inventory establishes the recreation potential on the Forest for various types of recreational opportunities (1983, revised 1985).

Trail System Inventory - This map shows existing and potential trail segments, existing trail conditions, and trail maintenance priorities. Trail systems for each alternative were developed from this information (1983, updated 1985, 1988).

RARE II and Roadless Area Inventories - These maps identify roadless area boundaries, according to Regional criteria, for use in the alternatives (1978, 1984).

Visual Quality Objectives (VQO) - The Forest was inventoried according to visual quality objectives as determined through a combination of variety class and sensitivity levels. This data guided application of management area prescriptions designed to retain or partially retain natural beauty (1983, revised 1985,1988).

Existing Visual Condition Map (EVC) - This map depicts the existing visual condition of the Forest, in terms of the degree to which an area appears to have been altered by man's activities. By establishing a reference point, this inventory allows a determination of how the alternatives alter existing visual conditions (1983).

Big Game Winter Range and Summer Range Areas - Based on big game habitat differences and actual big game usage, this map depicts the associated summer range and winter range areas used by various subpopulations across the Forest. This inventory was used to develop big game population projections, and to help develop management areas for the alternatives (updated 1-20-87).

Crown Closure/Thermal Cover - A data set describing the relationship between timber stand crown closure and big game thermal cover values was used to evaluate and control big game habitat (updated 6-26-84).

Old Growth - Maps of stands currently in an old growth condition were used to help identify how existing old growth would be affected by the alternatives. Maps of potential old growth management areas, based largely on distribution criteria, were used to help develop alternatives (3-15-88).

Nationwide Rivers Inventory - This inventory was conducted by the National Park Service, and served to identify which rivers on the Forest have the potential to be classified as Wild or Scenic Rivers (1982).

Watershed Condition - Watersheds were classified according to soil depth, riparian condition, road concentrations, and compaction hazards to help schedule timber harvests while meeting soil and water requirements (11-84).

Soil Resource Inventory (SRI) - This inventory identifies mapping units according to soil characteristics, vegetation, slope, aspect, landform, and bedrock characteristics. It was used to identify cost differences, suitability for some types of activities, and mitigation measures (12-77).

Riparian Improvement Schedule - This inventory identifies soil, water, and riparian problem areas, and was used to help determine costs and apply prescriptions (1-15-87).

Watershed Improvement Schedule - This inventory identifies soil, water, and riparian problem areas, and was used to help determine costs and apply prescriptions (1-12-89).

Physical and Biological Stream Surveys - Physical and biological data on most of the Forest's major streams were used to help develop and apply riparian prescriptions (1972-79).

Timber Inventory - The timber inventory and associated stand mapping was recently accomplished (1980-1982) and was the primary data used to describe the Forest's timbered vegetation. The stand mapping was a major part of the analysis area stratification. Timber volume and growth by species from the inventory were used as the basis for existing stands yield tables.

Managed Timber Yield Table Data - Several sources of data were used to develop and calibrate the timber yield tables for regenerated stands. Plot data from actual Forest plantations and naturally regenerated areas formed the main data input to the PROGNOSIS model used to generate these tables. Additionally, Forest stand exam data, previous inventory statistics, and published site index tables were used to calibrate the growth and yield model (1985, updated 1987).

Timber Suitability Map - Lands unsuitable for timber production due to physical and biological conditions that prevent successful regeneration were identified based on soil mapping, district experience, and field checking (1983).

Ecoclass Inventory - The Forest was mapped into plant communities using the classification established in the "Plant Communities of the Blue Mountains" guide. This map base provided a means of stratifying analysis areas for non-timber vegetation. Forage production data from the guide for each of these ecoclasses was used to develop livestock yields.

Cultural Resource Inventory - This inventory contains site specific data for the pre-historic sites known to exist on the Forest, and provided the context for the estimation of effects for the alternatives. (1976-present)

Transportation Sheds and Road Map - Areas of the Forest were mapped into transportation sheds, thereby delineating areas of similar traffic patterns and costs. This facilitated analysis of cost efficient transportation investments, and tied directly to a map of existing road segments and conditions (1989).

Road Management Plan - This plan contains data identifying road segment categories, mileages, travel times, haul and maintenance costs, construction/reconstruction needs and costs, and existing traffic levels. This provided the basic data for the Forest network analysis for each alternative (1989).

Slope Map - The Forest and Grassland was mapped into two slope classes to help determine appropriate activities and costs, and to schedule prescriptions efficiently (1983).

Timber Sale Appraisal Records (2400-17 Forms) - This data set was used to develop stumpage values and logging costs (76-84).

ADVENT/RPA Cost Data - Actual expenditures and planned costs were used to help develop cost data (76-86)

IMPLAN National and County Data Files, 1982 - These data describe the local counties' economies and the inter-industry transactions that occur as goods are produced and sold. They formed the base data used by IMPLAN to help predict local economic impacts of the alternatives.

Output Expenditure Data - These are used in the IMPLAN model. They compute the effect upon given sectors in the local economy of changing a unit of Forest outputs. This allows IMPLAN to trace the effect of the alternatives on local jobs and income. Some expenditure data was computed from the IMPLAN model for 1982, other data was originally computed for 1977 and then updated to 1982.

Socio-Economic Overview - A contractor prepared overview described the social constitution of the local area. This was used as the basis to describe the effects of the alternatives on social patterns and trends (2-82).

Fuels inventory - Project-level site-specific fuels inventories were used to select fuels models for the Fire Analysis System (late 1970's to early 80's).

Fire History/Weather History Records - These historic records provided the baseline data for the Fire Analysis System. This system was used to determine the most cost efficient fire suppression strategies given these historic probabilities of fire behavior and weather (1970-79).

Brush Disposal (BD) Appraisals - These appraisals provided data used to develop BD costs for efficient treatment scheduling (1980-84).

Mineral Potential Reports and Maps - Two separate documents were prepared - one for the Crooked River National Grassland (6/88) and one for the Ochoco National Forest (3/89). These documents discuss locatable and leasable minerals, addressing the geology of the area, historic mine production, and mineral potential. Both documents include mineral potential maps that are reproduced in the Plans. The documents are available for review in the Supervisor's Office.

The Forest Planning Model (FORPLAN)

(Section 3)

Overview

Forest planning is a very complex process. An enormous amount of information must be considered before an alternative management plan can be recommended as the one which best addresses the issues, concerns, and opportunities identified at the outset of the planning problem. Because of this complexity, several interrelated computer models and analytical tools have been utilized to help determine the decision space within which alternatives can be developed, and to evaluate their associated outputs and effects.

One of these models is called FORPLAN. The name is an acronym for FORest PLANning Model. FORPLAN is a computerized linear programming (LP) model which has its roots in RAM (Resource Allocation Model) and MUSYC (Multiple-Use Sustained Yield Calculations). It is composed of a matrix generator, a linear programming solution system (FMPS), and a report writer. Within the bounds of the matrix generator and the FMPS solution package, the user is allowed a great deal of latitude in formulating the mathematical representation of the forest planning problem to be analyzed. Our modeling analysis was performed with Version

I, Release 14. The system is maintained and operated on the Univac computer at Fort Collins, Colorado.

The Ochoco FORPLAN Model was specifically designed to help the Interdisciplinary Planning Team analyze the economic and production tradeoffs associated with the recreation, timber, visuals, range, water, and wildlife resources, and to help evaluate the extent to which various alternative management scenarios were able to address and resolve the identified planning issues. One key step in the development of the FORPLAN Model was to divide the Forest and Grassland into analysis areas Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN Model. Their delineations were intended to capture the significant social, biological, and economic differences in the way the land responds to alternative management strategies. The focus of the delineations was upon the planning issues.

In the FORPLAN Model, analysis areas were assigned to management emphases in order to achieve the resource management objectives of a particular benchmark analysis or alternative. "Management emphasis" is a FORPLAN term and is directly related to the "management areas" described in Chapter 2. Each management area has a set of standards and guidelines concerning how the resources in that area are to be managed to meet multiple use objectives. These are termed management prescriptions (see Appendix D). Six to ten different management emphases were available to each analysis area, depending upon its resource production opportunities.

In turn, "modeling prescriptions" were developed to achieve the multiple use objectives of each management area. In FORPLAN these are referred to as combinations of management emphases and intensities. Modeling prescriptions are combinations of scheduled activities and practices, and their associated outputs and effects The modeling prescriptions and their range of timing choices are represented as decision variables in FORPLAN. The outputs and effects associated with the prescription choices are represented as mathematical coefficients in the respective decision variables. FORPLAN had from one to twenty prescriptions to choose from for each management emphasis for each analysis area. In addition, dozens of different timing patterns and rotations were provided for most management emphases-management intensity combinations on timbered lands

The prescriptions FORPLAN selected depended upon the objective function and the set of constraints used to represent a particular benchmark or land management plan alternative. The objective function was usually to maximize present net value or the production of timber. These were subject to first satisfying all the specified constraints. Constraints were designed to guarantee the spatial and temporal feasibility of land allocation and harvest scheduling choices. Once the model had determined that a feasible solution existed by satisfying all of the constraints, it would then search for the set of prescriptions and timing choices which permitted it to optimize the solution according to the specified objective function.

Since operation and interpretation of the Ochoco's FORPLAN model must be consistent with the basic assumptions and limitations of LP, many analyses must be performed to fully analyze resource opportunities and trade-offs.

The next 3 segments of this section describe the concepts underlying the Forest's model and how the model was used to fully evaluate the ICO's. The last four segments of this section describe more completely the Ochoco's FORPLAN model.

Changes Between the DEIS and FEIS

The changes described in this section relate to a number of facets of the use of the FORPLAN model. The incorporation of new issues, and how these issues relate to modeling characteristics, is described. The section also discusses new analysis of such issues as uneven-aged management and elk habitat. The description of the use of other modeling tools has been expanded. Finally, the updating of analysis areas and management areas, and the development of new yield tables are explained.

Analysis Process

Ochoco Model Design and Relationship to ICO'S

Modeling Assumptions

Ideally, Forests would be able to take full advantage of the optimization characteristic of LP to allow the scheduling of activities from a full set of prescriptions that completely describe production potentials for all relevant resources. Prescription selection by LP could be based on economic efficiency criteria alone, since all the relevant resources, with competing economic values, would be represented in the model . Differences in the land's ability to provide these outputs would all be reflected in the land and resource stratification, allowing the model to differentiate between production functions to find the most efficient set of prescriptions. The land stratification would also contain specific geographic boundaries, enabling control of modeling inputs, outputs, effects, or conditions within these areas to ensure feasible activity schedules. The resulting solution would represent assignment of management direction to suitable, geographically coherent management areas.

Several assumptions underlie the ideal approach described above. Relationships expressed in the LP matrix must be congruent with the fundamental mathematical assumptions of LP. Activity variables are assumed to be linear and homogeneous. All significant aspects of the production functions to be analyzed must be known and quantifiable. Data required to categorize and measure these productive interrelationships must also be available. All resource values must be known and quantifiable. If the above assumptions can be met, current technology must be available to construct and solve the LP within reasonable time frames and without undue expense.

Ochoco Planning Problems And Modeling Characteristics

Design and development of modeling and analysis processes on the Ochoco required a determination of the public issues, management concerns, and resource opportunities to be addressed in the planning effort. These ICO's defined the objectives to be represented. Delineation of analysis areas, development of prescriptions, and model design were all influenced by the content of the ICO's. Consequently, the first step to understanding the Ochoco's LP model and its capabilities and limitations is to identify the planning problems being addressed. Data gathered from public involvement processes and

TABLE B-3-1
ISSUES, CONCERNS, AND OPPORTUNITIES FOR THE OCHOCO NATIONAL FOREST AND CROOKED RIVER NATIONAL GRASSLAND
As Presented in the DEIS

1 What should be the level of timber production?
2 How can activities on the Forest and Grassland benefit social and economic wants and needs of local communities?
3 What is the appropriate level of livestock grazing and intensity of range management?
4 How should riparian areas be managed to meet various resource needs?
5 What road system should be provided to meet public, commercial, and administrative access needs?
6 What habitat levels should be provided for big game?
7 How much roadless recreation opportunity should be provided?
8 What level of emphasis should be placed on management of scenic resources?
9 How much old growth habitat should be provided?
10 To what extent should firewood be provided to meet demand?
11 How much habitat should be provided for wildlife species dependent upon dead trees?
12 To what extent should the Forest provide for winter sports activities?

from Forest personnel were analyzed to develop a list of ICO's (Table B-3-1). Appendix A describes the evaluation of these ICO's and Chapter 1 summarizes them. The following paragraphs summarize the factors affecting production of key outputs and effects related to these ICO's, and the adaptability of these factors to LP modeling.

A few of the more important issues facing the Ochoco are the level of timber harvest, species mix, and size of material. The scheduling of intermediate and regeneration harvests, and the timing and stocking level of reforestation methods and precommercial thinnings, are the major activities affecting timber growth. The size class and species mix of the standing timber inventory is the other major component of harvest level projections. Fortunately, use of LP is well suited to analysis of timber harvest schedules (Ware and Clutter 1971, Navon 1971, Johnson and Scheurman 1977, and Johnson and Jones 1980). Different timber types can be reflected in the analysis area stratification, and inputs related to the activities described above are reasonably linear in the production of timber. In fact, FORPLAN (Johnson et al. 1980) contains many features of the harvest scheduling model called MUSYC (Johnson and Jones 1980). Adequate analysis of the combinations of stand treatment options that best meet Forest objectives and constraints consumes a great deal of model space, however. Each of the treatment sequences for an analysis area needs to have many scheduling choices available to provide the LP with sufficient flexibility.

The issue of social and economic impacts is to some degree a composite of all the ICO's, since the resolution of any ICO has a social and/or economic impact. Several related aspects of social and economic concerns comprise this ICO. One major focus of this issue is the provision of job opportunities and income to the local area. Forest Service planning processes employ an input-output model (IMPLAN) to trace the effects of changes in National Forest outputs through the local economy to estimate the impact on local jobs and income. Within this context, factors relating to commodity and non-commodity production, and the economics thereof, that affect local jobs and income deal directly with this issue. A second aspect of this ICO arises primarily from a national management concern for determination of the most cost efficient set of prescriptions appropriate for a given set of objectives. This concern focuses on attaining the most efficient use of capital in the national economy, thereby maximizing national wealth. A major factor affecting and limiting analysis of this concern is lack of good, specific cost data. This concern is a composite of all ICO's but places greater emphasis on those ICO's with larger economic implications. A third component of this ICO stems from a national concern to maintain or attain a high level of returns to the Federal treasury. All three of these components are most affected by the level and scheduling of timber harvest and timber management practices.

A third major ICO for the Ochoco concerns the number of animal unit months (AUM's) permitted for livestock. Factors affecting the level of forage available for livestock include the particular analysis area, timber stand density, application of nonstructural improvements, and the percentage of total forage production allocated to livestock. These activities can be reasonably represented as coefficients in a LP. The presence or absence of water sources also affects livestock yields, as this controls the area over which livestock graze This spatial distribution factor is more difficult to deal with, however, since it is related to factors which are hard to measure and do not completely fit the linearity and homogeneity assumption of LP. The water improvements associated with a prescription should be modeled as a step function, not a linear function. In the context of forest planning, the steps may be small enough that this is not a significant problem. Another problem associated with water improvements is that the area served by one development usually encompasses several analysis areas with different yields, thus distorting LP coefficients developed for specific analysis areas. Additionally, an economic analysis of water development opportunities would need to account for differences in the land base which cause water improvement costs to vary widely. Measurement and categorization of those differences would involve accounting for topographical, climatic, and historical variations, and would be a difficult task at best.

The spatial distribution of livestock is a major aspect of another important ICO; i.e., riparian area conditions. Livestock concentration in riparian zones often reduces vegetative shading, which increases stream temperature and reduces channel stability. In order to attain riparian objectives, activities need to be coordinated along and adjacent to lengthy stream segments. This aspect of the issue and the highly constrained management prescribed for these areas greatly reduces the value of modeling activity optimization within riparian zones on a per acre basis. For example, timber management practices influence the shading present over streams, thereby affecting stream temperature. Achievement of specific temperature objectives requires consistent treatment over long stream reaches. Additional difficulties with modeling riparian area choices include an inability to quantify the aesthetic, vegetative diversity, and non-game wildlife values obtained, and lack of accurate in-place data within riparian influence zones.

Similar modeling problems hinder efforts to effectively analyze transportation-related questions and problems within the LP. Development of reasonable network road construction and reconstruction costs requires site-specific knowledge within the model of the activities scheduled and the associated management area objectives. Roads are built by segments that must follow a certain sequence and are not linearly related to prescriptions applied to spatially disjunct analysis areas on a per acre basis. Transportation planning models are available for use (Kirby, et al., 1980), but making an effective linkage between models requires large amounts of model space in the LP to provide a usable degree of spatial resolution. Even with fairly specific geographic boundaries, the loading of harvest volumes from analysis areas to road network nodes still requires somewhat arbitrary assumptions This is one of the most difficult problems to deal with since road related costs are a significant portion of the total costs on the Ochoco.

Analysis of big game habitat levels is one of the more complex and interesting modeling problems. The major component of big game habitat is the amount and spatial arrangement of cover and forage over broad areas. Sufficiently large contiguous blocks of land must be represented in the model for valid assessment of habitat-population relationships. The approximate home range of elk was used as a minimum size. If these contiguous areas are modeled, then cover and forage habitat components can be manipulated with harvest scheduling constraints to control big game habitat and provide compatible harvest schedules. Provision of cover and forage varies according to the timber management practices used, which generally can be reasonably portrayed on a per acre basis Modeling big game habitat as a function of relatively large areas, however, renders valuation of big game-related recreation in the acre-based LP ineffectual.

The roadless recreation issue also presents modeling difficulties. Management of large contiguous areas in an unroaded state is necessary to provide the desired condition. Historical patterns of use, intermingled ownerships, and expressions of public interest are all factors which are difficult to measure and affect the relative desirability of one area over another. Primitive recreation area attribute rating systems are highly subjective and not widely accepted.

The scenery issue is primarily concerned with the type of timber harvest constraints imposed to meet scenic objectives. Factors related to modeling scenic quality trade-offs include the inability to specify a dollar value for the benefits obtained, difficulty with categorizing the relative desirability of one area over another, and the fact that scenery prescriptions are logically applied to specific broad areas of land Similar to the modeling of big game, attainment of scenic objectives can be insured by manipulating harvest scheduling constraints if appropriate areas are represented.

The winter sports issue is primarily concerned with the allocation of competing recreation uses on specific areas. Prescription assignment must be specific to the areas involved to resolve the issue. Another aspect of the issue relates to the type of timber harvest activities occurring in these areas. In some cases management objectives for these areas would require modification of timber harvest practices for scenic purposes. Harvest scheduling constraints can

ensure attainment of these objectives in the model if the appropriate areas are represented

The two remaining wildlife issues, old growth and snags, have similar modeling characteristics. First, neither of these resources produces outputs with monetary values. Second, effects of providing different levels of old growth or snags are straightforward in that both result in direct timber harvest level reductions. Analysis of other resource interactions in the LP is not particularly useful for these issues. Additionally, in order to ensure attainment of objectives old growth needs to be provided in units of certain sizes at particular spacings, further limiting modeling flexibility.

The remaining ICO, firewood, is relatively minor from a modeling standpoint by virtue of the values involved and the magnitude of the trade-offs required. Provision of firewood would be relatively amenable to modeling in a LP if it were competitive with normal timber harvesting on the Ochoco.

Four new ICO's were identified since the DEIS, and are incorporated in the FEIS. They are:

13. Anadromous fish
14. Historic trail preservation
15. Off-road vehicle (ORV) use
16. Round Mountain

All four new ICO's present modeling characteristics similar to the problems described above. Anadromous fish presents modeling problems similar to riparian; historic trail and Round Mountain are similar to the scenery issue, and ORV use is similar to winter sports.

As evidenced by the foregoing discussion, much of the effort associated with constructing an LP model for the Ochoco centers around the spatial relationships inherent in the analysis of Ochoco planning problems. These relationships present modeling problems because they are not congruent with the nature of the LP activity variables. Activity variables represent the assignment of prescriptions to analysis areas and are assumed to be linear and homogeneous on a per acre basis. Stratification of the land and resource base so that costs and yields portrayed in the LP meet these assumptions results in analysis areas composed of many individual units scattered across broad sections of the Forest. The analysis necessary to explore the resolution of the ICO's was supported by other tools (see pp. B-17 through B-18).

Figure B-3-1 illustrates this pattern on a typical section of the Forest. Many of the Ochoco's planning problems, however, require the application of management direction to specific land areas. Riparian, roadless, scenery, winter sports, and old growth ICO's all fall into this category. Other planning problems, such as big game habitat, necessitate analysis of broad contiguous areas for valid representation of management objectives. As a result, land areas allocated to a particular set of management directions to resolve an ICO are comprised of portions of many analysis areas. Figure B-3-2 depicts this relationship with a realistic land allocation pattern. These circumstances led to the conclusion that some sort of spatial control over the assignment of management direction to analysis areas is necessary to realistically analyze the management opportunities on the Ochoco.

Basic Model Design

The design of a valid and meaningful model for the Ochoco required the careful consideration of the factors discussed in the previous section. The assumption of linear, homogeneous activity variables and the relationships inherent in analyzing planning problems with particular spatial characteristics had to be reconciled to meet the planning mandate. Several additional criteria were used to guide model design. An evenly spaced sample of production functions adequately covering the full range of production possibilities was necessary to ensure thorough analysis of management opportunities, and to provide as much flexibility as possible to the LP. A need consistent with this objective was to include all of the relevant cost and price data in the LP, if feasible. A further model design goal was to capture as much of the significant land and resource variability in the analysis area stratification as the data would support. The inclusion of specific geographic

Figure B-3-1

ILLUSTRATION OF THE NON-CONTIGUOUS NATURE OF OCHOCO ANALYSIS AREAS

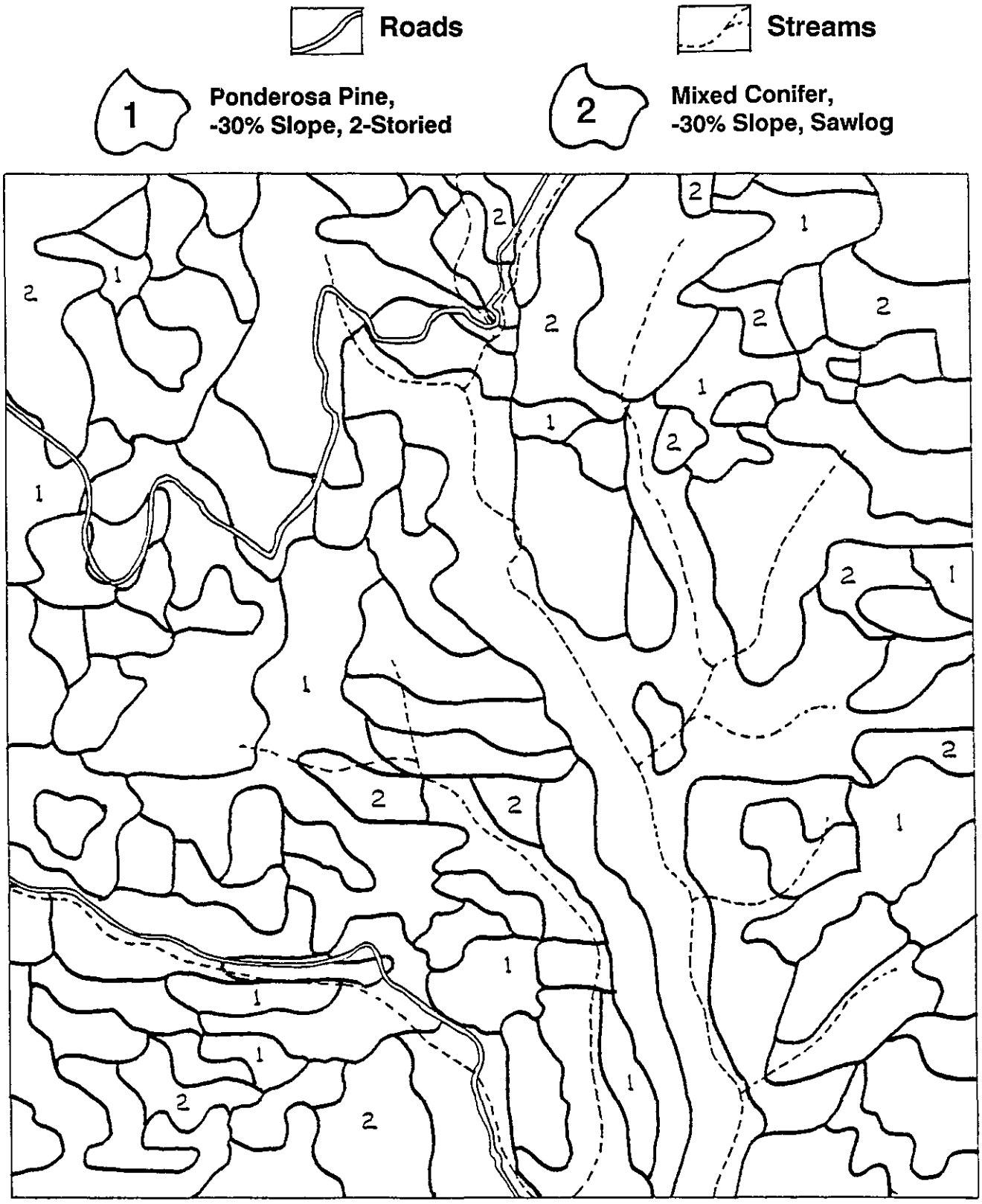
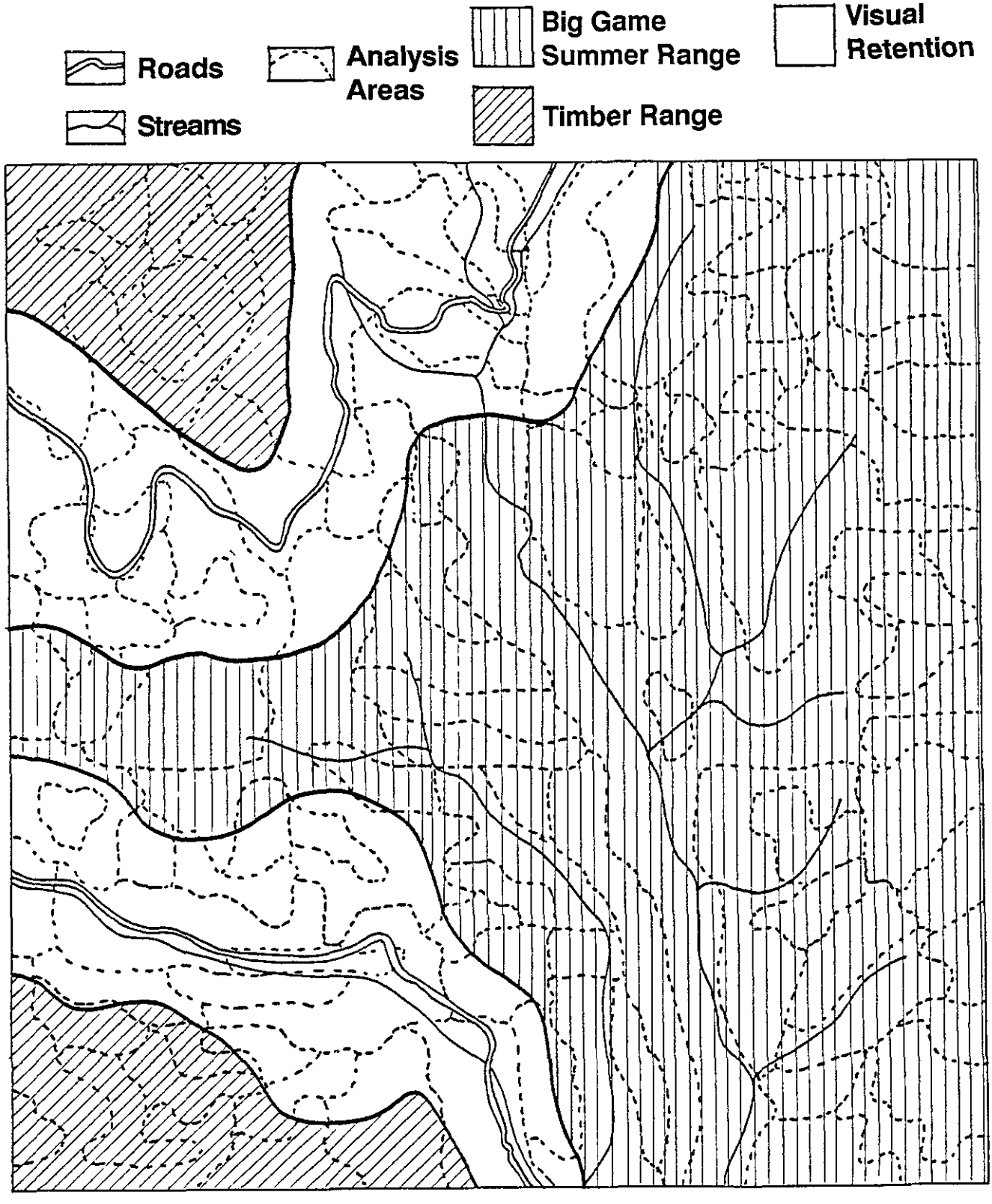


Figure B-3-2

RELATIONSHIP OF A LAND ALLOCATION TO ANALYSIS AREAS ON THE OCHOCO



boundaries enabling control of the LP to ensure both accurate representation of objectives and technical feasibility was also desired. In an environment of limited budgets, a final criterion placed a high premium on the design of a relatively inexpensive model

The planning problems described earlier fall into several categories relative to model design criteria and modeling characteristics. Analysis of timber and range ICO's requires portrayal of a wide range of potential activity schedules. These activities generally meet the assumptions of LP variables, comprise a large proportion of the total economic picture, and can be stratified in the land and resource base to reflect cost and yield variabilities. The scenery, historic trail, Round Mountain, winter sports, and big game habitat ICO's can be categorized as requiring some sort of spatial control over the assignment of management direction to analysis areas. However, provided that the objectives of areas assigned to this type of management can be ensured, a range of potential timber and range activities may be scheduled. The riparian, anadramous, old growth, and roadless area planning problems are similar in that spatial control is again needed. In this case, management objectives are obtained through imposition of strict timber harvest and/or grazing constraints. These latter two categories are similar in that both require spatial constraints over prescription assignment to ensure attainment of objectives. A wide range of land areas that could be assigned to these types of emphases needs to be examined to ensure consideration of a full spectrum of production opportunities and selection of cost efficient activities. Similarities also exist between the snag ICO and a major aspect of the road system planning problem. Both snags and local road construction and reconstruction needs are directly associated with costs and yields modeled as a per acre function of timber and range activities. Due to the difficulties described earlier, a second component of the road system, major arterial and collector roads, is not analyzed within the LP. The firewood ICO is also addressed utilizing other processes.

The model structure selected as best meeting the design criteria stated earlier can be described in terms of three types of model components. The first of these, management prescriptions, provides the objectives and types of direction necessary to coordinate and schedule activities to ensure attainment of the desired condition within relatively large land areas. This type of direction is portrayed on maps of alternative forest plans and responds to the particular spatial characteristics of individual planning problems. The second and third model components are closely linked together in that one, analysis areas, represents the land and resource stratification, and the other, modeling prescriptions, contains sequences of management activities applied to specific analysis areas. The level of resolution attainable in a Forest-wide planning effort prohibits sensible mapping of activity schedules for individual analysis areas. Accordingly, activity sequences for specific analysis areas are regarded as modeling prescriptions used to calculate broader activity schedules applicable to the larger management area. These analysis area-modeling prescription combinations constitute the columns in the LP matrix. A simple example is presented (Table B-3-2) to illustrate the relationships between these components in the LP matrix.

Management prescriptions are represented in the LP matrix by selecting a particular column or subset of columns and fixing the analysis area acreage to which it is assigned for any one model run. This spatial control is necessary to ensure that appropriate areas are assigned to special area prescriptions and contiguous blocks of land are assessed when resource considerations require it. Right hand side constraints can then be applied to these subsets of columns controlling the activity scheduling to represent management prescription objectives. A simplified matrix depicts this structure in Table B-3-2. Two analysis areas and four management prescriptions are represented. Three modeling prescriptions showing the timber yield and resulting effects on big game cover are contained in the matrix for the timber/range and big game management prescriptions. The timber management activities portrayed in these columns are described in Table B-3-3. The first set of rows, the acreage control rows, constrains the acreage assigned for each management prescription to

TABLE B-3-2
A SIMPLIFIED EXAMPLE MATRIX DEPICTING THE OCHOCO MODEL STRUCTURE

		ANALYSIS AREA #1								ANALYSIS AREA #2								
		Timber/Range			Big Game			RP	OG	Timber/Range			Big Game			RP	OG	
		1	2	3	1	2	3	1	1	1	2	3	1	2	3	1	1	RHS VALUES
Acreage Control	AA #1 T/R	1	1	1														=600
	AA #1 BG				1	1	1											=250
	AA #1 RP							1										=50
	AA #1 OG								1									=100
	AA #2 T/R									1	1	1						=400
	AA #2 BG												1	1	1			=400
	AA #2 RP															1		=50
	AA #2 OG																1	=150
Timber Volume	Period 1	6	6		6	6				29			29			3		>700
	2			7				1			32			32		3		>700
	3	8	8		8	8		1				35				3		>700
	4			19			19	1		6			7			4		>700
	5	17		9			9	2			6					4		>700
	6	8	20		20			2		7						4		>700
	7		9		9			2			7		8			4		>700
	8							2		7		7		17		4		>700
	9			5		29		2			23		24			4		>700
	10	7				14		2		29		24			17	4		>700
Thermal Cover	Period 1				6	6	10						0	14	14			>300
	2				6	6	10						2	0	14			>300
	3				6	6	10						2	2	14			>300
	4				6	6	10						2	6	0			>300
	5				8	8	4						4	10	2			>300
	6				4	8	2						4	12	6			>300
	7				2	10	2						4	14	10			>300
	8				4	10	4						6	0	12			>300
	9				4	10	6						0	2	14			>300
	10				6	4	8						2	6	0			>300

ANALYSIS AREA #1 = PONDEROSA PINE
ANALYSIS AREA #2 = MIXED CONIFER-SAWLOG

Management Area Prescriptions

T/R = Timber Range BG = Big Game RP = Riparian OG = Old Growth

TABLE B-3-3
ACTIVITIES REPRESENTED IN THE EXAMPLE MATRIX

Analysis Area Number 1 = Ponderosa Pine - Sapling

	Prescriptions							
Planning Period	T/R-1	T/R-2	T/R-3	BG-1	BG-2	BG-3	RP	OG
1	CT	CT		CT	CT			
2			CT				AH	
3	CT	CT		CT	CT		AH	
4			SH-RG			SH-RG	AH	
5	SH-RG		SH-OV			SH-OV	AH	
6	SH-OV	SH-RG		SH-RG			AH	
7	PCT	SH-OV		SH-OV			AH	
8		PCT		PCT			AH	
9			CT		SH-RG		AH	
10	CT				SH-OV		AH	

Analysis Area Number 2 = Mixed Conifer - Sawlog

	Prescriptions							
Planning Period	T/R-1	T/R-2	T/R-3	BG-1	BG-2	BG-3	RP	OG
1	CC			CC			AH	
2		CC			CC		AH	
3	PCT		CC	PCT			AH	
4	CT	PCT				CC	AH	
5		CT		CT			AH	
6	CT						AH	
7		CT		CT			AH	
8	CT		CT		CC		AH	
9		CC		CC			AH	
10	CC		CC			CC	AH	

MANAGEMENT AREA PRESCRIPTIONS
T/R = Timber/Range
BG = Big Game
RP = Riparian
OG = Old Growth

ACTIVITIES
PCT = Pre-Commercial Thin
CT = Commercial Thin
SH-RG = Shelterwood-Regeneration Cut
SH-OV = Shelterwood-Overwood Removal
CC = Clearcut
AH = Average Periodic Harvest

the constituent analysis area proportions. In the case of the timber/range and big game management prescriptions, several columns are available within the overall acreage control. In the full Ochoco model, several dozen columns containing different sets of activities and many scheduling options are generated for these management prescriptions when applied to timbered analysis areas. Only one column is displayed for the riparian and old growth prescriptions. The timber volume rows illustrate that the average periodic harvest from the riparian prescription contributes to constraints in the LP. The third set of rows, thermal cover constraints, displays the application of right hand side constraints representing big game habitat objectives to a subset of columns. The combination of the acreage control rows and the thermal cover rows ensures that habitat objectives are assessed for contiguous potential management areas.

In order to ensure that model results could be validly interpreted, some compromises in model design were required as compared to the ideal optimization model These compromises took two major forms. The first category includes monetarily valued outputs not present in the FORPLAN LP model. Fish, wildlife, and roadless-oriented recreation are the major outputs in this category. The second form of compromise refers to the assignment of management objectives to specific management areas prior to the execution of any particular model run. Ensuring that the most efficient assignment of prescriptions occurs, given these compromises, requires thorough analysis utilizing sequences of model runs or other supplemental analyses. For example, to compensate for assigning a roadless management emphasis to a specific area prior to running the model, a series of runs were made with candidate areas successively assigned an unroaded emphasis. Opportunity costs and trade-offs were examined and decisions made in light of this information. Another example concerns the development of structures, primarily water developments, to increase livestock utilization of existing forage. Since this could not be adequately dealt with this in the LP model, supplemental analysis was conducted to determine the economic prudence of these proposed investments. More detail on these types of analyses and the role of the Ochoco's LP model in the overall analysis process can be found in the following segment.

Other Analysis

The overall analysis process followed on the Forest and Grassland was designed to ensure a wide range of reasonably distributed, cost efficient alternatives that responded to the identified issues and concerns. From an analysis standpoint the guiding direction is found in the NFMA regulations (36 CFR 219.12 (f)(8)) as stated below:

> "Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

The Forest met this requirement through careful design of the FORPLAN model, use of the model to select and schedule prescriptions for each alternative, use of the model in sequential analyses to help design alternatives, and by conducting supplemental analyses. The following paragraphs summarize the types of analyses performed.

The Forest performed several types of analysis in the process of designing and building the Ochoco FORPLAN model. The purpose of these analyses was to allow FORPLAN a wide range of choice to evaluate the significant aspects of cost efficient prescription assignment. The Forest developed analysis areas several times, testing different combinations of land classifications each time, finally leading to use of analysis area data that most efficiently reflected economic factors (see Planning Records, 1920, 7/7/83). Specific modeling prescriptions were developed, tested, and selected based to a large degree upon cost efficiency analysis (see Planning Records, 1920, 9/10/84). Once the model was built, scheduling options for management of two-storied stands were evaluated and refined based upon a cost efficiency analysis. This is the largest timbered stand component on the Forest. Specific modeling procedures were also analyzed for cost efficiency. The

Forest elected to manage and model old growth habitat with a dedicated stand system based in part upon economic efficiency considerations (see Planning Records, 1920, 6/21/84). Final procedures for modeling dispersion of harvest units were adopted to minimize the impacts on present net value (PNV) while meeting dispersion objectives (see Planning Records, 1920, 6/13/85). The resulting Ochoco FORPLAN model is flexible, trackable, and capable of determining cost efficient prescription assignment and scheduling for each alternative or benchmark.

The Ochoco FORPLAN model was used to select and schedule prescriptions for all alternatives. The goals and objectives of each alternative were represented by constraints and the objective function in the LP matrix. These are described in detail in Section 7 of this appendix. Other components of the LP model (analysis areas, prescriptions, and economic data) are described in Sections 3 and 4 of this appendix. Design and use of the LP model consistent with the underlying assumptions of LP, as described on pp. B11 through B-16, helps assure cost efficient prescription selection due to the optimization characteristic of LP.

Many different types of analysis were performed with FORPLAN, both to evaluate different mixes of goals and objectives and to fully evaluate choices not explicitly analyzed within FORPLAN. An analysis in the latter category examined the relative cost efficiencies of different management prescriptions and the timing of initial entry, as applied to individual roadless areas. The Ochoco FORPLAN model was not able to validly analyze these choices with a single model "run", so sequential analyses were performed to provide economic efficiency trade-off data (see Planning Records, 1920, 10/3/85). A similar type of analysis examined relative cost efficiencies of different management area locations on the Forest and Grassland (see Planning Records, 1920, 10/2/85). The Analysis of the Management Situation (AMS) (see Planning Records, 11/24/84) documented a series of analyses performed to provide a framework for alternative development. Economic relationships were examined relative to the maximum PNV obtainable, to competition between market and assigned values, and to current management direction. The opportunity costs of economic assumptions, minimum management requirements, and timber harvest policies were also displayed in the AMS.

For various reasons the Ochoco FORPLAN model was not able to effectively deal with some types of choices. Significant choices of this nature were analyzed "outside the model" with supplemental analyses. Early in the planning process the Forest ID team recognized an opportunity to increase domestic livestock utilization of forage by constructing additional water developments. An economic analysis of these proposed investments was conducted and the results used in the various benchmarks and alternatives (see Planning Records, Range Structural Improvement Analysis, 2/85). Similarly, the trade-offs between livestock usage and recreation users in riparian areas were examined in an economic analysis and used accordingly in benchmarks and alternatives (see Planning Records, 1920, 3/27/85).

Between the DEIS and FEIS many types of analysis were performed to update the design of the Ochoco FORPLAN model, to both evaluate different mixes of goals and objectives, and to fully evaluate choices not explicitly analyzed within FORPLAN. Model design was experimented with and changed to handle various uneven-aged management scenarios, changes in timber yield stratification, desired rotation lengths, new thinning options for low-site pine and maximizing species volume.

The model was used extensively in evaluating different mixes of goals and objectives for the three new or updated alternatives, and to evaluate choices not explicitly analyzed within FORPLAN. For example, the level of management intensity applied to certain roadless areas was varied. The effect of cover component manipulation on elk habitat was analyzed. The Forest also updated analyses that the Ochoco FORPLAN model was not able to analyze effectively. These include the opportunity to increase domestic livestock utilization of forage by constructing additional water developments, riparian and

watershed improvement analysis, and stream condition (Planning Records, 1920, 1/87). Others analyses considered acres of remaining old growth existing and over time, biological diversity, and road management. Considerable effort was also put into the updating of the elk habitat effectiveness model. Elk production potential and the effect of open roads were modified.

The question of whether forage should be in the elk habitat model was also revisited. As in a similar analysis done in 1983, it was felt that forage is generally not limiting, and at this level of planning would not have any effect in the model.

Other Tools

Due to the complexity of planning, numerous computerized and noncomputerized models and analytical tools have been used in addition to FORPLAN.

FORSUM (FORplan SUMmary)

Due to FORPLAN Version One's limitations, both in model formulation and report writing capabilities, the Ochoco National Forest developed a post FORPLAN processor. This processor aggregates timber harvest information in a more useful manner for the Ochoco National Forest. Some of the major summary reports listed acres by Management Intensity, rotation age, and diameter; and various treatment types by working group and management emphasis. It also uses FORPLAN outputs and additional formulas to generate information on snag levels, successional stages, big game habitat, road construction, soils, and number of AUM's.

IMPLAN (IMpact PLANning Analysis)

IMPLAN is a computer-based input-output (I-O) model designed to assess the potential economic impacts of alternative courses of action. Economic input-output analysis is a procedure for describing the structure of inter-industry dependencies in a regional economy. The three regions in this case are Crook, Harney, and Wheeler counties. I-O analysis is based upon the interdependence of the production and consumption sectors of the economy of the area being studied. Its foundation rests on the concept that industries must purchase inputs from other industries, as well as from primary sources (i.e, natural resources), for use in the production of outputs which are then sold either to other industries or to final consumers. Thus, a set of I-O accounts can be thought of as a "picture" of an impact area's economic structure at one point in time. See Chapter 3 of the FEIS and Section 5 of this appendix for a more complete description.

The IMPLAN system consists of:

A data base of economic information from which input-output tables for the three counties were constructed,

Several computer programs designed to access the data base and construct an input-output model for any county or group of counties that the user designates; and

An analysis program that records data about land management planning alternatives and computes their economic impacts.

The IMPLAN data base has two major components:

The national level technological matrix, derived from the Department of Commerce 1977 national input-output model (updated to 1982, and in some cases to 1987); and

Estimates of sectoral activity for final demand, final payments, industrial output, primary inputs, and employment by county. These county estimates provide a detailed description of the structure of the regional economy, identifying which industries are present and their relationship to other industries.

IMPLAN estimates the changes (direct, indirect, and induced) in gross outputs, employment, income, and value added. In addition, IMPLAN provides some features that, thus far, have not been used by the Ochoco.

The availability of a complete transactions table permits the estimation of gross regional product. Detailed employment analysis is possible by tracking employment requirements among various occupations and by accounting for the effects of either

in-migration of workers or re-employment of unemployed local labor. This type of information could provide a comprehensive, detailed account of potential regional impacts.

Spreadsheets

Numerous spreadsheets were developed to process economic efficiency information (PNV, discounted benefits and costs), budget item information, and other resource related information.

Other

Most resource outputs, scheduled activities, and environmental effects were generated with the assistance of noncomputerized processes. They range from the very simplistic to more complicated, such as the elk habitat effectiveness model.

Development of Analysis Areas

Overview

In our current forest planning process, the land and resource base is described in terms of analysis areas. Analysis areas represent aggregations of many individual non-contiguous mapping units that are characterized by having identical delineators and are considered homogeneous in terms of costs and yields. Without reference to these individual units, sometimes called capability areas, analysis areas lose site specificity. The fact that forest planning attempts to deal comprehensively with multiple resources across an entire Forest requires analysis area delineators that reflect fairly broad conditions. The selection of these identifiers was an important step, however, since the composition of an analysis area defined the range of management activities appropriate for a given objective and the resulting costs and yields. Selection of analysis area delineators followed from criteria and general principles set forth in Forest Service planning handbooks and manuals, and in the relevant literature. One of the criteria used was that delineators had to be able to provide information useful for resolving issues, concerns, and opportunities (ICO's). Analysis area identifiers responding to several ICO's or higher priority ICO's were favored over those that did not. A second major criterion used was that delineators must reflect the key factors affecting the variability of cost and yield responses to potential management practices. The relevant costs and yields were those that were significant to the problem and met the linearity and homogeneity assumptions of LP. The availability, resolution, and accuracy of the data being considered was a third major criterion used to select analysis area identifiers. Another factor important to the interdisciplinary (ID) team was recognition of the need to accommodate a wide range of prescriptions and the limits of FORPLAN. In general more analysis area meant fewer prescriptions per analysis area.

Since the Forest used a large number of prescriptions for each analysis area, a goal of having a fairly low number of analysis areas effectively limited the types of information portrayed with analysis areas. Three types of data were not included in analysis areas due to this practical and technical limit. The first type desired was more specific geographical boundaries, such as watersheds or aggregations of watersheds. Not including these reduced the accuracy of some objectives modeled with FORPLAN and increased the difficulty of determining some outputs and effects. Elk winter range boundaries were also excluded from the model with similar consequences. The third type of data desired was aggregations of soil types. Soil types affect the types of practices allowed and the related costs. Not using these delineators required some averaging of costs (e.g., brush disposal costs), resulting in a less discriminating analysis and less accurate cost calculations.

Composition

The set of delineators currently in use on the Ochoco evolved through a lengthy process fully documented in the Ochoco planning records (file designation

TABLE B-3-4
ANALYSIS AREA DELINEATORS FOR THE OCHOCO NATIONAL FOREST AND CROOKED RIVER NATIONAL GRASSLAND

Level 1	Level 2	Working Group	Land Class	Condition Class
Big Summit Paulina Prineville Snow Mountain Crooked River National Grassland	Roaded Unroaded Green Mountain Lookout Mountain Rock Creek Cottonwood Silver Creek Deschutes Canyon Unavailable Unproductive	Ponderosa Pine Mixed Conifer Ponderosa Pine-Low Site Timbered-Unsuitable Grassland Unavailable Unproductive	<30% Slope >30% Slope Unavailable Unproductive	Seedling/sapling Poles Sawlog Two-storied Low Productivity Moderate Productivity High Productivity Meadows Unavailable Unproductive

1920, dated 7/7/83). Table B-3-4 displays these analysis area identifiers using FORPLAN terminology to identify each level of information, i.e., Level 1, Level 2, Working Group, Land Class, and Condition Class. The following paragraphs describe each level in terms of their composition, relative specificity and accuracy, use for cost and yield differentiations, and use for reporting and control purposes.

Level 1 identifiers represent our five District boundaries and provide some geographic definition to the LP. These boundaries are accurate but fairly general in that each district contains 110,000 to 240,000 acres. The only cost or yield differences tied to this level are higher timber haul and road maintenance costs on one District (Paulina), and different livestock distribution percentages on another District (Crooked River National Grassland). One of the primary functions of these boundaries is to make the multiple resource harvest scheduling constraints more specific, and therefore more accurate, than for the full Forest. The ability to report, control,and interpret outputs at the district level for implementation purposes, as well as to address administrative and community stability concerns is also a major reason for their inclusion.

Three different roading categories are recognized in the Level 2 identifiers. Small unroaded areas not requiring network road construction for access are lumped together and differentiated from the general roaded areas of the Forest. Larger unroaded areas that require collector construction for access are each uniquely identified in this level. Boundaries for these areas are accurate. The small unroaded areas category is fairly general in that most Districts contain several of these areas. The large unroaded areas are very specific since each area is uniquely identified. Local road construction cost differences for currently unroaded areas are reflected with these identifiers The major purpose of individually identifying the larger unroaded areas is to interpret and control the scheduling of activities within each area so that road building costs can be more accurately analyzed using the Forest's transportation network model. These boundaries also enable the reporting of outputs and effects for these areas by alternative.

Major cover type differences for both timbered and non-timbered lands are represented with the Working Group level. These cover types are fairly general, reflecting major structural and productivity differences. Each of the Working Groups contain several different plant communities. Given the general nature of these Working Groups, the data are fairly accurate. The stand mapping used was the basis for the recent timber inventory (1981). Major cost differences are tracked by Working Group, including logging, brush disposal, haul costs, road mainte-

nance, reforestation, and range treatments Stumpage values vary by Working Group, as do livestock forage yields. Working Group identifiers also enable the Forest to control and report timber outputs and practices, range practices, and big game cover provision. This latter capability is essential to meet multiple resource objectives.

The Land Class identifier distinguishes the major slope break commonly used by the Forest to determine the appropriate logging system. These two categories are fairly general since they do not reflect all of the site-specific factors that govern the actual logging system used and costs incurred. These identifiers are believed to be very accurate, however, since they were mapped to a 2 acre level of resolution from USGS topographic maps. Major cost differences are tracked by Land Class, including logging, brush disposal, road haul and maintenance, and range treatments. Range forage utilization and distribution factors also vary by Land Class. This level is not generally used for reporting and control purposes except for dispersion of timber harvest units.

Timber size classes and forage productivity classes are represented with the Condition Class level. Both of these stratifications are general in nature. The timber size classes represent an average of many different conditions found on the ground. This is particularly true of the Forest's many two-story stands, most of which have been entered several times in the past with some type of partial cut. The same stand mapping base used for the Working Group level was used for these size classes. The forage productivity classes also represent averages of many different ground conditions. They are considered to be reasonably accurate for purposes of estimating forage yields. Timber size classes affect treatment opportunities and the scheduling thereof All associated costs and yields related to timber scheduling are therefore affected. Livestock forage yields, and to a degree utilization and treatment opportunities, are affected by the productivity classes. This level is not generally used for reporting and control purposes, except for timber harvest dispersion.

Between the DEIS and FEIS, the Forest evaluated their Analysis Area delineators and acres assigned to each. This intensive analysis was undertaken for two main reasons. The first reason was the large amount of volume that was returned to the Forest (buy back) that the model assumed had been treated. Secondly, during the five years since acres were assigned to analysis areas, the Forest had cut and sold a historically high level of timber. Based on this analysis, the acre assignment to analysis areas was updated because of significant shift in acres between the condition class levels.

Development of Prescriptions

Overview

The analysis of factors required to produce outputs and conditions related to the resolution of ICO's described earlier (pp. B-11 through B-20) demonstrated that two levels of prescriptions were necessary. The first level applies to relatively large manageable areas and contains the types of management direction needed to coordinate activities within a management area to ensure attainment of objectives. These are called management prescriptions. As described previously, many of the factors related to broad areas do not meet the assumptions necessary to be modeled in LP columns and, consequently, are controlled with Right Hand Side constraints. The second tier of prescriptions is called FORPLAN prescriptions, or modeling prescriptions, and represents sets of activities applied to specific analysis areas to meet management prescription objectives. This level of prescriptions constitutes the columns in the LP matrix and represents the resulting costs, yields, and conditions. Potentially, there is a set of these columns in the LP for each analysis area-management prescription combination. For any one model run, potential management areas are selected, each of which contains portions of analysis areas. Geographic control is maintained in the model by constraining the acres

assigned to each management area to those analysis area proportions. Right Hand Side constraints can then be applied to specific management areas to meet management objectives. One of the keys to the successful use of LP within this modeling framework is providing adequate choice among production possibilities for each analysis area-management prescription combination. A discussion of how these choices are structured follows the ensuing description of the Ochoco management prescriptions.

Management Prescriptions

The National Forest Management Act (NFMA) regulations define management prescriptions as "management practices selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219.3). Management prescriptions consist of a goal statement which establishes the purpose of the prescription and a compatible set of management practices designed to develop and/or protect some combination of resources and to create or perpetuate a desired condition Prescriptions were constructed within the requirements specified in 36 CFR 219.27 (see Planning Records, 1920 1/84). These requirements guide the development, analysis, approval, implementation, monitoring and evaluation of Forest Plans with regard to

(a) Resource protection

(b) Vegetative manipulation

(c) Silvicultural practices

(d) Even-aged management

(e) Riparian areas

(f) Soil and water

(g) Diversity

The process of identifying and subsequently developing management prescriptions began with an Interdisciplinary Team review of the issues, concerns, and opportunities (ICO's). Prescriptions were then identified which would help address those ICO's related to decisions regarding standards and guidelines, scheduling, or land allocations. There were other ICO's which were to be addressed through policy statements for which it was not appropriate to develop prescriptions.

To start the development of management prescriptions, the ID team identified a list of potential resource emphasis strategies. As these strategies were fleshed out, similarities and differences became apparent, allowing consolidation and further definition. The final list of management strategies responded to the ICO's and ensured a full range of choice among realistic management possibilities. These strategies provided the direction for construction of detailed management prescriptions (see Planning Records, 1920 8/10/83).

Once the need and purpose for certain types of prescriptions were identified, goal and objective statements for each management prescription were designed to respond to the ICO's. The ID team then identified the practices which would be used to meet the objectives To accomplish this, the ID team used professional judgment, evaluation of existing policy, legislative directions and research literature. As appropriate practices were identified for each prescription, standards and guidelines for accomplishing them were developed Essentially the standards and guidelines are intended to meet legal requirements and objectives of the prescription and to provide the guidelines for how the prescription is to be implemented on the ground. In addition, general policies, standards, and guidelines were written by the Interdisciplinary Team to cover practices common to all prescriptions and resource management situations that are Forest-wide in scope.

In addition to addressing ICO's, the process of designing management prescriptions was also guided by the following criteria:(1) prescriptions should be achievable and contain realistic practices, (2) they are to be general enough to accommodate the variable site specific conditions on the ground, (3) they should be specific enough for the Interdisciplinary Team to develop accurate resource and economic output and effects coefficients, and (4) to the extent practicable they should be the most cost effective means of achieving the intent of the prescription

To a large degree, the particular structure used represented a consensus judgment about the type and detail of direction appropriate for management areas. Sufficient detail is necessary to resolve problem areas and provide clear direction. Enough flexibility must be preserved to allow for efficient accomplishment of objectives. Improvement of the accuracy and specificity of data and of analysis techniques may allow more specific direction in the future.

In the DEIS, prescriptions were developed for each of the fourteen management areas to which different parts of the Forest could be allocated For each management area, a resource management goal and the general objectives to achieve a desired future condition are described. Management practices are implemented within each prescription according to the resource management goals and the standards and guidelines A map of the land allocation to each management area is available for each alternative. This map, in conjunction with the associated prescriptions and the standards and guidelines, identifies what and where activities will take place. Table B-3-5 compares the major elements for each management area prescription Between the DEIS and FEIS, the Forest decided to create many new management areas to address the ICO's. The Draft management areas are identified as MA-D1 through MA-D14, and have been updated and carried forward from the DEIS The Forest management areas are identified as MA-F1 through MA-F28, while the Grassland management areas include MA-G1 through MA-G16, all of which were developed for the FEIS. There may or may not be any difference between the 14 DEIS management areas and those developed for the FEIS. Table B-3-6 lists management area groupings by resource emphasis. The fifty-eight management areas are summarized below. Appendix D describes them more completely.

Draft Management Areas

MA-D1. General Forest

Emphasis

The primary management objective is to produce timber and livestock.

Desired Condition

Timber management activities will include planting genetically improved stock, natural regeneration, precommercial thinning, commercial thinnings, and regeneration harvests generally at or near culmination of mean annual increment. Timber stands will generally be even-aged, 20 to 40 acres in size, with relatively uniform spacing. The largest trees in managed stands will be 16 to 18 inches DBH. Forage production for livestock will be enhanced by most timber harvesting activities and by range improvement activities, including the use of prescribed fire and the construction of additional water sources.

MA-D2. Big Game Winter Range

Emphasis

The primary management objective is to produce winter range habitat of sufficient quality to ensure high big game survival potentials.

Desired Condition

A quality big game winter range habitat will be brought about, over time, through vegetative treatment, including timber harvests and prescribed fire. These activities will be designed to create an optimal relationship between the size and spacing of thermal cover units for maximum deer and elk use. Open road densities will be kept low to limit the amount of disturbance to big game from vehicle traffic. Livestock grazing will be monitored and controlled to ensure sufficient forage for big game.

Uneven-aged management has been added to Alternative C-Modified, and it will have an effect on a portion of this management area. It is not known at this time how close those acres managed under this silvicultural system will be to the desired future condition specified for this management area.

MA-D3. Big Game Summer Range

Emphasis

Management is directed towards ensuring big game habitat of sufficient quality for high production levels of deer and elk.

Desired Condition

A quality big game habitat will be brought about, over time, through timber harvest and other vegetative treatments. These activities will create an optimum relationship between the size and spacing of cover units and forage areas for maximum deer and elk use. Open road density will be kept low to limit the amount of disturbance to big game from vehicle traffic

Uneven-aged management has been added to Alternative C-Modified, and it will have an effect on a portion of this management area. It is not known at this time how close those acres managed under this silvicultural system will be to the desired future condition specified for this management area.

MA-D4. Old Growth

Emphasis

The management emphasis on these lands is to provide habitat for wildlife species dependent on old growth habitat.

Desired Condition

Timbered stands of 300 acres or greater in size will contain mature and overmature trees in a multilayered canopy. Standing dead and down material will also be a significant component of the stand Stands managed for old growth will generally be distributed throughout the Forest. To create this pattern, existing old growth stands will be utilized where possible. If no suitable old growth exists, areas capable of becoming old growth will be managed to bring the stand to an old growth habitat condition as rapidly as possible.

MA-D5. Retention Foreground

Emphasis

The primary management emphasis of these areas is to provide scenic views that retain or enhance natural beauty.

Desired Condition

Lands in this management area are comprised of the seen area immediately adjacent to areas of very high recreational use. Management activities will only repeat form, line, color, or textures frequently found in a natural landscape. Changes to the scenery will not be visually apparent to the casual Forest user. Where possible, forested areas will contain a major component of large ponderosa pine in open, parklike stands.

MA-D6. Partial Retention Foreground

Emphasis

Management in these areas is directed towards providing scenic views that partially retain natural beauty.

Desired Condition

Lands in this management area are comprised of the seen area immediately adjacent to areas of high recreational use Management activities may change form, line, color, or texture but should remain subordinate to natural patterns and not dominate the landscape. Where possible, forested areas will contain a major component of large ponderosa pine in open, parklike stands.

MA-D7. Partial Retention Middleground

Emphasis

These areas provide scenic views that partially retain natural beauty, with man's activities remaining visually subordinate to the natural landscape.

Desired Condition

Lands in this management area are located in the visual middleground adjacent to areas managed under a retention prescription (Management Area #D5). Management activities may change form, line, color, or texture but should remain subordinate to natural patterns and not dominate the landscape. When viewed from a highway, widely dispersed, small timber harvesting units will be visible, but will be shaped to the terrain.

MA-D8. Wilderness

Emphasis

Protect the Wilderness ecosystems. Manage to maintain a natural setting and preserve solitude. (This management area has changed from the Draft and presently applies to the Deshutes Canyon-Steelhead Falls area for Alternatives C-Modified and E-Departure only.)

Desired Condition

These areas are to be managed in a manner "...where the earth and its community of life are untrammeled by man..." and where ". .natural processes operate without interference by man..." Opportunities for solitude and challenge are offered away from the sights and sounds of motorized mechanical vehicles or equipment. Scientific information may be sought without the intrusion of permanent improvements or motorized equipment. Special exceptions provided in the Oregon Wilderness Act will be allowed.

MA-D9. Semiprimitive Nonmotorized

Emphasis

The management goal for these areas is to administratively provide near-natural, unroaded, and undeveloped recreational opportunities.

Desired Condition

Motorized vehicles are excluded except for over-snow vehicles, allowing for a semiprimitive nonmotorized recreational experience Generally, interaction between users is low, but there is often evidence of other users. Natural processes will generally be operating without human interference, but management may occur to protect or enhance roadless qualities.

Motorized equipment such as chainsaws may be used in the management and maintenance of these areas Nonmotorized mechanized equipment, such as "mountain bikes" and wheel-barrows, is acceptable. River corridors that are eligible for designation as Scenic Rivers under the Wild and Scenic Rivers Act are included in this management area.

MA-D10. Semiprimitive Motorized

Emphasis

The management emphasis on these lands is to provide challenging motorized recreational opportunities in a natural appearing environment free from developed roads, highway vehicles, and concentrations of people.

Desired Condition

This Management Area contains selected roadless areas that meet these goals. Management is directed towards maintaining a natural appearing setting for off-road vehicle use while maintaining other resource values.

MA-D11. Developed Recreation

Emphasis

The management goal at these sites is to provide and maintain safe, healthful, and aesthetically pleasing recreational facilities.

Desired Condition

This applies to sites currently developed or planned for parking, camping, picnicking, boating and other recreational activities.

MA-D12. Research Natural Areas

Emphasis

The management goal of these areas is to preserve Research Natural Areas (RNA's) as scientific benchmarks.

Desired Condition

This management area contains natural or nearly undisturbed areas which are representative of important forest and range land ecosystems. These areas fulfill identified needs for completion of the Regional RNA system. The RNA's will preserve natural ecosystems for research, education, and comparison with those affected by human activities.

MA-D13. Riparian in Acceptable Condition

Emphasis

The primary management emphasis of these areas is to improve poor riparian areas to a fair condition,

and to maintain existing conditions in other riparian areas.

Desired Condition

Streambank vegetation will be managed to maintain or improve streambank stability and fish habitat as needed to meet this objective. Water temperatures will generally not be increased in major streams. Temperatures in other streams will not deteriorate downstream fish habitat. Natural, large, woody material will be provided. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection needs.

MA-D14. Riparian in Excellent Condition

Emphasis

Management in these areas will ensure that riparian areas are maintained or improved to provide excellent streambank stability and fish habitat in 15 years.

Desired Condition

Streambank vegetation will be managed to provide the amount of cover and shade needed to meet this objective. Water temperatures will not be increased in major streams, and may need to be decreased in some areas Temperatures in other streams will contribute to improved downstream fish habitat. Natural, large, woody material will be provided to help achieve high quality fish habitat. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection needs.

Forest Management Areas

The land and resource management emphasis and goals for the management areas for Alternative I are summarized on the following pages. The 28 management areas for the Forest and the 14 management areas for the Grassland are presented in narrative form to provide a picture of the physical description, management emphasis, and desired future condition of each area. The standards and guidelines that apply to each of the Management Areas and the Forest-wide Standards and Guidelines are presented in Chapters 4 of the Forest and Grassland Plans.

MA-F1. Black Canyon Wilderness

Emphasis

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

Desired Condition

The Black Canyon Wilderness will be as natural as is possible, with little evidence of human activity. The area will be a place of natural settings with opportunities for solitude. Present road access and hunter caches and camps will be rehabilitated so their presence is no longer a dominant land feature. Recreational improvements, such as trailheads and access trails, will be evident where they are necessary to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident

Old growth stands will be evident within the Management Area, along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning starts occur.

MA-F2. Bridge Creek Wilderness

Empasis:

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude. The area will be managed as a trailless wilderness where people can use their orientation skills.

Desired Condition

The Bridge Creek Wilderness will be as natural as possible, with little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access will be rehabilitated so that its presence is no longer a dominant land feature. Recreational improvements, such as trailheads and access trails, will not be evident, but entry points will be signed where necessary to control use and to preserve wilderness qualities.

Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the Management Area, along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality, resulting from past Mountain Pine Beetle infestations and other endemic insects and pathogens will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning starts occur.

MA-F3. Mill Creek Wilderness

Emphasis

Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

Desired Condition

The Mill Creek Wilderness area will be as natural as possible, with little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access will be rehabilitated so that its presence is no longer a dominant land feature. Recreational improvements, such as trail heads and access trails, will be evident where necessary to control use to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident. The stock driveway in the northeast portion of the Wilderness will be evident due to its routine use in association with the Mill Creek Allotment.

Old growth stands will be evident within the Management Area, along with those wildlife species dependent in old growth habitat on the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality, resulting from past Mountain Pine Beetle and other endemic insects and pathogens, will be evident along with associated changes in fuel loadings and plant succession. Fuel loadings will become very significant along the south side of Forest Road 27 and will pose a serious fire risk. Fire occurrence will be evident where lightning and human-caused starts occur. There may be planned ignitions to achieve wilderness objectives.

Minerals activities on valid mining claims will be evident along with authorized access under approved plans of operation

MA-F4. North Fork Crooked River Wilderness Study Area

Emphasis

Management will maintain the existing conditions of the area pending a decision by Congress on wilderness designation.

Desired Condition

The wilderness study area will be as natural as possible with reduced evidence of human activity. The area will be a place of natural settings where solitude may be sought. Present road access, and hunter caches and camps, will be rehabilitated. Recreation improvements, such as trail heads and access trails, will be evident where necessary to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the management area, along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

The Final Environmental Impact Statement for Wilderness by the BLM has not been published, but a decision on the status of this area along with the adjoining BLM lands is pending. If these areas are not designated wilderness, they will be managed

under old growth, riparian, and general forest standards and guidelines.

MA-F5. Research Natural Areas

Emphasis

These tracts of land are areas where natural processes are maintained for research and education purposes. They will provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species.

Desired Condition

Natural conditions will be maintained. Any management activities within the RNA's will be directed at maintaining the natural conditions of the area, and these human-caused changes to the ecosystem will not be readily evident. Continuing, nondestructive baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural lightning and human-caused fire starts occur.

MA-F6. Old Growth

Emphasis

Provide habitat for wildlife species dependent on old growth stands.

Desired Condition

Stands of old growth are not expected to change significantly over the next ten to fifty years, barring natural catastrophe. They will continue to provide habitat for a number of wildlife species, such as the pileated woodpecker and Rocky Mountain elk, and may become more extensively used by these species as the majority of the Forest moves towards a "managed condition." High levels of snag habitat will continue as individual trees within the stands die of old age, as well as from periodic infestations by insect and disease populations. Management activities and roads will generally not be evident. Fire occurrence will be evident where lightning and human-caused starts occur. Prescribed fire may be evident if natural fuels accumulate to dangerous levels, threatening the existence of the old growth stand, or where vegetation manipulation is needed to maintain stand structure and species composition. Grazing by livestock, as well as by big game wildlife species may be evident.

MA-F7. Summit Historic Trail

Emphasis

Protect the existing integrity of the Summit Trail. Enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities.

Desired Condition

The Summit Trail will be a place where Forest visitors can enjoy the cultural and recreational resources offered in a visually pleasing environment. The majority of the trail route is along developed roads and will provide travel by highway vehicle, as well as by mountain bike and horseback. Vegetation may appear manipulated in widely dispersed areas in order to enhance cultural and recreational resources, but will generally not dominate the landscape. Interpretive facilities such as signs and landmarks may be visible in special, culturally significant areas.

The outer boundary of the management area will generally not exceed 600 feet on either side of the trail.

MA-F8. Rock Creek/Cottonwood Creek Roadless Area

Emphasis

Provide for protection of soil, water, and fisheries, and for opportunities for nonmotorized recreational use and enjoyment. Maintain vegetation on steep slopes to prevent erosion and to protect water quality and the anadromous fishery.

Desired Condition

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will occur, but the area will appear natural. These activities, along with any desired recreational improvements, will be the only visible impacts of direct human activities.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area, along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Structures may be constructed, or other work may be done to maintain or improve habitat for the anadromous fishery. The area will remain one where there are above average numbers of trophy-sized elk and deer. Tree mortality, resulting from past spruce budworm infestations and other endemic insects and pathogens, will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning and human-caused starts occur.

MA-F9. Rock Creek/Cottonwood Creek Unroaded-Helicopter Area

Emphasis

Allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes, and big game habitat.

Desired Condition

The area will be unroaded. Timber harvest and associated activities will use helicopter systems. The area will remain unroaded with landings located outside the management area. Prescribed fire use will also be evident in some areas where its use is desirable to attain management objectives. Visible harvest impacts will generally be limited to vegetation modification with little soil or other surface disturbance.

Recreation improvements, such as trailheads and access trails, will be evident where necessary to enhance access. Livestock use may be evident, but the successful application of allotment management requirements will show acceptable grazing practices Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area, along with those wildlife species dependent on old growth habitat in the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from spruce budworm and other endemic insects and pathogens will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning and human-caused starts occur.

MA-F10. Silver Creek Roadless Area

Emphasis

Protect and enhance the roadless qualities and provide nonmotorized recreational use.

Desired Condition

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will be evident over time. These activities, along with any desired recreational improvements, will be the only visible impacts of human activities within the Management Area.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the Management Area, along with those wildlife species dependent on old growth habitat on the Ochoco National Forest Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where lightning and human-caused starts occur.

MA-F11. Lookout Mountain Recreation Area

Emphasis

Maintain a natural setting, providing continued opportunities for high quality, semiprimitive recreational activities and wildlife habitat, while maintaining healthy forests.

Desired Condition

General

The Lookout Mountain Management Area will become a well-known area for year-round recreational activities and will provide excellent habitat for big game.

Prescription Area A:

This area will comprise approximately 7,550 acres of Forest land in a semiprimitive state with no vegetation manipulation planned. The recreational user will experience a highly diverse, natural landscape with interspersed stands of trees, openings, rock outcrops, and talus. A tree species mix including early successional species such as ponderosa pine, western larch and lodgepole pine will be seen across the lower elevations of the landscape. Lodgepole pine, sub-alpine fir, white fir and Douglas-fir will dominate at the higher elevations. Pockets of mixed conifer old growth will be an integral part of the vegetation mosaic. Natural tree mortality will be evident.

Big game habitat will be excellent due to the secluded nature of the area, high elevation moist meadows, and good year-round springs with heavy dense cover. Elk wallows will be numerous and big game use will be evident.

The area will be roadless, with currently existing roadbeds exhibiting evidence of rehabilitation activities and revegetation. Man-made improvements will be subordinate to the natural landscape and will be present to enhance recreational use of the area Typical improvements apparent to the recreational user may include trails, trailheads, signing, trail shelters, livestock fencing, and possible wildlife habitat enhancement projects.

Prescription Area B:

This area will comprise about 8,110 acres in a relatively natural appearing condition.

A variety of trails, roads, trail shelters, signs and other improvements for the benefit of recreational users may exist, but will be designed and managed to be subordinate to the natural landscape. Several existing roads into the Management Area will remain open for motorized travel to dispersed campsites and mining activities.

Vegetation may appear manipulated in widely dispersed places in order to enhance recreational opportunities and wildlife habitat resources; vegetation manipulation will not dominate the landscape or generally be evident to the casual Forest visitor. Various vegetation manipulation techniques will be used to promote healthy forests which are more resistant to catastrophic events that may detract from big game habitat or a recreational experience. As a result of these limited entries, ponderosa pine and western larch, which are tree species valued for their appearance, will become more abundant over time. These species will be interspersed in a mosaic of other mixed conifer species of various size and age classes, including stands of old growth mixed conifer and ponderosa pine.

Minimum standard roads designed for specific projects will exist in low densities on the more gentle ground. Road use will be restricted to project activities and roads will be closed upon completion of each project Roadbeds and banks will be seeded with mixtures of legumes and grasses to improve wildlife habitat. The amount of activity occurring at any one time will be limited.

MA-F12. Eagle Roosting Areas

Emphasis

Provide winter roosting habitat for migrating bald eagles from December through April.

Desired Condition

An uneven-aged stand will contain large trees which are at least 22 inches DBH, and a few trees which are 36-40 inches at DBH. Roost trees generally are at least 22 inches DBH and have an open structure which allows eagles to land easily. Those trees actively being used will be preserved along with replacement trees in the same vicinity.

The area will be free of potentially disturbing human activity during the period from December 1 to May 1. When actual or potential roosting areas overlap with areas which have more restrictive prescriptions, the area will be managed under the most restrictive prescription as long as roost trees are maintained.

MA-F13. Developed Recreation

Emphasis

Provide safe, healthful, and aesthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.

Desired Condition

This Management Area will consist of natural-appearing areas with obvious man-made controls and structures to direct users, provide for comfort and sanitation, and protect the natural resources. Developed sites will be provided for a broad range of recreational opportunities.

New and upgraded sites will incorporate a barrier-free design.

Management activities will not be visually evident. Scenic views may be enhanced through harvest or thinning but will appear natural.

Facilities, roads, and trails will have a well maintained appearance and provide a safe recreational environment. When vandalism is a problem, public use may be prohibited on a seasonal basis.

MA-F14. Dispersed Recreation

Emphasis

Provide a near-natural setting for people to utilize while pursuing outdoor recreation experiences.

Desired Condition

Within the immediate dispersed site, management activities will not be evident to the casual observer. Activities may be evident in areas adjacent to the site, depending on the management prescription applied to them. Primitive, user-constructed structures or facilities, consistent with a site's use, will be seen. Sites will be managed so that users tend to feel relatively isolated. A strategy will be developed that encourages individuals or groups to "find their own place."

Livestock grazing may be evident, but the successful application of allotment management requirements will also be evident.

MA-F15. Riparian

Emphasis

Manage streamside vegetation and habitat in order to maintain or improve water quality and meet temperature and turbidity levels as required by state standards under the Clean Water Act (See Forest-wide Standards and Guidelines, Water; and Best Management Practices (BMP'S), Appendix G).

Desired Condition

Riparian areas will exhibit a low but apparent level of management. Vegetation may or may not appear manipulated, depending on the condition of the stream. An abundance of wildlife species should be evident. Due to management restrictions and the low risk associated with these areas, the signs of natural or man-caused fire will be infrequent.

For management purposes, a special protection area (100 feet from the edges of perennial bodies of water) will be apparent. In addition, the streams listed below will receive extra protection to 200 feet from the stream edge, in order to provide "connective habitat" for a variety of wildlife species on the Forest:

> Trout Creek, Bear Creek, Drake Creek, Pine Creek, Allen Creek, Indian Creek, West Fork Bridge Creek, Porter Creek, Howard Creek, Fox Creek, Cottonwood Creek, Baldy Creek, Little Windy and Windy Creek, and Nicoll Creek.

Roads not planned for future use will be obliterated and revegetated to a natural or near natural condition.

Within the limits of ecological potential, a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation will exist.

Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time. Sites unable to support a canopy of deciduous or evergreen species will be characterized by vigorous stands of forbs, grasses, and grass-like riparian species.

Bank slopes containing high plant densities, thick root masses, embedded angular boulders, and old

logs will also characterize these areas Extensive scouring of streambanks will be an uncommon occurrence, as will soil deposition outside the norm for the individual stream system. Streambeds will be commonly covered by native aquatic growth on assorted sizes of rocks and boulders.

Where cobble and gravel bars are prominent, they will become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are re-built and cutbanks stabilized, a narrower, deeper channel will gradually develop.

Springs and wet meadows are not specifically included in this management area prescription, but should receive appropriate protection as stated in Forest-wide Standards and Guidelines for Water, Chapters 4, Forest and Grassland Plans.

MA-F16. Bandit Springs Recreation Area

Emphasis

Provide dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. Expand the recreational activities and opportunities beyond winter recreation to year-round activities.

Desired Condition

The Bandit Springs Recreation Area is expected to become an important winter sports use area on the Forest, as well as a setting for other year-round recreational activities, including environmental education, mountain bike riding, day hiking, hunting, and horseback riding. Developments to accommodate a broad spectrum of nonmotorized recreationists' needs will be built. Emphasis will be on enjoying the natural scenery, with interpretation aiding the casual visitor. Developments may include trail shelters, maintained trails, horse unloading ramps, toilets, information areas, parking, picnic areas, and signs.

Periodic manipulation of vegetation to meet recreation and visual objectives for the area will be apparent to the user. Timber stands will be managed to develop and maintain resistance to catastrophic events that would detract from the recreational experience. Both uneven- and even-aged silvicultural practices will be used. A road system will be visible, but secondary to the natural setting Livestock use will also be evident.

MA-F17. Stein's Pillar Recreation Area

Emphasis

Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Stein's Pillar. Provide roadless nonmotorized recreation with opportunities to enjoy nature.

Desired Condition

The area will be a natural or natural-appearing place with a variety of volcanic plugs, topography, plant communities, and wildlife, where recreationists can enjoy nonmotorized recreation.

Ponderosa pine stands will have large, yellow-bark trees, particularly along the Stein's Pillar Trail. There will be a mosaic of these large-tree, open pine stands interspersed with juniper scab flats and fir stands Created openings will blend with the natural appearance of the area. Scenic views will be created but management activities will not be evident to the casual observer.

The area will offer scenic views of Stein's Pillar and other volcanic plugs, as well as the Ochoco and Cascade Mountains. Recreationists will enjoy nonmotorized activities, including hiking, picnicking, rockclimbing, sightseeing, horseback riding, and group activities. These activities will mostly be day use.

Nonmotorized recreational opportunities and facilities will be provided. A rustic trail, designed and maintained for family day walks, will access Stein's Pillar. There will be an associated trailhead and access route. The trail system may be extended to the north to tie to the Benefield road Also, a safe way to the base of the pillars will be constructed to allow easier access for climbers and others. Interpretive facilities will highlight geological, recreational, historical, old-growth, and wildlife features, and the nearby wilderness

Streamsides will be extremely shady and brushy with an abundance of tall overstory conifer trees and/or shorter hardwoods of alder, willow, and aspen. Streamsides will meet the Riparian Management Area objectives.

Deer and elk may use the area for winter cover, feed, and security. Deer and elk may summer throughout the area. A 300-acre Old Growth Management Area will be available for wildlife, such as the goshawk and pileated woodpecker. Snags will occur naturally, providing habitat for woodpeckers, nuthatches, owls, and other cavity nesters.

Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

MA-F18. Hammer Creek Wildlife/ Recreation Area

Emphasis

Provide and maintain habitat diversity for a variety of wildlife species where open road density is minimal. Provide a scenic, semi-natural or natural-appearing setting for nonmotorized recreational opportunities.

Desired Condition

Forested areas of ponderosa pine will be seen as a wide variety of size/age classes with a major component of large, yellow-barked pine. Mixed conifer areas will be a mosaic of open and closed canopy stands of various size classes to provide an optimum forage and cover mix for big game. Nonforested areas will generally appear natural in character, but with periodic evidence of livestock grazing. Riparian areas will be shady and consist of a mixture of trees and shrubs. Management activities will remain visually subordinate to the characteristic landscape.

Developed facilities such as trailheads, picnic/camp areas, and associated access routes will be evident on the periphery of the unit. Interpretive facilities will be available to highlight historical, recreational, and wildlife features.

Access roads to trailheads will be open All other roads will be closed to motorized use and rehabilitated after management projects are completed.

MA-F19. Deep Creek Recreation Area

Emphasis

Provide a near natural setting for recreational pursuits within the area

Desired Condition

Forested areas will contain large larch and ponderosa pine. Nonforested areas will generally appear natural in character with little immediate evidence of management activities. The riparian area will contain abundant alder and other riparian hardwood species.

Dispersed recreational areas will be protected. Opportunities for camping in developed sites will be provided at Deep Creek Campground.

Trails may be developed that provide day hiking or interpretive recreational opportunities.

Management activities, including timber harvest and prescribed burning, will not be evident to the casual observer. Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

MA-F20. Winter Range

Emphasis

Manage for big game winter range habitat.

Desired Condition

Big game use on winter range will be the primary activity, with other management activities and human intervention restricted from December 1 to May 1. Habitat effectiveness for big game will improve over time, due to increases in both quality and quantity of thermal cover, and to reductions in open road density. Road and trail use will be limited to one mile of open access per section, from December 1 to May 1, but up to three miles per section will be available during the remainder of the year.

Vegetation cover types, key species condition, big game use, and domestic livestock grazing will be inventoried and mapped. Treatment units will be identified and treatments prescribed on a scheduled basis to maintain key forage and browse species. Treatments will be monitored to assure appropriate forage and browse allocations for big game.

Management, including vegetation manipulation, structures, and prescribed fire to maintain or improve winter range, may be apparent. Livestock use of forage will be conducted in harmony with big game winter range habitat needs.

Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, may be evident along with associated changes in fuel loadings and plant succession, in areas reserved for big game cover.

MA-F21. General Forest Winter Range

Emphasis

Manage for timber production, with measures taken to maintain habitat effectiveness for big game. Design and implement management activities to recognize big game habitat needs.

Desired Condition

Big game use on winter range will be the primary activity, with other management activities and human intervention restricted from December 1 to May 1. Habitat effectiveness will slowly decrease in this area, mainly due to future reductions in quality and quantity of thermal cover. This decrease will not be as rapid as in MA-22 General Forest, due to specified road closures and other incidental wildlife improvements. Road and trail use will be limited to one mile of open access per section during December 1 to May 1, but up to three miles per section will be available during the remainder of the year.

Fire occurrence will be visible where lightning and human-caused starts occur and where prescribed fire is applied.

Management activities will take into account vegetation types and successional responses in order to apply prescriptions which have beneficial results for habitat. Areas of particular importance as big game habitat will be identified and management activities modified to complement, protect, or improve habitat. Livestock use of forage will be conducted in harmony with big game winter range habitat needs.

Tree mortality, resulting from past spruce budworm and other endemic insects and pathogens, may be evident along with associated changes in fuel loadings and plant succession, in areas reserved for big game cover.

MA-F22. General Forest

Emphasis

Produce timber and forage while meeting the Forest-wide standards and guidelines for all resources. In ponderosa pine stands, management will emphasize production of high-value (quality) timber.

Desired Condition

Most ponderosa pine stands and some mixed conifer stands on slopes less than 30 percent will exhibit the application of uneven-aged management. Trees up to 20 inches DBH will be seen in these stands, and the evidence of trees managed for high quality lumber (where the first log is relatively free of limbs) will be noted.

Most mixed conifer timber stands, most stands on slopes greater than 30 percent, and some pine stands not suitable for uneven-aged management will be seen as even-aged, with trees uniformly spaced and fully occupying the site, except in seedling and sapling stages. Regenerated stands will generally be 20 to 40 acres in size. A mix of species, with emphasis on the seral species such as pine and larch, will be evident where conditions permit. The largest trees will generally be 18 to 22 inches DBH, but larger ones may be found where left for snag replacements or other resource reasons Trees will have full crowns and be relatively free of defect. Snags will be apparent over the area with potential snag habitat managed at the 20 percent level for Alternative B-Modified and at the 40 percent level for Alternative I.

A variety of native grasses, sedges and forbs will be available for grazing animals. Competition from nonforage species such as sagebrush and juniper will not be a major problem. Most of the forested range lands will be in fair and good forage condition class Forage use will be apparent, and improvements installed to facilitate stock distribution and effective

use of available forage will be evident.

Following use for timber haul, local access routes with planned future use will generally be open to high clearance access (maintenance level 2) for Forest visitor and administrative use, unless there are significant reasons to do otherwise. Access routes/ trails will be developed to offer a variety of terrain and experience levels for ATV's, and users will be restricted to these areas. Recreational off-road motorized use will be allowed, but users will be encouraged to use designated routes in order to protect Forest resources such as soils and water quality.

Dispersed sites will be scattered throughout the area. These sites will be maintained in as natural a condition as possible.

Fire occurrence will be visible where natural lightning or human-caused starts occur, and where prescribed fire was applied.

MA-F23. North Fork Crooked River Recreation Corridor

Emphasis

Maintain the appearance of a natural landscape in the foreground view from Road 42. Protect and enhance public use and enjoyment of the river segment.

Desired Condition

This segment of the North Fork of the Crooked River will be a free-flowing river whose shorelines may be accessible by roads The immediate river environment (up to one-quarter mile from the river) will appear natural, though there may be evidence of past and ongoing timber harvest and grazing. Developed and dispersed campsites and interpretive signing will be seen throughout the area. The use of prescribed fire may be evident where used to enhance the retention of featured tree species such as old growth ponderosa pine or western larch.

MA-F24. North Fork Crooked River Scenic Corridor

Emphasis

Maintain and enhance a natural appearing landscape to protect the "scenic river" designation.

Desired Condition

This segment of the North Fork of the Crooked River will be seen as a free-flowing river whose shoreline is accessed by a road. The immediate river environment (up to one-quarter mile from the river) will have an overall natural appearance, though there may be evidence of past timber harvest. Other management activities will be evident, including dispersed campsites and interpretive signing. A low standard trail will be developed that will require wading or rock-to-rock natural crossings. Prescribed burning will be apparent where used to enhance the retention of featured tree species such as large old growth ponderosa pine and western larch.

Several stands have been designated for old growth within the scenic river corridor. Where old growth restrictions are more restrictive than scenic river restrictions, the old growth prescriptions will apply.

MA-F25. U.S. Highway 26 Visual Corridor

Emphasis

Maintain and enhance the scenery along U.S. Highway 26.

Desired Condition

The U.S. Highway 26 Corridor will be managed to maintain the big tree appearance; activities will not be evident to the casual Forest visitor. Vegetation will be manipulated in order to provide a variety of size and age classes of timbered stands, including open parklike stands of old growth ponderosa pine, dense shaded stands of mixed conifer, and small openings with planted and natural tree seedlings. Both uneven- and even-aged stand conditions will exist.

An established road system will be in place but will have been designed to minimize the visual effect on the landscape. Prescribed livestock grazing is planned. Pastoral scenes will add to visual variety. Prescriptive grazing will be designed to be in concert with the visual quality objectives of the area.

Wildlife may be viewed in the corridor. This might include big game and a variety of bird species. The effects of fire will be periodically evident, as a result of natural and prescribed burning.

Dispersed recreation sites will be abundant throughout the corridor. Camping will be encouraged, except where restricted for other resource reasons, such as streamside management areas along Mark's Creek. Snowparks for winter recreation will be constructed to blend into the surroundings.

MA-F26. Visual Management Corridors

(This includes all visual management areas outside of other special management areas, e.g. Highway 26, Summit Trail, etc.)

Emphasis

Maintain the natural-appearing character of the Forest along major travel routes, where management activities are not evident, or are visually subordinate to the surrounding landscape.

Desired Condition

Prescription Area A

This area will encompass about 86 miles of Forest roads and include approximately 9,300 acres of associated landscape. The outer boundary of the Management Area will generally not exceed 600 feet on each side the road. Retention will be the visual quality objective. Long-term management activities will not be visually evident to the casual observer.

Forest visitors will encounter a diverse landscape which reflects ecosystems where management activities appear as a natural condition.

Vegetation will be manipulated, but will reflect a natural forest setting. Stands of trees will exist in multiple age classes, from young seedlings to mature old growth in both uneven- and even-aged conditions. Unique characteristics of the landscape, such as rock bluffs and aspen clones, will be highlighted, where they are currently hidden from view due to existing vegetation.

Prescription Area B

This area will encompass about 174 miles of Forest roads and include approximately 23,960 acres of associated landscape. The outer boundary of the management area will generally not exceed 600 feet on each side the road Partial retention will be the visual quality objective. Long-term management activities may be evident but will be visually subordinant to the characteristic landscape. Forest visitors will encounter a near-natural scenic view, with a diverse ecosystem reflecting a low level of management.

Vegetation will appear manipulated. Stands of trees, in multiple age classes in both uneven- and even-aged conditions, will occur in a background of rock outcrops, aspen clones and native grass communities.

Prescription Areas A and B

An established road system will be in place, but will have been designed to minimize the visual effect on the landscape. Grazing by livestock may or may not be visible immediately adjacent to these roads.

As a consequence of visual management, an abundance of wildlife may be viewed in the corridor. This might include big game, a variety of bird species, and fish. The affects of fire will be periodically evident as a result of natural and prescribed burning.

MA-F27. Round Mountain National Recreation Trail

Emphasis

Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting. Rehabilitate trail sites where management activities conflict with National Recreation Trail objectives.

Desired Condition

The visitor will note a naturally appearing forest along the majority of the trail route (visual quality objective of retention). The outer boundary of the management area will generally not exceed 600 feet

on either side of the trail. The Round Mountain National Recreation Trail will be linked to trails on Lookout Mountain and the access road to the Summit of Round Mountain, as well as to Walton Lake Campground, through appropriate signing. Recreational improvements will be evident in those locations where necessary to protect the land, for public safety, and to enhance the public's enjoyment of the area.

Old growth stands will be seen within the management area. Fire occurrence will be evident where natural lightning and human-caused starts occur. Rehabilitation will be done in areas visually impacted by past management activity.

MA-F28. Facilities

Emphasis

Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surroundings.

Desired Condition

Sites will be efficiently designed work areas consistent with type and intensity of use. Employee wellness and public safety will be the primary design criteria. Color and design of structures and facilities will blend with the surrounding environment.

Traffic controls and signing will be designed to provide a safe driving environment. Roads and trails will be planned, designed, operated and maintained to levels sufficient to provide safe use for the intended traveler.

The historical significance of buildings and structures will be considered during any modifications to the site.

Employee residential areas will be designed to meet employee needs.

Management activities, such as timber harvest, thinnings, and fuel treatments for the protection of facilities from wildfire, may be apparent on a short-term basis.

Grassland Management Areas

MA-G1. Antelope Winter Range

Emphasis

Manage for optimum winter range conditions for antelope.

Desired Condition

This Management Area will consist of generally open grassland with shrub heights at or below 24 inches, but not over 30 inches in height. Range improvements that facilitate antelope migration will be constructed. Harassment and stress on wildlife caused by motorized vehicle traffic will be reduced.

Fall greenup will be reserved for use by antelope during winter.

MA-G2. Metolius Deer Winter

Emphasis

Manage for big game winter range habitat.

Desired Condition

Management in this area will support the Oregon Department of Fish and Wildlife management objectives for the wintering deer population. A 60/40 forage/cover ratio, and a vigorous shrub overstory will be maintained Private land will be acquired when possible. The implementation of seasonal road closures will reduce harassment and stress on wildlife from motorized traffic. Early season livestock grazing will be used as a vegetative management tool to maintain forage in a palatable condition. Fall greenup will be reserved for deer forage. A management plan for the entire winter range area will be developed in coordination with Oregon Department of Fish and Wildlife.

MA-G3. General Forage

Emphasis

Manage for forage production and utilization in a manner consistent with general standards and guidelines for other resources.

Desired Condition

Structural and nonstructural range improvements, prescribed fire to increase the palatability of desirable species, and livestock management will be used to maintain or increase forage production. The natural composition and cover values of native grasses, sedges, forbs and palatable shrubs will be retained. Competition from undesirable forage plants, such as sagebrush and juniper, that decrease range productivity will be reduced. Proper stocking levels and distribution will be employed to effectively utilize forage production without adversely affecting plant communities. Areas planted in crested wheat grass will proceed through natural succession to reestablish native plant species, unless specific resource management objectives can be better met by maintaining certain pastures in crested wheat grass. Aspen clones will be allowed to regenerate. The occurrence and increase of noxious weeds will be prevented. A variety of native and introduced grasses, sedges, and forbs will be provided for grazing animals. Improvements that facilitate stock distribution and the effective use of available forage will be installed.

MA-G4. Research Natural Areas

Emphasis

These tracts of land are areas where natural processes are maintained for research purposes and education. They will provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species.

Desired Condition

Natural conditions will be maintained. Any management activities within the RNA's will be directed at maintaining the natural conditions of the area, and these human-caused changes to the ecosystem will not be readily evident. Continuing, nondestructive baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural lightning and human-caused fire starts occur.

If available, the private land on Haystack Butte RNA will be acquired.

MA-G5. Juniper Old Growth

Emphasis

Provide habitat for wildlife species dependent on old growth stands.

Desired Condition

The common flicker is the management indicator species. Stands at least 40 acres in size and not more than five miles apart will be maintained. Trees should be large with hollow centers and have broad, irregular-shaped crowns or spike tops. Most of the large trees, both live and dead, should support lichen growth. Cavities should be evident in the trees from either bole splits and/or limbs that have broken away from the tree bole. Some younger trees may be present along with various grasses, forbs, and shrubs Management activities and roads will generally not be evident. Fire occurrence will be evident where lightning and human-caused starts occur. Grazing by livestock, as well as by big game wildlife species, may be evident.

MA-G6. Crooked River Recreation Area

Emphasis

Maintain the appearance of a natural landscape to enhance and protect recreational values.

Desired Condition

The natural and scenic qualities of the river corridor will be preserved, as required by the Wild and Scenic Rivers Act.

A trail system and dispersed campsites will be developed to assist in public enjoyment of the area

MA-G7. Deschutes River Scenic Corridor

Emphasis

Manage for scenic quality and natural appearance of the landscape.

Desired Condition

The natural and scenic qualities of the river corridor will be preserved as required by the Wild and Scenic Rivers Act. A trail system will be developed to provide access to the area. Dispersed campsites will be designated to aid in management of the area.

MA-G8. Squaw Creek

Emphasis

Provide opportunities for semiprimitive nonmotorized recreation in a pristine canyon setting while protecting and enhancing the deer winter range habitat and fisheries. A 1,370-acre corridor along the creek will be managed for its scenic quality as a "scenic river."

Desired Condition

A travel management program will restrict vehicle access seasonally, except for administrative and special uses. Private inholdings which facilitate management of the area will be acquired when possible. Recreational use, livestock grazing, prescribed fire and wildfire will occur, but the area will appear natural. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Fire occurrence will be evident where lightning and human-caused starts occur.

A corridor along the creek from the Grassland boundary to the confluence with the Deshutes River has been determined to be suitable for designation as a scenic river under the Wild and Scenic Rivers Act 1 This corridor will be managed to preserve and, or enhance its natural and scenic qualities.

MA-G9. Riparian

Emphasis

Maintain riparian habitat, including streambank stability and fish habitat capability, at existing levels where the desired condition is met. On sites where the desired condition is not met, take steps necessary to bring riparian condition to its ecological potential. Allow no activities that will result in a deterioration of water quality in perennial and fish bearing streams.

Desired Condition

General: On-the-ground work and management changes are needed to improve riparian conditions on approximately 1,250 acres of the Grassland, all but 400 acres have been completed. Remaining work will be completed in the first decade. However, it will take from 20 to 60 years for some of these areas to heal and function fully as natural systems.

Rehabilitation activities include fencing, seeding, planting, and installation of physical structures such as rock structures, check dams, and log weirs Changes in livestock management are an important part of this strategy. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection or enhancement needs.

Specific projects are shown in the Riparian Improvement Schedule in Appendix A.

Work to restore riparian areas will have been completed, but not all riparian areas will have had time to recover to full biological potential. Many streams that presently flow only seasonally will flow yearround. The potential for overland flows and delivery of sediment to streams from upland areas will have been reduced by construction of improvements such as fences, the development of dispersed water sources, and adjustments in grazing systems. Water quality will be maintained or improved to meet state standards for temperature and turbidity.

Stream Channels: Establish a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation. Sites unable to support a canopy of deciduous species will be characterized by vigorous stands of forbs, grasses, and grasslike riparian species. Although cobble and gravel are often prominent features during the development of riparian stream courses, they become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are rebuilt and stabilized, a narrower, deeper channel will gradually develop.

Springs: Manage springs to maximize water storage and support excellent condition riparian vegetation. These ecosystems should support deciduous vegetation where such vegetation was present in the past

At spring sites not associated with deciduous vegetation manage the riparian area to support vegetation associated with excellent condition. These spring areas will not show signs of compaction, channeling, or head cuts.

Wet Meadows: Manage wet meadows to support vegetation associated with excellent conditions such as forbs, grasses, reeds, sedges, and rushes. These areas will not show signs of channeling or gully development of sufficient size to lower the seasonally saturated zone and change the plant community type. These zones should be showing no signs of invasion from nonriparian species such as rabbitbrush, sagebrush, or juniper.

MA-G10. Rimrock Springs Wildlife Area

Emphasis

Provide unique habitat (wetlands, ponds, springs) within the juniper-sagebrush steppe. Provide for nonconsumptive (viewing, photography) wildlife uses in a natural setting. Improve present habitat conditions and promote habitat diversity.

Desired Condition

Increased opportunities for wildlife viewing and photography, including a barrier-free interpretive trail and a brochure will be provided. Barrier-free toilet facilities will be available at the trailhead. Interpretation of unique cultural resources will preserve early history of the area. Prescribed fire will be used to improve habitat.

MA-G11. Haystack Reservoir

Emphasis

Provide users with a system of quality facilities that are safe and environmentally sound. Continue to emphasize camping, picnicking, boating, fishing, and swimming.

Desired Condition

The existing partnerships will be continued and new ones explored to provide for the needs of the recreational users. Bureau of Reclamation (BOR) lands around the reservoir will be acquired to simplify management of the area; BOR would retain ownership and management of the dam. New and upgraded facilities will provide for barrier-free opportunities.

MA-G12. Cove Palisades State Park

Emphasis

Manage for developed campgrounds and water related recreational activities.

Desired Condition

The landbase needed by the State to operate a high-quality developed recreational facility on the shores of Lake Billy Chinook will be provided. Other resources within the park boundary will be managed to support this goal.

MA-G13. Lake Billy Chinook View Area

Emphasis

Maintain the natural appearing character of the viewshed from Lake Billy Chinook, where management activities are not evident or are visually subordinated to the surrounding landscape.

Desired Condition

The natural and scenic qualities of the management area will be preserved.

MA-G14. Dispersed Recreation

Emphasis

Provide and maintain a near-natural setting for outdoor recreational experiences.

Desired Condition

Within the immediate dispersed site, management activities will not be evident to the casual observer. Activities may be evident in areas adjacent to the site, depending on the management prescription applied to them. Primitive, user-constructed structures or facilities, consistent with the sites' use, will be seen. Sites will be managed so that users tend to feel relatively isolated. A strategy will be developed that encourages individuals or groups to "find their own place." Livestock grazing may be evident, but the successful application of allotment management requirements will also be evident.

MA-G15. Gray Butte Electronic Site

Emphasis

Manage the site to provide low power output electronic equipment. Limit transmitters to a maximum of 150 watts.

Desired Condition

All development should meet partial retention from important viewpoints. Minimize interference potential through facility design, location, spacing, capacity and establishment of site-noise floor limits. Meet user needs, and maximize utilization of the site. Three buildings and three towers will be allowed at the site.

MA-G16. Utility Corridors

Emphasis

Accommodate energy-transmission facilities.

Desired Condition

Future development will be confined to existing corridors. No windows for future development will be designated. Identify exclusion and avoidance areas. Through design and management, the use of lands allocated to power facilities will be optimized. The proliferation of separate rights-of-way will be discouraged to reduce the cumulative environmental impact of linear facilities. The creation of corridors in addition to those currently designated will be discouraged.

Modeling Characteristics

Many new management prescriptions have been developed and included in the FEIS. In Table B-3-5, it is evident that many of the management emphases from the DEIS and FEIS are similar in their treatment of the resources. Because the Ochoco's FORPLAN model deals primarily with those activities that manipulate vegetation, it is possible for the Ochoco's FORPLAN model to group many different management areas if their vegetation treatment activities are similar. Table B-3-6 displays the FORPLAN groupings for all management area prescriptions. The following text explains some of the modeling characteristics of each.

Certain parts of the Forest and Grassland may be designated to meet wildlife, recreation, aesthetic, or scientific objectives in a particular alternative. Prescriptions applied to these areas contain moderate to completely binding constraints on timber and range management. These prescriptions include all those described above except the timber/range management area prescription (Group VII). The Group VII management prescriptions in the DEIS emphasize only timber and/or range production and allow a high degree of flexibility in the application of activities to the ground. Depending upon the analysis area to which they are applied, several dozen to several hundred columns represent these activities in the LP. In the FEIS, the Group VII management area prescription had Management Intensities, timing choices, and Right Hand Side constraints added to address resource concerns (uneven-age management, rotation ages, big game cover). As a result, other resource objectives besides timber and range may be emphasized.

The emphasis for management area prescription Groups VI and VIII are similar in that the primary objective is to produce elk habitat through control of cover and forage unit, amounts, sizes, and spacings. The key factors in regulating habitat conditions on the Ochoco are the control of cover and road use. The main factors affecting cover are the presence or absence of precommercial thinning, stocking level, and whether it is a ponderosa pine or mixed conifer working group. Relative cover values are used as coefficients in the LP based upon the concept that a stand provides differing levels of protection to an animal depending upon stand density. Use of relative cover values based upon the crown closure of the stand refines the ability of the LP to differentiate among eligible columns in order to satisfy big game cover and forage objectives. These are expressed as Right Hand Side constraints and applied to contiguous blocks of land. Considerable flexibility for response to multiple objectives or constraints is contained in the applicable columns.

Although management objectives differ, management area prescriptions in Group I are modeled in a similar manner. Each of these prohibits timber harvesting and the application of intensive range

TABLE B-3-5
PRESCRIPTION STANDARDS AND GUIDELINES

This Table Summarizes and Compares the Following Elements for Each Management Area Prescription

Pre-scrip-tion	Timber	Range	Recreation	Wildlife	Access	Protection
MA-D1 MA-F9 MA-F22 MA-F21	Scheduled timber harvest, full yield, maximize either PNV or timber volume	Range management to optimize forage utilization; forage production based on economic efficiency	Manage for roaded modified/roaded natural opportunity; visual quality is modification to maximum modification	Manage for deer and elk cover as compatible with timber objectives; snag level can vary from MR to 40% level	High open road densities, good access, except F9 which has no long-term road development, mainly trail access for MA-D1; F22 <3 miles/section.	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-D2 MA-F20	Scheduled timber harvest, reduced yield, objectives to optimize big game winter range habitat Uneven-aged mgmt allowed in Alt C-Mod	Most range management practices allowed as long as they don't interfere with big game objectives	Manage for roaded modified/roaded natural opportunity, visual quality is modification to maximum modification	Manage for high elk and deer use, snag level can vary from MR to 80% level	Reduced access, open road density no higher than 2 mi /sq mi (3 mi for F20), seasonal road closure to 1 mi. for big game winter habitat	Confine, contain or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block.
MA-D3	Scheduled timber harvest, reduced yield, objectives to optimize big game summer range habitat Uneven-aged mgmt allowed in Alt C-Mod	Most range management practices allowed as long as they don't interfere with big game objectives	Manage for roaded modified/roaded natural opportunity, visual quality is modification to maximum modification	Manage for high elk and deer production, snag level can vary from MR to 80% level	Reduced access, open road density no higher than 2 mi/sq mi	Confine, contain or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-D4 MA-F6	No scheduled timber harvest, cultural treatments allowed in areas not currently in "old growth" to facilitate reaching old growth conditions as soon as possible	No scheduled improvements, full forage utilization	Use will be not be emphasized, visual quality is retention	Manage for pileated woodpecker and common flicker; snag level at 100%	Construction of new roads avoided whenever possible If essential, work would not be performed between 2/1 through 7/15	Control suppression strategy utilized
MA-D5 MA-F25 Parts of MA-F26 MA-F7	Schedules timber harvest, reduced yield, management objective is to retain or enhance the natural beauty	No scheduled improvements, full forage utilization	Visual quality is retention, management activities will not be visually evident, recreation opportunities provided in roaded natural setting	Snag level at 100%	Avoid construction of local roads other than at needed junctions	Confine, contain or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block, emphasize minimum physical disturbance

Prescription	Timber	Range	Recreation	Wildlife	Access	Protection
MA-D6 Parts of MA-F26 MA-F7	Scheduled timber harvest, reduced yield; management objective is to retain or enhance the natural beauty	No scheduled improvements, full forage utilization	Visual quality is partial retention, management activities may be evident but will remain visually subordinate to the natural landscape.	Snag level at 100%	Avoid construction of local roads other than at needed junctions	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block, emphasize minimum physical disturbance
MA-D7	Scheduled timber harvest, reduced yield, management objective is to partially retain the natural beauty	Most range management practices allowed as long as they don't interfere with visual quality objective	Visual quality is partial retention, management activities may be evident but will remain visually subordinate to the natural landscape	Snag level can vary from MR to 40% level, habitat improvement may be implemented	Avoid construction of local roads other than at needed junctions	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-D8 MA-F1 MA-F2 MA-F3 MA-F4 Parts of MA-F7	No timber management activities	No scheduled improvements, full forage utilization	Visual quality objective is preservation, recreation opportunities provided in a semiprimitive setting.	No habitat manipulation scheduled, snag level at 100%	Trails only, nonmotorized	Confine and contain most natural ignition fires, control all person caused fires, emphasize minimum physical disturbance
MA-D9 MA-F8 MA-F10	No scheduled timber harvest, salvage harvests allowed for the purpose of maintaining a healthy, attractive semiprimitive setting	No scheduled improvement, full forage utilization	Visual quality objective is retention, nonmotorized opportunities provided in a semiprimitive setting	Habitat improvement allowed if they meet visual objectives, snag level at 100%	No (long term) toad development, mainly trail access	Confine and contain mostly, control may be considered emphasize minimum physical disturbance
MA-D10	Scheduled timber harvest, reduced yield, uneven-aged and patch cut systems	No scheduled improvement, full forage utilization	Visual quality objective is partial retention, motorized opportunities in a semiprimitive setting.	Habitat improvement allowed if they meet visual objectives, snag level at 100%	Access restricted, primitive road system developed to provide a challenging ORV experience	All suppression strategies allowed, confine and contain given emphasis, minimize physical disturbance
MA-D11 MA-F13	No scheduled timber harvest, harvest is allowed for the purpose of maintaining a safe, functional and attractive site.	No scheduled improvement, domestic livestock grazing excluded except when needed to meet recreation objectives	Visual quality objective is retention, provide and maintain sage, healthful and aesthetic facilities	Habitat improvements allowed providing they meet VCO's and do not distract from recreational values	Road standards comparable with the ROS level	Strategy is to contain or control, emphasize minimum physical disturbance
MA-D12 MA-F5	No timber management activities	No scheduled improvements, domestic livestock grazing excluded except when it is essential for maintaining a vegetation type or for research purposes	Prescription results in VQO level of preservation, recreational use discouraged	Habitat improvements allowed only as related to research, snag level at 100%	Access restricted, low standard roads needed for research may be constructed	Natural fires undisturbed unless they threaten escape or uniqueness of the RNA

Pre-scrip-tion	Timber	Range	Recreation	Wildlife	Access	Protection
MA-D13	Scheduled timber harvest, reduced yield, logging system constraints	Scheduled improvements allowed if they meet riparian objectives, reduced forage utilization when riparian conditions need to be improved to meet riparian objectives	VQO is partial retention	Habitat improvement allowed, snag level at 100%.	When possible avoid new construction, strict standards to avoid any adverse environmental consequences	Confine and contain are the principle strategies, minimize soil and vegetation disturbance
MA-D14 MA-F15	Scheduled timber harvest, reduced yield, logging system constraints	Scheduled improvements allowed if they meet riparian objectives, reduced forage utilization when riparian conditions need to be improved to meet riparian objectives.	VQO is partial retention	Habitat improvements allowed, snag level at 100%	When possible avoid new construction, strict standards to avoid any adverse environmental consequences	Confine and contain are the principle strategies, minimize soil and vegetation disturbance
MA-F11A	No scheduled timber harvest	No scheduled improvement, full forage utilization	Visual quality objective is retaining nonmotorized opportunities provided in a semiprimitive setting	Habitat improvement allowed if they meet visual objectives, snag level at 100%	No (long-term) road development, mainly trail access.	Confine and contain mostly, control may be considered emphasize minimum physical disturbance
MA-F11B	No scheduled timber harvest	Most range management practices allowed as long as they don't interfere with big game or recreation objectives	Manage for roaded modified/roaded natural opportunity, visual quality is modification to maximum modification	Manage for high elk and deer use, snag level can vary from MR to 100% level	Reduced access, road closed after use	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-F16	Harvest timber to provide a natural setting while maintaining forest health	Most range management practices allowed as long as they don't interfere with recreation objectives	VQO is retention, management activities will not be evident, roaded natural setting	Manage for high production of elk and deer, if compatible with objectives.	Reduced access, primitive road system, mainly trail access.	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block, emphasize minimum physical disturbance
MA-F17	Scheduled timber harvest, reduced yield, uneven-aged and patch cut systems	Most range management practices allowed as long as they don't interfere with recreation objectives	VQO is retention, management activities will not be visually evident, roaded natural setting	Manage for high production of deer and elk is compatible with objectives	When possible avoid new construction strict standards to avoid any adverse environmental consequences	Control suppression strategy utilized
MA-F18	Scheduled timber harvest, reduced yield, management objective is to retain or enhance the natural beauty and provide for big game habitat	Most range management practices allowed as long as they don't interfere with recreation objectives	VQO is partial retention, management activities may be evident but will remain visually subordinate due to the natural landscape	Snag level at 100%, manage for high deer and elk use	Avoid construction when possible, strict standards to avoid any adverse environmental consequences	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block, emphasize minimum physical disturbance

Prescription	Timber	Range	Recreation	Wildlife	Access	Protection
MA-F19	Scheduled timber harvest, reduced yield, uneven-aged and patch cut systems, enhance the natural beauty	Most range management practices allowed as long as they don't interfere with recreation objectives	VQO is retention, manage for roaded natural/roaded modified	To provide habitat for big game while meeting primary emphasis for specific management area.	Avoid construction when possible, strict standards to avoid any adverse environmental consequences	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block, emphasize minimum physical disturbance
MA-F23	Scheduled timber harvest, reduced yield, management objective is to retain the natural beauty	No scheduled improvements, full forage utilization	Visual quality is partial retention, management activities may be evident but will remain visually subordinate to the natural landscape, roaded natural	Snag level at 80%, habitat improvement may be implemented	Nonmotorized use of trails, access restricted	Confine, contain , or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-F24	Scheduled timber harvest, reduced yield, uneven-aged and patch cut systems	No scheduled improvement, full forage utilization	Visual quality objective is partial retention, motorized opportunities in a semiprimitive setting	Habitat improvement allowed if they meet visual objectives, snag level at 100%	Avoid construction of local roads other than at needed junctions	All suppression strategies allowed, confine and contain given emphasis, minimum physical disturbance
MA-F28	No scheduled timber harvest, harvest allowed for the purpose of maintaining a safe, functional and attractive site	No scheduled improvement, domestic livestock grazing excluded except when needed to meet recreation objectives	VQO is retention, managed for roaded natural /roaded modified	Habitat improvements allowed providing they meet VQO's and do not distract from recreational values, snag level 0%	Avoid construction of local roads other than at needed junctions	Strategy is to contain or control, emphasize minimum physical disturbance
MA-G1	No scheduled timber harvest	Reserve fall green-up for antelope, most range practices allowed	Manage for roaded modified/roaded natural opportunity, VQO is modification to maximum modification	Manage for high production of antelope	High open road densities, high clearance	Confine, contain or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-G2	No scheduled timber harvest	Most range management practices allowed, stress early season use	Manage for roaded modified/roaded natural opportunity, VQO is modification to maximum modification	Manage for high winter deer use.	Reduced access, high clearance	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-G3	No scheduled timber harvest	Range management to optimize forage utilization, forage production based on economic efficiency	Manage for roaded modified/roaded natural opportunity, visual quality is modification to maximum modification.	Manage for habitat as compatible with mgmt objectives	High open road densities, high clearance	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block

Prescription	Timber	Range	Recreation	Wildlife	Access	Protection
MA-G4	No scheduled timber harvest	No scheduled improvements, domestic livestock grazing excluded except when it is essential for maintaining a vegetation type or for research purposes	Prescription results in VQO level of preservation, recreational use discouraged	Habitat improvements allowed as long as they meet objectives of the RNA, snag level at 100%	Access restricted, low standard roads needed for research may be constructed	Natural fires undisturbed unless they threatened escape or uniqueness of the RNA
MA-G5	No scheduled timber harvest	No scheduled improvements, full forage utilization	Use will be de-emphasized, visual quality is retention	Manage for common flicker.	Construction of new roads avoided whenever possible If essential, work would not be performed from February through July 15	Control suppression strategy utilized
MA-G6 MA-G7	No scheduled timber harvest	No livestock grazing	VQO is preservation, recreation opportunities provided in a semiprimitive setting.	Manage for and permit improvements that are compatible with primary objectives.	No long-term road development, mainly trail access.	Confine and contain mostly, control may be considered, emphasize minimum physical disturbance
MA-G8	No timber management activities	No livestock grazing in lower canyon, other must be compatible with deer habitat	VQO is partial retention, motorized opportunities in a semiprimitive setting	Optimum habitat for deer use	No long-term road development, mainly trail access	Confine and contain mostly, control may be considered, emphasize minimum physical disturbance
MA-G9	No scheduled timber harvest	No scheduled improvement, forage utilization reduced when riparian conditions need to be improved to meet objectives	VQO is partial retention	Habitat improvement allowed, manage for brook and rainbow trout, and upland birds	When possible avoid new construction, strict standards to avoid any adverse environmental consequences.	Confine and contain are the principle strategies, minimize soil and vegetation disturbance.
MA-G10	No scheduled timber harvest	Most range management practices allowed as long as they don't interfere with wildlife objectives	VQO is modification	Habitat improvement allowed if they meet visual quality objectives, manage for wetland species	No long-term road development, mainly trail access	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-G11	No scheduled timber harvest	No scheduled improvement, domestic livestock grazing excluded except when needed to meet recreation objectives	VQO is retention, provide and maintain safe, healthful, and aesthetic facilities.	Manage for and permit improvements that are compatible with primary objectives	Road standards comparable with the ROS level	Control suppression strategy utilized

Prescription	Timber	Range	Recreation	Wildlife	Access	Protection
MA-G12	No timber management activities	No scheduled improvements, domestic livestock grazing excluded except when it is essential for maintaining a vegetation type or for research purposes	VQO is retention, provide and maintain safe, healthful, and aesthetic facilities	Manage for and permit improvements that are compatible with primary objectives	Road standards comparable with the ROS level	Control suppression strategy utilized
MA-G13	No scheduled timber harvest	Most range management practices allowed, stress early season use	VQO is partial retention	Manage for permit improvements that are compatible with primary objectives.	When possible avoid new construction, strict standards to avoid any adverse environmental consequences	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-G14	No scheduled timber harvest.	Most range practices allowed if they don't interfere with management objectives	Manage for roaded modified/roaded natural opportunity, visual quality is modification to maximum modification	Use adjacent management area objectives	When possible avoid new construction, strict standards to avvoid any adverse environmental consequences.	Confine, contain, or control suppression strategies utilized in accordance with economic efficiency analysis for each preattack block
MA-G15	No scheduled timber harvest	Range management to optimize forage utilization, forage production based on economic efficiency.	Manage for roaded modified/roaded natural opportunity, VQO is modification to maximum modification	Use adjacent management area objectives	Access restricted.	Confine and contain are the principle strategies, minimize soil and vegetation disturbance

TABLE B-3-6
FORPLAN Groupings For Management Area Prescriptions 1/

GROUP I	
MA-F1	Black Canyon Wilderness
MA-F2	Bridge Creek Wilderness
MA-F3	Mill Creek Wilderness
MA-F4	N F C R Wilderness Study
MA-F5	RNA's
MA-F6	Old Growth
MA-F7	Summit Trail (preservation)
MA-F8	Rock Creek/Cottonwood Creek Unroaded
MA-F10	Silver Creek Unroaded
MA-F11	Lookout Mountain
MA-F28	Facilities
MA-D4	Old Growth
MA-D8	Deschutes Canyon-Steelhead Falls WSA
MA-D9	Semiprimitive Nonmotorized
MA-D10	Semiprimitive Motorized
MA-D11	Developed Recreation
MA-D12	RNA's

GROUP II	
MA-D13	Riparian in Acceptable Condition
MA-D14	Riparian in Excellent Condition
MA-F15	Riparian

GROUP III	
MA-D10	Semiprimitive Motorized
MA-F17	Stein's Pillar
MA-F19	Deep Creek
MA-F24	N F.C R Scenic River

GROUP IV	
MA-F7	Summit Trail (retention)
MA-F12	Eagle Roosting
MA-F13	Developed Recreation
MA-F14	Dispersed Recreation
MA-F16	Bandit Springs
MA-F25	Highway 26 Corridor
MA-F26	Visual Management (retention)
MA-F27	Round Mountain National Recreation Trail
MA-D5	Retention Foreground

GROUP V	
MA-F7	Summit Trail (partial retention)
MA-F18	Hammer Creek
MA-F23	N F C R Recreation River
MA-F26	Visual Management (partial retention)
MA-D6	Partial Retention

GROUP VI	
MA-F20	Winter Range
MA-D2	Big Game Winter Range

GROUP VII	
MA-F9	Rock Creek/Cottonwood Creek Helicopter
MA-F21	General Forest Winter Range
MA-F22	General Forest
MA-D7	General Forest

GROUP VIII	
MA-D3	Big Game Summer Range

GROUP IX	
MA-D7	Partial Retention Middleground

1/ Management area prescriptions were not developed for Grassland management areas in alternatives A, E, and NC

practices. Consequently, they are represented in the LP as single columns. The effects of applying these prescriptions are simulated. Information about resource trade-offs and allocation efficiencies were developed through successive model runs. Objectives for the size, distribution, and stability of old growth units, and an evaluation of the trade-offs required from other resources led to the use of this dedicated stand approach for old growth (see Planning Records, 1920, 6/21/84).

Two groups of prescriptions, Groups II and III, are dealt with in a similar manner. Management activities are very constrained in these areas, although some timber harvesting is permitted. These areas are, in effect, pre-scheduled so that negligible room for optimization exists. Accordingly, these prescriptions are modeled in the LP as single columns so that the effects of their application can be simulated.

Although the management objectives differ for management area prescriptions in Group IV, V, and IX, they share modeling characteristics. Although the numbers differ for all three, extended rotation ages and restrictions on timber cutting unit rates and sizes distinguish scenic prescriptions from the rest. Spatial control achieved within our modeling framework allows the imposition of Right Hand Side rate of cut constraints on the management Areaaas a unit. Several dozen columns representing alternative activities and schedules contribute to this constraint. Rotation age constraints are represented in the per acre treatment columns.

Modeling Prescriptions

In order to understand the details of how management prescriptions are structured in the LP, some knowledge of FORPLAN data structures and terminology is required. Two types of modeling prescriptions are recognized in FORPLAN. "Existing prescriptions" are specific to each analysis area and cover treatments applied from the present until the stand is regenerated. These prescriptions apply to the entire planning horizon for options not involving regeneration of timber stands. "Regenerated prescriptions" cover one full rotation from reforestation to regeneration harvest and apply to specific regeneration classes In general, there are fewer regenerated prescriptions than existing prescriptions, because there are more analysis areas than regeneration classes, and only those existing prescriptions involving timber harvest need to link with a regenerated prescription. These prescriptions are structured into the LP differently depending upon whether a Model I or Model II matrix (Johnson and Scheurman 1977) is being generated by FORPLAN. The example given earlier is a Model I formulation, as is the Ochoco model. Each column contains a set of activities over the entire planning horizon. Eash set is composed of an existing prescription plus the number of cycles of the associated regenerated prescription necessary to reach the end of the planning horizon. Both existing and regenerated prescriptions are structured at three levels in FORPLAN. The broadest level is termed the "management emphasis" of a prescription, which in the Ochoco's case ties directly to management prescriptions. There may be multiple sets of activities within each management emphasis labeled as different "management intensities". Each of these management emphasis-management intensity combinations may contain a range of intermediate and regeneration harvest timings at the third level. A specific column, then, is composed of one activity schedule covering the entire planning horizon for a particular management emphasis and intensity for both existing and regenerated prescriptions.

The modeling prescriptions used in FORPLAN are best described in terms of the activities represented by each. Again, these practices are the timber and range activities affecting vegetative growth and yield Timber practices modeled included overstory removals for existing two-story stands, uneven-aged (single tree or group selection) management, commercial thins, precommercial thins, reforestation methods, and shelterwood and clearcut regeneration harvests. In many cases stocking levels and timing patterns also differed from one management intensity to another. Within a management intensity, the timing of intermediate cuts was fixed for regenerated prescriptions to reduce model size but flexible for existing prescriptions. Uneven-aged management

entry cycles were fixed for a particular management emphasis but varied between emphasis.

Regeneration harvest can be scheduled in every eligible period of the planning horizon for existing prescriptions. There is a range of five periods in which regeneration harvest may occur for regenerated prescriptions. Rotation ages range upward from 95 percent of culmination of mean annual increment for the Group VI, VII, and VIII management emphases, with longer rotations for the other prescriptions. There is one exception to this in the FEIS. In Alternative I, the rotation age for pine stands was increased well beyond culmination in Groups VI and VII. Choice of regeneration harvest method depends upon site specific factors that could not be reasonably modeled. Recognizing that these assumptions would not apply on every case but would in aggregate balance out, all pine regeneration harvests were modeled as shelterwoods and mixed conifer harvests as clearcuts. A similar situation occurs for choice of logging method. The assumption in this case was that tractor logging would be used on slopes less than 30 percent, and cable methods for steeper analysis areas. Range practices modeled included mechanical or non-mechanical forage treatments and the associated structural improvement levels. Scheduling flexibility was built into prescriptions calling for these practices, allowing their implementation anytime during the first five decades. Once the activity is implemented, periodic treatments to maintain that production level are scheduled.

The selection of management intensities for each management emphasis was designed to ensure that either cost-efficient combinations of practices appropriate for specified objectives were represented, or to ensure the objectives would be met. For example, uneven-aged management intensity was forced into solutions in several management emphasis. A broad, evenly dispersed sample of the potential production possibilities for most management emphases was also maintained. Silvicultural options for existing stands and range practices could all be reasonably accommodated within FORPLAN. However, more potential treatment options for managed stands exist than could be included in the LP. Thus, the Ochoco undertook an economic analysis of a wide array of managed timber yield tables (see Planning Records, 1920 12/22/82 and 8/31/82). This analysis is referred to as "Stage II".

Stage II

The Stage II analysis considered over 30 different combinations of reforestation practices (planting vs. natural regeneration, stocking level, presence or absence of precommercial thins). Timing and number of commercial thins were tested for ponderosa pine and mixed conifer, for both under and over 30 percent slope.

Each of the thirty-four timber yield tables for managed stands had a soil expectation value (SEV) calculated using the rotation age of culmination of mean annual increment, and a four percent discount rate. These are displayed in Table B-3-7 for both tractor and cable ground. Soil expectation value was judged to be the best measure for establishing a relative ranking of managed yield tables, since the sequence of practices starts from bare ground. These rankings are sensitive to cost and value assumptions. In general, the less intensive management regimes ranked higher in SEV. However, these regimes also have longer rotation ages and provide considerably less volume which, if selected, would result in a lower rate of harvest of the existing high valued stands. These observations point out the need to provide the LP with the opportunity to perform this balancing act by providing a wide range of intensities and scheduling possibilities.

A set of criteria, of which SEV was only one, were developed and used to guide the process of selecting the managed yield tables to be included in the Forest's FORPLAN (LP) model. One of the primary criteria was to provide a wide range of intensities to ensure examination of a full range of management opportunities. Related to this criterion was the need to provide a wide range of scheduling opportunities to ensure maximum flexibility for the LP. Accordingly, the timber management strategy includes yield tables with early rotation ages and/or early thinning volumes, as well as an intensity maximizing total merchantable volume. Economic criteria also weighed

TABLE B-3-7
STAGE II ANALYSIS
SUMMARY OF PER ACRE SEV 1/ FOR MANAGED YIELD TABLES

PONDEROSA PINE				
YT ##	Rotation Age 2/	Practices	Tractor $/Acre	Cable $/Acre
2	100	P+Pct CT3	-252	-317
3	100	P+Pct CT2	-261	-324
4	100	P+ Pct CT1	-269	-292
5	100	P Pct CT2 or 3	-221	-262
6	100	P Pct CT2	-229	-267
7	100	P Pct CT1	-229	-250
8	100	P Pct	-243	-255
10	100	P CT2	-207	-259
11	110	P CT1	-229	-259
12	100	P	-232	-248
21	120	N Pct CT3	-122	-146
22	110	N Pct CT2	-123	-147
23	110	N Pct CT1	-123	-147
24	110	N Pct	-135	-146
26	120	N CT2	-87	-111
27	120	N CT1	-86	-112
28	120	N	-95	-101
31	90	P+Pct CT1 3/	-273	-333
32	60	Pt Pct	-281	-340

MIXED CONIFER				
YT ##	Rotation Age 2/	Practices	Tractor $/Acre	Cable $/Acre
52	90	P+ Pct CT3	-192	-308
54	90	P+Pct	-238	-287
55	100	P Pct CT2 or 3	-157	-219
56	100	P Pct CT2	-170	-233
57	100	P Pct CT1	-197	-240
58	90	P Pct	-218	-245
60	90	P CT2	-154	-214
61	100	P CT1	-180	-460
62	100	P	-208	-229
71	110	N Pct CT3	-85	-178
73	110	N Pct CT1	-96	-175
76	110	N CT2	-63	-150
77	110	N CT1	-57	-136
78	120	N	-84	-148
81	90	P+Pct CT1 3/	-208	-264

1/ Rotation age used was that of culmination of mean annual increment, except for Table 32 which was 95% of culmination
2/ This set of practices include a higher stocking level and a delayed commercial thinning
3/ Soil Expectation Level (SEV) calculated using a 4% discount rate

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P+ Plant to increased stocking levels
P Plant at current stocking levles
N Natural regeneration
Pct Precommercial thinning
CT1 One commercial thinning
CT2 Two commercial thinnings, 20 year interval for ponderosa pine and mixed conifer
CT3 Three commercial thinnings, 20 year interval for ponderosa pine and mixed conifer

heavily in the selection process. A table that maximized per acre SEV, and a minimum investment yield table were included. Additionally, when other factors were nearly equal, the table with the highest SEV was selected. The resource emphasis of each strategy was also of primary importance.

The quantity and quality of big game cover was a primary criterion for big game-oriented management strategies. Range emphasis requires relatively open stands with multiple entries. Riparian standards require less intensive management, with few entries and provision for shade. The semi-primitive motorized management strategy also requires less intensive management in an attempt to provide a "natural" appearing environment. Scenery prescriptions depend mostly on longer rotation ages and provision for large, yellow-bark trees. One final criterion used was that, if every other criterion was equally satisfied, practices reflecting current management were favored. Table B-3-8 depicts the tables selected for each management strategy and the particular criteria underlying each choice. In most cases several criteria influenced the selection of a particular yield table.

TABLE B-3-8
ACTIVITIES REPRESENTED IN EXISTING PRESCRIPTIONS FOR ANALYSIS
AREAS ELIGIBLE FOR COMMERCIAL THINS

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	RH	NT-EX
	2	Timber/	CT-RH	NT-EX
	2	Range		NM-EX
	3		NC	NT-EX
Group VIII	1	Big Game	RH	NT-EX
	2	Big Game	CT-RH	NT-EX
	3		NC	NT-EX
Group VI	1	Big Game	RH	NT-EX
	2	Big Game	CT-RH	NT-EX
	3		NC	NT-EX
Group I	1		NC	NT-EX
Group II	1	Riparian	RH	NT-EX
	2	Riparian	CT-RH	NT-EX
	3		NC	NT-EX
	4	Riparian	Uneven	NT-EX
Group III	4	Recreation	Uneven	NM-EX
Group I	1	No Treatment	NC	NM-EX
Group IV	1	Visual	RH	NM-EX
	2	Visual	CT-RH	NM-EX
	3		NC	NM-EX
Group V	1	Visual	RH	NM-EX
	2	Visual	CT-RH	NM-EX
	3		NC	NM-EX
Group IX	1	Visual	RH	NT-EX
	2	Visual	CT-RH	NT-EX
	3		NC	NT-EX

1/ Timber Activity Abbreviations

OR = Overstory removal
CT = Commercial thin
NC = No cut
N = Natural regeneration
P = Planting @ reduced stocking levels
PCT/NW = Precommercial thin
PCT/OP = Precommercial thin @ 18 x18' spacing
Uneven = Uneven aged management
P = Planting at present stocking levels
P+ = Planting @ increased stocking level
RH = Regeneration Harvest

2/ Range Activity Abbreviations

2/ Range Activity Abbreviations
NT = No treatment
NM = Nonmechanical treatment
FL = Full distribution level
M = Mechanical treatment
EX = Existing distribution level

Development of Yields

Timber

Timber yield tables containing both harvest and inventory volumes were constructed for all of the modeling prescriptions described in the previous section. Detailed documentation of the assumptions made and procedures followed are contained in Ochoco planning files (Existing Yield Tables, 4/13/83; Managed Yield Tables, 4/18/83). Yield tables used for the existing prescriptions were based upon empirical yield tables constructed by Regional Office personnel from data gathered in the 1981-1982 Ochoco timber inventory, and show merchantable growth into the future. These yields are specific to each of the eight inventory components modeled: 1) ponderosa pine-seedlings/saplings, 2) ponderosa pine-poles, 3) ponderosa pine-sawlogs, 4) ponderosa pine-two storied, 5) mixed conifer-seedlings/saplings/poles, 6) mixed conifer-sawlog, 7) mixed conifer-two storied, and 8) ponderosa pine-low site. Some of these categories contain acreages and averaged yields from other components merged together because of small acreages. Yield tables for existing prescriptions calling for overstory removals or intermediate harvests also relied upon information developed for managed yield tables with the Prognosis Model (Wykoff et.al. 1982).

The forest silviculturist calibrated the North Idaho variant of Prognosis for use on the Ochoco. This model was used to develop managed yields for ponderosa pine and mixed conifer regenerated prescriptions. Growth and yield patterns were developed that reflected reforestation practices, stocking levels, thinning, and regeneration harvests. Ponderosa pine-low site managed yields were constructed from a local model called Growth and Yield IV (Wood 1979) and a Regional Managed Yield Tables Program (USDA-Forest Service, not dated). No additional yield differentiations were made for productivity variations or unroaded areas. Use of timber yield tables representing one forest-wide average productivity for ponderosa pine, and one for mixed conifer resulted primarily from our timber inventory being conducted at that level of resolution. Forest-wide average yields limit the degree of optimization attainable and the level of geographic specificity feasible. Yield tables for different management emphases have reductions for snag levels built into the yield stream. In many cases several yield tables have been constructed with the same set of activities but with different snag levels. We then altered the snag level of a prescription set to meet different mixtures of objectives and to evaluate associated trade-offs.

Between the DEIS and FEIS, the Forest developed uneven-aged yield tables in response to public comments. Again the PROGNOSIS model was used and tables were developed for ponderosa pine two-story and sawlog stands. It was felt that uneven-age management was biologically inappropriate, too costly, or involved too few acres to be applied to the other stand types (See Planning Record 1920). The Forest also developed new managed yield tables for ponderosa pine. These tables have a new pre-commercial thin spacing. The purpose was to provide some protection against Mountain Pine Beetle susceptibility; yet provide some cover for big game. The Forest also evaluated its managed pine tables in the context of extended rotations beyond the culmination of the mean annual increment. In this case it was felt that the yield tables were suitable and the changes were made in the FORPLAN prescriptions.

Livestock Forage

Livestock AUM (animal unit month) yields were monetarily valued in the LP using the values obtained for the Ochoco through the USDA-Economic Research Service ranch budget study (see Planning Records, 1/24/83). The process used for estimating AUM yields was based upon forage production figures obtained by averaging yields in the "Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington" (Hall 1973) for the productivity types modeled. Basic yield categories were established for the five major cover types, i.e. 1) ponderosa pine, 2) mixed conifer, 3) timbered lands producing less than 20 ft/ac/yr, 4)

tree shrub types, and 5) grassland types. One average yield was used for ponderosa pine, and one for mixed conifer types. Yield variation associated with differences in existing timber stand density, and changes in stand density according to the treatments prescribed were modeled as joint production functions with timber. Broad productivity distinctions were modeled for the three remaining cover types as indicated by the working group and condition class analysis area identifiers (Table B-3-4). The application of mechanical or non-mechanical range treatments to the ground results in increased forage yields. Several of the management prescriptions allow these types of activities. Tables B-3-9 through B-3-14 display the structure of these practices in the modeling prescriptions.

The translation of forage production into livestock production occurred through the use of two related factors. The first, a utilization factor, represents the amount of forage produced that is utilized by livestock. This factor is distinctly different for analysis areas with slopes less than 30 percent versus those with steeper slopes. Utilization differences are incorporated into the riparian prescriptions to allow attainment of different objectives. Other prescriptions use the same utilization factors.

The high producing grassland types (non-native wheatgrasses) are a special case requiring greater amounts of utilization to maintain plant vigor. The second factor represents the amount of area, expressed as a percentage, over which the average utilization is expected to occur. This distributional factor is tied to the level of water developments present on an allotment as well as topographical features. The modeling recognizes different distribution percentages for the National Grassland versus the National Forest based upon the types of developments in place, and the differing purposes of the two units. Major variations also occur according to the slope break. Management prescriptions state whether or not additional water developments are appropriate.

The scheduled outputs used for AUM yields incorporate all of the elements just described into a periodic livestock output. The use of scheduled outputs for mechanical and non-mechanical treatments provides the ability to control the amount of treatment allowed within a management area. This control is necessary to meet management area objectives since we are using homogeneous per acre variables. A scheduled output table is also necessary to incorporate correct costs into the matrix for range treatments. Costs are included for mechanical and non-mechanical treatments on the different cover types. Also, broad average costs are associated with the livestock distribution levels.

Cover for Big Game

Another major use of scheduled outputs is to track and control the provision of cover for elk. Tables showing the effects of each ponderosa pine and mixed conifer modeling prescription on cover are input to FORPLAN. Use of relative thermal cover values based upon the crown closure of the stand refines the ability of the LP to differentiate among eligible columns in order to satisfy big game habitat objectives expressed as right hand side constraints. Geographic control in the model is necessary to ensure that these constraints are applied to contiguous blocks of land. The theoretical framework for these relative values derives from several sources as documented in Ochoco planning records ("Process for Evaluating Elk Habitat", undated). The main concept is that a stand provides more or less protection to an animal depending upon stand density. Values used are keyed to the annual energy balance of an individual elk in Central Oregon. Patterns of cover, based on timber practices, and the values used are considerably different for ponderosa pine versus mixed conifer. The main activity affecting provision of cover is the presence or absence, and stocking level of precommercial thins and the amount of uneven-aged management. Different values are used for the summer range and winter range prescriptions.

TABLE B-3-9
ACTIVITIES REPRESENTED IN EXISTING PRESCRIPTIONS FOR ANALYSIS AREAS WITH MATURE SAWTIMBER

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	RH	NT-EX
	2	Timber/	RH	NT-EX
	2	Range	RH	NM-EX
	3		NC	NT-EX
	9	Uneven	Uneven	NM-EX
Group VIII	1	Big Game	RH	NT-EX
	2	Big Game	NC	NT-EX
	3		NC	NT-EX
	9	Uneven		
Group VI	1	Big Game	RH	NT-EX
	2	Big Game	NC	NT-EX
	3	Big Game	NC	NT-EX
Group I	3		NC	NT-EX
Group II	1	Riparian	RH	NT-EX
	2	Riparian	CT	NT-EX
	3	Riparian	NC	NT-EX
	4	Riparian	Uneven	NT-EX
Group III	4	Recreation	Uneven	NM-EX
Group I	3		NC	NM-EX
Group IV	1	Visual	RH	NM-EX
	2		CT	NM-EX
	3		NC	NM-EX
Group V	1	Visual	RH	NM-EX
	2		CT	NM-EX
	3		NC	NM-EX
Group IX	1	Visual	RH	NT-EX
	2		CT	NT-EX
	3		NC	

1/ Timber Activity Abbreviations

- OR = Overstory removal
- CT = Commercial thin
- NC = No Cut
- N = Natural regeneration
- P- = Planting @ reduced stocking levels
- PCT/NW = Precommercial thin
- PCT/OP = Precommercial thin @ 18'x18' spacing
- Uneven = Uneven aged management
- P = Planting at present stocking levels
- P+ = Planting @ increased stocking level
- RH = Regeneration Harvest

2/ Range Activity Abbreviations

- NT = No treatment
- NM = Nonmechanical treatment
- FL = Full distribution level
- M = Mechanical treatment
- EX = Existing distribution level

TABLE B-3-10
ACTIVITIES REPRESENTED IN EXISTING PRESCRIPTIONS
FOR TWO-STORIED ANALYSIS AREAS

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	RH	NT-EX
	2	Timber	OR-PCT/NW-CT-RH	NT-EX
	3	Timber	NC	NT-EX
	4	Range	OR-PCT/OP-CT-RH	NM-EX
	5	Range	OR-PCT/OP-CT-RH	NM-FL
	6		NC	NT-EX
	9	Uneven	Uneven	NT-EX
Group VIII	1	Big Game	RH	NT-EX
	2	Big Game	OR-PCT/NW-CT-RH	NT-EX
	3	Big Game	NC	NT-EX
	4	Big Game	OR-CT-RH	NT-EX
	5		NC	NT-EX
	9	Uneven	Uneven	
Group VI	1	Big Game	RH	NT-EX
	2	Big Game	OR-PCT/NW-CT-RH	NT-EX
	3	Big Game	NC	NT-EX
	4	Big Game	OR-CT-RH	NT-EX
	5		NC	NT-EX
	9	Uneven	Uneven	
Group I	1		NC	NT-EX
Group II	1	Riparian	RH	NT-EX
	2	Riparian	OR-PCT/NW-CT-RH	NT-EX
	3		NC	NT-EX
	4	Riparian	Uneven	NT-EX
Group III	4	Recreation	Uneven	NM-EX
Group I	3		NC	NM-EX
Group IV	1	Visual	RH	NM-EX
	2		CT	NM-EX
	3	Visual	NC	NM-EX
Group V	1	Visual	RH	NM-EX
	2	Visual	OR-PCT/OP-CT-RH	NM-EX
	3		NC	NM-EX
Group IX	1	Visual	RH	NT-EX
	2	Visual	OR-PCT/OP-CT-RH	
	3		NC	NT-EX

1/ Timber Activity Abbreviations

OR = Overstory removal
CT = Commercial thin
NC = No cut
N = Natural regeneration
P- = Planting @ reduced stocking levels
PCT/NW = Precommercial thin
PCT/OP = Precommercial thin @ 18'x18' spacing
Uneven = Uneven aged management
P = Planting at present stocking levels
P+ = Planting @ increased stocking level
RH = Regeneration Harvest

2/ Range Activity Abbreviations

NT = No treatment
NM = Nonmechanical treatment
FL = Full distribution level
M = Mechanical treatment
EX = Existing distribution level

TABLE B-3-11
ACTIVITIES REPRESENTED IN EXISTING PRESCRIPTIONS FOR PONDEROSA PINE - LOW-SITE ANALYSIS AREAS

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	RH	NT-EX
	2	Range	RH	NT-EX
	3		NC	NM-EX
	4		NC	NM-FL
	5		NC	NT-EX
Group VIII	1		NC	NM-EX
	2		NC	NT-EX
	3		NC	NT-EX
Group VI	1		NC	NT-EX
	2		NC	NT-EX
Group I	1		NC	NT-EX
Group II	1		NC	NT-EX
	2		NC	NT-EX
Group III	4	Recreation	Uneven	NM-EX
Group I	1		NC	NM-EX
Group IV	1	Visual	Uneven	NM-EX
	2		NC	NM-EX
Group V	1	Visual	Uneven	NM-EX
	2		NC	NM-EX
Group IX	1	Visual	RH	NT-EX
	2		NC	NM-EX
	3		NC	NT-EX

1/ Timber Activity Abbreviations

- OR = Overstory removal
- CT = Commercial thin
- NC = No cut
- N = Natural regeneration
- P- = Planting @ reduced stocking levels
- PCT/NW = Precommercial thin
- PCT/OP = Precommercial thin @ 18'x18' spacing
- Uneven = Uneven aged management
- P = Planting at present stocking levels
- P+ = Planting @ increased stocking level
- RH = Regeneration Harvest

2/ Range Activity Abbreviations

- NT = No treatment
- NM = Nonmechanical treatment
- FL = Full distribution level
- M = Mechanical treatment
- EX = Existing distribution level

TABLE B-3-12
ACTIVITIES REPRESENTED IN EXISTING PRESCRIPTIONS FOR NON-TIMBERED ANALYSIS AREAS

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1 2 3 4 5 6			M-FL* M-EX* NM-FL NM-EX NT-FL NT-EX
Group VIII	1 2			NM-EX NT-EX
Group VI	1 2			NM-EX NT-EX
Group I	1			NT-EX
Group II	1 2			NT-EX NT-EX
Group III	1			NM-EX
Group I	1			NM-EX
Group IV	1			NM-EX
Group IX	1 2			NM-EX NM-EX

* - Mechanical treatments can only be applied to analysis areas with <30% slope

1/ Timber Activity Abbreviations

OR = Overstory removal
CT = Commercial thin
NC = No cut
N = Natural regeneration
P- = Planting @ reduced stocking levels
PCT/NW = Precommercial thin
PCT/OP = Precommercial thin @ 18'x18' spacing
Uneven = Uneven aged management
P = Planting at present stocking levels
P+ = Planting @ increased stocking level
RH = Regeneration Harvest

2/ Range Activity Abbreviations

NT = No treatment
NM = Nonmechanical treatment
M = Mechanical treatment
EX = Existing distribution level
FL = Full distribution level

TABLE B-3-13
ACTIVITIES REPRESENTED IN REGENERATED PRESCRIPTIONS FOR PONDEROSA PINE REGENERATION CLASSES

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	P+-PCT-CT(3)-RH	NT-EX
	2	Timber	P-PCT-CT(1)-RH	NT-EX
	3	Timber	P-PCT-CT(3)-RH	NT-EX
	4	Timber	N-RH	NT-EX
	5	Range	P-PCT-CT(2)-RH	NM-EX
	6	Range	N-PCT-CT(3)-RH	NM-FL
	7	Range		NT-FL
	9	Uneven	Uneven	NT-EX
Group VI, VIII	1	Big Game	P-PCT-CT(1)-RH	NT-EX
	2	Big Game	P-CT(1)-RH	NT-EX
	3	Big Game	P-RH	NT-EX
	4	Big Game	P+-PCT-CT(1)-RH	NT-EX
	9	Uneven	Uneven	NT-EX
Group VII	4	Recreation	Uneven	Nm-EX
Group II	1	Riparian	N-RH	NT-EX
	2	Riparian	N-CT-RH	NT-EX
	3	Riparian	N-PCT-CT-RH OR P-PCT-CT-RH	NT-EX
	4		Uneven	NT-EX
Group IV, V	1	Visual	P-PCT-CT(3)-RH	NT-EX
	2	Visual	P-PCT-CT(1)-RH	NT-EX
	3	Visual	P-CT(2)-RH	NT-EX

1/ Timber Activity Abbreviations

OR = Overstory removal
CT = Commercial thin
NC = No cut
N = Natural regeneration
P = Planting @ reduced stocking levels
PCT/NW = Precommercial thin
PCT/OP = *Precommercial thin @ 18'x18' spacing*
Uneven = Uneven aged management
P = Planting at present stocking levels
P+ = Planting @ increased stocking level
RH = Regeneration Harvest

2/ Range Activity Abbreviations

NT = No treatment
NM = Nonmechanical treatment
FL = Full distribution level
M = Mechanical treatment
EX = Existing distribution level

TABLE B-3-14
ACTIVITIES REPRESENTED IN REGENERATED PRESCRIPTIONS FOR MIXED CONIFER REGENERATION CLASSES

			Activities	
Management Emphasis	Management Intensity Class	Regenerated Condition Class	Timber 1/	Range 2/
Group VII	1	Timber	P+-PCT-CT(3)-RH	NT-EX
	2	Timber	P-PCT-CT(1)-RH	NT-EX
	3	Timber	P-PCT-CT(3)-RH	NT-EX
	4	Timber	N-RH	NT-EX
	5	Range	P-PCT-CT(2)-RH	NM-EX
	6	Range	N-PCT-CT(3)-RH	NM-FL
	7	Range		NT-FL
	9	Uneven	Uneven	NT-EX
Group VI, VIII	1	Big Game	P-PCT-CT(1)-RH	NT-EX
	2	Big Game	P-PCT-RH	NT-EX
	3	Big Game	P-RH	NT-EX
	4	Big Game	P+-PCT-CT(1)-RH	NT-EX
	9	Uneven	Uneven	NT-FL
Group VII	4	Recreation	Uneven	NM-EX
Group II	1	Riparian	N-RH	NT-EX
	2	Riparian	N-CT-RH	NT-EX
	3	Riparian	N-PCT-CT-RH OR P-PCT-CT-RH	NT-EX
	4		Uneven	NT
Group IV, V	1	Visual	P-PCT-CT(3)-RH	NT-EX
	2	Visual	N-CT(1)-RH	NT-EX
	3	Visual	P+-PCT-CT(2)-RH	NT-EX

1/ Timber Activity Abbreviations

OR = Overstory removal
CT = Commercial thin
NC = No cut
N = Natural regeneration
P- = Planting @ reduced stocking levels
PCT/NW = Precommercial thin
PCT/OP = Precommercial thin @ 18'x18' spacing
Uneven = Uneven aged management
P = Planting at present stocking levels
P+ = Planting @ increased stocking level
RH Regeneration Harvest

2/ Range Activity Abbreviations

NT = No treatment
NM = Nonmechanical treatment
FL = Full distribution level
M = Mechanical treatment
EX = Existing distribution level

Overview of Constraints

Different types of constraints are used in the LP to represent different types of objectives Some are incorporated directly into the columns through the yield tables. Snag levels and rotation age constraints are the primary objectives and policies treated in this manner. Another category of constraints are those applied to the selection of prescriptions. Acreages of management emphases by analysis area are constrained as previously described to ensure management prescription objectives are validly modeled. The remaining type of constraint is applied as a *Right Hand Side constraint to some subset of columns* in order to satisfy management requirements, meet harvest flow policies, attain the objectives of a management prescription or alternative, or evaluate economic implications. Section 7 describes these constraints more fully.

Management requirements modeled with right hand side constraints included timber harvest dispersion and riparian area harvest restrictions. Dispersion constraints necessary to meet water quality standards, and to meet Regional requirements, were applied on an individual analysis area basis, and reflect watershed conditions (see Appendix E). These limit the amount of area that can be regeneration harvested in one decade. Riparian area harvest limitations were also designed to meet water quality standards, by ensuring shade and limiting disturbance.

Three different types of constraints are necessary to meet harvest flow policies. The nondeclining yield policy is imposed through a series of constraints limiting the harvest of any decade to an amount greater than or equal to that of the previous decade. The policy of limiting harvests to an amount equal to or less than the long run sustained yield is also met through the nondeclining yield constraint in conjunction with constraining the last decades harvest to not exceed that quantity. The ending inventory constraint provides some assurance that the projected harvest levels can be maintained over time by requiring standing volume to equal or exceed the average inventory of the regulated forest according to the regenerated prescriptions selected. Departure policies were also allowed by adjusting the long run sustained yield constraint, and by loosening the nondeclining yield constraints to allow some downward flow variation.

Several groups of constraints are applied as right hand side constraints in order to meet the objectives of management prescriptions. Amounts of thermal cover provided, rates of harvest in visual zones, and acreage limits on range practices fall into this category. Elk cover constraints apply separately to the ponderosa pine and mixed conifer cover types at the district level. The process of determining the specific constraint values to use in the LP begins with the habitat objectives expressed in Ochoco management prescriptions. For any given run the location of big game management areas is determined and based on the total acres of these areas and the objectives of the prescription the amount of cover desired is calculated. Through map overlays accomplished with the Ochoco R2MAP data base amounts of cover provided by other management areas and non-timber cover types are subtracted from the total desired and the remainder distributed to the ponderosa pine and mixed conifer cover types. These values are then input as a range to the FORPLAN matrix generator.

Scenic area rate of cut constraints are also written separately for the ponderosa pine and mixed conifer cover types specific to the district level. These right hand side constraints limit the proportion of the area within these zones that can be regeneration harvested per decade. These proportions were developed based on the experience and judgment of landscape architects on the Forest. Acreage constraints limiting the area that can be treated by mechanical or non-mechanical methods are similar to scenic area rate of cut constraints. These limits derive from management area objectives and are applied at the district level for the timber/range and big game prescriptions. Budget constraints and output level controls were also used to meet the objectives of an alternative, or to evaluate budgetary and administrative implementation concerns

Economic Efficiency Analysis

(Section 4)

Overview

This section describes the costs and benefits, as well as some concepts, involved in economic efficiency analysis, how they were derived, and how they were used in the Forest Planning process. Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and played an important role in the development and evaluation of Forest Planning Benchmarks and Alternatives. Specifically, the Regulations (36 CFR 219.12(f)) state that:

> "The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits."

They follow up in 36 CFR 219.12(F)(8) by stating that:

> "Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

Changes Between the DEIS and FEIS

Clarification of opportunity cost and trade-offs and the updating of certain activity costs are the only major changes in this section.

Basic Concepts

Priced Benefits

Priced outputs are those that are or can be exchanged in the market place. Their quantitative values are determined by actual market transactions or by estimation methods that produce prices commensurate with those determined by market transactions. Timber, forage, and minerals are examples of commodities which are bought and sold in the market. Their values are determined through the interaction of buyers and sellers based on the supply and demand conditions in the market at the time of the transaction. RVD's, on the other hand, are not normally exchanged via market transactions. Their market values are estimated by using some market transaction data in combination with various theoretical techniques. Conceptually, these assigned values should be consistent and comparable to those values which were actually derived via market transactions (Rosenthal and Brown, 1985). Therefore, both assigned and market values for priced outputs are appropriate to use for calculating quantitative measures of efficiency such as Present Net Value.

Nonpriced Benefits

Non-priced outputs are those for which there is no available market transaction evidence and no rea-

sonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. In these cases, subjective non-dollar values must be attributed to their production. These values are qualitatively described rather than quantitatively. They may be either positive or negative. In fact, what may be considered to be a benefit to someone may represent a cost to someone else. Examples of nonpriced outputs include the maintenance of threatened and endangered species, natural and scientific areas, historical and anthropological sites, visual quality, and clean air.

Discounting

Financial analyses of alternative investment options usually involve cash flows over a fixed period of time in the future. Inherently, there is a time value associated with money. Due to man's propensity to consume now, a dollar today is worth more than a dollar ten years from now. Discounting is a process for adjusting the dollar values of costs and benefits which occur at different periods in the future to dollar values for a common time period so that they may be compared. Usually the common time period is the present. In which case, the discounted cash flow is referred to as the present value.

Present Net Value (PNV)

Present Net Value is the difference between the discounted value (benefits) of all outputs to which monetary values or established prices are assigned and the total discounted costs of managing the planning area. The maximization of Present Net Value was the criterion used to help assure that each alternative was the most economically efficient combination of outputs and activities needed to meet the objectives established for that alternative. Present Net Value calculations consider only the benefits for which market prices exist or can be assigned. On the Ochoco, the priced benefits included timber, recreation, wildlife, special uses, and range. These were compared against all Forest Service fixed and variable costs associated with managing the planning area, irregardless of whether they were incurred for the production of either priced or non-priced outputs, or as overhead expenses for general maintenance of the organization. Therefore, PNV is an estimate of the current market value of the priced forest resources after all costs of producing both priced and non-priced outputs and meeting other multiple-use objectives have been considered.

Net Public Benefits (NPB)

The maximization of net public benefits is a goal of the Forest Planning process. Net public benefits is the overall value to the nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits cannot be expressed as a numeric quantity because it includes qualitatively valued nonpriced outputs.

Conceptually, net public benefits is the sum of the Present Net Value of priced outputs plus the full value of all non-priced outputs. The full value of non-priced benefits is used because the costs associated with their production is accounted for in the calculation of PNV. It is only necessary to identify the marginal values of non-priced outputs when management inputs are increased in order to provide these outputs at levels above current standards or legal requirements. In such cases, it is important to depict the physical, biological, and social dimensions of the non-priced outputs, as well as who will benefit and who will suffer from their production. Account should also be taken of any changes that may occur among the other non-priced outputs as a result of providing a particular non-priced output. In assessing the net public benefits of a particular alternative, it is necessary to judge whether the subjective value to society of its non-priced outputs exceeds the opportunity costs associated with their production.

Opportunity Costs/Trade-offs

Opportunity costs are defined as the value of a resource's foregone net benefit in its most economi-

cally efficient alternative use (FSM 1970.5). In its simplest terms it means "revenue foregone." In relation to the economic analysis performed for Forest Planning, it represents the decrease in maximized PNV of an alternative or benchmark when some alternative level of resource outputs are forced into solution. Therefore, opportunity costs measure the change in PNV for priced resource outputs, and can be used to measure the economic value traded off in order to produce other less efficient priced benefits or non-priced benefits included in net public benefits. On this forest, timber harvest is the most efficient use, therefore, the opportunity cost is associated with timber. This is not meant to imply that opportunity cost must always be tied to a loss of timber volume or that opportunity cost is the only criteria used to evaluate effects (see Trade-offs).

Trade-offs on the other hand are not consigned solely to economic parameters (revenue foregone). Trade-off is a more general term meaning forgoing of one thing in return for another.

Income Distribution Effects

There is another level of effects which are also a concern of National Forest Policy and Management. These are the welfare distribution effects influenced by the mix and level of outputs produced by the National Forest. They can be either positive or negative. Their impacts can also be local, regional, or national in scope. Some distributive effects such as changes in consumer prices or taxpayer costs have national level impacts. Others, such as induced jobs and income, or payments in lieu of taxes are more local or regional in nature. They are more related to questions of equity (ie. who pays and who benefits) rather than efficiency. They are not assessed in the context of the efficiency criteria associated with the PNV and net public benefit concepts. However, these positive and negative distributive effects need to be assessed in conjunction with the net public benefit measures since equity objectives often influence efficiency objectives and vice versa These will be discussed in more detail in Section 5.

Parameters

Introduction

In order to calculate the Present Net Value for each alternative, several assumptions had to made regarding discount rates, demand curves, real dollar adjustments, and real price and cost trends. This section will summarize these decisions and their resulting parameters. A more detailed discussion can be found in various process records in the Supervisor's Office.

Discount Rates

Discounting requires the use of a discount rate which is an interest rate that represents the cost or time value of money in determining the present value of future costs and benefits. Two discount rates were used to calculate the Present Net Values for each benchmark and alternative. Both of them were real discount rates meaning that they were adjusted to exclude the effects of inflation (Real dollar adjustments will be discussed more below) According to FSM 1971.71:

> For evaluations of long-term investments and operations in land and resource management in the 1980-1985 planning period, a four percent real discount rate shall be used. Evaluations should also discount benefits and costs at the real discount rate used in the most recent RPA to determine sensitivity of alternatives to variations in the discount rate.

The four percent rate approximates the "real" return on corporate long-range investments above the rate of inflation (Row, et al., 1981). The 4 percent rate was used to solve FORPLAN and calculate the PNV for each benchmark and alternative. The 1985 RPA program used a real discount rate of 7-1/8 percent. An analysis of the sensitivity of the preferred alternative to the discount rate was performed by solving FORPLAN using both the 4 percent and the 7-1/8 percent discount rates. For all other benchmarks

and alternatives, the Present Net Values were merely recalculated using this second discount rate (FSM 1971.71). Finally, all costs and benefits were discounted from the midpoint of the decade in which they were incurred.

Demand Curves and Real Price Trends

As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand Curves," 2/3/81) and in keeping with FSM 1971.65, horizontal demand curves for timber and nontimber resources were used to analyze the benchmarks and alternatives for the DEIS. Many factors can influence the demand for stumpage from any one forest (Adams and Haynes, 1985). Some of these factors include trends in (1) interest rates, (2) the species and products mix of forest products consumption, (3) use of wood for energy, (4) forest products exports, (5) the cost of wood in Canada, (6) the rate of technical improvements in wood and fiber processing, and (7) the levels of other national forests harvests. All of these contain some degree of uncertainty regarding their future states of nature. Neither the empirical nor the theoretical bases have been well enough developed to derive reasonable estimates of the demand functions for the resources offered at the Forest level. Evidence does exist, however, that suggests that the elasticity in the portion of the timber demand curve for which the Forest can influence output levels is such that prices would be relatively insensitive to some "reasonable" range of quantity offerings. In other words, it appears that the timber demand curve for the range of output levels analyzed during the development of alternatives is nearly horizontal.

As a surrogate for resource demand curves, real price trends were developed and used to represent the rate at which resource values will change over time as a result of anticipated supply and demand interactions in the market place. As specified by the Regional Office (1920 letter to Forest Supervisors, "Timber Price Trends, Values, and Costs," 9/25/84), a 1 percent per year real price trend for stumpage was used for FORPLAN harvest scheduling analyses. These were applied for the first 50 years, and then a 0 percent price trend was assumed for the remaining 100 years of the harvest scheduling planning horizon. These imply that nominal stumpage prices (ie. those which include the effects of inflation) will increase during the next 50 years at a rate of one percent greater than the rate of inflation, and equal to rate of inflation from there on after.

Since price trends are reflections of expected futures, there is an inherent uncertainty involved with making such projections. In recognition of this uncertainty, we performed a sensitivity analysis by rerunning Run-3 of the benchmarks using alternative stumpage price trends of 0, and 3 percent.

The results of these runs are quite complex and are discussed in detail in the Forest Planning Document titled "A Summary of the Analysis of the Management Situation." Generally, higher price trends make silvicultural investments economically more attractive, but they also tend to result in the substitution of lower valued species for higher valued species in sale offerings during the early decades since it pays to hold the higher valued timber on the stump as far as maximizing PNV is concerned.

Based on Washington Office direction, a 0 percent real price trend for all other resources was used during the development of the benchmarks and the alternatives. In other words, their future nominal values will change at rates equal to inflation.

Real Cost Trends

As with price trends, there is an inherent uncertainty with projecting future costs. In recognition of this uncertainty we performed a sensitivity analysis by rerunning Run-3 using 20 percent reduction in forest expected costs. As with the use of higher price trends this resulted in the more intensive silvicultural investments becoming economically attractive Based on Washington Office direction, 0 percent real cost trends were used for all future costs used in the development of the benchmarks and alternatives. In other words, the costs of labor, fuels, mate-

rials, and all other factors of production involved with managing the Forest are assumed to change at a rate equal to the rate of inflation.

Base Year Dollars

Future prices and costs can be expressed in both nominal and real terms. The projection of nominal values includes the effects of inflation on these values. The projection of real values does not. For example, assume that the future prices for commodity XYZ are projected to increase annually by 8 percent. Also assume that the rate of inflation is anticipated to be 5 percent. In real terms, the prices are increasing by only 3 percent per year above and beyond the rate of inflation. Real value changes are the result of the interactions of supply and demand forces in the market place. They do not include the effects of inflation.

All future values and costs used in the Forest Planning process were expressed in real 1982 dollars, consistent with the 1985 RPA program. The GNP implicit price deflator index was used to convert both historical and future nominal prices and costs to this common base (FSM 1971.32b).

Costs

Introduction

This section describes the costs used to perform economic efficiency analysis for each of the benchmarks and alternatives considered during the development of the DEIS.

All Forest Service costs were included for purposes of estimating budgets and calculating Present Net Values for each alternative. At the outset, each cost was categorized as either a fixed or a variable cost. If it was identified as a variable cost, decisions were made as to whether it would be analyzed in FORPLAN, or some form of electronic spreadsheet. Costs were determined by examining: (1) the PAMARS database, (2) Advent RPA budget files, (3) historical records and contracts, and (4) the results of time-motion studies. Professional judgement was also an important factor when it came to making assumptions regarding what bearing historical costs had on anticipated future costs. All costs were developed and reviewed by the Forest Analyst/ Economist and the appropriate staff and sub-staff personnel. In the following discussion, we will summarize the cost breakdowns and how they were incorporated into the efficiency analyses for each alternative. A more detailed presentation of the specific costs and their functions in the analytical tools can be found in the process records at the Supervisor's Office. Table B-4-1 lists all costs and the categories used in estimating budgets and calculating PNV for each alternative. Costs are listed according to whether they are fixed or variable, capital investment or operation and maintenance, or in or out of FORPLAN. If the cost has changed between the DEIS and FEIS it is also included in the table.

Fixed Costs

Most costs that did not vary significantly by alternative are classified as fixed costs. These costs did not relate directly to specific activities within any management area prescription nor to the production of specific amounts of outputs. As a result, they did not vary by alternative and were not included in FORPLAN. They were a component of budget estimates and the PNV calculations for each alternative. Fixed costs ranged between 20 and 30 percent of the total cost for all the alternatives.

Capital Investment Operation and Maintenance

Capital investment costs include trails, roads, reforestation, timber stand improvement, prescribed burnings, and physical structures for range, recreation, fish and wildlife. In any alternative, capital

TABLE B-4-1
COSTS FOR PNV AND BUDGET CALCULATIONS

	DEIS			FEIS		
Cost Categories	Variable/ Fixed	In FORPLAN	Cost	Variable/ Fixed	In FORPLAN	Cost
RECREATION						
Capital Investment						
Trailhead (Foot)	Variable	No	1,660/T H	Fixed	No	0-346,000
Trailhead (Horse)	Variable	No	2,360/T H>	Variable	No	2,360/T H
Campgrounds	Variable	No	100,000/20 Unit	Fixed	No	0 3,300,000
New Trails	Variable	No	14,050/Mile	Fixed	No	0 5,989,000
Rehab/Reconstruction	Fixed	No	22,430	Fixed	No	22,430
Operation and Maintenance						
Support for Timber Management	Variable	No	1 0/MCF	Variable	No	1 0/MCF
Support for Other Resources	Fixed	No	13,000	Fixed	No	13,000
General Operations Maintenance						
Wilderness	Fixed	No	23,700	Fixed	No	23,700
Dispersed Recreation	Variable	No	11/RVD	Variable	No	11/RVD
Developed Recreation	Variable	No	1 51/RVD	Variable	No	1 51/RVD
CULTURAL RESOURCES						
Operation and Maintenance						
Support for Timber Mgmt	Variable	No	4 5/MCF	Variable	No	4 5/MCF
Support for Other Resources	Fixed	No	52,000	Fixed	No	52,000
FISH AND WILDLIFE						
Capital Investments						
Road Closures	Variable	No	1 22 1 75/Ac 1/	Variable	No	1 22-1 75/Ac
Wildlife Improvement	Fixed		123,000/decade	Fixed		23,000 593,000 (45/Ac Enhanced 1st Decade
Fish Structures(See Riparian)						
Operation and Maintenance						
Support for Timber Mgmt	Variable	No	5 20/MCF	Variable	No	5 20/MCF
Support for Other Resources	Fixed	No	16,800	Fixed	No	16,800
Program Mgmt	Fixed	No	74,000	Fixed	No	74,000
General Operation and Maint.	Fixed	No	40,000	Fixed	No	40,000
RANGE						
Capital Investments						
Construction	Variable	No	837,000 Times (% of land base allocated to TR & G)	Variable	No	1,940/structure
Reconstruction	Variable	No	132,040 Times (% of land base allocated to TR & B) 22,580 Timber (% of land base allocated to TR & B) 1/	Fixed	No	927,000
Non-Structural	Variable	Yes	5 72/Ac	Variable	Yes	5-72/Ac
Operation and Maintenance						
Support for Timber Mgmt	Variable	No	5 2/MCF	Variable	No	5 2/MCF
Support for Other Resources	Fixed	No	16,800	Fixed	No	16,800
General Operation & Maint.						
Wild Horses	Fixed	No	20,000	Fixed	No	20,000
Admin & Planning	Variable	No	2 62	Variable	No	2 62
TIMBER						
Capital Investment						
Reforestation	Variable	Yes	121-326/Ac 1/	Variable	Yes	121-326/Ac 1/
Timber Stand Improvement	Variable	Yes	32 179/Ac	Variable	Yes	32 179/Ac
Operation and Maintenance						
Support for Other Resources	Fixed	No	2,830	Fixed	No	2,830
Program Management	Variable	No	13 03/MCF	Variable	No	13 03/MCF
Stand Exam, Sale Prep, Admin	Variable	No	42 58/MCF	Variable	No	42 58/MCF
Salvage Administration	Variable	No	1,110/MCF	Variable	No	1,110/MCF
Insect and Disease Control	Fixed	No	3,150	Fixed	No	3,150
Firewood Administration	Variable	No	23 14/MCF	Variable	No	23 14/MCF
Genetics	Fixed	No	42,350	Fixed	No	42,350

Cost Categories	Variable/ Fixed	In FORPLAN	Cost	Variable/ Fixed	In FORPLAN	Cost
SOIL AND WATERSHED						
Capital Investment						
Riparian Structural	Variable	No	16 5/Ac of Enhancement	Variable	No	79/Ac of Enhancement (1st Decade)
Operation and Maintenance						
Support for Timber Management	Variable	No	3 86/MCF	Variable	No	3 86/MCF
Support for Other Resources	Fixed	No	9,000	Fixed	No	9,000
Program Management	Fixed	No	60,420	Fixed	No	60,420
General Operation & Mgmt	Variable	No	140 0/MCF	Variable	No	140 0/MCF
MINERALS						
Operation and Maintenance						
Program Management	Fixed	No	866,080	Fixed	No	66,100
HUMAN RESOURCES						
Operation and Maintenance	Fixed	No	224,200	Fixed	No	224,200
LANDS						
Operation and Maintenance						
Program Management	Fixed	No	75,520	Fixed	No	75,520
Land Line Location	Fixed	No	151,040 (Decade 1)	Fixed	No	151,040 (Decade 1)
Land Line Location	Fixed	No	94,400 (Decade 2)	Fixed	No	94,400 (Decade 2)
FACILITIES						
Capital Investment						
FA&O-Construction	Fixed	No	212,400 (Decade 1) 141,600 (Decade 2)	Fixed	No	212,400 (Decade 1) 141,600 (Decade 2)
PRC-Construction						
(Arterial/Collector)	Variable	Yes	0-4,140,000	Variable	Yes	0-4,140,000
PRC-Reconstruction						
(Arterial/Collector)	Variable No	No		Variable		
Local Road Construction	Variable	Yes	22-170	Variable	Yes	22-170
Local Road Reconstruction	Variable	Yes	18 43	Variable	Yes	18-43
Operation and Maintenance						
Program Management Admin	Variable	No	50/MCF	Variable	No	50/MCF
FA&O Maintenance	Fixed	No	141,600	Fixed	No	141,600
FR&T Maintenance	Fixed	No	623,000	Fixed	No	623,000
Coop Maintenance	Variable	Yes		Variable	Yes	
PROTECTION						
Capital Investment						
Natural Fuels Treatment	Variable	No	33- 78/Ac	Variable	No	33- 78/Ac
Operation and Maintenance						
Support for Timber Mgmt	Variable	No	2.91/MCF	Variable	No	2 91/MCF
Support for Forest	Fixed	No	9,980	Fixed	No	9,980
IHC (Regional Shared Res)	Fixed	No	99,580	Fixed	No	99,580
Forest Fire Protection	Variable	No	1 29/MCF	Variable	No	1 29/MCF
Brush Disposal	Variable	Yes	45/Ac	Variable	Yes	45/Ac
GENERAL ADMINISTRATION						
General Administration	Fixed	No	936,530	Fixed	No	936,530
KV	Variable	No	15% of KV	Variable	No	15% of KV
Coop	Variable	No	15% of Coop	Variable	No	15% of Coop
Salvage	Variable	No	15% of Salvage	Variable	No	15% of Salvage
Brush Disposal	Variable	No	15% of Brush Disposal	Variable	No	15% of Brush Disposal

1/ Represents per decade cost.

investment costs pertain mostly to roads and timber stand improvements. For example, capital investment cost associated with road construction and timber management range from a minimum of 76 percent in Alternative C-Modified to a maximum of 95 percent in Alternative A.

Operation and maintenance costs are those costs associated with operating and maintaining facilities, program management and support for management of other resources. The majority of operation and maintenance costs in all alternatives are program management, followed by support funds necessary to carry out timber programs. Capital investment costs range from a high of 43 percent (Alternative A) to a low of 37 percent (Alternative C-Modified) of the total first decade cost in any alternative.

Costs within FORPLAN

In general, FORPLAN contains all the variable costs associated with implementing vegetation management activities associated with the timber and range resources. The activities included; range nonstructural improvements, site preparation, reforestation, and timber stand improvements. Costs associated with initial arterial/collector road construction and local road construction and reconstruction are also included in the model.

Costs for sale prep and administration along with non-Forest costs (logging, haul, manufacturing) were also included. These non-Forest costs are included in FORPLAN's PNV calculation but do not influence the Forest Service budget estimates.

These costs were usually expressed in terms of dollars/acre or dollars/MCF. The costs which were expressed in units of volume were also developed by diameter classes. This was true for both the marginal non-federal logging costs, and the sale preparation/ administration costs. For each FORPLAN cost category, a range of costs were entered into the model based on the Management Prescriptions, and the characteristics of the analysis areas to which they applied. All in all, 136 different FORPLAN economic tables were developed to cover the different cost and value combinations to which prescriptions could be assigned in the Model.

Values other than those associated with timber, range, and roads were calculated outside of FORPLAN. This was necessary because of their unique spatial or non-linear characteristics, unknown or poorly defined joint production relationship or poor economic information.

The network model was used to calculate the cost of reconstruction of the arterial/collector system. All other costs were calculated with the use of electronic spreadsheets.

The remaining variable costs were a function of the amount of output and emphasis a particular benchmark or alternative was designed to provide for this resource, the land allocation scheme, timber management or other resource activities and outputs. Basically, the costs associated with these activities were estimated by comparing the amount of relevant land allocations under activity levels in a particular alternative to experienced costs, and projecting the cost based on these relationships.

Benefits

Introduction

This section describes both the priced and non-priced benefits which were incorporated in the economic efficiency analyses for each benchmark and alternative considered during the development of the DEIS.

Resource outputs to which dollar values were assigned constitute the priced benefits included in the Present Net Value calculations. Like all of the costs included in the analyses, only those benefits incurred during the 50 year RPA planning horizon were incorporated in the PNV calculations The economic efficiency analysis for each alternative also considered non-priced benefits. These are outputs for which there is no available market transac-

tion evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. In these cases, a subjective qualitative value must be attributed to their production. Conceptually, the addition of the non-priced benefits to PNV is used to derive the net public benefits associated with each alternative. Both priced and nonpriced outputs and their associated values will be summarized below. More detailed documentation of the specific values and the process used to develop them can be found at the Supervisor's Office.

Priced Benefits

Introduction

Priced benefits fall into one of two categories: market and nonmarket (assigned). The market values constitute the unit price of an output normally exchanged in a market after at least one stage of production, and are expressed in terms of what people are willing to pay as evidenced by market transactions. Nonmarket values constitute the unit price of a nonmarket output not normally exchanged in a market at any stage before consumption, and thus must be imputed from other economic information (FSM 1970.5). They are valued in terms of what reasonable people would be willing-to-pay (above participation costs) rather than go without the output. These values were derived directly from the 1985 RPP program assignment. In either case their values are theoretically commensurate and appropriate for inclusion in PNV calculations. The resources for which dollar values were estimated on the Ochoco consisted of timber, range, special uses, and developed, dispersed, and wildlife oriented recreation.

Timber

Timber mill pond values were used in FORPLAN. These values were expressed in terms of dollars/MCF. The mill pond values were developed for both existing natural and future managed stands. The values were specific for each working group (Ponderosa Pine and Mixed Conifer) and diameter class.

The process for calculating the mill pond values was quite complex. Essentially the process used the procedures directed by the Regional Office, 1920, 4/27/84 (See process record 1920; 6/84). We will summarize it here. All calculations were performed in terms of constant 1982 dollars. Also, since most of the source data was expressed in terms of dollar/MBF, it was necessary to convert these to dollars/MCF. The mill pond values were first calculated for each individual species and then converted to working group mill pond values based on the species composition of each working group modelled in FORPLAN. Also, since none of the source data was diameter specific, assumptions had to be made regarding the average diameter of trees sold for each species during the period for which the data sources covered. The diameter specific values and costs were then developed based on diameter class relative indices for stumpage values.

The first step was to use the stumpage values calculated by the Regional Office from the Ochoco National Forest's Cut and Sold Reports covering the period April 1977 through September 1983. The second step was to adjust the regionally developed price-diameter relationship to Ochoco values

This was done by placing the 100 percent value or the average DBH of that species sold between 1977-1981. Relative values for the lower DBH classes were established using the same ratios as the regional tables. DBH classes higher than the average were all assigned the 100 percent value. Shifting the diameter which received the 100 percent level to the average DBH was necessary because these values would be applied to the average stumpage value for that species.

The next step was to convert these species relative values to working group relative values. Weighted average relative values were developed for the PP and MC working groups. The PP working group percentage weights are ponderosa pine - 87 percent, Douglas fir - 13 percent. The MC working group percentage weights are ponderosa pine - 49 percent, Douglas fir - 24 percent, white fir - 18 percent, western larch - seven percent and lodgepole pine - two percent. These mixtures represent the major

species harvested on the Ochoco National Forest. The percentages by working group were developed from a comparison of sell records and inventory data

Weighted average stumpage values for the two working groups were then developed using the species stumpage rates furnished by the Regional Office and the same species percentage weightings as listed above.

Average logging cost developed from the Forest's 2400-17 forms was added to the stumpage values, giving mill pond values for the two working groups. FORPLAN also had Analysis Area logging cost. This was done so that when management area prescriptions were applied to analysis areas the stumpage values would be adjusted to better reflect site specific differences.

Average board feet/cubic feet conversion factors for the two working groups was derived from the 1982 inventory data. These values were then applied to the millpond value based on board feet to convert this to a value per cubic feet.

The final step was to apply the adjusted price diameter index to those mill pond values to establish values by diameter groups. These values were then entered into FORPLAN.

Table B-4-2 presents the diameter specific working group mill pond values.

Range

The range outputs represent the amounts of forage permitted to be grazed and are measured in units of animal unit months (AUM's). AUM values were calculated as the value of the marginal product of an AUM in the production of a marketable animal. The Forest Service entered into a cooperative agreement with the USDA Economic Research Service to develop livestock enterprise budgets for each National Forest. The Range Budget Approach was used for this analysis. Because Forest AUM's are not actually priced in a free competitive market, the calculated price is an estimate of market value. First, returns from all ranch products were determined. Then, all costs of production were subtracted. The remaining returns plus the cost of the Forest Service permits became the residual value of the AUM This residual value of an AUM to ranch livestock production is comparable to conversion surplus timber values. Based on the information provided in the RPA 1985 Program analysis for the DEIS, and a Regional Office Memo (2340, 9/30/83), the AUM value for the Ochoco National Forest in 1982 dollars is $11.75.

Although range outputs were explicitly represented in FORPLAN some adjustments were done outside the model. FORPLAN derived AUM's were adjusted based upon the number of structural improvements and acres of riparian enhancement. Both of these factors have unique spatial characteristics not easily represented in FORPLAN. All other priced benefits were analyzed with electronic spreadsheet outside of FORPLAN.

TABLE B-4-2
WORKING GROUP MILL POND VALUES
($/MCF)

DBH Class	Ponderosa Pine	Ponderosa Pine Low-Site	Mixed Conifer
7.0	116.2	116.2	113.6
12.0	135.3	135.3	133.1
15.0	147.4	147.4	144.4
18.0	159.5	159.5	154.2
+21.0	173.4	173.4	162.3

Recreation

The non-wildlife related recreation and wilderness outputs represent the amount of use consumed on the Forest and are measured in terms of recreation visitor days (RVD's). The wildlife related recreation use is measured in terms of wildlife and fish user days (WFUD's). The values used for these priced outputs were derived directly from the 1985 RPA program assessment. This discussion is a summary of the write-up found in Appendix F of the 1985 RPA DEIS.

The development of recreation, wilderness, and wildlife values for the 1985 RPA Program analysis consisted of two steps: (1) development of recreation and wildlife benefit values by activity per RVD or WFUD; and (2) adjustment of values to reflect standard and less-than standard levels of management.

The Resource Evaluation Group at the Rocky Mountain Forest and Range Experiment Station conducted an extensive literature search to develop the 1985 activity values for recreation. Benefit values for recreation, wilderness, and wildlife activities were developed from recent travel cost models and contingent valuation research (Loomis and Sorg, 1982). In-service and academic specialists reviewed the research and activity values and adjusted the initial values to achieve methodological consistency to apply them to regional conditions. The values represent total willingness to pay for an additional recreation site, animal unit, or wilderness area. The RVD values by recreation activity that were generated by this study can be found in Table F.4 of the 1985 RPA DEIS. For program evaluation purposes, these values were subsequently adjusted downward because:

> The travel cost method represents a total willingness-to-pay. Other resource values in the RPA evaluation represent market price or value of the marginal product. Consequently, the willingness-to-pay values were adjusted in an effort to make the recreation values more compatible with values used for other resource outputs.
>
> The travel cost method estimates values on a site-by-site basis. The method does not address the question of whether regionally or nationally a given quantity of RVD's will, in fact, be consumed if that price were changed.
>
> It is believed that the travel cost studies are typically done at higher quality sites, do not take into account substitutes to individual sites, and do not accurately measure trip length; consequently, values from these studies may be on the high side when applied to average situations on a region-wide basis.

In response to the first concerns, the values were adjusted based on the relationship between the proportion of recreation provided by the Forest Service and estimates of an average nationwide demand elasticity for outdoor recreation. It is estimated that nationally, roughly a 5 percent increase in price will result in a 1 percent decrease in quantity demanded (Lewis, Hughes, and Lloyd, date unknown). It is also estimated that in 1982 the Forest Service provided 7.5 percent of all outdoor recreation. Consequently, it is roughly estimated that there will be a 5 percent decrease in price for each percent of the 7.5 percent Forest Service market share or a total decrease of 37.5 percent for clearing the market. Therefore, the initial willingness-to-pay values were reduced 37.5 percent for use in comparing resource allocation choices.

In response to the quality factor, the concept of standard and less-than-standard service was introduced, and the resulting impact on the value of the experience to the recreationist was estimated. If recreation facilities are not fully maintained, the quality of the experience will be lowered. Two different sets of values were developed to account for the standard and less-than-standard outputs. A special study showed that on the average the less-than-standard RVD's are valued at about 53 percent of the value of standard RVD's. Accordingly, different capital investment, and operations and maintenance costs were developed for the standard and less-than-standard recreation outputs. All alternatives except the current direction alternative manage all the recreation resources at a standard service level.

Finally, these values were expressed in terms of the recreation opportunity spectrum (ROS) activity

TABLE B-4-3
1985 RPA RECREATION BENEFIT VALUES
(1982 $)

Recreation	Value ($/RVD)
Primitive (STD)	11 25
Primitive (LSTD	5 96
Semiprimitive Nonmotorized (STD)	13 25
Semiprimitive Nonmotorized (LSTD)	7 02
Semiprimitive Motorized (STD)	12 13
Semiprimitive Motorized (LSTD)	6 43
Roaded Natural (STD)	9 38
Roaded Natural (LSTD)	4 97
Rural (STD)	8 47
Rural (LSTD)	4 49
Urban (STD)	11 38
Urban (LSTD)	6 03
Wilderness	**Value ($/RVD)**
Primitive (STD)	17 50
Primitive (LSTD)	9 28
Semiprimitive Nonmotorized (STD)	17 50
Semiprimitive Nonmotorized (LSTD)	9 28
Wildlife & Fish	**Value ($/WFUD)**
Big Game	30 00
Nongame	25 00
Resident Fish	15 00
Anadromous Fish*	30 00
Other Game	19 00
WL/F Recreation (STD)	21 00
WL/F Recreation (LSTD)	14 00

STD - Standard
LSTD - Less than standard

* In addition for anadromous fish, an RPA value of $1 05 per lb is assigned

categories in accordance with the way they were developed and tracked during the process of analyzing alternatives. The resulting values are depicted in Table B-4-3.

In addition, for anadramous fish, the RPA value of $1.05 per lb is assigned.

Soil and Water

The values used for these priced outputs were taken directly from the 1985 RPA program assessment. Values considered pertained to increase in water yields, sediment reduction, improved water quality and maintained water quality. Increased water yields are assumed to have no additional value in the Pacific Northwest. Almost all area water meets the quality goals, as a result no additional value will be assigned. The two water related values the Forest included were increased value from sediment reduction ($6.00/M ton) and maintaining water quality ($.20/acre feet).

Minerals

The minimum bid value of $2.50 per acre leased is used. With no experience in what actual bed values may be combined with no difference in the estimate of acres leased.

Nonpriced Benefits

Introduction

The calculation of PNV enables the comparison of alternatives with regards to their output levels for priced resources, and their efficiency in producing them. However, other factors also influence the decision making process. In some cases, the importance of nonpriced benefits for which it is impossible to assign monetary values can outweigh the advantages of producing higher levels of priced outputs. The importance of the need to consider these subjectively valued benefits in Forest management decisionmaking is addressed in the NFMA Regulations which charge the Forest Service with identifying the alternative which comes nearest to maximizing net public benefits (36 CFR 219.12(F)).

Net public benefits (NPB) represent the overall value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not (36 CFR 219.3). Net public benefits include both priced and nonpriced resource outputs, less all costs associated with managing the area

As stated earlier, all priced outputs and all costs associated with managing the Forest are included in the calculation of PNV. To this, the net subjective values of the nonpriced outputs must be added in order to arrive at the overall NPB of an alternative. Some of the most important nonpriced benefits addressed during the Ochoco National Forest planning process revolve around maintaining and enhancing the following:

Lifestyles;

Diversity and quality of recreation opportunities;

Biological diversity;

Old growth and snag habitat;

Scenic quality;

Historical and cultural resources,

Riparian condition; and

Air quality.

These are all outputs and effects which are influenced to a large degree by decisions regarding how to manage the Forest. They are all the topic of one or more issues and concerns which were identified at the outset of the planning process. So they are important, but it is not possible to measure their importance in dollar terms which are comparable to market values. Their values must be subjectively determined.

The provision for many of the nonpriced benefits is achieved by applying constraints to the production of priced outputs (ie. such as timber harvesting constraints in FORPLAN). These constraints usually result in a decrease in the PNV of the priced outputs to which the constraints were applied. Subjective judgments are then necessary in assessing whether the benefits of producing the non-priced outputs exceed the opportunity costs associated with producing fewer priced outputs. If a PNV tradeoff induced by the provision of a nonpriced output is judged acceptable, then a positive contribution to NPB has resulted, and the alternative is overall more efficient.

The nonpriced outputs considered during the development and evaluation of alternatives are discussed below. While the quantitative dollar values of each can not be determined, they can generally be evaluated by examining such quantitative indicators as acres of appropriate allocations, resource inventories, or timber production related activities and outputs.

Lifestyles

Surveys of the Central Oregon populous have shown that many people enjoy living in the area because of the outdoor lifestyles it provides. A Forest with a broad recreation base in a pleasing environment could be an asset to the Central Oregon area while still providing goods and services necessary for stable Forest based economies.

Central to maintaining and enhancing the Central Oregon lifestyle is the provision of diverse recreation opportunities, and clean air and water to enjoy them. The freedom and ability to cut personal use firewood is also important. To the extent that an alternative results in reduced or less diverse recreation opportunities, lower quality water, smokier air, or more restrictive access to personal use firewood, the alternative will be less desirable from a lifestyle point of view. Many of these effects are directly related to land allocations and resource management goals which emphasize the production of wood at the expense of amenity values.

The stability of jobs and income in the area is also an element of the concern about lifestyles. For this purpose, each alternative was analyzed with regards to its potential impacts on jobs and income in the 3 county zone of influence (refer to Section 5). Any indications that the implementation of an alternative would result in fewer jobs and less income would be considered disruptive of the current lifestyles.

Diversity and Quality of Recreation Opportunities

The number of recreation visitor days and their associated priced values are included in the PNV calculations for each alternative. However, the assigned dollar values per RVD do not reflect the

value of providing a diversity of recreation opportunities and settings. The Forest currently provides adequate recreation diversity as indicated by the reasons many people choose to live and recreate in the area. However, some aspects of the recreation opportunity spectrum are becoming more difficult to retain. For example, as remaining roadless areas are either designated as wilderness, or roaded and developed for other uses, there are fewer opportunities for the semiprimitive and primitive recreation experiences outside of wilderness areas. Related to this is the idea that as more and more roadless areas are either developed or designated as wilderness, future generations will have fewer options regarding how to best manage them to meet changing needs. To the extent that retaining roadless areas in undeveloped conditions does not overly restrict the efficient production of priced outputs, both the recreation diversity and the future options which they offer are considered a nonpriced benefit. For each alternative, the recreation allocations and projected carrying capacities are categorized according to the recreation opportunity spectrum. This can be used to assess the recreation diversity which an alternative provides.

Biological Diversity

Maintaining plant and animal diversity over time is also considered as a nonpriced component of net public benefits. Benefits generally associated with biological diversity are gene pool maintenance, preservation of long-term productivity, maintenance of forest health, and insurance of viable populations of plant and animals, especially Threatened and Endangered Species. Since animal diversity is to a large extent dependent upon plant diversity, attention is focused particularly on the number of acres for each working group in each successional stage. The amount of old growth provided is especially important since this grazing component would be the most difficult to replace once it disappears. Timber harvesting and fire are the chief means of manipulating vegetative diversity. The effects of scheduled timber harvesting on vegetative diversity were evaluated through a combination of FORPLAN reports and some special software programs which were developed specifically for that purpose. To a certain extent, the more old growth and riparian areas in excellent condition and snags provided for in a particular alternative, the higher the benefits associated with this non-priced output.

Old Growth and Snag Habitat

Besides influencing biological diversity calculations both old growth and snags provide specific habitat for non-adaptive wildlife species. While enhancing biological diversity both the habitat and species present increase non-consumptive wildlife opportunities and visitor experiences. As a result, the more old growth and snag habitat provided in a particular alternative, the higher the benefits associated with these non-priced outputs.

Scenic Quality

While the value of scenic quality is not directly included in the PNV calculations, its value is indirectly represented through the consideration of recreation as a priced benefit. It is safe to assume that the provision of positive visual experiences has a direct relationship to the quantity and quality of recreation on the Forest. However, a large number of people who benefit from the visually appealing scenery are not tallied as recreation users of the Forest. For example, there is a major highway which passes through the Forest. The people who drive on this pass through some quality scenic areas. Yet they are not counted as RVD's. There are also the people who live in or around the Forest who everyday enjoy scenic qualities associated with the forested mountain environment. Again, these beneficiaries are not tallied as RVD's. These benefits are nonmeasurable.

The alternatives each vary in their emphases to satisfy scenic quality objectives. This can be measured in terms of the percentage of all sensitive retention and partial retention scenic quality objectives which are being met through the implementation of an alternative.

Historical and Cultural Resources

A large number of scientifically and historically valu-

able cultural resources are identified on the Forest. Over 50 new sites, mainly prehistoric Indian campsites, are found each year as a result of the Forest's cultural resource inventory program. Cultural resources are an issue in the sense that many people are concerned about how many and how adequately these cultural sites are being preserved and protected in the face of ground disturbing projects and vandalism that occurs on the Forest. The more areas that are opened up to development for road construction, timber harvesting, and minerals and energy development, the more difficult it will be to protect these resources.

Riparian Condition

The number of fish user days and their associated priced values are included in the PNV calculations for each alternative. However, the assigned dollar value per WUD do not reflect the total value of providing excellent riparian conditions. As discussed in Chapters 3 and 4 of the DEIS, riparian zones represent a small but unique opportunity on the Forest. As a result, use has been concentrated and some degradation of the resource has occurred due to road location, timber and livestock management and recreational pressure. Improving riparian conditions will have unquantified benefits to dispersed recreation users, wildlife, biological diversity, and scenic quality. The more an alternative emphasizes wood production or livestock use in riparian areas the lower the benefits associated with these non-priced outputs.

Air Quality

Air quality is another important aspect of the Central Oregon area For the most part, air quality conditions are good. During certain times during the winter, temperature inversions create woodstove pollution problems, and during the spring and summer, prescribed burning activities reduce air qualty.

Most of the firewood supply utilized in the area comes from the Forest. Different approaches for making firewood available to the public were explored in some alternatives. As a result, firewood burning and its related pollution problems will continue to exist.

Air quality degradation resulting from fuels treatment and prescribed burning activities is closely related to the amount of scheduled timber and vegetative management activities associated with an alternative. The more acres of these activities called for in an alternative, the lower the quality of the air during certain seasons of the year.

Socio-Economic Impact Analysis

(Section 5)

Overview

Each of the alternatives will have economic and social effects on the surrounding areas. The ICO's which the alternatives address all represent blends of economic and social concerns. The ones which most specifically address these issues are the first two: "What should be the level of timber production?" and "How can activities on the Forest and Grassland benefit social and economic wants and needs of local communities?"

To address these ICO's, two economic and four social measures were examined. The economic measures, computed by the IMPLAN program, are:

Employment; and

Personal Income.

The social measures were selected on the basis of Forest expertise. These measures are:

Work related lifestyle;

Leisure activities;

Effects on community cohesion and community stability; and

Effects on minorities and women.

Area Analyzed

These measures were used to analyze the alternatives' effects in Crook, Harney and Wheeler Counties. Jefferson County was examined in the DEIS, but only minor effects were found; the analysis was omitted from the FEIS. Deschutes and Grant Counties were not modeled because of the limited effects of the Ochoco National Forest on these counties. Because the economies of Crook, Harney, and Wheeler counties are not especially interrelated, each of the counties was modeled separately in the IMPLAN analysis.

Economic Model (IMPLAN)

IMPLAN is an input-output model developed by the Forest Service. Like all input-output models, it simulates an economy, and can examine the effects on the whole economy of changes made in particular sectors. This means that IMPLAN is forced to assume that the basis for the economy will remain static. This means, among other things, that there will be no technological changes, no new industries or industries that cease to exist, and no changes in the patterns in which industries purchase from one another. The industries may change in size only, not in makeup.

This assumption is assumed to be realistic for the Ochoco National Forest models for the first decade. No IMPLAN runs were made for further decades because for them the assumption was judged not to be reasonable.

IMPLAN (specifically, IMPLAN Version 2 0) is based on a 528 sector national model. This model derives its interindustry relationships from the 1977 Department of Commerce I-O model, but is updated to 1982. Individual county models are derived from the national model by examining county data to determine which sectors of the national model are present in that county. The county model is then created as a subset of the national model. This process requires the assumption that the county interindustry linkages resemble the national picture. This assumption is reasonable for the Crook, Harney and Wheeler county economies.

Data Used in the Model

The process just described creates a county model - a description of what industries are present in the county. But additional information must be provided which defines the level at which each local industry is producing. This information is also provided, in rough form, by IMPLAN. It is mostly taken from various censuses published by the Department of Commerce Bureau of the Census. The data is for the year 1982.

The 1982 economic figures were reviewed for accuracy. The fact that 1982 was a recession year with low employment does not in itself pose a problem to the analysis. However, if there were changes in industry structure - either because of the recession, or since the recession - the data needs to be recomputed.

The Forest determined that the data for Wheeler County was adequate. For Crook and Harney counties, we judged the wood products industry data needed to be updated and the rest of the data was accurate. (For a more general discussion of changes in the wood products industry, see the "Social and Economic Setting" section in Chapter 3.) To update the data for the wood products industries, we asked the various manufacturers in the two counties for data on their operations, which they kindly gave to us. From this data, combined with published local and national data, we constructed a picture of the wood products sector as it existed in 1987.

Expenditures Associated with One Unit of Output

The final step in building the IMPLAN model was to determine the effect on the economy of varying one unit of forest output - one MMBF, one MAUM, one MRVD. This data is called expenditure data, since it measures the expenditures in the economic sectors which are associated with one unit of output.

To determine timber-related expenditures, it had to be determined how much of the timber was milled and how much was re-milled before leaving the local area. These figures were provided from Forest Service data and data gathered from local mills.

The timber harvest of the years 1980-1988 was analyzed. The results obtained are shown in Table B-5-1.

Forage expenditures were computed from USDA Economic Research Service data for the Forest and Grassland. The total value of the herd was multiplied by the percentage of the forage that came from the Forest/Grassland to obtain the value due to the Forest/Grassland; then that figure was divided by the number of AUM's to get the value per AUM. This method makes two assumptions. First, it is

TABLE B-5-1
MILLING LOCATION OF OCHOCO NATIONAL FOREST TIMBER

	Crook County	Harney County	Elsewhere
D1, D2, D3 Ponderosa Pine	90%	–	10%
D1, D2, D3 Associated Species	38%	–	62%
D4 Ponderosa Pine	16%	70%	14%
D4 Associated Species	61%	31%	8%

assumed that all the cows and yearlings come either from calves produced by the herd or calves purchased immediately after birth. Second, it is assumed that the value of the Forest/Grassland forage is equal to the average forage value.

Expenditure data for RVD's (recreation) were obtained from the RO, classified by RIM category. These figures were applied to the Ochoco recreation pattern.

The remaining expenditure data are related to Forest Service budgets and to 25 percent monies. The Forest Service salaries and the portion of the 25 percent monies that go to teachers' salaries were proportioned according to the average consumer expenditure pattern for each county. Forest Service non-salary monies were proportioned according to the general federal government expenditure pattern. Twenty-five percent monies that went to roads were allocated to 75 percent road maintenance and 25 percent new road construction. Twenty-five percent monies that went to schools that were not spent on salaries were proportioned according to the education expenditure pattern for each county.

Current Situation

IMPLAN can compute either absolute or relative results. The Forest's process was to define a "current situation" and then compare the alternatives to it. The current situation for timber harvest levels is the 1980-1988 average, as described above. For recreation, averages were computed for the last twenty years and values were chosen which represent the 1985 levels. For grazing, 1985 levels were also used.

Basic Economic Cause and Effect Relationships

Table B-5-2 shows the effect upon a county's economy of a change in one unit of Forest output - one MMBF, one MAUM, one MRVD. The coefficients were computed independently for the three counties, but they are similar because the counties' economies are similar.

Description of Economic Effects

Tables B-5-3, B-5-4, and B-5-5 show the changes in employment and income for Crook, Harney, and Wheeler counties

In Section 5 of Appendix B of the DEIS, the document displayed tables similar to the above except that results were displayed for two decades. This was done to reveal results due to the selection of a Departure for a Preferred Alternative. However, the Preferred Alternative in the FEIS is not a Departure, and results are displayed only for the first decade.

TABLE B-5-2
EMPLOYMENT AND INCOME EFFECTS PER RESOURCE UNIT

Resource Unit	Jobs Effect	Income Effect
1 MMBF Ponderosa Pine	11	220,000
1 MMBF Associated Species	3	60,000
1 MAUM	25	2,000
1 Hunting MRVD	50	9,000
1 Fishing MRVD	50	8,000
1 Dispersed Recreation MRVD	1	13,000
1 Developed Recreation MRVD	50	7,000
1 Roadless Recreation MRVD	1 5	15,000
1 Wilderness Recreation MRVD	1	10,000

TABLE B-5-3
CHANGES IN JOBS AND INCOME
CROOK COUNTY
(Income Expressed in Thousands of 1982 Dollars)

		B-MOD	E-DEP	I Preferred	A	C-MOD
Logging						
	Jobs	13	6	5	3	-6
	Income	246	123	97	65	-113
Sawmills						
	Jobs	25	15	11	8	-10
	Income	620	360	270	209	-257
Remanufacturing						
	Jobs	43	28	16	9	-40
	Income	684	455	252	140	-637
Retail Trade						
	Jobs	33	46	39	18	21
	Income	409	493	410	217	147
All Other Economic Sectors						
	Jobs	47	50	32	14	-33
	Income	731	779	499	235	-506
Total						
	Jobs	161	146	103	54	-68
	Income	2,692	2,212	1,527	869	-1,367

TABLE B-5-4
CHANGES IN JOBS AND INCOME
HARNEY COUNTY
(Income Expressed in Thousands of 1982 Dollars)

		B-MOD	E-DEP	I Preferred	A	C-MOD
Logging						
	Jobs	1	3	0	1	-1
	Income	23	74	4	33	-37
Sawmills						
	Jobs	0	3	-1	1	-4
	Income	1	81	-20	15	-86
Remanufacturing						
	Jobs	-8	1	-8	-6	-15
	Income	-178	30	-181	-148	-359
Retail Trade						
	Jobs	4	19	12	3	0
	Income	26	191	89	25	-4
All Other Economic Sectors						
	Jobs	10	17	8	3	-7
	Income	175	279	127	49	-141
Total						
	Jobs	8	43	12	1	-8
	Income	46	656	18	-26	-145

TABLE B-5-5
CHANGES IN JOBS AND INCOME
WHEELER COUNTY
(Income Expressed in Thousands of 1982 Dollars)

		B-MOD	E-DEP	I Preferred	A	C-MOD
Livestock						
	Jobs	0	0	0	0	0
	Income	1	1	1	1	0
Retail Trade						
	Jobs	0	0	0	0	0
	Income	2	2	1	0	-4
All Other Economic Sectors						
	Jobs	7	6	3	1	-7
	Income	123	112	60	17	-141
Total						
	Jobs	7	6	3	1	-8
	Income	127	115	62	17	-145

Social Effects

The social effects by alternative are listed in Chapter 4. The social measures used to describe these effects are based on the Forest Service *Economic and Social Analysis Handbook* (FSH 1909.17). The handbook suggests analyzing six social measures.:

Lifestyles;

Attitudes, beliefs, and values;

Social organization: Community institutions, community cohesion and community stability;

Population characteristics;

Land use patterns; and

Civil rights (effects on minorities and women).

Of these measures, we judged that "population characteristics" and "land use patterns" would not be affected by any of the alternatives. "Attitudes, beliefs and values" was used as a measure of social effects in the DEIS. However, attitudes, beliefs and values seem to be measured well by the rest of the social measures taken together. For this reason, the separate "attitudes, beliefs and values" category was omitted. For the same reason, we omitted "community institutions" from the "social organization" category.

The "lifestyle" classification was examined extensively in the Socio-Economic Overview (pp 62-92). Six lifestyle categories were described there:

Native American;

Farmer;

Loggers;

Millworker;

Small town merchants; and

Government employees.

Except for the "Native American" category, these lifestyles are related to employment choices although they are not limited to these choices. See the Socio-Economic Overview for more information on "lifestyles "

Since leisure activities are important, they were added as a separately defined social effect. Therefore, the final list of social measures is the following:

Work-related lifestyle;

Leisure activities;

Community cohesion and community stability; and

Effects on minorities and women.

Analysis Prior to Development of Alternatives

(Section 6)

Introduction

The primary analysis performed prior to the development of alternatives was the "Analysis of the Management Situation" (AMS). During this step, the conditions of the Forest, its ability to produce outputs, and society's demands for its resources were assessed. The analysis performed during this step helped to define the "decision space" within which the Forest can operate. The detailed results of this analysis step can be found in the planning documents titled "Analysis of the Management Situation."

The purpose of benchmarks is to define the range within which integrated alternatives will be developed.

Benchmark analysis will enable the Forest to:

Comply with planning regulation direction to establish management requirements (36 CFR 219.27);

Estimate the schedule of management activities, resource outputs, effects, costs, and PNV appropriate to achieving the purpose of the benchmarks; and

Analyze the implications of legal and policy constraints and economic assumptions.

Benchmarks will:

Be approximately implementable;

Not be constrained by budget;

Will generally use a Maximum PNV objective function to obtain a final analytical solution when FORPLAN is used, and

Meet management requirements.

The required benchmarks are:

Minimum level;

Maximum PNV using market prices only,

Maximum PNV including assigned values,

Maximum resource levels; and

Current Level.

For the Ochoco National Forest and Crooked River National Grassland, the following Maximum Resource Levels are displayed:

Timber;

Range,

Big Game; and

Recreation.

Changes Between DEIS and FEIS

The major changes discussed in this section are

Dropping an MR (thermal cover),

The effects of being characterized as having a

"surplus" inventory;

The smaller change in PNV and timber volume between the Max PNV and timber benchmarks,

The effects of different demand assumptions, timber outputs, costs, production relationships and how they relate to the production of market vs. nonmarket outputs,

The potential to maximize various resources, and

The addition of four new ICO's.

Management Requirements

Development and Efficiency Analysis

Management requirements are directed toward assuring that a viable level of resources will be provided for, both short term and over time.

These requirements stem from the National Forest Management Act as interpreted by the implementing regulations (36 CFR 219.27). The following sections of 219.27 contain the basic direction for management requirements:

Resource Protection;

Vegetative Manipulation,

Silvicultural Practices,

Even-Aged Management;

Riparian Areas;

Soil and Water; and

Diversity.

Further direction for incorporating these requirements has been provided to the Forest in the form of "Regional Guidelines for Incorporating Minimum Management Requirements in Forest Planning" (1920 2/9/83). Those minimum management requirements described in the Regional Guidelines address:

Requirements that are outside the Forest Service's authority to change;

Requirements which impose substantive standards (as opposed to procedural),

Requirements that can be dealt with in the analysis, and

Requirements which are likely to have an impact on the analysis.

Other direction which helped form the basis for the Ochoco's approach are: April 16, 1984, RO 1920 Clarification of Wildlife MMR Direction by J. Simon, June 1986, RO, A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service; June 1986, RO, A Background Document on the Development and Review of Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service.

The Forest Interdisciplinary (ID) Team worked over a period of several years attempting to interpret and define specific management requirements applicable to the Ochoco National Forest and Crooked River National Grassland. Those requirements pertinent to the Ochoco where the Forest has discretion in the methods used to meet the requirement include old growth, riparian areas, harvest dispersion, soil and water conservation, and other wildlife habitat. In each of these cases the Forest evaluated alternative methods of meeting the requirement and, where identical effects resulted, chose the method with the least impact on PNV. Chosen methods have been incorporated into the Forest FORPLAN model.

In the fall of 1986 the Northwest Forest Resource Council filed an appeal contesting these management requirements. The appeal resulted in the Ochoco National Forest issuing a supplement to the DEIS in the fall of 1988. The supplement in part dealt with the same information discussed here. Appendix F in

the FEIS contains a more detailed discussion of this information.

In the case of old growth, the Ochoco followed Regional planning direction (1920 11/10/83) which states that this assessment can take a variety of forms, including "1) use mapping systems and logic to distribute the species in a way that minimizes the impact on the commercial forest land base but still achieves the distributional requirements of the species, 2) conduct Regional analysis to determine whether setasides or long rotations are least impactful..." The Ochoco constructed a map to the minimum level of old growth habitat following recent revision of Regional direction (1920 4/16/84).

While there was little flexibility left because of the distributional requirements, logic was applied to minimize the impact on the suitable timber land base. Examples include placing the maximum number of stands in designated Wilderness areas, the RNA, and in areas with a high probability of less intensive timber management such as visual corridors, riparian areas, and less economically viable unroaded areas. Other Forests in the region with a similar timber inventory structure to the Ochoco's have conducted some analysis of the relative efficiencies of a dedicated or managed approach. The Siuslaw found that a dedicated approach was more efficient on the order of a two to four percent difference in PNV. The Wallowa-Whitman also found a dedicated approach to be more efficient with a difference of less than one percent in PNV. Both of these Forests performed their analysis by comparing FORPLAN runs with all constraints except for old growth remaining constant between runs Additionally, an analysis conducted on the Ochoco showed the dedicated approach to be more efficient.

The basic procedure followed was to calculate the percent of a rotation that would be in old growth, the area needed to support a given level of old growth with those rotation ages, and the resultant difference in mean annual increment (MAI). Forest-wide yield differences on a MAI basis were then calculated. Various management schemes using different rotations and different levels of old growth for both mixed conifer and ponderosa pine were examined and in every case a dedicated approach was found to be more efficient (Ochoco planning files 8/16/82). In summary, dedicated stands were mapped in a manner to minimize the impact on the suitable timber land base Results of FORPLAN analysis conducted by forests with a similar timber inventory structure, and an analysis conducted on the Ochoco showed the dedicated approach to be more cost-efficient. Therefore, the Forest elected to use the dedicated habitat modeling approach.

Several methods of meeting management requirements for riparian areas were considered. The more direct method involved dedicating riparian areas to non-timber harvest prescriptions. This would most directly ensure meeting management requirements but would also have the greatest impact on timber harvest and, therefore, the most impact on PNV.

The ID team thus sought to find alternative standards and guidelines that would meet riparian requirements but have less impact on PNV. The approach decided upon relies on a mix of practices and project level standards and guidelines, as well as harvest restrictions. These guidelines include the following:

Use of designated skid trails;

Use of non-mechanical slash disposal;

Use of non-mechanical site preparation;

Cable logging systems on slopes greater than 30 percent;

Limits on road density and stream crossings;

Extended rotations (200 years) and/or uneven-aged management;

Limitation in the amount of riparian areas available for timber harvest in any one decade, and

Manipulation of grazing utilization standards rather than structural improvements.

In addition, after ID team evaluation, the Forest decided that restrictions in riparian areas should only be placed on Class I and II streams and not the much more numerous Class III and IV streams. Thus, these requirements affect approximately 18,000 acres (less than two percent of the land area).

The DEIS contained a requirement of ten percent cover in winter range. This requirement came directly from Regional direction. Since then, Regional direction has been modified and this requirement was dropped. The Forest is explicitly modeling cover in the Ochoco FORPLAN model. This allows the linear program to select the most efficient set of management intensities and the scheduling thereof to meet overall Forest objectives as well as the thermal cover constraint. Considerable effort was expended by the Forest, as documented in planning files (1920 5/16/84, 1920 9/10/84), to assure that the best set of management intensities and schedulings is available for the model to select from.

Harvest dispersion constraints are also explicitly portrayed in the Ochoco FORPLAN model. Following the two-step process in the Regional planning direction (1920 11/10/83), a theoretical dispersion factor was first calculated and then validated by extensive mapping (1920 5/31/84). This factor has been thoroughly evaluated by the IDT and tested by both Forest and District personnel. This analysis showed that a 33 percent limit on regeneration harvest by analysis area was appropriate. One distinction made in the Forest's modeling is between planting and natural regeneration. This has a direct effect on dispersion since natural regeneration takes twice as long to grow out of the opening stage. This difference is portrayed by explicitly modeling openings and allowing the linear program to select from among various management intensities with either planting or natural regeneration to most efficiently meet Forest objectives and the harvest dispersion constraint. Again, extensive analysis was conducted to assure that the best set of practices is available for the model to select from.

An option briefly considered early in the Forest's planning efforts was to use an altogether different modeling approach where alternative harvest schedules would be determined prior to running the model, averaged over time to reflect harvest dispersion, and input to the model. Since most Forest issues and concerns, as well as the major portion of the Forest's costs and values, revolve around harvest scheduling, this scheme for modeling dispersion was dropped. Far too few of the hundreds of potential schedules available for an analysis area could be represented with this approach, thus unnecessarily limiting PNV.

Analysis of benchmark runs in the AMS indicated individual watersheds had equivalent clearcut acres exceeding 45% in the first and later decades. The Forest Management Team decided this level would not meet management requirements for soil and water. The Forest's watersheds were then analyzed and assigned harvest level thresholds which they could absorb without significant impacts to the soil and water resources. Numerous FORPLAN runs were made to find the modeling techniques with the least impacts on PNV and timber volume while meeting this objective.

These final dispersion constraints include regeneration harvest limitation of between 17 and 23 percent (depending upon proportion of analysis area within low, moderate, or high sensitivity watersheds), and a 50 - 67 percent limitation on first decade overstory removals. Regeneration harvest limitations are applied to a scheduled output that tracks the difference between natural and artificial regeneration in terms of the time it takes to grow out of the opening stage. (See planning record 1920 8/13/85.)

Management requirements for the provision of snags outside of areas dedicated to old growth management relate to snags 12 inches in diameter or less Analysis of benchmark runs showed that these levels could be provided through normal mortality and that no constraints or allocations are necessary to meet this requirement.

Opportunity Costs

Several FORPLAN runs were made with different MR constraints present so that the impacts of management requirements and National and Regional direction could be determined. All of these runs used run #3 (BM5) in Cargill's (1920, May 17, 1983) benchmark run sequence as a basis for comparison This run maximized PNV subject to nondeclining yield and rotations restricted by CMAI. The runs used for comparison differ from run BM5 only in the presence of constraints designed to meet one or

TABLE B-6-1
MANAGEMENT REQUIREMENT ANALYSIS RESULTS

		Annual Timber Output MMCF 2/		
ID 1/	Management Requirement Constraints	Decade 1	LRSY	PNV (MM$) 3/
BM5	None	23 4	23 4	494 0
BMA	Old Growth Only	22 8	22 8	478 1
BMB	Cover Only 4/	23 2	23 2	492 0
BMD	Harvest Dispersion Only	23 3	23 3	477 6
BMC	Watershed Dispersion Only	22 4	22 5	449 6
B7E	All	21 3	21 6	429 1

1/ All of these runs maximize PNV subject to non-declining yield and use of CMAI rotations
2/ Volume figures do not include unregulated salvage All runs produce at the LRSY level in decade 1 except BMC (watershed dispersion) and B7E (maximum PNV benchmark)
3/ These PNV figures are taken directly from the FORPLAN reports and are not 100% comparable to PNV s given elsewhere in the DEIS For comparison purposes, however, these figures are accurate
4/ Dropped as a management requirement in the FEIS

more MMR. Table B-6-1 shows the results of these runs. Comparisons in this narrative will be in terms of the change in PNV. Timber volume trade-offs in cubic feet can be determined from the table. The effect of not providing for these MR's is addressed in more detail in Appendix F.

When constraints to meet all management requirements are present, the total impact on PNV is a reduction of 13.2 percent (run BM5 compared to run B7E). Three other runs were made to look at the impact of individual MR constraint sets (old growth, harvest dispersion and watershed dispersion). A forth MR constraint, special riparian area prescriptions, was not examined individually due to the minor impact on PNV (one percent). PNV reductions caused by the constraints individually amounted to 3.2 percent for old growth (run BMA compared to run 607BM5), 3.4 percent for harvest dispersion (run BMD compared to run 607BM5), and nine percent for watershed dispersion (run BMC compared to run BM5). The reduction in PNV for harvest dispersion while timber outputs remain unchanged is due to the difference between planting and natural regeneration in the amount of time required to grow out of the opening stage. To meet dispersion requirements, more expensive planting is frequently required.

Results of comparisons of individual management requirements would represent the maximum impact of that constraint. The linear program would not have an opportunity to consider any overlapping or interactive effects in its optimization procedures. However, these particular constraints are largely independent of one another except for harvest dispersion and watershed dispersion. In this case the watershed dispersion constraints are much more restrictive and completely overlap the harvest dispersion constraints. The independent nature of these constrains can be seen by comparing the total impact of 13.2 percent to the sum of the individual impacts, excluding harvest dispersion impacts (15.5 percent). In the context of a particular alternative, however, more overlapping of constraints, hence less of an impact on PNV, would be expected

The preceding discussion relates directly to the DEIS. Since then changes in some of the relationships and model updates would result in minor changes. Due to the probable magnitude of the changes and the high cost and time to update, these analyses were not updated.

Timber Harvest Policy Benchmark Analysis

In response to National and Regional direction, the Ochoco followed the benchmark run sequence (1920 8/8/83, 1920 11/10/83) in order to develop information to display the impacts of timber harvest policies (see Table B-6-2). The two types of constraints examined were nondeclining yield and rotations restricted to culmination of mean annual increment (CMAI). Using the results of the benchmark run sequence, these two policies can be examined either independently or in combination, and either with or without management requirements. As with the preceding section's management requirements, this analysis has been carried forward from the DEIS.

Looking first at rotations restricted by CMAI, the Ochoco found that the impacts on PNV are less than one percent under nondeclining yield (run #6 compared to run #7) and 1.1 percent with 25 percent sequential bounds (run #4 compared to run #5). This is not surprising since the Forest spent considerable effort constructing harvest schedules for the numerous two storied stands which most efficiently provide volume in the critical decades of the conversion period with rotations at CMAI. The small increase in PNV with a two percent increase in timber volume can be attributed to the fact that, because of the early rotation ages in the future and LRSY not being binding in BM3, more of the high volume and high valued existing stands can be harvested now. All four of these runs include constraints necessary to meet management requirements. Model updates described in Section 3, have resulted in the model characterizing the Ochoco as a surplus forest in which the LRSY is binding on the ASQ. As a result, rotation short of culmination has little to no effect on ASQ because moving rotation ages forward from their biological potential has a tendency to reduce LRSY which would further impact the ASQ.

Results of comparing runs made with and without strict nondeclining yield requirements, however, show a much more significant impact. With CMAI rotation constraints the nondeclining yield constraints reduce PNV by 1.1 percent (run #7 compared to run #5). Without the CMAI restrictions PNV is reduced by 1.4 percent (run #6 compared to run #4) with strict nondeclining yield. Timber volume on the other hand, is reduced by 15 percent in both runs under NDY (runs 6 and 7) This large decrease in timber volume with only a minor drop in PNV is a result of the departure run's additional volume coming from lower value/higher cost stands which were not

TABLE B-6-2
TIMBER HARVEST POLICY ANALYSIS

	Annual Timber Output 2/		
Benchmark Run Sequence Number 1/ (FORPLAN Run ID)	Decade 1 (MMCF/M)	LRSY 2/ (MMCF)	PNV 3/ (MM$)
1 BIA (NDY-CMAI)	24 5	24 5	379 0
2 BM4 (Dep, UTIL)	41 2	22 5	532 2
3 BM5 (NDY-CMAI)	23 4	23 4	494 0
4 BM1 (Dep-UTIL,MMR)	25 4	21 4	438 5
5 BM2 (Dep-CMAI-MMR)	25 2	21 6	433 8
6 BM3 (NDY-UTIL-MMR)	21.8	21 8	432 2
7 B7E (NDY-CMAI-MMR)	21 3	21 6	429 1

1/ Run numbers follow the convention established in Cargill's 1920 letter of 8/8/83 and use the constraints and objective function defined in that direction
2/ Volume figures do not include unregulated salvage All runs with the nondeclining yield constraint produce at the LRSY level in decade 1 except B7E
3/ These PNV figures are those taken directly from the FORPLAN reports and are not 100% comparable to PNV's given elsewhere in the AMS For comparison and relative purposes, however, these figures are accurate

selected by the runs with a nondeclining yield formulation. All four of these runs include constraints necessary to meet management requirements. It is also expected that with a surplus inventory a departure schedule would have little to no effect. Even with shorter rotations, the existing inventory will still have control over the departure schedule. This is because the existing inventory will still need to be meted out until new stands (short of culmination) are available for harvest.

The effects of these two requirements (CMA and NDY) in combination can also be extracted from the results of the benchmark run sequence. In general, since the CMAI restrictions have such a small effect, results are very similar to those obtained looking only at the nondeclining yield requirements With all management requirements met, the effect on PNV of the nondeclining yield constraints and CMAI restrictions together is 2.2 percent (run #7 compared to run #4). Without management requirement restrictions the impact on PNV is 7.1 percent (run #3 compared to run #2). The greater difference in PNV between these four runs and that shown between runs 7 and 5 and 6 and 4, which were discussed above, indicates that it is the management requirements which prevent a departure schedule from dramatically increasing PNV while increasing harvested volume.

Because the assigned value and market value benchmarks treat the timber resource in the same way, the impacts of timber harvest policies (NDY and CMAI) will be the same for both.

The effect of removing the nondeclining even flow constraint results in elk and deer numbers remaining similar to today's level for the first two decades. A drastic reduction occurs in the fourth decade and is only slightly above viable population levels in the fifth decade.

The decline in big game populations after the third decade is due to intensive timber harvesting during the earlier decades. This results in low amounts of cover, which is poorly dispersed, and high road densities.

Removing nondeclining even flow increases sediment production between 1.4 and 1.9 times more than the other benchmark runs in the first decade. However total sediment projections are less than the total sediment for Maximum Timber, PNV, Range, and Current Situations benchmarks. Water runoff on the other hand only increases seven percent over non-departure benchmarks.

Benchmark Descriptions

Minimum Level

Description and Purpose

The minimum level benchmark is a determination of the minimum costs and resultant outputs necessary to retain National Forest lands in Federal ownership. Minimum environmental constraints and protection of the life, health and safety of users must be provided.

The purpose of developing the minimum level benchmark is:

To determine the minimum costs involved with maintaining National Forest lands in the National Forest system; i.e., a cost level that is not discretionary in the Programming and Budgeting process; and

To determine the outputs and effects related to this "minimum expenditure" level.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Practices and costs are only those necessary to keep the Forest in public ownership.

Some costs are necessary to protect the life, health, and safety of incidental users; to prevent environmental damage to lands or resources of adjoining ownerships, administer unavoidable special uses; and to not allow significant impairment of the productivity of the land.

Outputs associated with this benchmark include only uncontrollable outputs and uses, such as naturally occurring water runoff, wildlife and fish, and dispersed recreation.

Costs for a transition "close down" are not included, as per Regional direction (11/10/83).

No Action with NFMA Requirements

Description and Purpose

This benchmark is also Alternative A in the FEIS.

In the DEIS the purpose behind this particular analysis is to isolate the outputs and costs that can be attributed to NFMA requirements not currently incorporated in the Current Situation Alternative, as well as to present a version of the current situation alternative updated to reflect NFMA requirements. In the FEIS, Alternative A has been modified and now incorporates all NFMA requirements. As a result, there is no difference between the No Action benchmark and Alternative A(No Action). The No Action Benchmark is displayed here for comparative purposes only.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Appendix for acreages).

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Regeneration harvests cannot be scheduled until stands have reached 95% of culmination of mean annual increment.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

Allocations used are those specified in current unit plans as interpreted by the IDT and Forest Management Team.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

An objective function of maximizing timber for the first decade was used. Timber outputs were then "rolled over" to a second run which used a maximum PNV objective function for 15 periods.

Maximum PNV Using Market Values Only

Description and Purpose

This benchmark estimates the maximum PNV that might be attained on the Forest by valuing only those outputs that have an established market price (timber, range, and developed recreation), subject to management requirements, rotation age restrictions (CMAI), and non-declining yield.

The purpose of developing this benchmark is to estimate the level of goods and services produced by a maximum PNV objective and to permit a comparison of this PNV and associated outputs with the PNV and outputs of other benchmarks and plan alternatives.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95% of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirement for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet management requirements for primary cavity excavators.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Objective function used is to maximize present net value for the entire modeling horizon using only market values.

Areas of the forest not allocated to old growth, riparian, wilderness, or research natural areas are allocated to the timber/range prescription

Maximum PNV Using Assigned Values

Description and Purpose

This benchmark estimates the maximum PNV that might be attained on the Forest by valuing outputs with either market or assigned values, subject to minimum management requirements, rotation age restrictions (CMAI), and non-declining yield.

The purpose of developing this benchmark is to estimate the level of goods and services produced by a max PNV objective and to permit a comparison of this PNV and associated outputs with the PNV and outputs of other benchmarks and plan alternatives.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95% of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirement for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet management requirements for primary cavity excavators

Wild horse numbers are managed at todays levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Objective function used is to maximize present net value for the entire modeling horizon including both market values and assigned values.

Analysis summarized below showed that the only adjustment to the FORPLAN allocation of lands for costs and benefits not included in the model that should be made according to the maximization of PNV criterion when assigned values are included was to use the enhance riparian prescription.

Areas of the forest not allocated to old growth, riparian, wilderness, or research natural areas are allocated to the timber/range prescription.

Maximum Recreation/ Unroaded

Description and Purpose

This benchmark estimates the maximum capability of the Forest and Grassland to provide semi-primitive nonmotorized, semi-primitive motorized, roaded natural, and developed recreation opportunities subject to management requirements, rotation age restrictions (CMAI), and non-declining yield.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and con-

straints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirements for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet management requirements for primary cavity excavators.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Objective function used is to maximize Present Net Value for the entire modeling horizon.

All currently inventoried semi-primitive nonmotorized and semi-primitive motorized areas are allocated to prescriptions maintaining that character.

Riparian areas receive additional protection to enhance riparian conditions.

Construction of new facilities results in increased developed recreation use.

The Deschutes Canyon Further Planning Area would be recommended for wilderness in this benchmark.

Remaining areas of the Forest and Grassland are allocated to big game prescriptions with the corresponding thermal cover constraints and road closure costs.

Maximum Timber

Description and Purpose

This benchmark estimates the maximum level of timber volume that can be attained on the Forest, subject to rotation age restrictions, nondeclining yield, and management requirements.

The purpose of developing this benchmark is to determine the maximum level of timber volume that can be produced on the Forest, subject to management requirements, rotation age restrictions (CMAI), and nondeclining yield.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and

effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

Sufficient timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirements for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet management requirements for primary cavity excavators.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Timber harvest levels are determined through the following process:

A run is made which maximizes timber for the first decade.

Using that run's results for the first decade, another run maximizes timber for all 15 decades.

Constraining in the results of the second run, a third run is made in which the objective function is to maximize Present Net Value for the entire modeling horizon.

Areas of the Forest other than old growth, riparian, wilderness, or research natural areas are allocated to the timber/range prescription.

Maximum Range

Description and Purpose

This benchmark estimates the maximum capability of the Forest and Grassland to provide commercial livestock grazing, subject to management requirements, rotation age restrictions (CMAI), and nondeclining yield.

The purpose of this benchmark is to show the maximum level of commercial livestock grazing.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sus-

tained yield capacity in any decade.

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirements for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet management requirements for primary cavity excavators.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Forage output levels are determined through the following process:

A run is made which maximizes forage for all 15 decades.

Constraining in the results of the first run, a second run is made in which the objective function is to maximize the PNV for the entire modeling horizon.

Areas of the Forest other than old growth, riparian, wilderness, or research natural areas are allocated to the timber/range prescription.

Acreage limitations on mechanical treatments were set so that only operable soils with range in poor to fair condition are scheduled for treatment.

Acreage limitations on non-mechanical treatments were set at operationally feasible levels to prevent extreme disruptions in grazing programs.

Maximum Big Game

Description and Purpose

This benchmark estimates the maximum capability of the Forest and Grassland to produce big game subject to management requirements, rotation age restrictions (CMAI), and non-declining yield.

The purpose of this benchmark is to show the maximum level of big game.

Assumptions and Constraints

In the process of formulating benchmarks and alternatives certain assumptions must be made and constraints specified in order to model or portray complex relationships and estimate costs, outputs, and effects. Those assumptions and constraints with significant bearing on cost, output, and effect estimation are listed below.

Timber harvest is scheduled only on lands classified as suitable for timber harvest through the Stage I suitability analysis (see Process Record 1920 1/84 for acreages).

Timber harvest cannot exceed the long run sustained yield capacity in any decade.

Sufficient ending timber inventory must remain at the end of the modeling horizon to sustain timber harvest at the long run sustained yield

capacity.

Timber harvest cannot decrease in any decade as compared to the immediately preceding decade (NDY).

Regeneration harvests cannot be scheduled until stands have reached 95 percent of culmination of mean annual increment.

Regeneration harvests are dispersed to meet Regional Guidelines for size and separation of harvest units.

Regeneration harvests and overstory removals are dispersed to meet management requirements for soil and water.

Less intensive silvicultural practices are scheduled in riparian areas to meet management requirements for soil and water.

Old growth units are dedicated according to Regional Guidelines for distribution and amount to meet minimum management requirements for primary cavity excavators.

Wild horse numbers are managed at today's levels according to the Big Summit Territory Management Plan.

Big game user days (WFUD's) change directly in response to changes in big game habitat capability.

Riparian based recreation use increases when riparian conditions are enhanced.

The quantity and quality of thermal cover directly affect big game habitat capability. Hiding cover and forage are both available in abundant supply and do not limit habitat capability.

Objective function used is to maximize present net value for the entire modeling horizon.

Areas of the forest other than old growth, riparian, wilderness, or research natural areas are allocated to big game prescriptions with the corresponding thermal cover constraints and road closure costs.

Opportunity Cost of Maximum Production, Minimum Level and No Action Benchmarks

An analysis of benchmarks was conducted to ascertain opportunity costs associated with the resolution of ICO's. These evaluations were completed using a common constraint set to localize the effect directly attributable to achieving a specific resource objective. The opportunity cost displayed here are in addition to these associated with management requirements and timber harvest policy. The following two sections treat this information in more detail.

The discussion and values in the next three sections are taken from the DEIS. Although the values would change if updated, no change in relationships is expected. When values or relationships change, the effect will be discussed. Table 3-3B contains some of the same information (updated) as Table 3-3A.

Max Timber Benchmark

Runs compared:	B7E	(PNV 479 MM$)
	BT5	(PNV 441 MM$)

Opportunity Cost: 38 MM$ (eight percent reduction)

Land assignments selected by FORPLAN to maximize timber production are identical to those selected to maximize PNV. This is primarily due to timber's significant contribution to PNV, relative to other resource values. Opportunity costs associated with maximizing timber production occur because less efficient acres are brought into solution earlier in the planning horizon. In addition, the model selects less efficient management intensities than it would select under Max PNV. PNV declines eight percent ($38 million); average annual first decade timber production increases seven percent (1.5 MMCF). Between the DEIS and FEIS, changes in the timber yield tables and analysis area data have resulted in a smaller decline in PNV and a smaller increase in ASQ.

Max Unroaded Benchmark

Runs Compared: B7E (PNV 479 MM$)
BR3 (PNV 453 MM$)

Opportunity Cost: 26 MM$ (five percent reduction)

All presently unroaded land was placed under custodial management in this benchmark which reduced the available/suitable timber base relative to Max PNV. The remainder of the suitable acres is assigned to big game prescriptions, which limits the intensity of management and harvest scheduling flexibility. Average annual first decade timber yield is reduced 5.3 MMCF (29 percent). A reduction in PNV (five percent) occurs with the reduction in timber harvest as the increased recreational use is not sufficient to completely offset the loss in timber revenues.

Max Range Benchmark

Run Compared: B7E (PNV 479 MM$)
BF5 (PNV 425 MM$)

Opportunity Cost: 54 MM$ (11 percent reduction)

Average annual first decade timber yield increased .3 MMCF due to an increase in management intensity relative to the Max PNV. PNV was reduced 11 MM$ because increased livestock use could not offset the foregone timber values (lower value, higher cost relative to the Max PNV benchmark).

Max Big Game Benchmark

Runs Compared: B7E (PNV 479 MM$)
BE3 (PNV 422 MM$)

Opportunity Cost: 57 MM$ (12 percent reduction)

Management intensities required to achieve optimum habitat for big game species reduce the harvest scheduling flexibility relative to the Max PNV. Average annual first decade timber harvest declined 4.7 MMCF. Reductions in PNV (12 percent) are primarily due to the reduction in timber harvest. The increase in wildlife user days was not enough to offset forage and timber values.

Min Level Benchmark

Runs Compared B7A (PNV 479 MM$)
MINLVL (PNV 176 MM$)

Opportunity Cost: 303 MM$ (63 percent reduction)

The Min Level Benchmark defines the costs and benefits of operating the Forest in a custodial fashion, with no production of controllable goods and services such as timber or developed recreation. Management under this benchmark reduces PNV by 63 percent and essentially terminates all market outputs with the exception of anadromous fish for commercial harvest.

No Action Benchmark

Runs Compared: B7E (PNV 479 MM$)
5A6 (PNV 388 MM$)

Opportunity Cost: 91 MM$ (19 percent reduction)

Land assignments in this benchmark are identical to those of the "No Action" Alternative. The multiple-use orientation of this benchmark reduces average annual first decade timber harvest 2.5 MMCF (11 percent), relative to Max PNV. PNV declines 91 MM$ to meet the resource objectives specified in existing management plans.

Significant Relationships in the Production of Market and Nonmarket Outputs

Comparison of outputs, costs, and effects for the Max PNV benchmark which includes assigned values shows only minor differences as compared to Max PNV with only market values. A determination of how the allocation and scheduling of lands and resources would differ if assigned values were also used requires an analysis of the relationships and

trade-offs between resource outputs with market based values and those with assigned values. Outputs with assigned values that could affect the allocation and scheduling of market valued resources include semiprimitive nonmotorized RVD's, semiprimitive motorized RVD's, big game WFUD's, fishing WFUD's, and soil and water outputs. Other outputs with assigned values do not change from one benchmark to another. Results of the analysis conducted by the Forest are summarized below.

Semiprimitive nonmotorized and motorized RVD's can only be produced on areas of the Forest in a currently unroaded or near unroaded condition. When these areas are allocated to prescriptions enabling maintenance of semiprimitive recreation opportunities there results an increase in present value of $11,551,000 due to increased SPNM and SPM RVD's (BR3), an increase in present costs of $1,978,000 due to trail and trailhead construction (BR3), and a decrease in net present value of $27,100,000 due to foregone timber harvest (BR1 compared to B7A). The total change in PNV is -$17,523,000, which leads to the conclusion that no change in the allocation and scheduling of market resources should occur according to the maximization of present net value criterion by using the assigned values for semi primitive RVD's. Between the DEIS and FEIS both the timber model component and SPNM demand estimates were updated. As a result, both discounted timber benefits and RVD's are somewhat lower.

A comparison of the contribution to the present value of big game WFUD's and timber outputs in runs BE3 and B7E shows the trade-offs involved in present value from timber harvest necessary to obtain greater value from big game WFUD's. The only difference in these two runs is the presence of thermal cover constraints in BE3 designed to improve big game habitat capability. In run B7E, $472,990,000 of present value is attributed to timber harvests and $79,733,487 of present value is attributed to big game WFUD's. In run BE3, $398,742,000 of present value is attributed to timber harvests and $89,343,507 can be attributed to big game WFUD's. A reduction in present value of $74,248,000 from the timber resource was incurred to produce an increase of $9,609,000 in present value from the big game resource. A major reason that significant differences in big game habitat capability do not show up as significant differences in present value is that these differences mostly occur after the first two decades and are heavily discounted in present dollar terms. With non-declining yield requirements, constraints necessary to produce improved habitat capability in the future translate into early decade losses in timber contributed present value. In general those areas of the Forest that require the least trade-off of timber value (predominantly mixed conifer) are the same areas that have the best habitat capability currently and show the least change in habitat capability.

Wildlife user days associated with hunting are relatively higher in the FEIS than in the DEIS. This fact, combined with slightly lower discounted timber benefits, would lower the loss in PNV due to big game habitat but will not change the relationship

An analysis of fishing WFUD's shows the area of conflict requiring some trade-off is with livestock AUM's. Changes in timber-generated value are relatively insignificant whether a "maintain riparian conditions" prescription or an "enhance riparian prescription" is employed. However, with enhanced conditions an increase in fishing WFUD's occurs, generating an increase in present value of $12,266,100. Livestock AUM's also decrease, with an associated present value of $1,369,740. Cost decreases for livestock administration are approximately offset by increases in structural improvements necessary to obtain enhanced riparian conditions. The total change in PNV when enhancing all Class 1 and 2 streams is an increase of $11,396,360. The results of analysis in this case show that a reallocation should occur when assigned values are considered according to a maximization of PNV criterion.

Between the DEIS and FEIS the livestock/riparian interactions and fishing demand assumptions were reevaluated. This resulted in significant changes in outputs. Firstly, the amount of fishing is predicted to be higher. Also, in the FEIS anadromous fishing was valued. Capital investments needed to improve the habitat are significantly higher. Finally, the loss of

AUM's due to habitat improvement is less in the FEIS. The increase in RVD's would increase the change in the PNV while the higher cost and less reductions in AUM's would offset it. It is expected that improving riparian conditions is still more cost efficient.

Consideration of the assigned values contributed from soil and water outputs, however, shows that the magnitude of the changes in present value from soil and water is negligible as compared to the change in present value from timber that is linked to soil and water values. When comparing the resource benchmarks (excluding the minimum level) the difference in present value from the benchmark with the least soil and water value (maximum timber) to the one with the most (maximum recreation) is only $580,000. The difference in present value between benchmarks due to timber contributed value is on the order of tens of millions of dollars. Considering the minimum level benchmark where soil and water values are highest, present value attributed to soil and water increases $1,101,000 as compared to the maximum timber benchmark. The loss in present value due to foregone timber values, however, is on the order of hundreds of millions of dollars.

An additional analysis performed on the Forest was designed to ensure that the particular intensities and scheduling patterns modeled as choices in the timber-range prescription contained all of the choices used by the model to maximize Present Net Value. This analysis considered both per acre and Forest-wide scheduling aspects and is documented in planning files (1920 5/16/84 and 1920 9/10/84). Necessary changes were made as a result of this analysis, and the timber-range prescription now contains all of the flexibility in management intensity and scheduling patterns necessary to maximize PNV.

Given the conclusions of the analysis described above, it is apparent that very little difference exists in outputs, effects, and costs result due to consideration of all assigned values. The differences that do show up are attributable to use of the prescription to enhance riparian conditions.

Resource Maximization Potentials

The benchmark runs discussed earlier were made in order to explore the maximum potentials of the Forest to produce various outputs. These outputs include present net value, range, recreation, timber, and big game. In addition to helping define the maximum resource production capabilities of the Forest and the decision space within which alternatives can be developed to address the planning ICO's, some idea can be obtained about the magnitude of output tradeoffs that are incurred when various resources are emphasized.

The analysis was performed by providing FORPLAN with the land allocations and prescriptions which would lead to the maximization of a particular resource (i e., range or PNV, or recreation, or timber, or big game). FORPLAN was then run with a maximum PNV objective function for the Max PNV, maximum recreation and maximum big game benchmarks. On the other hand, the Maximum Timber Benchmark and Maximum Range Benchmark were first run with a maximize timber objective function, and maximize forage objective function. The timber and forage outputs from these runs were then "rolled over" to a second run which was executed with a maximum PNV objective function.

The resource output's discounted benefits and costs were calculated with electronic spreadsheets outside of FORPLAN. The budget estimations and the overall present net value calculations were also performed with the use of electronic spreadsheets.

Table B-6-3A displays the outputs and effects associated with the various resource maximization benchmarks.

A comparison of the two PNV benchmarks (market values only and assigned values plus market values) has already been presented above and for this comparison benchmark #3 (B7E, market plus assigned values) will be used as the reference point The PNV of benchmark B7E is 479 million dollars. This includes a total present value of 712 million dollars of which 215 million can be attributed to assigned

TABLE B-6-3A
OUTPUTS AND EFFECTS OF REQUIRED BENCHMARKS
DEIS

	Minimum Level	Max PNV	Max Timber	Max Range	Max Big Game	Max Unroaded Recreation	No Action
Social-Economic							
PNV (MM $)	176	479	441	425	422	453	388
Return to Treasury	0	21 6	20 7	19 3	17 2	16 2	16 5
Change In Jobs From Current Situation	-1156	69	99	20	-250	-195	118
Discounted Benefits (MM $)							
Timber	0	473	480	456	399	378	385
Recreation	73	91	91	91	91	119	88
Range	0	24	25	29	19	18	20
Fish & Wildlife	132	121	101	104	114	132	114
Soil & Water	3	5	3	3	3	3	3
Discounted Costs (MM $)	4	232	259	258	204	196	232
Harvest Levels (MMCF)							
Decade 1	0	21 8	23 3	22 1	17 1	15 5	19 3
Decade 2	0	21 8	23 3	22 1	17 1	15 5	19 3
Decade 3	0	21 8	23 3	22 1	17 1	15 5	19 3
Decade 4	0	21 8	23 3	22 1	17 1	15 5	19 3
Decade 5	0	21 8	23 3	22 1	17 1	15 5	19 3
Long Run Sustained Yield (MMCF)	0	21 6	22 8	22 7	19 2	17 6	19 5
Recreation Use (MRVD) Annual First Decade							
Developed	0	120	116	116	119	120	117
Dispersed	395	369	358	358	367	407	382
Wildlife Population Levels							
Elk (# - 5th Decade)	5,300	1,900	1,500	1,600	4,500	4,100	2,330
Deer (# - 5th Decade)	22,600	20,500	13,400	17,100	22,600	22,600	22,600
Woodpeckers (% of Blo Pot.)	100	20	20	20	20	25	55
Big Game Use Days (MWUD's-5th Decade)	225 1	156 6	128 5	141 4	209 6	203 0	187 7
Fish Use Days (MWUD's) (1st Decade Avg Annual)	185 8	188 4	174 6	174 6	185 8	191 6	179 5
Old Growth (Acres)	80,000	31,800	31,800	31,800	31,800	56,000	60,000
Range Livestock Use (MAUM s) (Annual-1st Decade)	0	89	96	110	73	66	73

TABLE B-6-3B
OUTPUTS AND EFFECTS OF REQUIRED BENCHMARKS
FEIS

	Minimum Level	Max PNV	Max Timber	Max Range	Max Big Game	Max Unroaded Recreation	No Action
PNV (MM $)	Unknown	512	480	424	429	454	421
Change in Jobs From Current Situation	-1028	234	226	149	-93	-107	57
Payments to Counties (MM $)	0	6 0	5 6	4 7	4 2	4 0	4 3
1st Decade Avg Annual ASQ MMCF MMBF	 0 0	 22 9 139	 23 4 142	 22 1 132	 17 1 102	 15 5 93	 19 3 115
Elk (No of Elk 5th Decade)	7,950	1,510	1,270	1,350	4,270	4,040	2,670
Deer (No of Deer 5th Decade)	22,600	20,470	13,350	17,060	22,600	22,600	2,260
Forage Production (MAUM's/Yr)	0	82.0	80 6	105 3	71 0	71 0	77 5
Old Growth (M Acres 5th Decade)	94	39	39	39	40	75	53 0
Snag Habitat for Cavity Nesters (% of potential 5th Decade)	70	30	30	30	60	45	52
Riparian Areas in Excellent Condition (M Acres 5th Decade)	17 1	17 1	1 9	1 9	17 1	17 1	5 4
Roadless - Allocated (M Acres)	59 9	0	0	0	0	59 9	31 2

values and 496 million to market values. The majority of the 541 million comes from timber harvest (473 million). The basic thrust of this benchmark is to capture as much value from the existing timber stands as possible under nondeclining yield. This is accomplished by balancing the higher reforestation costs but less constraining harvest dispersion constraints associated with planting against the lower cost but more constraining dispersion constraints associated with natural regeneration. Consequently, reforestation scheduled in the first five decades is a mix of planting and natural regeneration. This results in somewhat lower timber yields as compared to the maximum timber benchmark. Range yields on transitory range are produced at levels commensurate with the timber scheduling that maximizes PNV. Range values can not compete with timber values to influence the harvest scheduling. Analysis of runs made with and without range outputs valued in the maximize PNV objective function showed no significant change in the harvest schedule (TIE and TIF). Range output increases due to non-structural improvements do not generally increase PNV except in the small numberof meadows on the Forest Additional structural improvements, on the other hand, do generate positive PNV and are included in this and other benchmarks. Analysis conducted by the Forest showed that an opportunity for construction of approximately 300 water developments exists that would increase PNV and result in an additional 22,000 AUM's Re-analysis between the DEIS and FEIS indicated that most developments would not support as many AUM's (10,000 instead of 22,000) and would cost significantly more. Only 140, instead of 300, are cost effective and increase PNV. Recreation use cannot compete with timber harvest in monetary terms and is produced at background values commensurate with timber harvest in this benchmark. The fishing aspect of recreation use, however, does not compete with timber harvest but successfully competes with livestock use in monetary terms. Therefore, riparian prescriptions calling

for enhanced conditions are employed resulting in higher fishing WFUD's and lower AUM's. Soil and water outputs with assigned values cannot compete with timber harvest and are produced at levels resulting from the timber harvest schedule that maximizes PNV. More detail on these relationships is contained in Section 3.

The two benchmarks with the second highest and lowest PNV, maximum recreation (453 million) and maximum big game (422 million) are very similar. In both cases most of the Forest is allocated to big game prescriptions. However, the maximum recreation benchmark allocated currently unroaded areas to semiprimitive prescriptions and invested money into trail, trailhead, and campground development. The main reason for the differences between these two in terms of PNV is that the maximum recreation benchmark generates more present value from the higher discounted benefits and lesser cost associated with the semiprimitive RVD's than does the additional timber and big game benefits but higher costs in the maximum big game benchmark. The presence of big game cover constraints for big game in both cases limits capturing the value in the existing stands as fast as in the maximum PNV benchmark.

The two commodity oriented benchmarks, maximum timber and maximum range, have a lower PNV than the PNV benchmark, due to the large investments required to get the last 5-20 percent of output for the maximum. In the case of maximum timber (PNV of $447 million) an increase of seven million dollars in present value from timber, as compared to the maximum PNV benchmark, occurs but the increase in reforestation and TSI costs over the first 50 years is 33 million dollars (18 million in present costs). Other costs such as roads, administration, and support are also higher. In the case of maximum range (PNV of 425 million dollars), an increase of $7 million in present value from range, as compared to the maximum PNV benchmark, occurs at an increased cost of $21 million in non-structural improvements over the first 50 years ($9.4 million in present costs). A more substantial cost is the present value from timber foregone when harvest scheduling is designed to maximize livestock on transitory range ($17 million), as well as the increased costs of timber management resulting from higher reforestation costs and TSI costs.

The benchmark with the lowest PNV is the minimum level (PNV of $175 million). This represents essentially a background value attributable to various recreation, hunting, and fishing uses. The much lower PNV of this benchmark portrays the foregone opportunity to capture the high values in our existing stands of timber.

Most of the explanation of differences in costs is contained in the above paragraphs describing the differences in PNV. All resource benchmarks show costs that decline after the first decade. Road costs and precommercial thinning costs are the items common to all benchmarks that decline after the first decade. More acres are entered in the first decade due to the opportunity to do overstory removals in existing two story stands which leads to higher road costs and precommercial thinning costs that are higher than in managed stands. In the case of the maximum range and maximum recreation benchmarks, additional dollars for structural improvements are also included in the first decade costs Costs in all benchmarks rise between the third and fifth decades. This is largely a result of increased reforestation costs as more acres are planted.

The changes in local jobs and income are mostly a function of the total harvest level and species mix (see Chapter 4 and Section 5). As a result, those benchmarks (PNV, Timber and Range) which have a harvest level higher than today's will have an increase in jobs The effect of species mix is portrayed by comparing the Max Range Benchmark with the Max PNV Benchmark. Although the Max Range Benchmark has a higher timber harvest level, it creates fewer jobs because it harvests substantially less pine volume than does the Max PNV Benchmark.

The Max Recreation and Max Big Game Benchmarks both lose jobs compared to the current situation because they harvest substantially less timber volume. Their loss in timber related jobs is offset to a degree by the increase in service related jobs tied to the increase in recreational visitor days (RVD's).

Although the increase in RVD's offsets the loss in total jobs, it has less of an impact on income because service related jobs are not as valuable as timber generated jobs (see Section 5).

Although the Max Recreation Benchmark harvests substantially less timber than does the Max Big Game Benchmark it loses fewer jobs. This is a result of its harvesting the same amount of pine volume, providing the same amount of big game RVD's and having a substantial increase in SPNM RVD's. This translates into a slight decrease in timber related jobs, no change in service jobs related to big game opportunities and a substantial increase in service jobs related to SPNM opportunities. The net result is less total jobs being lost.

Potential to Resolve Issues and Concerns, and to Capture Management Opportunities

The following paragraphs summarize the ability of the Forest and Grassland to resolve the twelve issues that were identified to guide this planning process.

Timber

The Forest lacks the capability to meet the local demand for timber as indicated by the installed mill capacity. Current levels of timber harvest could be sustained, however, if reforestation and TSI investments were to be increased and some compromise in allocations to other resources were made. If management of other resources were to be reduced to the lowest level while still meeting management requirements, timber outputs could be increased 10-15 percent. The above comments pertain to timber harvest as measured in cubic feet. All analyses show declining harvests as measured in board feet. The maximum timber benchmark shows a board foot harvest in the fifth decade that is five percent lower than the current harvest level and 15 percent lower than in the first decade.

Conflicts with other resources and, to a degree, concerns about economic efficiency will impact timber harvest levels in most alternatives. Provision of old growth, roadless recreation opportunities, visual zones, riparian area management, high quality big game habitat, and snags all result in a reduced harvest level. Economic analyses show that natural regeneration competes economically with planting Natural regeneration results in a somewhat lower harvest level.

Socio-Economic

Results of analyses show the opportunity to make progress on both the major aspects of this issue and concern; i.e., local jobs and economic efficiency. Emphasis on increased timber outputs leads to an increased number of local jobs. Emphasis on economic efficiency could lead to an increase in PNV of 63 million dollars. These two alternative directions are not identical, however, in that attainment of the highest timber output levels and local jobs leads to a lower PNV than the maximum. In general, production of resource outputs that conflict with timber outputs result in a lower number of local jobs and PNV than could otherwise be produced.

Range

Analysis of forage production on the Forest and Grassland shows that significantly higher levels of livestock outputs could be generated if substantial investments were made. Significantly higher levels of funding would have to be available for reconstruction of existing structures as well as for new construction Existing levels of AUM's could be maintained without additional construction but an increase in reconstruction funding is necessary to maintain this level over time. The major conflict

with livestock production is the use and condition of riparian areas. Enhancement of these areas requires some reduction in livestock production.

Riparian Areas

Riparian areas could be enhanced to provide higher quality water and fish habitat and higher levels of recreation use. Standards and guidelines for timber harvest, silviculture, and road management require more costly practices to enhance these zones. Continuation of current livestock practices in riparian areas would prevent improvement of riparian area conditions.

Transportation System

The Forest and Grassland can respond to the various aspects of this issue through the mix of prescriptions utilized in a particular alternative and through the array of alternatives considered. The portion of the issue dealing with road design standards is dealt with by the use of the most cost efficient road construction standards for local roads, and by a network analysis for each alternative which shows the most efficient schedule of investments for the arterial and collector system. Some of the considerations included in this analysis will be the timber volume flowing over the network and the degree of emphasis recreation is receiving in the assigned prescriptions. This results in a shift in traffic service levels. The road access aspect of the issue will also be analyzed through the mix of prescriptions assigned for a particular alternative. Different prescriptions call for different levels of open road density.

Big Game

The Forest and Grassland have the capacity to substantially increase big game numbers over time, resulting in increased numbers of hunters. Allocations resulting in increases will reduce timber harvests. Maintenance of today's levels of big game requires allocations that produce similar amounts of cover as that found in the current land allocations (big game, old growth, roadless areas).

Roadless Recreation

The Forest and Grassland has the ability to meet identified demands for this type of recreation over the next fifty years if allocations are made that maintain the unroaded character in some unroaded areas. If all non-wilderness unroaded areas are allocated to roaded management then first decade demands will not be met. The major conflict is with timber harvest levels.

Scenic Resources

Management designed to retain natural appearing landscapes in visual corridors could be either decreased or increased from today's level. The main conflict is with timber harvest levels.

Old Growth

Allocations of old growth could either be increased or decreased from today's level. The main conflict is with timber harvest levels.

Firewood

The Forest has the ability to produce more firewood through several options. Higher timber harvest levels produce more residue for firewood, salvageable material could be reserved for firewood, thinnings could be designed for firewood; lodgepole pine management could be geared for firewood; firewood use could receive higher priority than pole or chip users; and snag management policies could be altered.

Snag Level

Snag levels, either at today's level, or below or above that level, could be provided on the Forest. The main conflict is with timber harvest levels.

Winter Sports

Opportunities for cross-country skiing could be enhanced with a trail development and maintenance program. Conflicts between skiing and snowmobiling that occur in some specific areas, such as Lookout Mountain, may be resolved by designating separate access routes.

New Issues in FEIS

Anadromous Fish

Anadromous fisheries are a subset of the riparian issue. Due to the relative inaccessibility of these streams, they are generally in good condition.

Historic Trail Preservation

This issue encompasses two factors: the Forest could protect and manage the historic resource as it does other cultural resources, and/or manage the trail as it does other scenic corridors. The major conflict with the latter is with timber harvest levels.

Off-Road Vehicle (ORV) Use

This issue has two facets. On one hand, ORV use could be more restricted on the Forest and Grassland. On the other hand, with an expanded trail system, more acres on the Forest and Grassland could be available for ORV use.

Round Mountain

This issue is similar to other recreation issues, such as roadless areas and big game, where special management is proposed for a specific area. The main conflict is with timber harvest levels.

Ability to Meet RPA Goals

Comparisons with the 1980 RPA outputs distributed to the Forest and Grassland through the Regional Guide are difficult for two reasons. First, RPA timber harvest levels are depicted for a Forest regulated under nondeclining yield in board feet when all of the Ochoco's analyses are based on regulating the Forest in cubic feet. Since conversion ratios change with the diameter of the material harvested and the average diameter harvested changes over time, comparison of first decade board foot harvest levels can be misleading. Second, it is very difficult to interpret some RPA outputs, such as acres of habitat improvement, in terms of outputs useful for resolving an issue (e.g., numbers of elk). Given this situation, the only RPA outputs that it appears the Forest and Grassland will have trouble meeting are the timber outputs.

An annual board foot harvest level (programmed sales offered) of 150 MMBF, as depicted in the Regional Guide, does not appear to be sustainable under any foreseeable circumstance. The maximum timber benchmark harvests 147 MMBF in the first decade, 144 MMBF in the second, and declines to 125 MMBF by the fifth decade. Harvest levels that reflect current land allocations are substantially lower than the maximum timber benchmark. The amount of acres scheduled for reforestation in RPA (1100-1400 acres annually) is not coordinated with the timber harvest levels shown. For example, the maximum timber benchmark reforests between 4900 and 6800 acres annually for the first fifty years.

Need to Alter Management Direction

Several elements of the current situation continue to be areas of conflict. One area of concern is the sustainability of board foot harvests over time. All of

the Ochoco's analyses indicate declining harvests in board feet (see Section 5). Another concern is the selection of silvicultural systems. There is very little emphasis on uneven-aged management under current plans. Another area of concern is the compatibility of cover requirements for big game in the unit plans with current timber harvest levels. Again, analysis indicates incompatibilities at present (Chapter 4). A third area of concern is the compatibility of current AUM output levels with direction for riparian area management in the unit plans. Analysis of output tables in Chapter 4 shows that there is indeed some conflict. Finally, conflict among user groups continues as to the appropriate type of management for Lookout Mountain. It is evident that this issue has not been resolved.

Formulation of Alternatives

(Section 7)

Introduction

Definition of An Alternative

A Forest Plan alternative is a mix of management prescriptions and activity schedules applied in specific locations of the Forest and Grassland in order to achieve the desired management goals and objectives. Alternatives produce a unique mix of goods and services for the public, and different combinations of resource outputs, land uses and environmental effects.

Changes Between the DEIS and FEIS

The major changes discussed in this section are: the dropping of alternatives, the addition of a new alternative; the modification of certain alternatives; and the update of the cost (in terms of PNV and ASQ) of the resource objectives for each alternative.

Required Alternatives

The following were alternatives in the DEIS which were required by regulation and National and Regional direction.

No Action

This is the "No Action" alternative required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14). This alternative would continue the management of the Ochoco National Forest and Crooked River National Grassland as defined by existing direction in approved management plans; continuation of existing policies, standards, and guidelines; current budget updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resource outputs.

Alternative A was the Current Direction Alternative (or the "No-Action" Alternative) in the DEIS.

No Change Alternative

The No Change Alternative, Alternative NC, was developed in response to decisions made regarding appeal number 1588, brought by the Northwest Forest Resources Council on May 19, 1986. The appeal questioned the decision by the Regional Forester to "require inclusion of minimum requirements (MR's) in the No Action Alternative for each Forest Plan." The substance of the appeal was that a "true no action alternative representing current management plans" was not included in the Forest Plan DEIS's. The No Change alternative is designed to represent the existing 1979 Timber Resource Plan and unit plans and, consequently, does not comply with all provisions of NFMA and regulations promulgated to implement NFMA.

Emphasis on Market Opportunities

This alternative has an emphasis on outputs that have an established market price (timber, domestic livestock use, developed recreation opportunities, and minerals). Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs

Alternative H was the alternative in the DEIS which emphasized market opportunities for the Forest and Grassland.

Emphasis on Nonmarket Opportunities

This alternative puts an emphasis on water, fish and wildlife, recreation and other amenity values. Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on amenity values.

Alternative C was the alternative in the DEIS which emphasized nonmarket opportunities

Emphasis on the Current RPA Program

This alternative will determine how the Current (1980) RPA Program distributed to the Forests through the Regional Guide can best be implemented.

Alternatives B and B-Departure were the current RPA Program alternatives in the DEIS.

Emphasis on Nondevelopment and Intensified Management

This alternative retains all currently roadless areas in an unroaded condition while increasing commodity production on those areas already roaded. Its purpose is to analyze the economic effects of not beginning commodity production in roadless areas.

Alternative F was the alternative which best emphasized roadless management and intensified commodity management in the DEIS.

Emphasis on Economic Efficiency

This alternative emphasizes management of outputs with market or assigned values at their most economically efficient levels.

Alternative H-Departure was the alternative which met this emphasis.

The following required alternatives were brought forward into the FEIS.

Alternative A (updated to include MR's).

Alternative NC.

Alternative B, as represented by Alternative B-Modified.

Alternative C, as represented by Alternative C-Modified.

All other required DEIS alternatives were eliminated from further study in the FEIS.

Process Used to Develop Alternatives

Requirements Concerning the Development of Alternatives

Several sources of direction guided the Forest in the development of alternatives. The implementing regulations of the National Forest Management Act (36 CFR 219) prescribe a general process for formulating alternatives, particularly in parts 219.12(e) and (f). Major points from these sections require:

Alternatives shall be distributed between the minimum resource potential and the maximum resource potential to reflect to the extent practicable the full range of major commodity and environmental resource uses and values that could be produced from the forest. Alternatives shall represent a range of resource outputs and expenditure levels.

Alternatives shall be formulated to facilitate analysis of opportunity costs and of resource use and environmental tradeoffs among alternatives and between benchmarks and alternatives.

Alternatives shall be formulated to facilitate evaluation of the effects on present net value, benefits, and costs of achieving various outputs and values that are not assigned monetary values, but are provided at specified levels.

Alternatives shall provide different ways to address and respond to the major public issues, management concerns, and resource opportunities identified during the planning process.

Reasonable alternatives which may require a change in existing law or policy to implement shall be formulated if necessary to address a major public issue, management concern, or resource opportunity identified during the planning process.

Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative.

Each alternative shall state at least-

The condition and uses that will result from the long-term application of the alternative.

The goods and services to be produced, the timing and flow of these resource outputs together with associated costs and benefits.

Resource management standards and guidelines.

The purpose of the management direction proposed.

The regulations also require that alternative development processes follow the NEPA (National Environmental Policy Act) procedures contained in Title 40 CFR 1502.14.

Within the framework given by these legal requirements, the Pacific Northwest Region of the Forest Service issued further direction (1920 11/10/83) on the development of alternatives. In addition to expanding on the need for a broad range of evenly distributed alternatives, this direction required development of alternatives that:

Meet the State of Oregon goals for timber and big game,

Strongly emphasize unpriced amenities,

Strongly emphasize priced commodities,

Closely examine economic efficiency,

Thoroughly evaluate roadless areas, and

Analyze timber volume flows over time that depart from non-declining yield.

Formulating a broad range of reasonable management alternatives for a National Forest is an extensive and complex process. Each alternative is a combination of land uses, Forest management activities, and schedules. Alternatives must consider the resource capabilities (both the limitations and the potentials) of many different areas of the Forest. Each alternative is designed to manage the land to achieve specific goals and objectives. Some of these objectives, such as maintaining air and water quality, are common to all alternatives; other objectives, such as the mix and amount of resource outputs, vary among the alternatives.

By managing the Forest and Grassland lands and resources in different ways, varied objectives can be achieved which respond to different issues and provide different combinations of public benefits. Forest management can vary by what is done, where it is done, and when it is done. These varying combinations of management activities, management areas, and schedules will result in different resource outputs and environmental conditions, thus meeting the unique objectives of the alternatives.

Formulation of Alternatives

The Ochoco National Forest and Crooked River National Grassland used the following steps to formulate alternatives.

Public Issues and Management Concerns

The issues and concerns discussed in Chapter 1 were condensed and grouped from hundreds of comments received by the Forest from local individuals, Forest Service employees, and other governing agencies or councils. National concerns were also included. This process of sorting, screening, and condensing represented the first step in the alternative development process since alternatives attempt to resolve issues and concerns. Appendix A described this process in detail.

Analysis of the Management Situation (AMS)

The analysis conducted during the AMS produced essential information for the development of alternatives. Benchmarks, discussed more fully in Section 6 p.71 to p. 94, and in Chapter 2 were used to:

Define the maximum potentials of the Forest and Grassland to produce various resource output levels and economic benefits,

Evaluate the complementary and conflicting relationships between and among major market and non-market benefits,

Identify the range within which integrated alternatives could be developed (decision space), and

Analyze the implications of continued management under current direction.

Maximum production potentials developed with benchmarks enabled the Forest to compare supply potentials with expected demands. Instances where the demand exceeded the potential, or where the potential greatly exceeded the demand, were noted. These, along with the issues and concerns, provided a focus for later steps in the process.

Information gathered during these steps was assimilated and analyzed to guide the formulation of alternatives. The alternatives reflect a range of future resource management options for the Forest. Each major issue, concern, and opportunity was addressed in one or more of the alternatives. The need to satisfy legal and regulatory mandates was also a factor in the development of the alternatives. Finally, cost efficiency was a consideration throughout the process. The following discussion is a summary of the planning actions involved in the formulation and analysis of the alternatives. The focus will be upon the roles which the ICO's and the benchmarks played in their development.

Development of Alternative Themes and Objectives

The Forest used a process to develop alternative themes and objectives that would help ensure a broad range of reasonably distributed alternatives Based upon the minimum and maximum resource output levels developed in the AMS, the Forest Interdisciplinary (ID) team established a number of output levels for each issue or concern. These outputs roughly corresponded with the "quantified indicators" of issue resolution discussed in Appendix A. In some cases outputs represented production levels, such as volume of timber, and in other cases they represented conditions, such as acres of old growth habitat. The ID team began to create alternative themes and objectives by grouping compatible output levels for each issue or concern. By including each output level for each issue or concern in an alternative, the ID team ensured that a broad range of evenly distributed alternatives was considered.

The Forest next entered a second stage of alternative theme and objective evaluation. The initial set of alternatives was evaluated to make sure that every identified issue or concern was resolved in at least one alternative in an acceptable manner. The competitive and complementary relationships of the ICO's were used as a guide in this process. Alternatives were then evaluated to ensure that they were sufficiently unique to warrant full development. As a result of this review, some preliminary alternatives were consolidated, added, or refined. A previous section in Chapter 2, Alternatives Considered but Eliminated from Detailed Study (DEIS, pp. 17-18), described the preliminary alternatives not fully developed. A detailed description of alternative themes and objectives, alternative development, and how they were derived in response to the Ochoco's ICO's is contained in Ochoco's Planning Records, 1920 9/4/84.

In December 1984, the Forest met with the Regional Forester and his Directors to review the Ochoco AMS and proposed alternatives. The basic set of eight alternative themes and objectives was approved at that time by the Regional Forester with a few relatively minor refinements. The Forest also agreed with the Regional Forester that three of the eight should be evaluated and fully developed with timber harvest schedules that depart from non-declining yield Thus, a set of eleven alternatives was

then approved for full development and analysis.

In the fall of 1989, the Ochoco National Forest issued a supplement to the DEIS. In that supplement a new alternative (NC) was developed and added to the 11 other DEIS alternatives. Formulation of Alternative NC (No Change) was different than the other alternatives. As mentioned previously, it was formulated as a result of an appeal by the Northwest Forest Resource Council. Alternative NC is designed to represent the existing Timber Management Plan and, does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA.

Alternatives Considered But Eliminated From Detailed Study Between the DEIS and FEIS

Analysis and evaluation of public comment resulted in the development of a new alternative (I), the modification of alternatives B and C, the update of alternative A to reflect the No Action benchmark and E-Departure and NC being carried forward as a reference point from the DEIS to the FEIS. Alternatives B, B-Departure, C, D, E, F, G, H, and H-Departure are eliminated from further detailed analysis in this FEIS. These alternatives were adequately addressed in the planning process and displayed in the DEIS and have contributed to the consideration of a reasonable range of alternatives in the development of the Forest and Grassland Plans. Based on a thorough review of the public comments and management concerns, it was determined that these alternatives could be eliminated at this point. The modified alternatives carried forward and the new alternative respond to planning issues considered in the DEIS and offer a reasonable and appropriate range of choice for the decision on the Forest and Grassland Plans.

See Table B-7-1 for alternatives: eliminated in the FEIS, modified, and created.

Model Formulation and Analysis in Relation to ICO's and Cost Efficiency

Alternative development and evaluation is a very complex process during which an enormous amount of information must be considered. Major factors contributing to this complexity include the following.

Potential management activities must be scheduled and evaluated over a long period of time.

TABLE B-7-1

DISPOSITION OF ALTERNATIVES CONSIDERED IN THE FINAL

	ALTERNATIVES															
TREATMENT	A	B	B Dep	B Mod 1/	C	C Mod	D	E	E Dep	F	G	H	H Dep	I Pre 2/	NC	CD BNCH 3/
Detailed Alts in DEIS	X	X	X		X		X	X	X	X	X	X	X		X	X
DEIS Alts Detailed in FEIS									X						X	X
DEIS Alts Eliminated in FEIS	X	X	X		X		X	X		X	X	X	X			
New Alts Detailed in FEIS				X		X								X		

/1 Alternative B-Mod represents evolution and change of Alternative B-plus proposed by timber industry Alternative B-Mod is a new industry alternative It is different than B-Departure in the draft, the latter of which was much the same as Alternative B

/2 Preferred Alternative I

/3 Current Direction Benchmark with National Forest Management Act (NFMA), Alternative A in this FEIS

The entire Forest and Grassland, nearly one million acres that are highly diverse, must be assessed simultaneously.

Potential management activities must be assessed relative to multiple resource criteria.

Scheduled management activities must be cost-efficient.

Cost effectiveness and resolution of the ICO's has driven the entire process from data and information collection through model design, alternative formulation and the iterative analysis process. It was necessary to consider these factors in all stages of the analysis to ensure the formulation of a wide range of reasonably distributed and cost efficient alternatives that responded to the identified issues and concerns.

Many sources of data were used to incorporate the best resource information and cost and dollar value information available into the Ochoco model. Resolution of the ICO's and cost efficiency were met through careful design of the FORPLAN model, use of the model to select and schedule prescriptions for each alternative, use of the model in sequential analyses to help design alternatives and by conducting supplemental analyses.

The following paragraphs describe how model development, alternative formulation, and the analysis performed relate to resolution of the ICO's and cost efficiency. Sections 2, 3, and 5 contain more detailed descriptions of the data collection, model design and analysis performed. See these sections for the changes between the DEIS and FEIS.

The central model in this analysis process is called FORPLAN (FORest PLANning Model). FORPLAN is a computerized linear programming model which allows a great deal of flexibility in formulating a mathematical representation of forest management interactions and activities. The major reason for using FORPLAN is to select the most efficient method of achieving a set of goals and objectives. Tens of thousands of management options can be considered simultaneously by FORPLAN. The Ochoco FORPLAN model is specifically designed by the Forest ID Team to analyze the economic and production trade-offs associated with the issues and concerns described in Chapter 1.

The first key step in the development of the FORPLAN Model was to divide the total Forest and Grassland into analysis areas. Analysis areas are tracts of land with similar characteristics in terms of the costs, outputs, and effects that are being analyzed in the FORPLAN Model. Their boundaries represented the significant physical, biological, and economic differences in the way the land responds to alternative management strategies. And, of course, the delineations focused upon the planning issues and concerns. An example of an analysis area on the Forest is all two-storied ponderosa pine stands, on steep slopes, contained in roadless areas, on the Big Summit Ranger District. The Forest developed analysis areas several times, testing different combinations of land classifications each time, finally leading to use of analysis area data that most efficiently reflected the ICO's and economic factors (see Planning Records, 1920 7/7/83).

In the FORPLAN model, analysis areas were allocated to management strategies in order to achieve the resource management objectives of a particular benchmark analysis or alternative. These strategies are associated with management areas and contain a set of standards and guidelines describing how the resources in that area are to be managed. Management areas are delineated by applying a Management Strategy (Prescription) to a particular piece of land. The Forest ID Team developed a complete set of strategies designed to achieve a wide range of goals and objectives The Forest's issues and concerns guided this process. From six to ten different management strategies were available to each analysis area depending upon its resource production opportunities.

The Forest then developed several maps of potential management areas for each management prescription that could be applied to different portions of the Forest and Grassland. These maps considered resource conditions and capabilities, multi-resource and other-ownership compatibilities, economic efficiency, and non-priced benefits.

Each of these potential management areas was analyzed to develop trade-off information. The Forest's FORPLAN model was used to assist in this process. Relative impacts on PNV, big game numbers, RVD's, and timber outputs were assembled for each potential management area. Using this data and other information presented on the relative benefits of managing one area versus another under a given management prescription, an expanded Forest Management Team assigned priorities to management areas for each alternative. The expanded management team consisted of the Forest Supervisor and Staff Officers, the Forest ID Team, and the District Rangers and their principal staff. Using these priorities and the alternative themes and objectives, final management area maps were developed. See Planning Records, 1920 10/02/85 for a detailed description of this analysis.

Once the management strategies were designed, "modeling prescriptions" were developed to represent different methods of management to achieve the multiple use objectives of each management strategy. These specific modeling prescriptions were developed, tested, and selected based to a large degree upon cost efficiency analysis (see Planning Records, 1920 9/10/84). In FORPLAN these are referred to as combinations of management emphases and intensities. Modeling prescriptions are combinations of scheduled activities and practices, and their associated outputs and effects. The modeling prescriptions and their range of timing choices are represented as decision variables in FORPLAN. In other words, specific options concerning how to manage a particular piece of land over time serve as the basis for choice in the model. The outputs and effects associated with the prescription choices are represented as mathematical coefficients in the respective decision variables. FORPLAN had from one to twenty modeling prescriptions to choose from for each management emphasis for each analysis area. In addition, dozens of different timing patterns and rotation ages were provided for most management emphasis/management intensity combinations on timbered lands.

Cost efficient coefficients used in the model to represent management choices were developed with the aid of various processes and models (including FORPLAN). These specific modeling procedures and scheduling options were evaluated and refined based upon cost efficiency analysis. For example, the Forest elected to manage and model old growth habitat with a dedicated stand system based in part upon economic efficiency considerations (see Planning Records, 1920 6/21/84). Final procedures for modeling dispersion of harvest units were adopted to minimize the impacts on present net value (PNV) while meeting dispersion objectives (see Planning Records, 1920 6/13/85). Scheduling options for management of two-storied stands (the largest timbered stand component on the Forest) were evaluated and refined based upon a cost efficiency analysis (see Planning Records, 1920 9/10/84).

Development of potential timber volume yields from management of existing timber stands required a Forest-wide timber inventory in 1981 to 1982. Yields from future stands were developed by calibrating testing areas using the Ochoco PROGNOSIS Model This per acre analysis was then combined with a Forest-wide prescription scheduling analysis within FORPLAN. As a result of this analysis, additional yield tables were developed with different practices and timing mixes. This iterative process culminated in the Ochoco's Model having a wide range of management intensities to ensure examination of a full range of management opportunities and provided for maximum flexibility to the Ochoco's FORPLAN Model for optimization.

Forage yields were adaptations of Regional averages to Ochoco conditions. Range water developments were analyzed and those which were economically efficient were included in all benchmarks and alternatives. The relationship between timber stand conditions and big game animal energetics was developed and tied to elk cover quality and represented directly in yield tables. Having this relationship directly represented in the Model allows FORPLAN to pick the most cost efficient means of meeting the big game requirements under the various benchmarks and alternatives.

The trade-offs between livestock and recreation uses in riparian areas were also examined in an economic analysis and used accordingly in all benchmarks and alternatives.

Other types of analyses were performed with FORPLAN, both to evaluate different mixes of goals and objectives, and to fully evaluate choices not explicity analyzed within FORPLAN. An analysis in the latter category examined the relative cost efficiencies of different management prescriptions and the timing of initial entry, as applied to individual roadless areas. The Ochoco FORPLAN model was not able to validly analyze these choices with a single model run, so sequential analyses were performed to provide economic efficiency trade-off data (see Planning Records, 1920 10/03/85).

Different mixes of goals and objectives were examined to provide cost efficiency information relative to competition between market and assigned values. The opportunity costs and cost efficiency of economic assumptions, management requirements and timber harvest policies were also examined.

A final analysis concerning the ICO's revolved around a series of feasibility screens applied to the scheduling results of all alternatives. Items considered included: 1) timber volume available in the Burns-Hines timbershed over time, 2) timber species mix, 3) logging systems mix, 4) reforestation methods mix, and 5) ability to meet watershed requirements. Minor adjustments needed to produce implementable alternatives were made, and the alternatives prepared for complete analysis and evaluation. (See Planning Records, 1920 10/O4/85 for a complete discussion of this analysis.)

The processes described above have provided reliable coefficients that were developed with the ICO's and cost efficiency in mind. They result in the Ochoco's FORPLAN model being capable of determining cost efficient prescription assignment and scheduling under the various goals and objectives of all benchmarks and alternatives. This guarantees valid results because these coefficients provide the bases for the model to discriminate between the various management options available.

Cost Efficiency and Scheduling of Management Activities

Having assured that the Ochoco's FORPLAN model design was valid, responsive to the ICO's, and cost efficient, and that management area assignment best fit the goals and objectives of the alternative and/or benchmark, the final step in assuring a cost efficient solution for a particular alternative or benchmark was to schedule management activities over time in a most cost efficient manner. This was accomplished using the Ochoco's FORPLAN Model.

The model was used to analyze the most economically efficient outputs and effects associated with the achievement of the multiple use objectives of an alternative. Which prescriptions FORPLAN selected depended upon the objective function and the set of constraints used to represent a particular benchmark or land management plan alternative. Usually, the objective function was to maximize PNV or the production of timber. These were subject to first satisfying all the specified constraints. The constraints were designed to guarantee the spatial and temporal feasibility of land allocation and harvest scheduling choices in order to achieve multiple use objectives. The following is a list of some of the types of constraints used:

Constraints on timber harvest flow, rotation length, and ending inventory,

Harvest dispersion objectives,

Constraints on the acreages of analysis areas available to certain management strategies,

Rate of timber harvest restrictions in riparian areas and scenic corridors, and

Cover requirements for elk.

Once the model had determined that a feasible solution existed by satisfying all of the constraints, it would then search for the set of prescriptions and timing choices which permitted it to optimize the solution according to the specified objective function.

In the case of those benchmarks and alternatives which used a maximize PNV objective function, this

ensured a cost efficient schedule of management activities. Those alternatives or benchmarks using an objective function other then maximize PNV were then "rolled over." This means that the outputs which were maximized became constraints and the model was run again using a maximize PNV objective function.

Several computerized models and systems were used to facilitate and supplement the use of FORPLAN in the evaluation of an alternative. Operation of the Ochoco FORPLAN model required frequent calculation of acreage data. A computerized grid cell mapping system (R2MAP) was built and used to meet this need and provide other essential information. After obtaining a feasible FORPLAN solution that met the applicable goals and objectives, several additional models were used to help analyze economic implications. These are described in more detail in Sections 3 and 4. An input-output model derived from the IMPLAN system was calibrated to local conditions and used to estimate the effects on local jobs and income by alternative or benchmark. Timber volumes scheduled by analysis area and management prescriptions were distributed onto a road network model (MINCOST) to determine the most cost efficient road investment and maintenance program. The final modeling link in the analysis process used a computerized spreadsheet program to calculate total budget costs, economic values and receipts, efficiency measures, and other intermediate results.

Common Constraints

The FORPLAN model was used to estimate the timber related management activities, economic consequences, and outputs by reflecting the multiple use resource management objectives of each alternative through a given set of constraints. Many of the constraints used to help formulate and characterize the different alternatives were the same across all alternatives. These were necessary in order to meet minimum management requirements, existing laws and policies, or the objectives of prescriptions. There were also constraints which, while serving common purposes across all of the alternatives, varied in the amounts and locations to which they were applied. In addition, there were constraints which were totally unique to a particular alternative.

In the following discussion, those constraints which were applied in common to all alternatives will be presented in terms of their purpose and rationale. The common constraints will be separated into 3 categories: 1) those needed to meet legal and management requirements; 2) those needed to ensure biological feasibility, and 3) those needed to ensure administrative/operational feasibility. The constraints which were more or less unique and those whose amounts and locations vary between the alternatives will be discussed in the next section pertaining to the development of alternatives.

Constraints Needed to Meet Legal, Policy and Management Requirements

Ending Inventory Constraints

Purpose:

The use of this constraint ensures that the total inventory volume left at the conclusion of the harvest scheduling planning horizon (150 years) will equal or exceed the volume that would occur in a regulated forest managed in accordance with the prescriptions selected for regenerated timber.

Rationale:

If this constraint were not used, the FORPLAN model would have no incentive to leave enough inventory at the end of the harvest scheduling horizon to sustain the harvest levels into perpetuity.

Tradeoff:

Since some volume which is available for harvest at the end of the harvest scheduling horizon must be reserved for future decades, timber related outputs and benefits will be reduced.

Link to Long-Term Sustained Yield Constraint

Purpose:

Assures that timber harvest in the last period of the planning horizon is equal to or less than that which can be harvested indefinitely.

Rationale:

This along with the Ending Inventory Constraint ensures that harvest equals or is close to growth in perpetuity.

Tradeoff:

As with the ending inventory constraints this constraint may result in the reduction of timber related outputs and benefits.

No Regeneration Harvest Until Stands Have Reached 95% of Culmination of Mean Annual Increment

Purpose:

Ensures a minimum tree size and full site utilization.

Rationale:

The model could potentially harvest stands before the full utilization of the site and where the average tree diameter is inappropriate.

Tradeoff:

The Ochoco's FORPLAN model characterizes the Ochoco as a deficit forest in which the LRSY level is not binding on the ASQ. As a result, rotation short of culmination has a positive effect on the ASQ level because higher yield managed stands are brought into production earlier. An analysis determined that restricting rotation ages to CMAI results in a maximum decrease of one percent in PNV and a two percent decrease in first decade timber volume.

Model updates described in Section 3 have resulted in the model characterizing the Ochoco as a surplus Forest in which the LRSY land is binding on the ASQ. As a result, rotation short of culmination has little to no effect on ASQ because moving rotation ages forward from their biological potential has a tendency to reduce LRSY which would further impact the ASQ.

Timber Harvest Scheduled Only on Lands Classified as Suitable Through the Stage I Suitability Analysis

Purpose:

Prevent scheduled harvest from lands not meeting Stage I suitability criteria.

Rationale:

It is very likely that FORPLAN would schedule harvest from these lands if given the choice.

Tradeoff·

Because some of these lands contain merchantable timber volume, timber related outputs and benefits will be reduced.

Forty-Acre Unit Size/Logical Leave Unit Dispersion Constraints

Purpose:

This constraint is used so that the resulting FORPLAN harvest scheduling solution is in compliance with the Regulations 36 CFR 219.27(d)(2) which states that even-aged regeneration harvest units do not exceed 40 acres in size and that these openings are separated by logical harvest units.

Rationale

If these constraints were not used, the FORPLAN model could schedule for harvest in one decade large contiguous acreages of stands in order to best meet its objective function. To prevent this, upper limit constraints are placed on the proportion of an area that can be in harvest created openings at one time. The area is specified by combining analysis area and management emphases.

Tradeoffs.

These constraints have the potential to restrict FORPLAN's freedom in the way it schedules the harvesting of timber to meet its objectives. Analysis performed on these constraints during the AMS

indicated that a maximum of 3.4 percent reduction in PNV and no reduction in the ASQ is possible when the ASQ is set using a maximize PNV objective function. When the ASQ is set with a maximize timber objective function some reduction in ASQ is also expected. The cost of these constraints would be offset slightly due to the increase in elk they produce. Application of these constraints also eliminates the need for, or reduces the impact of, various feasibility constraints such as constraints on species mix, slope and condition class.

These constraints are completely overlapped by the watershed dispersion constraints. As a result they will have no impact within an alternative.

Watershed Dispersion Constraints

Purpose:

The upper limit of a watershed in a cutover state is limited to 25 percent to 35 percent depending on the watershed's sensitivity level. These constraints are used so that the resulting FORPLAN harvest scheduling solution is in compliance with the regulations 36 CFR 219.27(a,d&c), (Conservation of Soil and Water Resources).

Rationale:

Without these constraints FORPLAN could schedule more harvest activities in individual watersheds than their sensitivity levels indicate they can absorb.

Trade offs:

These constraints have the potential to restrict FORPLAN's freedom in the way it schedules the harvesting of timber to meet its objectives. Analysis performed on these constraints during the AMS indicated that a maximum of 9 percent reduction in PNV and a 4.3 reduction in the ASQ is possible.

The cost of these constraints would be offset slightly due to the increase in elk they produce. Application of these constraints also eliminates the need for or reduces the impact of various feasibility constraints such as constraints on species mix, slope and condition class.

Harvest Scheduling Constraints and Less Intensive Silvicultural Prescriptions Applied to Riparian Areas

Purpose:

To meet management requirements for riparian areas as stated in Regulations 36 CFR 219.27(e).

Rationale:

General forest scheduling and prescriptions are too intensive to ensure meeting riparian requirements.

Tradeoff:

Analysis conducted for the AMS indicated that a maximum of 1 percent in timber related outputs and benefits would be expected.

Inventory Constraints for Old Growth Dependent Wildlife Species

Purpose:

These constraints are applied to ensure that the wildlife habitat management requirements for pileated woodpeckers, pine martens, etc. are satisfied in accordance with the regulation.

Rationale:

All of these species are dependent upon mature and overmature stands of trees for their habitat. These constraints were designed to maintain at least the MR levels of habitat for these species. If they were not applied, it is very likely that FORPLAN would convert all or most of the mature and overmature suitable habitat to young managed plantations by the fifth decade.

Trade offs:

Timber related outputs and benefits will be reduced because timber harvesting is excluded on 18,000 acres of forested lands. Analysis indicates that the maximum effect would be a reduction of 2.6 percent on ASQ and 3.2 percent on PNV.

For a more detailed discussion of constraints 4 through 8 see section 6 of Appendix B and Appendix F.

Constraints needed to meet Biological Concerns

Limit Amount of Commercial Thinning Allowed on Ponderosa Pine Sapling Stands.

Purpose:

Because of the aggregation of data within the model, not all acres in this condition class are capable of being thinned. The main reasons are due to age and/ or stand condition.

Rationale:

The model could possibly schedule commercial thinning on more acres of this class than is actually feasible.

Trade offs:

These constraints have the potential to restrict FORPLAN's freedom in the way it schedules the harvesting of timber to meet its objectives. Their potential effect on ASQ and PNV is minor.

Limit Amount of Overstory Removal in Mixed Conifer Two-Storied Stands

Purpose·

Not all acres in this condition class are capable of having the understory managed due to the understory's condition, species mix, remaining volume and/or residual fuels.

Rationale:

The model potential could schedule overstory removal on more acres than is feasible.

Trade offs:

These constraints have the potential to restrict FORPLAN's freedom in the way it schedules the harvesting of timber to meet its objectives. Their potential effect on ASQ and PNV is minor.

Limit Amount of Acres that can be Reforested by Planting at Increased Stocking Levels

Purpose:

Planting at increased stocking levels is not feasible on all soil types.

Rationale:

The model could potentially schedule all acres to be planted at increased stocking levels regardless of soil types.

Trade offs:

Under alternatives which manage the timber resource more intensively than is economically efficient, these constraints could result in a minor reduction in ASQ and a slight increase in PNV.

Reforestation with Natural Regeneration Limited in both Pine and Mixed Conifer Stands

Purpose:

Not all areas of the forest are suited to natural regeneration. This is due either to an unacceptable time lag to become satisfactorily stocked and/or potential disease problems.

Rationale:

FORPLAN could schedule more acres than feasible with natural regeneration.

Trade offs:

Potentially, these constraints could have a minor effect on PNV (negative) and ASQ (positive).

Limitation on Acres FORPLAN can Schedule for Range Improvement

Purpose:

Treatment will be allowed only on those acres which are biologically feasible and/or cost efficient.

Rationale:
FORPLAN could potentially schedule treatment on more acres than feasible or cost efficient.

Trade offs:
This limits the amount of forage production which in turn limits the amount of AUM's. This will increase PNV slightly.

Total Effects for all Biological Constraints

An in/out analysis, performed on all the above biological constraints, using the maximum PNV benchmark, indicates a maximum decrease of a tenth of a percent in ASQ and an increase of a tenth of a percent in PNV.

Constraints Needed to Meet Administrative/Operational Concerns

Limit Acres of Two-Story Pine on Slopes (Less than 30 Percent) Able to Receive Overstory Removal and Precommercial Thinning of the Understory

Purpose:
Due to the heavy fuel loading in these natural stands, only a percentage of these stands needing precommercial thinning could feasibly have the resulting slash treated.

Rationale:
The model could potentially schedule more acres of this stand component to receive a precommercial thinning than is feasible.

Trade offs:
Potentially, these constraints could have a minor effect on PNV (negative and ASQ (positive).

Limit Low Site Pine Regeneration Harvest to 20 Percent per Decade

Purpose:
This condition class is comprised of scattered patches around the fringes of the main pine stands. It is not feasible to harvest these as a separate component. Instead they would have to be sold mixed in with other pine sales.

Rationale:
Because these are an independent analysis areas the model could schedule the entire condition class for harvest in a single decade.

Trade offs:
These constraints have the potential to restrict FORPLAN's freedom in the way it schedules the harvesting of timber to meet its objectives. Their potential effect on ASQ and PNV is minor.

Limit Timber Harvest Activities on Slopes Less than 30 Percent

Purpose:
These constraints are applied to ensure FORPLAN scheduled timber harvests are applied to a mix of slope classes. This is necessary to accommodate local logging capabilities and logical sale layout

Rationale:
Without this constraint FORPLAN could schedule an unacceptable mix of slope classes and fluctuation between decades.

Trade offs:
Potentially these constraints could have a minor effect on PNV (negative) and ASQ (positive).

Total Effects of All Administrative/ Operational Constraints

An in/out analysis, performed on all the above administrative/operational constraints, using the Max PNV Benchmark indicates a maximum decrease of a tenth of a percent in PNV and an increase of a tenth of a percent in ASQ.

Development of Alternatives

Introduction

The following discussion pertains to the development of the twelve alternatives displayed in the DEIS, the updated DEIS alternatives brought forward, and the new FEIS alternatives. The focus will be upon describing the purpose of each alternative and identifying the constraints used to characterize them so that their multiple resource management objectives were achieved as efficiently as possible. As previously discussed, the "No Change" Alternative was developed in response to decisions made by the Chief of the Forest Service and Deputy Assistant Secretary Douglas MacCleary regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by the Regional Forester to "require inclusion of (MR's) in the current Direction Alternative for each Forest Plan". The substance of the appeal was that a "true no-action alternative representing current management plan" was not included in Forest Plan EIS's. The No Change Alternative is designed to represent the existing Timber Management Plan and does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA.

Each alternative is a combination of land uses, forest management activities, and resource outputs. As such, alternatives must consider the resource production capabilities (both the high and low limitations) of the many different areas on the Forest and Grassland. Each alternative is designed to manage the land to achieve predetermined goals and objectives. Some of these objectives, such as maintaining clean air and water, are common to all of the alternatives, other objectives, such as providing a certain mix and amount of resource outputs, vary between the alternatives. Several steps were involved in the development and analysis of the alternatives. They can be summarized as follows.

National and Regional direction, the planning Issues, Concerns and Opportunities, and the benchmark analyses were all used to help define a broad range of reasonable management alternatives which needed to be developed.

Within that range, alternatives with different management philosophies, goals and objectives were developed so as to reflect a wide range of choices concerning the best way to manage the Forest in order to maximize net public benefits.

Once the management philosophies, goals and objectives for all of the alternatives were determined, a land use pattern for the Forest was developed to reflect the intent of each alternative.

Other resource management objectives for each alternative were formulated in terms of constraints on activities, resource mixes and output levels, etc. in order to fully characterize the purpose of the alternative.

FORPLAN was then used to analyze the timber and range related outputs and effects for each alternative.

The results from the original FORPLAN runs were examined with regards to how well the predetermined goals and objectives of the alternative were achieved. Biological and administrative/operational concerns were also considered at this time. Depending on how well the alternative met all these considerations, land allocations and/or constraints to protect other resource objectives were adjusted and FORPLAN run again. This process continued until all objectives and concerns for all alternatives were adequately resolved.

The Transportation Network Model, and various customized software packages and electronic spreadsheets were then used to evaluate other outputs and effects associated with each alternative. Based on the results of this analysis, additional FORPLAN runs may or may not have been necessary to finish the alternative.

In the following discussion, the purpose of each alternative, the criteria and assumptions underlying its development, and its accompanying constraints

are presented. The constraints presented are those which were used in the final FORPLAN formulation of the alternative as it appears in the DEIS.

The tradeoffs associated with the individual constraint sets within each alternative are also discussed per the requirements of the May 17th outline for Appendix B, Section 7 Part C, and Section 8 Part D. The requirements of these two sections seemed to duplicate each other, so they were combined into this one section.

"With and without" constraint analysis was performed on the Max PNV Benchmark and a multiple use issue driven alternative (see Planning Records, 1920 11/85). Table B-7-2 summarizes this information and shows the maximum and minimum cost for each constraint type developed with this process. The following paragraph described the "with and without" process.

The opportunity costs associated with the Max PNV Benchmark should represent close to the maximum possible for an individual constraint within the context of any alternative. Development of these "maximum" individual constraint costs was accomplished by applying a few acres to the constraint in question and running the Max PNV Benchmark over. The fewer acres to which the constraints are applied, the less ability the model has to minimize their impact. As a result these costs should represent the maximum in the context of any alternative. Development of the constraint cost was accomplished by comparing the change in PNV between this run and the Max PNV Benchmark and dividing by the number of acres it was applied to. This process was used for all constraint types. The opportunity cost associated with the multiple use issue driven alternative followed the same procedures. In this case, acres were removed from the constraint type and the alternative run again. Because these costs were developed with all constraint types present and applied to large acreage these costs should represent close to the minimum these constraints would cost in the context of any alternative.

TABLE B-7-2
RANGE OF OPPORTUNITY COSTS FOR CONSTRAINTS

	1st Decade ft³/Ac		Dollars/Ac	
	Benchmark (Maximum)	Alternative (Minimum)	Benchmark (Maximum)	Alternative (Minimum)
Visuals				
Retention	361 48	139 99	864 96	148 74
Partial Retention	344 49	133 41	807 79	138 91
Semiprimitive				
Nonmotorized	400 34	295 95	720 64	205 17
Motorized	188 68	141 98	401 92	114 43
Big Game	53 14	45 65	125 42	49 54
Old Growth	362 57	272 84	873 07	248 57
Maintain Riparian	0	0	670 60	670 60
Wilderness	400 34	295 95	720 64	205 17
RNA	400 34	295 95	732 17	218 17
Snags (every 20%)	2 - 2 5% of total value		2 - 2 5% of total value	

"With and without" analysis was not performed for each alternative. The process would have been complex and the cost would have been prohibitive.

Alternative NC

The purpose of the "no change" alternative (Alternative NC) was in response to Appeal 1588, filed May 19, 1986, by the Northwest Forest Resource Council in which they requested that a "true no action alternative representing current management plans be included in Forest Plans and environmental impact statements.

Alternative NC is very similar to the no action alternative (Alternative A) described and analyzed in the Draft Environmental Impact Statement. Both were originally developed without National Forest Management Act (NFMA) requirements. This NC Alternative is based on the Timber Resource Plan which, in turn, is based on land allocations and other management decisions made in the three unit plans: Ochoco-Crooked River (1979), Silvies-Malheur (1978), and South Fork (1978).

Alternative NC differs from Alternative A in this FEIS in that each is based on a different computer model, timber inventory, and yield tables. Also, there are some differences in the way old growth and big game habitat would be managed, resulting in potential differences in environmental effect, and finally Alternative A has incorporated MR's.

Criteria and assumptions underlying the development of this Alternative are:

Unit Plan direction was incorporated if it does not conflict with Timber Resource Plan direction.

It will be based on existing management direction provided by the Timber Resource Plan.

Only NFMA requirements that are part of a current direction as established in the Timber Resource Plan and unit plans are included.

The yield tables used in the 1979 Timber Resource Plan (the basis for Alternative NC) were developed in 1975 for the entire Blue Mountain area without benefit of computer models. One set of yield tables was made for each timber type (Appendix D, Timber Resource Plan, 1979).

The Timber Resource Plan was modeled using Timber RAM (Resource Allocation Method), a linear program that is less sophisticated than the FORPLAN model used to develop the other alternatives. Timber RAM cannot consider economics or other resource constraints as FORPLAN does. All calculations were based on application of shelterwood silvicultural system with planting,, but the option of using other prescriptions was left open (Timber Resource Plan, pp. 15-16).

Alternative NC was based on the 1972 timber inventory. Alternative A (and all other alternatives) were based on the 1982 timber inventory.

The method for determining timber land suitability in Alternative NC was different from the NFMA-mandated methods used for Alternative A (and all other alternatives).

The suitable timber base in Alternative NC was taken from the Timber Resource Plan. Land allocations from the unit plans were deducted from the timber base in the reserved or deferred categories, or included as commercial forest land in one of four categories: standard component, special component, marginal component, or unregulated. The commercial forest land in the Timber Resource Plan (adjusted for the Oregon Wilderness Act) is 535,253 acres.

Alternative A (No Action)

The purpose of the "No Action" Alternative required by NFPA is to portray a description of the outputs and effects that could be expected to occur if the current management direction is continued This alternative was formulated using the four Unit Plans (Ochoco-Crooked River, Silvies-Malheur, South Fork of the John Day, and the Crooked River National Grassland), and the Timber Resource Plan.

It was not specifically designed to address the identified planning Issues, Concerns and Opportunities. The interpretations the Forest made results in an alternative with a blend of resource emphasis. The timber, range, big game, roadless, scenic, riparian, old growth, snag dependent wildlife species and dispersed recreation resources are all managed at levels less than maximum but more than minimum.

Criteria and assumptions underlying the development of this Alternative are:

It will be based on existing land use patterns and management direction provided by the four Unit Plans and the Timber Resource Plan.

Timber harvest is scheduled on a nondeclining yield basis. Current direction is to intensively manage timbered stands to the degree consistent with other resource requirements identified in the Unit Plans. This involves planting harvested units with genetically superior seedlings, planting at increased stocking levels, precommercial thinning to control the spacing of trees, one to three commercial thinnings both to harvest trees early and concentrate growth on the remaining trees, and managing for a rotation age close to the time where average annual growth is highest. This type of management is planned for the majority of the Forest's acres. Other resource requirements for some lands may either prohibit timber harvesting (old growth and roadless recreation management), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas).

Current direction is to make forage available for livestock use at levels that do not cause conflicts with other resources. Livestock numbers will be similar to current levels.

Additional Constraints

In addition to the common constraints described in Section 6, other unique constraints were also used in order to help achieve the objectives of this Alternative. These additional constraints were incorporated into the development of the Alternative for which the results are summarized in Table B-7-3. The purpose, rationale and tradeoffs associated with each of these unique individual constraints, or constraint sets, is discussed below.

Nondeclining Yield Constraints

Purpose:

To ensure that the timber volume harvested in any decade is greater than or equal to the timber volume harvested in the preceding decade. Current management direction is based on nondeclining yield.

Rationale:

Without these constraints, FORPLAN could schedule harvest levels which rise and fall erratically. This would not be consistent with current management plans.

Trade offs:

Since both the Max PNV Benchmark and Alternative A schedule the harvesting of timber under nondeclining flow, the tradeoffs of imposing these constraints on this Alternative are not measurable by comparing the two. However, by imposing the nondeclining flow constraints, the model's flexibility to harvest timber in such a way as to maximize PNV is reduced. Therefore, early decade economic returns and timber output levels are traded off in exchange for stable long term harvest levels. Comparing departure timber harvest schedules within other alternatives indicates that it is possible that relaxing this constraint could result in a maximum increase of 16 percent in the first decade ASQ and a two percent increase in PNV.

Snag Level Constraints

Purpose.

Habitat for cavity dwelling species (snags) is managed to provide for 55 percent of maximum potential populations across the Forest. Current management direction is providing for this level. In order to meet this objective all timber yield tables for timber, range and big game emphases provided snag habitat at the 40 and 60 percent level respectively

Rationale:
Without specifically providing for this level, FORPLAN would select timber yield tables which only provide snag habitat at the MMR level.

Trade offs:
Because these constraints limit the volume of timber that can be harvested on a per acre basis, they reduce both the ASQ and PNV.

Limit the amount of planting at increased stocking levels in any one decade to 75 percent for any working group needing reforestation.

Purpose:
Not only is there a biological limit on the total acres for this practice (see Common Constraints), but an operational limit as well. Because the soil types amenable to this practice are intermixed with other soil types, it is practical to schedule this reforestation method on only a portion of those acres needing reforestation in any one decade.

Rationale:
Because of the intensity of timber management in this alternative, FORPLAN could schedule this practice on all acres needing reforestation in the early decade.

Trade offs:
Since planting at increased stocking results in higher future stand volumes and or earlier rotation ages, these constraints restrict FORPLAN's harvest scheduling flexibility. Analysis indicates that imposition of these constraints has a slightly negative effect on first decade ASQ (less than one percent) and because of the high cost of this activity, a slightly positive effect on PNV (less than one percent).

Use of a maximize timber objective function to set the ASQ

Purpose:
Current management direction is to manage intensively for timber production.

Rationale:
Without the use of this objective function it would not be possible to meet both the current harvest level and other resource objectives.

Trade offs:
Under this objective function, the Model selects more intensive management practices and schedules harvest from more costly and less valuable stands which have higher growth potential than would be selected with the use of a maximize PNV objective function. As a result, first decade ASQ is significantly higher and PNV is significantly lower.

Resource Objective Constraints

Purpose:
These constraints were applied so that the multiple resource land use pattern of the current land management plans would be correctly represented across all of the FORPLAN analysis areas.

Rationale:
Many of the wildlife, recreation, and other resources on the Forest are not represented with output and value coefficients in FORPLAN. In the absence of these constraints, the Model would only have timber and range related values available to it for making land allocation choices. These constraints indicate how many acres of each analysis area are allocated to particular multiple resource management objective. These acreage figures are in addition to those found in the Max PNV Benchmark. FORPLAN then decides which schedule of management activities, and which level of capital investment is the most efficient in order to meet the overall objectives of the Alternative. The breakdown of acres allocated to the various resource objectives for this Alternative is displayed in Table B-7-3.

TABLE B-7-3
RESOURCE OBJECTIVES FOR ALTERNATIVE A

Resource Objective	Acres
Big Game	
Summer & Winter Range	93,930
Old Growth	19,200
Scenic Views	
Retention Foreground	32,172
Partial Retention Foreground	55,312
Semiprimitive Nonmotorized	31,455
Riparian - Acceptable	12,210

Trade offs·
As Table B-7-4 indicates, all resource objectives have a negative impact on both PNV and first decade ASQ. This is a result of these resource objectives limiting the percentage of an emphasis area that can be harvested in a decade, extending rotation ages or limiting the intensity of management. All resource objectives have a significant cost This is a result of large acreage being applied to all these resource objectives.

Alternative B-Modified

The intent of this alternative in the DEIS (Alternative B) was to meet the 1980 RPA timber and range program targets, as identified for the Forest and Grassland in the Regional Guide, with a timber harvest schedule based on nondeclining yield. This alternative was very similar to the max timber benchmark. This alternative focuses heavily on intensive management to produce timber and range products Special provisions were also made to provide enough firewood to meet identified local demand Other resources were managed at minimum levels. Alternative B's basic philosophy of intensive timber management has been modified to emphasize other resource management where compatible with timber Also, for some resources (selected roadless areas, visual corridors, etc), timber volume was given up to provide for these resources.

The criteria and assumptions underlying the development of this Alternative are:

Forage would be made available for livestock use at the current level (75,000 AUM's).

Timber harvest is scheduled on a nondeclining yield basis. Intensive timber management practices would be applied to many of the suitable acres. This involves

TABLE B-7-4
ALTERNATIVE A
OPPORTUNITY COST OF RESOURCE OBJECTIVES 1/

Resource Objective	PNV (M $)	ASQ (1st Decade MMCF)	Discount Benefits (M $)	Discounted Costs (M $)
PNV Benchmark	512	229	754	242
Alternative A	421	193	657	236
Total Cost	-91	-36	-97	-6

	PNV (M $)	ASQ (1st Decade MMCF)
Increased ASQ *	-17 6	+8 5
Visual		
Retention	-7 2	-7 0
Partial Retention	-11 7	-8 0
Semiprimitive Nonmotorized	-9 7	-10 1
Big Game	-7 2	-4 9
Old Growth	-7 2	-5 6
Riparian	-5 8	
Snags	-24 6	-8 9

* Intensity of timber management increased through the use of a maximized timber objective function

1/ Only those resource objectives which have an opportunity cost are portrayed

planting harvested units with genetically superior seedlings, planting at increased stocking levels, precommercial thinning to control the spacing of trees, up to three commercial thinnings both to harvest trees early and concentrate growth on the remaining trees, and managing for a rotation age close to the point in time where average annual growth is highest.

Approximately 120,000 acres of ponderosa pine stands would be managed under an uneven-age management system.

All riparian areas would be managed to achieve and/or maintain an "excellent" classification.

Big game habitat would receive some special management on 171,500 acres of General Forest Winter Range.

Corridors along many of the principal roadways would be managed to retain their scenic values (34,000 acres).

Old growth would receive a low emphasis (18,000 acres).

Habitat for cavity dwelling species (snags) would be managed at the 20 percent of potential populations (MR level).

Portions of Lookout Mountain and Silver Creek would be managed to retain their roadless character. A modified roadless area (Squaw Creek) would also be created.

Special protection would be provided for dispersed recreation sites (Deep Creek, Bandit Springs, Steins Pillar, and Round Mountain recreation trail management areas).

Additional campgrounds would be added and the trail system would be significantly expanded.

Additional Constraints

In addition to the common constraints described in Section 7, other unique constraints were also used in order to help achieve the objectives of this Alternative. These additional constraints were incorporated into the development of the Alternative. The results are summarized in Table B-7-5. The purpose, rationale and trade-offs associated with each of these unique individual constraints, or constraint sets, is discussed below.

Nondeclining Yield Constraint

Purpose·

To ensure that the timber volume harvested in any decade is greater than or equal to the timber volume harvested in the preceding decades to meet the requirements set in CFR 219.16(a).

Rationale:

Without this constraint FORPLAN could schedule harvest levels which rise and fall erratically. This would not meet the intent of the CFR regulations or the objective of the alternative.

Trade offs.

Since both the Max PNV Benchmark and Alternative B schedule the harvesting of timber under nondeclining flow, the tradeoffs of imposing these constraints on this alternative are not measurable by comparing the two. However, in general, by imposing the nondeclining flow constraints, the model's flexibility to harvest timber in such a way as to maximize PNV is reduced. Therefore, early decade economic returns and timber output levels are traded off in exchange for stable long term harvest levels. Comparing departure timber harvest schedules within other alternatives, it is possible that relaxing this constraint could result in a maximum increase of 16 percent in the first decade ASQ and a 2 percent increase in PNV.

Limit the amount of planting at increased stocking levels to 75 percent for any working group needing reforestation in any one decade

Purpose:

Not only is there a biological limit on the total acres for this practice (see Common Constraints), but an operational limit as well. Because the soil types amendable to this practice are intermixed with other soil types, it is practical to schedule this reforestation method on only a portion of those acres needing reforestation in any one decade.

Rationale.

Because of the intensity of timber management in

this alternative, FORPLAN could schedule this practice on all acres needing reforestation in the early decade.

Trade offs
Since planting at increased stocking results in higher future stand volumes and or earlier rotation ages, these constraints restrict FORPLAN's harvest scheduling flexibility. Analysis indicates that imposition of these constraints has a slightly negative effect on first decade ASQ (less than one percent) and because of the high cost of this activity, a slightly positive effect on PNV (less than one percent).

Use of a Maximized Timber Objective Function to set the ASQ

Purpose.
To help meet RPA timber harvest targets.

Rationale:

Without the use of this objective function this alternative could not meet RPA timber targets.

Trade offs:

Under this objective function, the model selects more intensive management practices, and schedules timber harvests from more costly and less valuable stands with higher growth potential, than would be selected with the use of a maximize PNV objective function. As a result, first decade ASQ is significantly higher and PNV is significantly lower.

Constrain 120,000 acres of ponderosa pine to uneven-aged management

Purpose.
To ensure the Forest Plan selects a portion of the ponderosa pine stands for uneven-aged management.

Rationale:
Without it FORPLAN would not select any acres for uneven-age management in this alternative.

Trade offs
This alternative uses a maximum timber objective function to set the ASQ and LRSYC is binding. As a result, forcing the model to select acres for uneven-age management will have a negative effect on ASQ.

Resource Objective Constraints

Purpose·
These constraints were applied so that the multiple resource land use pattern needed to achieve the objectives of this Alternative would be correctly represented across all of the FORPLAN analysis areas.

Rationale
Since many of the wildlife, recreation, and other resources on the Forest are not represented with output and value coefficients in FORPLAN, in the absence of these constraints the Model would only have timber and range related values available to it for making land allocation choices. These acreage figures are in addition to those found in the Max PNV Benchmark. These constraints indicate how many acres of each analysis area should be allocated to particular multiple resource management emphases. FORPLAN then decides which schedule of management activities, and which level of capital investment is the most efficient in order to meet the overall objectives of the Alternative. The breakdown of acres allocated to the various resource objectives for this Alternative are displayed in Table B-7-5.

TABLE B-7-5
RESOURCE OBJECTIVES FOR ALTERNATIVE B-MODIFIED

Resource Objective	Acres
Scenic Views	
Retention Foreground	6,850
Partial Retention Foreground	27,550
Semiprimitive Nonmotorized	10,660
Special I 1/	9,240
Special II 2/	1,830
Special III 3/	3,240

1/ Special I is comprised of management areas that fall into FORPLAN Group IV (see Section 3) and are not visual corridors This includes parts of MA F7, and all of MA-F13, 14, 16, and 27

2/ Special II is comprised of management areas that fall into FORPLAN Group V (see Section 3) and are not visual corridors This includes parts of MA F7 and all of MA F18 and 23

3/ Special III is comprised of management areas that fall into FORPLAN Group III (see Section 3) and are not visual corridors This includes MA F17, 19, and 24

Trade offs:
As Table B-7-6 indicates, all resource objectives have a negative impact on both PNV and first decade ASQ. This is a result of these resource objectives limiting the percentage of an emphasis area that can be harvested in a decade, extending rotation ages or limiting the intensity of management. Both the scenic and SPNM objectives have low costs associated with them because very few acres are involved Riparian conditions, on the other hand, have a high cost because they are applied to the maximum amount of acres.

Alternative C-Modified

The purpose of this alternative is to respond to issues raised during the planning process regarding amenity resources found within the Forest and Grassland. This alternative is very similar to the Max Recreation and Big Game Benchmark.

This alternative will emphasize resources associated with amenity values, such as water, visuals, fish and wildlife, and dispersed recreation. Management for other resources (timber and range) will be at economically and environmentally feasible levels consistent with the emphasis on amenity values. This alternative is similar to Alternative C in the DEIS The major change involves reducing big game cover objectives in order to allow most of the ponderosa pine acres to be managed with uneven-aged silvicultural systems.

TABLE B-7-6
ALTERNATIVE B-MODIFIED
OPPORTUNITY COST OF RESOURCE OBJECTIVES 1/

Resource Objective	PNV (M $)	ASQ (1st Decade MMCF)	Discount Benefits (M $)	Discounted Costs (M $)
PNV Benchmark	512	229	754	242
Alternative B-Modified	455	219	714	262
Total Cost	-57	-10	-40	+20

	PNV (M $)	ASQ (1st Decade MMCF)
Increased ASQ *	-19 7	+13 0
Visual		
Retention	-3 3	-2 1
Partial Retention	-12 8	-7 7
Semiprimitive Nonmotorized	-8 6	-5 3
Special I	-1 8	-3 3
Special II	- 4	- 2
Special III	-1 6	- 9
Uneven-aged	-5 6	-3 5

* Intensity of timber management increased through the use of a maximized timber objective function

1/ Only those resource objectives which have an opportunity cost are portrayed

The criteria and assumptions underlying the development of this alternative are:

Additional campground units would be added to the Delintment Lake, Antelope, and Falls campgrounds.

The trail system on the Forest and Grassland would be significantly expanded. These developments would primarily be in association with Wildernesses and roadless management areas.

Corridors adjacent to all of the principal pathways throughout the Forest and Grassland would be managed to attain or retain pleasing scenery.

The Silver Creek, Cottonwood, Rock Creek, and Lookout Mountain roadless areas would be managed to maintain the present roadless character. Green Mountain would be partially developed to provide a semi-primitive setting with primitive roads for recreational use. Deschutes Canyon would be recommended for Wilderness in this alternative.

Big game receives a special management emphasis on the majority of the Forest and Grassland (679,000 acres). In these areas, road use and thermal cover quantity, quality, and distribution would be controlled to provide high quality big game habitat.

A relatively large amount of land would be specially dedicated to old growth habitat in this alternative (45,000 acres). The Wildernesses and roadless management areas provide an additional 29,000 acres of old growth.

Habitat for cavity dwelling species (snags) would be provided for at high levels, sustaining dependent species at 80 percent of their potential population levels.

Forage would be made available at low levels, approximately 12 percent lower (65,800 AUM's) than currently allowed. Heavy emphasis on improvement of riparian conditions, and timber management designed to maintain dense timber stands for big game cover, account for the diminished level of forage for livestock use.

Timber harvest is scheduled on a nondeclining yield basis. Timber management activities which are most economically efficient would be used while meeting other resource objectives. Resource requirements for this alternative may either prohibit timber harvesting (old growth and roadless recreation management), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas).

Approximately 170,000 acres of ponderosa pine stands would be managed under uneven-aged management systems.

Relatively low volumes of personal use firewood would be available in this alternative due to the diminished rate of timber harvest. Road closures for big game might limit access to firewood.

Management in riparian areas would be directed toward achieving and maintaining excellent streambank stability, stream temperature, and fish habitat within fifteen years. All watersheds on the Forest and Grassland would be managed to meet these goals

Additional Constraints

In addition to the common constraints described in Section 7, other constraints were also used to help achieve the objectives of this Alternative. These additional constraints were incorporated into the development of the Alternative for which the results are summarized in Table B-7-7. The purpose, rationale, and tradeoffs associated with each of these unique individual constraints, or constraint sets, are discussed below.

Nondeclining Yield Constraints

Purpose·

To ensure that the timber volume harvested in any decade is greater than or equal to the timber volume harvested in the preceding decades. To meet the requirements set in CFR 219.16(a).

Rationale:

Without this constraint FORPLAN could schedule harvest levels which rise and fall erratically. This would not meet the intent of the CFR regulations or the objective of the alternative.

Trade offs.

Since both the Max PNV Benchmark and Alterna-

tive C schedule the harvesting of timber under nondeclining flow, the tradeoffs of imposing these constraints on this alternative are not measurable by comparing the two. However, in general, by imposing the nondeclining flow constraints, the model's flexibility to harvest timber in such a way as to maximize PNV is reduced. Therefore, early decade economic returns and timber output levels are traded off in exchange for stable long term harvest levels. Comparing departure timber harvest schedules within other alternatives, it is possible that relaxing this constraint could result in a maximum increase of 16 percent in the first decade ASQ and a two percent increase in PNV.

Snag Level Constraints

Purpose:

Habitat for cavity dwelling species (snags) is managed to provide for 80 percent of the maximum potential populations across the Forest. One of the main objectives of this alternative is high population levels of cavity nesters. In order to meet this objective, management emphases which do not automatically provide the 100 percent level were provided with timber yield tables which provide for the 60 percent level.

Rationale:

Without specifically providing for this level, FORPLAN would select timber yield tables which only provide snag habitat at the MMR level.

Tradeoff:

Because these constraints limit the volume of timber that can be harvested on a per acre basis, they reduce both the ASQ and PNV.

Resource Objective Constraints

Purpose:

These constraints were applied so that the multiple resource land use pattern needed to achieve the objectives of this Alternative would be correctly represented across all of the FORPLAN analysis areas.

Rationale:

Since many of the wildlife, recreation, and other resources on the Forest are not represented with output and value coefficients in FORPLAN, in the absence of these constraints the Model would only have timber and range related values available to it for making land allocation choices. These constraints indicate how many acres of each analysis area should be allocated to particular multiple resource management emphases. These acreage figures are in addition to those found in the Max PNV Benchmark. FORPLAN then decides which schedule of management activities, and which level of capital investment is the most efficient in order to meet the overall objectives of the Alternative. The breakdown of acres allocated to the various resource objectives for this Alternative is displayed in Table B-7-7.

Trade offs:

As Table B-7-8 indicates, all resource objectives have a negative impact on both PNV and first decade ASQ. This is because these resource objectives limit the percentage of an emphasis area that can be harvested in a decade, extend rotation ages or limit the intensity of management. These resource objectives have the highest total cost in terms of PNV and first decade ASQ of all the alternatives. This is a result of the high acreage to which all the objectives are applied.

TABLE B-7-7
RESOURCE OBJECTIVES FOR ALTERNATIVE C-MODIFIED

Resource Objective	Acres
Big Game	
Summer & Winter Range	686,925
Old Growth	27,260
Scenic Views	
Retention Foreground	67,756
Partial Retention Foreground	38,961
Semiprimitive Nonmotorized &	
Addition to Wilderness	43,960
Semiprimitive Motorized	7,000
Research Natural Areas	2,620
Uneven-aged Management	170,000

TABLE B-7-8
ALTERNATIVE C-MODIFIED
OPPORTUNITY COST OF RESOURCE OBJECTIVES 1/

Resource Objective	PNV (M $)	ASQ (1st Decade MMCF)	Discount Benefits (M $)	Discounted Costs (M $)
PNV Benchmark	512	229	754	242
Alternative C-Modified	395	156	608	213
Total Cost	-117	-73	-146	-29

	PNV (M $)	ASQ (1st Decade MMCF)
Visual		
Retention	-19 3	-12 2
Partial Retention	-10 3	-6 7
Semiprimitive Nonmotorized & Additions to wilderness	-18 7	-18 0
Semiprimitive Motorized	-1 6	-1 4
Big Game	-33 2	-20.0
Old Growth	-13 0	-9 8
Research Natural Areas	-1 1	- 9
Snags	-13 3	-4 0
Uneven-aged	-6 5	0

1/ Only those resource objectives which have an opportunity cost are portrayed

Alternative I

The purpose of this alternative is to respond to ICO's raised since the issuance of the DEIS.

This alternative emphasizes a combination of roadless recreation, big game habitat, timber production, dispersed recreation opportunity, and uneven-aged management. A blend of resource uses provides for a high quality of life and contributes to local job stability. Almost all resources are managed at moderate levels.

The criteria and assumptions underlying the development of this alternative are:

The trail system on the Forest and Grassland would be greatly expanded. Foot and horse developments would mostly be in association with Wildernesses and roadless management areas.

A moderate number of travel corridors would be managed for scenery. These include major roads and access roads to roadless management areas.

Portions of the Rock Creek and Cottonwood Creek areas would be managed for unroaded recreation. Green Mountain would be managed under General Forest and General Forest Winter Range. The Silver Creek roadless area would be managed to retain the present roadless character. The Broadway area would be managed for General Forest. Lookout Mountain will remain roadless for the first decade. The lower portion of the Management Area would be managed for the enhancement of forest health, scenery, wildlife and recreation from the second through the fifth decades, leaving a 7,550 acre area unroaded.

A portion of the Deschutes River Canyon-Steelhead Falls Wilderness Study Area and an additional area outside the WSA Squaw Creek are combined to form a 7,840 acre management area emphasizing semiprimitive, nonmotorized recreational opportunities and wildlife habitat management.

Big game receives a special management emphasis on 230,500 acres of the Forest and Grassland. Most of this represents high priority winter range.

In these areas road use and cover quantity, quality, and distribution would be controlled to provide high quality big game habitat.

A small amount of land would be specially dedicated to old growth habitat in this alternative (19,990 acres).

Habitat for cavity dwelling species (snags) would be managed at fairly high levels, sustaining dependent species at 55 percent of their potential population levels.

Special management is proposed for dispersed recreation sites, Deep Creek, Bandit Springs, Stein's Pillar, Historic trail, and Round Mountain recreation trail.

Several areas would be proposed as new RNA's with this alternative. The Island, Stinger Creek, Silver Creek, and Dry Mountain, and a portion of Haystack Butte all fulfill research needs and would be managed in accordance with research priorities. The existing Ochoco Divide RNA would continue to be managed as such.

Forage would be made available for use at the current situation level (75,000 AUM's)

Timber harvest is scheduled on a nondeclining yield basis. Timber management activities which are most economically efficient would be used while meeting other resource objectives. Resource requirements for this alternative may either prohibit timber harvesting (old growth), lengthen rotations (riparian areas, scenic corridors, and ponderosa pine stands), or alter thinning practices (big game emphasis areas).

Approximately 100,000 acres of ponderosa pine stands would be managed under uneven-aged management strategies.

Relatively low volumes of personal use firewood would be available in this alternative, due to a lower rate of timber harvest than currently practiced.

Management in all riparian areas would be directed toward achieving and maintaining excellent streambank stability, stream temperature, and fish habitat within fifteen years

Additional Constraints

In addition to the common constraints described in Section 7, other unique constraints were also used to help achieve the objectives of this Alternative. These additional constraints were incorporated into the development of the Alternative for which the results are summarized in Table B-7-9. The purpose, rationale, and tradeoffs associated with each of these unique individual constraints, or constraint sets, is discussed below.

Nondeclining Yield Constraint

Purpose:

To ensure that the timber volume harvested in any decade is greater than or equal to the timber volume harvested in the preceding decades. To meet the requirements set in CFR 219.16(a).

Rationale:

Without this constraint FORPLAN could schedule harvest levels which rise and fall erratically. This would not meet the intent of the CFR regulations or the objective of the alternative.

Trade-off:

Since both the Max PNV Benchmark and Alternative E schedule the harvesting of timber under nondeclining flow, the tradeoffs of imposing these constraints on this Alternative are not measurable by comparing the two. However, in general, by imposing the nondeclining flow constraints, the model's flexibility to harvest timber in such a way as to maximize PNV is reduced. Therefore, early decade economic returns and timber output levels are traded off in exchange for stable long term harvest levels. Comparing departure timber harvest schedules within other alternatives, it is possible that relaxing this constraint could result in a maximum increase of 16 percent in ASQ and a two percent increase in PNV in the first decade.

Snag Level Constraints

Purpose:

Habitat for cavity dwelling species (snags) is managed to provide for 55 percent of maximum potential populations across the Forest. A moderate population level of cavity nesters reflects the objectives of this alternative. In order to meet this objective the timber/range management emphasis pro-

vides snags at the 40 percent level and the big game management emphasis provides snags at the 60 percent level.

Rationale
Without specifically providing for this level, FORPLAN could chose timber yield tables with snag habitat provided at the MMR level.

Trade offs.
Because these constraints limit the volume of timber that can be harvested on a per acre basis, they reduce both the ASQ and PNV.

Harvest Flow Constraints (Districts 1 and 2)

Purpose:
To ensure that the harvest schedule did not fluctuate dramatically in the early decades.

Rationale.
These constraints were applied because the FORPLAN scheduled harvest levels which fluctuated drastically in the early decades.

Trade offs
These constraints could limit the model's flexibility, thus reducing PNV and/or ASQ. In the context of Alternative I they have a minor effect on PNV and no effect on ASQ.

Upper Limit on Ponderosa Pine Working Group Volume

Purpose:
To ensure that ponderosa pine volume remains fairly stable in the early decades.

Rationale·
Without this constraint FORPLAN would schedule more ponderosa pine in the first decade and less in the second. The pine volume decrease between the first and second decade did not meet the intent of the Alternative.

Trade offs:
These constraints could limit the model's flexibility, thus reducing PNV and/or ASQ. This constraint had a slightly negative effect on PNV and no effect on ASQ

Upper Limit on the amount of Uneven-aged Management per Decade

Purpose.
Limit the fluctuation of acres treated and species volume harvested per decade.

Rationale:
Without this constraint the model started the uneven-aged cycle on all 100,000 acres in the first decade. This resulted in widely fluctuating acres treated and species volume between decades.

Trade offs:
These constraints could limit the model's flexibility, thus reducing PNV and/or ASQ. This constraint has a slightly negative affect on PNV and no effect on ASQ.

Resource Objective Constraints

Purpose
These constraints were applied so that the multiple resource land use pattern needed to achieve the objectives of this Alternative would be correctly represented across all of the FORPLAN analysis areas.

TABLE B-7-9
RESOURCE OBJECTIVES FOR ALTERNATIVE I

Resource Objective	Acres
Big Game	230,500
Old Growth	1,250
Scenic Views	
Retention Foreground	9,300
Partial Retention Foreground	23,960
Semiprimitive Nonmotorized	30,590
Special I 1/	18,800
Special II 2/	8,000
Special III 3/	3,240
Research Natural Areas	2,365

1/ Special I is comprised of management areas that fall into FORPLAN Group IV (see Section 3) and are not visual corridors This includes parts of MA-F7, and all of MA-F13, 14, 16, and 27

2/ Special II is comprised of management areas that fall into FORPLAN Group V (see Section 3) and are not visual corridors This includes parts of MA F7 and all of MA F18 and 23

3/ Special III is comprised of management areas that fall into FORPLAN Group III (see Section 3) and are not visual corridors This includes MA-F17, 19, and 24

Rationale.
Since many of the wildlife, recreation, and other resources on the Forest are not represented with output and value coefficients in FORPLAN, in the absence of these constraints the Model would only have timber and range related values available to it for making land allocation choices. These constraints indicate how many acres of each analysis area should be allocated to particular multiple resource management emphases. These acreage figures are in addition to those found in the Max PNV Benchmark. FORPLAN then decides which schedule of management activities and which level of capital investment is the most efficient in order to meet the overall objectives of the Alternative. The breakdown of acres allocated to the various resource objectives for this Alternative is displayed in Table B-7-9.

Trade offs:
As Table B-7-10 indicates, all resource objectives have a negative impact on both PNV and first decade ASQ. This is a result of these resource objectives limiting the percentages of an emphases area that can be harvested in a decade, extend rotation ages or limit the intensity of management. Most resource objectives are applied to a moderate amount of acres. This results in a moderate cost which is split fairly evenly amongst the resources.

Alternative E-Departure

The purpose of this alternative is to address both amenity and commodity values. Short term community stability is also heavily emphasized. This alternative has not been modified between the DEIS and FEIS.

TABLE B-7-10
ALTERNATIVE I
OPPORTUNITY COST OF RESOURCE OBJECTIVES 1/

Resource Objective	PNV (M $)	ASQ (1st Decade MMCF)	Discount Benefits (M $)	Discounted Costs (M $)
PNV Benchmark	512	229	754	242
Alternative B-Modified	475	190	701	227
Total Cost	-37	-39	-53	-15

	PNV (M $)	ASQ (1st Decade MMCF)
Visual		
Retention	-2 5	-2 4
Partial Retention	-5 3	-5 5
Semiprimitive Nonmotorized	-6 2	-10 8
Special I	-4 9	-4 8
Special II	-2 1	- 5
Special III	- 8	- 6
Big Game	-6 2	-6 0
Old Growth	- 8	- 6
Research Natural Areas	- 8	-1 2
Snags	-3 7	-3 3
18" Pine	-3 7	-3 3

* Intensity of timber management increased through the use of a maximized timber objective function

1/ Only those resource objectives which have an opportunity cost are portrayed

This alternative emphasizes a combination of timber production, roadless recreation, and big game habitat. Timber is scheduled as a departure from nondeclining yield. Timber volumes are scheduled so that first decade harvests remain close to current harvest levels, and then decline gradually over the next 50 years. A blend of resource uses is attempted that both maintains local jobs in the short term, and provides for a high quality of life. Almost all resources are managed at moderate levels.

The criteria and assumptions underlying the development of this alternative are:

The trail system on the Forest and Grassland would be greatly expanded. These developments would be in association with Wildernesses and roadless management areas. Additional campground units would be added to the Delintment Lake, Antelope and Falls campground.

A moderate number of travel corridors would managed for scenery (46,160 acres). This would apply to major roads, access roads to roadless management areas, and a recreation travel corridor on the Big Summit District.

The Rock Creek, Cottonwood, and Silver Creek roadless areas would be managed to retain the present roadless character. The Broadway area would be managed under a big game emphasis. Green Mountain and the top of Lookout Mountain would be partially developed to provide a semiprimitive setting with primitive roads for recreational use.

Big game would receive a special management emphasis on 226,400 acres of the Forest and Grassland. Most of this represents high priority winter range. In these areas road use and thermal cover quantity, quality, and distribution would be controlled to provide high quality big game habitat.

A fairly small amount of land would be specially dedicated to old growth habitat in this alternative (26,300 acres). The Wildernesses and roadless management areas provide an additional 21,000 acres of old growth.

Habitat for cavity dwelling species (snags) would be managed at fairly high levels, sustaining dependent species at 55 percent of their potential population levels.

Several areas would be proposed as new RNA's with this alternative. The Island, Stinger Creek, Silver Creek, and Dry Mountain, and a portion of Haystack Butte all fulfill research needs and would be managed in accordance with research priorities. The existing Ochoco Divide RNA would continue to be managed as such.

Forage would be made available for use at levels approximately five percent higher (79,000 AUM's) than currently allowed.

Timber harvest is scheduled as a departure from the nondeclining yield harvest levels set in Alternative E. The objective is to maintain current harvest levels for one decade (130 million board feet annually), and then gradually decline over the following 40 years to a sustainable level. Timber management activities which are most economically efficient would be used while meeting other resource objectives. Resource requirements for this alternative may either prohibit timber harvesting (old growth and roadless areas), lengthen rotations (riparian areas and scenic corridors), or alter thinning practices (big game emphasis areas).

Moderate volumes of personal use firewood would be available in this alternative due to the increased rate of timber harvest in the first decade (13,000 cords). Future firewood availability would decline significantly.

Management in many riparian areas would be directed toward achieving and maintaining excellent streambank stability, stream temperature, and fish habitat within fifteen years. Watersheds on the Forest and Grassland which contain anadromous fish, and high-valued resident trout will be managed to meet these goals.

Additional Constraints

In addition to the common constraints described earlier in this section, other constraints were also used to help achieve the objectives of this alterna-

tive. These additional constraints were incorporated into the development of the alternative for which the results are summarized in Table B-7-11. The purpose, rationale, and tradeoffs associated with each of these unique individual constraints, or constraint sets, is discussed below.

Scheduled Output Constraint

Purpose:
First decade harvest level is constrained at the current level (132 MMBF). The objective of this Alternative is to provide high levels of amenity resources and maintain local jobs in the short term. Because most job increases and decreases are tied to timber harvest levels, maintaining current timber harvest levels will maintain the current level of forest related jobs.

Rationale:
Because of resource objectives besides the ASQ, it was impossible to meet current harvest levels without specifically constraining the Model to provide this level.

Trade offs:
By allowing the ASQ to depart from nondeclining yield both the first decade ASQ and PNV increase significantly.

Harvest Flow Constraints

Purpose.
Because the first decade harvest level was not sustainable, it was necessary to allow the model to schedule declining volumes in latter decades. The model was allowed to schedule up to a ten percent decrease in volume between decades one and two and again between decades two and three. Between decades three and four and four and five volume was allowed to decrease five percent. From the fifth decade on the harvest flow was controlled by nondeclining yield.

Rationale:
The rationale behind these flow constraints was to have a timber harvest level which declines as gradually as possible to minimize the negative impact on dependent communities, yet ensures a feasible solution.

Trade offs:
These constraints limit the rate which the ASQ can decline between decades. As a result they limit the potential increase in first decade ASQ and PNV that could have been obtained under a departure timber harvest schedule.

Snag Level Constraints

Purpose:
Habitat for cavity dwelling species (snags) is managed to provide for 55 percent of maximum potential populations across the Forest. A moderate population level of cavity nesters reflects the objectives of this alternative. In order to meet this objective the timber/range and big game management emphasis provide snags at the 40 percent and 60 percent level respectively.

Rationale:
Without specifically providing for this level, FORPLAN could choose timber yield tables which only provide snag habitat at the MMR level.

Tradeoff:
Because these constraints limit the volume of timber that can be harvested on a per acre basis, they reduce both the ASQ and PNV.

Resource Objective Constraints

Purpose:
These constraints were applied so that the multiple resource land use pattern needed to achieve the objectives of this Alternative would be correctly represented across all of the FORPLAN analysis areas.

Rationale:
Since many of the wildlife, recreation, and other resources on the Forest are not represented with output and value coefficients in FORPLAN, in the absence of these constraints the Model would only have timber and range related values available to it for making land allocation choices. These acreage figures are in addition to those found in the Max PNV Benchmark. These constraints indicate how many acres of each analysis area should be allocated to particular multiple resource management emphases. FORPLAN then decides which schedule of management activities, and which level of capital investment is the most efficient in order to meet the

TABLE B-7-11
RESOURCE OBJECTIVES FOR ALTERNATIVE E-DEPARTURE

Resource Objective	Acres
Big Game	
Summer & Winter Range	226,400
Old Growth	8,570
Scenic Views	
Retention Foreground	13,730
Partial Retention Foreground	28,690
Semiprimitive Nonmotorized	27,315
Semiprimitive Motorized	7,000
Riparian - Acceptable	7,630
Research Natural Areas	2,570

overall objectives of the Alternative. The breakdown of acres allocated to the various resource objectives for this Alternative is displayed in Table B-7-11.

Trade offs:
As Table B-7-12 indicates, all resource objectives have a negative impact on both PNV and first decade ASQ. This is a result of these resource objectives limiting the percentages of an emphasis area that can be harvested in a decade, extending rotation ages or limiting the intensity of management. Alternative E-Departure's resource objectives result in a moderate cost, spread fairly evenly among resources.

TABLE B-7-12
ALTERNATIVE E-DEPARTURE
OPPORTUNITY COST OF RESOURCE OBJECTIVES 1/

Resource Objective	PNV (M $)	ASQ (1st Decade MMCF)	Discount Benefits (M $)	Discounted Costs (M $)
PNV Benchmark	512	229	754	242
Alternative E-Departure	471	206	693	236
Total Cost	-41	-23	-61	-21

	PNV (M $)	ASQ (1st Decade MMCF)
Relaxed timber flow (maintain current harvest level)	+6 0	+24 0
Visual		
Retention	+6 0	+24 0
Partial Retention	-3 5	-5 7
Semiprimitive Nonmotorized & Additions to wilderness	-6 4	-10 2
Semiprimitive Motorized	- 7	-1 1
Big Game	-8 7	-14 0
Old Growth	-1 9	-3 0
Riparian - Maintain	-14 7	
Research Natural Areas	- 7	-1 1
Snags	-8 7	-9 3

* Departure from nondeclining yield timber harvest schedule

1/ Only those resource objectives which have an opportunity cost are portrayed

Effects of Benchmarks, Constraints, and Alternatives

(Section 8)

Introduction

This section provides a detailed discussion of the outputs and effects of the Alternatives. The focus is upon the tradeoffs between the Alternatives as they provide different levels and mixes of goods and services, and as they address the planning Issues, Concerns and Opportunities (ICO's) in different ways. The purpose of presenting a discussion pertaining to the outputs and effects of each alternative, the consequences of the constraints used to help formulate them, and their relationship to the benchmarks, is to facilitate the identification of the alternative which comes closest to maximizing net public benefits. In order to accomplish this objective, there needs to be an understanding of the abilities of the Forest to produce different goods and services in response to the ICO's, and the tradeoffs involved with the decisions to produce one mix of outputs as opposed to another. As such, this comparative analysis provides the basis for selecting a proposed action, which is Step 8 of the planning process.

Process of Evaluating Significant Constraints

The multiple resource management objectives associated with a particular benchmark or land management alternative were represented in FORPLAN as a combination of constraints, and an objective function. The final objective function used in the development of an alternative or benchmark was to maximize Present Net Value. This objective function guided the FORPLAN model in the selection of the most economically efficient combination of prescriptions, activity scheduling choices, and resource output levels which satisfied the multiple resource management objectives of a particular benchmark or alternative.

However, the maximization of Present Net Value was subject to first satisfying all of the constraints which were used to represent the other resource management objectives not provided for by the economic efficiency objective function The imposition of the constraints often, but not always, reduced the PNV for a particular alternative. The PNV given up in response to achieving the objectives of a constraint is referred to as the "opportunity cost". In order to isolate the opportunity cost associated with a particular constraint, or set of constraints, the resulting solutions of FORPLAN runs made with and without the constraints included in them were examined for their differences in PNV (and other outputs and effects of interest). As long as the only difference between the runs being compared was the addition of the constraints, the reduction in PNV represented the opportunity cost (at the margin) of achieving the constraint's objective.

During the Benchmark Analyses, constraint sets which were needed in order to achieve the various multiple resource management objectives were developed and evaluated. For example, all of the different constraints which were proposed in order to achieve the MR's were evaluated both individually and collectively, to determine the magnitude of their tradeoffs and to assess the relative efficiency of alternative constraint sets designed to achieve common objectives. If one set of constraints achieved

a particular objective with less impact on the PNV than an alternative set of constraints designed to accomplish the same purpose, it was considered more efficient and was used throughout the remainder of the process of developing and analyzing alternatives. Sometimes, alternative approaches to formulating constraints to meet a common objective were not available. In these cases, the analysis was performed solely to determine the opportunity costs associated with the constraints.

Discretionary constraints (those not legally required) were also examined in order to assess the magnitude of their opportunity costs. These constraints were often used in conjunction with special prescriptions in order to produce the desired multiple habitat management objectives (i.e., scenic quality, wildlife habitat, recreation settings, etc.) of an alternative. Land allocation constraints necessary to meet resource objectives were fully analyzed in order to assess their opportunity costs. The policy constraints associated with nondeclining flow and rotations based on CMAI were also evaluated in the context of their effects on PNV and timber output levels. Finally, sensitivity analyses were performed in order to provide information regarding the consequences involved in making assumptions about timber management costs, and future stumpage values (i.e., price trends).

The results of these analyses are provided in the "Summary of the Analysis of the Management Situation" planning document, other planning documents, Appendix E, and in Section 6 and 8 of this Appendix. Since they are discussed in detail in these documents, they will not be repeated here.

The opportunity costs associated with the individual constraints in each alternative were not evaluated individually due to the prohibitive costs of performing this type of analysis. However, many of the constraints used to formulate the alternatives were examined in the Benchmarks, land allocation process and iterative alternative development process so their approximate trade-offs can be determined from that analysis. Also, constraints with potential significant opportunity costs, were analyzed using an in/out procedure on a representative sample of Benchmarks and/or Alternatives. Finally, by comparing the alternatives in their final forms, the economic tradeoffs of their different collective multiple resource management objectives was assessed. These efficiency tradeoffs were then compared to the environmental and socio-economic consequences in order to help identify the alternative, or alternatives, which came closest to maximizing net public benefits.

Analysis of Tradeoffs Among Alternatives

In this section, the tradeoffs between the alternatives are discussed. The focus will be upon the resolution of ICO's, resource outputs, environmental consequences, economic and social effects, and the overall tradeoffs incurred in attempting to address the ICO's.

Response to Major ICO's

Except for Alternative A and NC, which are designed to portray the outputs and effects associated with continuing on with current management direction, the alternatives were specifically tailored to reflect different ways of addressing the planning issues, concerns, and opportunities. The following discussion highlights some of the variation in the way the major issues were treated between them. Table B-8-1 tabularly summarizes the differences for all issues. For a more complete description of the ICO's and the role they played in the forest planning process, refer to Appendix A, Chapter 2 of the FEIS and the following portions of this Appendix which present the detailed outputs and effects of the alternatives with regards to their responses to the ICO's.

The factors relating to the timber issues key around how much and what kind of timber will be sold on an annual basis This was addressed in the alternatives by varying how much of the Forest was available for timber production, by varying the objective function

which influences the intensity of timber management by extending rotation ages in pine stands, by applying varying amounts of uneven-aged management with different diameter targets, and by exploring departure timber schedules in order to achieve higher wood outputs than could be produced under nondeclining flow. The resulting wood outputs were expressed in terms of average annual millions of cubic feet, and average annual millions of board feet. These outputs were also estimated for the three timber working groups: 1) ponderosa pine, 2) ponderosa pine low site, and 3) mixed conifer.

The factors relating to the wildlife issues key around what the population levels should be for certain key species such as mule deer, elk, trout, pileated woodpecker, and other cavity dwellers. The issues were treated by applying prescriptions to appropriate areas of the Forest in order to provide habitat which could support more or less numbers than currently exist. While population numbers were estimated for deer, trout, and elk, numbers of pairs or percent of potential populations were estimated for the other species.

The recreation issue centered around providing an opportunity for roadless recreation. Dispersed recreation was also a consideration. The alternatives varied in the amount of unroaded recreation opportunities which they offered over the long term. The output levels were expressed in terms of millions of recreation visitor days per year and acres.

New recreational issues that surfaced since the DEIS revolved around ORV use and the Round Mountain area. The ORV issue is dealt with in the FEIS by restricting use and/or developing a trail system for their use. The Round Mountain issue is measured by the number of acres protected.

Related to the recreation issues are concerns about scenic quality. This issue was addressed in the alternatives by applying prescriptions which provide for scenic quality to different areas of the Forest. The new historic trail is addressed in a similar manner. The extent to which scenic quality was provided for in each alternative was measured by the number of acres where scenic quality objectives were met in sensitive travel corridors.

The availability of personal use firewood is a key local issue. A range of options from making no special provisions for personal use firewood to fully meeting the demands for it was explored in the alternatives. The amount provided was expressed in terms of thousands of cords per year.

The factors relating to livestock grazing key around how much grazing should be allowed and how intensive management should be. The livestock use by alternative is a function of economic efficiency and the need to regulate use to meet other resource objectives.

The major factor relating to riparian areas is how they should be managed to produce the various resources they are capable of providing. The new anadromous fisheries issue is a subset of the riparian issue. All alternatives manage for excellent riparian condition where anadromous fisheries are involved. Concern is high because riparian conditions represent only a small portion of the total land base (two percent) but offer the greatest potential to meet multiple resource objectives of the Forest. Because of this, use has been concentrated, conflicts have merged and the riparian environment has been degraded. In all alternatives the present condition in these riparian areas will be maintained or improved if degraded. The extent to which the riparian issue varies by alternative is measured by the number of acres where conditions are managed to ensure meeting a condition classification of "excellent."

The broad social and economic issue contains several factors. First, local communities are highly dependent on forest related jobs and income, and payments to Counties in lieu of taxes. As a result, economics is the major facet in measuring the effect an alternative has on social-economic makeup of affected communities. At the same time, people expect the Forest to provide jobs and protect the economic well being of the communities. They also expect and desire recreational opportunities such as hunting and fishing. The consequences of the alternatives with respect to this issue were estimated by examining a variety of outputs and effects. They are: jobs, income, payment to Counties, PNV, recreation opportunities, firewood and scenic quality.

Resource Outputs, Effects, and Environmental Consequences

The implementation of any one of the alternatives will result in the production of certain outputs and effects and their associated environmental consequences. Some of the consequences are direct while others are indirect. Some of the consequences are short term while others are cumulative or long term. Chapter 4 of the FEIS describes the associated environmental consequences. Much of the analysis performed to develop these outputs, effects, and consequences is quite complex and is described in Chapter 2 and previous sections of this Appendix. Therefore, in order to fully understand the resource outputs, effects, and environmental consequences associated with each alternative, and their derivation, it is recommended that Appendix B be read along with Chapters 2 and 4 of the FEIS.

Tables B-8-1 and B-8-2 present the direct, indirect, and cumulative resource outputs and effects associated with each alternative and certain selected benchmarks. By examining these tables, a better understanding of the relationship between issue resolution and the resulting outputs and effects for each alternative can be obtained. At the same time, it is also necessary to associate the anticipated environmental consequences that would result from the production of these outputs and effects.

The most significant environmental consequences are those associated with the manipulation of vegetation. Vegetation management in the form of timber harvesting results in changes in the appearance of the forest, changes in wildlife habitat; the short term creation of dust, smoke, and noise; and soil disturbances. The magnitude of these consequences varies between the alternatives depending on how many acres are harvested.

On areas of the Forest where producing timber is one of the primary objectives, existing old growth and mature tree stands will be converted to new and younger stands. The trees in the long term will be smaller and organized in a more uniform manner. There will be less dead and downed material except in areas where it is specifically provided. Therefore, as old and mature stands of trees are replaced with younger stands, overall plant and animal diversity shifts from species associated with old growth communities to species associated with younger communities. Also, as existing mature stands are converted to plantations, more forage is available for grazing by domestic livestock and wildlife.

Some of the alternatives require the development of roadless areas. This would introduce human activity into areas where little human activity presently occurs. This could disturb some species of wildlife, especially elk and deer. Once an area is developed, its wilderness values are diminished, if not lost, and future options for managing the area as Wilderness are forgone. Roading unroaded areas also reduces the limited opportunity for unroaded dispersed recreation on the Forest, but at the same time increases the opportunities to develop other resources such as timber or range production which, in turn, have the potential to provide economic returns to the Federal and local governments.

Ground disturbing activities will displace and compact soils, but within acceptable limits as outlined by the standards and guidelines. Some compaction will occur, however, as a result of roads, skid trails, and construction of facilities. Also, the more ground disturbing activities an alternative has, the more it risks water quality.

To different extents, the alternatives provide for livestock grazing. The higher the livestock grazing levels, the greater the chances are for competition between livestock and deer and elk. Livestock use can also cause damage to young trees in plantations and result in increased reforestation costs, and some loss of tree growth. Also, vegetation is trampled in areas where livestock tend to concentrate near water sources or salt. However, livestock use levels in riparian zones are controlled to prevent damage to the vegetation and soils and to protect water quality.

Providing for different levels and types of resources also affects other resources. Providing for undeveloped recreation and big game habitat reduces the amount of timber that could be harvested and limits

other types of development such as range improvements.

All of the alternatives have their associated socio-economic effects as well as environmental effects. For the most part, the social effects are keyed around lifestyles and expectations of Forest users. The major social concerns are related to economics (including timber and livestock use), and recreational opportunities (including hunting, fishing and nonconsumptive wildlife, scenic quality and personal use firewood). Some of the alternatives would tend to polarize people and communities. This is particularly true of both the high amenity and the high commodity alternatives since they are not well balanced regarding the development and use of the Forest. Alternatives with a commodity emphasis tend to result in fewer provisions for scenic quality, recreation opportunity, and other amenity values. On the other hand, an alternative with a commodity emphasis can result in more jobs and higher revenues. Alternatives with an amenity emphasis do more to protect the scenic quality on large areas of the Forest, and provide high recreation opportunities and other amenity values, but jobs and revenues will be less. The alternatives represented in the FEIS do not represent the extremes from the DEIS. For example, the most amenity-oriented alternative in the FEIS has a higher ASQ, and the most timber-oriented alternative has a lower ASQ and more amenity value resource objectives.

Table B-8-1 displays the average annual quantifiable resource outputs and effects by alternative. The table is quite comprehensive and will be referred to time and again throughout the remainder of this document. Most of the outputs and effects for each alternative are displayed for the decades 1, 2, and 5.

Note that the output levels for some resources during the first two time periods are similar across all of the alternatives. This makes it appear as though there are no differences between the alternatives. However, there usually are. The elk population outputs are a good example for this discussion. The output levels across all alternatives during Decade 1 vary from 3000 elk for Alternative I to 3740 for Alternative C-Modified, a relatively narrow range. However, there is quite a wide range of differences between these Alternatives in the amount and location of lands managed for elk habitat The short term differences in elk populations between the alternatives are relatively small. The differences become greater over time as the different carrying capacities produced by different elk habitat between the alternatives begin to affect the ability of the Forest to produce and maintain elk populations. In essence, many of the consequences resulting from decisions made in the alternatives will not be apparent in the short-term, but will become more noticeable in the longrun outputs and effects. The same is true for the projections of recreation use and other wildlife population changes.

While evaluating the outputs and effects of the alternatives and assessing their ability to address the Planning ICO's, it is sometimes useful to know how the output levels of a particular alternative compare with the total potential of the Forest to produce those outputs. Table B-8-2 presents the output levels of certain key resources for each alternative and selected benchmarks and compares them to the capabilities of the Forest to produce those outputs. The rows in the table display the benchmarks and alternatives while the columns represent various outputs and effects which vary significantly across the alternatives. Two numbers are displayed for each row and column intersection in the table. The top number is the production level associated with a particular alternative (row) and output (column) The bottom number is the percent of the potential capability represented by the alternative's output level.

For example, the maximum PNV benchmark has a Present Net Value of $512 million (row 1 and column 1). Since this benchmark was developed to estimate the maximum Present Net Value of the priced resources (timber, range, and recreation) on the Forest, its Present Net Value represents 100 percent of the potential capability. The seventh row of the same column displays the Present Net Value of Alternative B-Modified at $455 million, or 94 percent of the potential capability. The remainder of the table may be interpreted in a similar manner.

Comparison of the Economic and Social Effects of the Alternatives

This section compares and discusses the economic consequences of the alternatives and benchmarks. The section will begin with a general discussion of PNV and the factors which influence it between the alternatives and benchmarks. The section will then cover the implications of the alternatives with regards to noncash benefits, and economic impacts on the local communities. Finally, the significant incremental changes in PNV from one alternative to another will be summarized. The focus of this discussion will be on the tradeoffs between priced and nonpriced outputs and their effects on the overall ability of the alternatives to address certain key issues, concerns, and opportunities.

PNV, Discounted Costs and Benefits, and Their General Relationships to Both Priced and Nonpriced Outputs

Present Net Value (PNV) is the primary quantitative measure of economic efficiency for each benchmark and alternative. PNV is the sum of market and nonmarket priced values less all management costs for the 50 year planning horizon discounted to present values at a four percent interest rate.

The PNV of the Max PNV Benchmark (B7F) and the six management alternatives are displayed in Table B-8-3. The alternatives are ranked in order of decreasing PNV. Table B-8-3 shows the differences in PNV between adjacent pairs of the successionally ranked alternatives. These figures are estimates of the net economic values of the priced resources that would be foregone if a lower-ranked alternative is selected over the preceding one.

Before comparing the PNV's, it is first necessary to discuss some of the components of the PNV calculations in order to get a better understanding of the true differences between the alternatives Displayed in Table B-8-3 are the present values of the costs and benefits associated with each of the alternatives. Table B-8-4 present a more detailed breakdown of the benefits and costs of major resource categories for all benchmarks and alternatives. The PNV for each alternative is the difference between discounted costs and discounted benefits.

The discounted cost is the sum of all Ochoco National Forest expenditures for 50 years, discounted to their present value using a four percent interest rate. The maximum discounted costs for management of the Forest is $260 million for Alternative B-Mod while the minimum is $213 million for Alternative C-Mod. As shown in Table B-8-4, the difference in discounted costs between alternatives is primarily accounted for in the amount of funding necessary for timber management, roads and organizational support in order to implement the alternatives.

The discounted benefits for each alternative is the sum of the present values of all market and nonmarket priced benefits over the 50 year planning horizon. As shown in Table B-8-4 and B-8-5, B7F provides the largest amount of discounted priced benefits ($720 million). Of the alternatives, Alternative B-Modified produces the most discounted priced benefits at $715 million while Alternative C-Mod and results in the fewest ($608 million). The differences between the alternatives can be attributed primarily to the timber related benefits and secondarily to recreation, including fish and wildlife.

Market and nonmarket resources can both be priced outputs which are or may be exchanged in the market place. Market values expressed in terms of what people are willing to pay as evidenced by actual sales transactions. Market resources on the Forest include: timber, livestock grazing, campgrounds, mineral leases, and special use permits. Nonmarket values constitute the unit price of an output not normally exchanged in a market and must be estimated. They are valued in terms of what reasonable people would be willing to pay rather than go without. Nonmarket resources include dispersed, wilderness, semi-primitive and wildlife dependent recreation. The purpose of assigning dollar values is to reflect an economic value even though none or only part of that value associated with a particular resource is actually directly collected. Thus, one can directly compare alternatives with regard to their

TABLE B-8-1
QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES, AND COSTS BY ALTERNATIVE
(AVERAGE PER YEAR UNLESS NOTED)

		ALTERNATIVES					
Resource/Activity/Effect	Unit of Measure	NC	B MOD	E DEP	I Preferred	A	C-MOD
AIR QUALITY							
Total Suspended Particulates by Prescribed Fire	M Tons/Yr						
Decade 1		12 6	12 9	12 9	12 3	12 6	13 3
2		12 8	11 6	12 4	12 6	12 8	13 1
5		12 4	13 0	11 0	12 8	12 4	14 6
BIOLOGICAL DIVERSITY							
Riparian Areas in Excellent Condition	M Acres						
Decade 1			10 0		10 0		10 0
2			11 2		11 2		11 2
5		5 4	17 5	9 4	17 5	5 4	17 5
Riparian Areas Designated for Connective Habitat	M Acres						
Decade 1		0	0	0	1 0	0	0
2		0	0	0	1 0	0	0
5		0	0	0	1 0	0	0
Snag Habitat for Cavity Nesters (Average across the Forest) 1/	Percent of Potential						
Decade 1		Unknown	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69
Existing Old Growth	M Acres						
Decade 1		93 8	93 8	93 8	93 8	93 8	93 8
2		80 0	80 6	82 5	83 9	73 0	85 8
5		40 0	42 4	55 0	55 1	53 0	78 2
Acres of Forested Land by Successional Stage 2/							
Stage I and II	M Acres						
Decade 1		Unknown	9	9	9	9	9
2		Unknown	55	40	30	37	19
5		Unknown	45	41	34	43	21
Stage III	M Acres						
Decade 1		Unknown	146	172	151	170	138
2		Unknown	140	181	151	176	147
5		Unknown	69	88	63	106	42
Stage IV	M Acres						
Decade 1		Unknown	205	159	184	159	191
2		Unknown	167	127	192	123	158
5		Unknown	192	205	190	178	166
Stage V	M Acres						
Decade 1		Unknown	118	138	134	139	140
2		Unknown	129	142	115	151	162
5		Unknown	224	183	230	191	265
Stage VI	M Acres						
Decade 1		Unknown	94	94	94	94	94
2		Unknown	81	82	84	84	86
5		Unknown	42	55	55	53	78
Acres of Nonforest Land by Plant Community Type							
Timberline Meadows	M Acres	3450	3450	3450	3450	3450	3450
Meadows	M Acres	16,850	16,850	16,850	16,850	16,850	16,850
Juniper Dominant	M Acres	137,650	137,650	137,650	137,650	137,650	137,650
Grass Dominant	M Acres	50,900	50,900	50,900	50,900	50,900	50,900
Sagebrush Dominant	M Acres	80,100	80,100	80,100	80,100	80,100	80,100
Biscuit Root-Scabland	M Acres	12,550	12,550	12,550	12,550	12,550	12,550

1/ Management indicator species (MIS) for snag dependent wildlife on the Forest and Grassland are the primary cavity excavators such as the Pileated woodpecker (also see Ch 3 pp 13 16)

2/ Acres are from the 1980 Timber Resource Plan and are adjusted for the Oregon Wilderness Act as per Timber Management Plan Ammendment No 1

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I Preferred	A	C MOD
CULTURAL RESOURCES							
Sites Documented	Number/Yr						
Decade 1		Unknown	140	130	120	120	120
2		Unknown	120	110	100	100	100
5		Unknown	70	60	60	60	60
Sites Enhanced/Interpreted	Number/Yr						
Decade 1		Unknown	3	3	3	3	3
2		Unknown	3	3	3	3	3
5		Unknown	2	2	2	2	2
Nat'l Register Nomination	Number/Decade						
Decade 1		Unknown	2	2	2	2	2
2		Unknown	2	2	2	2	2
5		Unknown	2	2	2	2	2
FIRE							
Wildfire Effectiveness Index	$/1000 Ac Protected						
Decade 1		725	720	725	715	725	732
2		726	720	725	715	726	732
5		729	720	733	715	729	732
Precribed Burning	M Acres/Yr						
Natural Fuels							
Decade 1		12 3	9 8	11 7	10 4	12 3	13 2
2		12.3	9 8	11 7	10 4	12.3	13.2
5		12 3	9 8	11 7	10 4	12 3	13 2
Activity Fuels	M Acres/Yr						
Decade 1		12 9	15 9	14.1	14 2	12 9	13 5
2		13 3	13 3	13 2	14 8	13 3	13 1
5		12 6	16 1	10 4	15 2	12 6	16 1
FISH							
Anadromous Fish							
Steelhead	SHCI 4/ (M Smolt)						
Decade 1		121	121	121	121	121	121
2		136	136	136	136	136	136
5		220	220	220	220	220	220
Resident Fish (Rainbow and Brook Trout)	M Numbers						
Decade 1		656 1	816 6	712 8	816 6	656 1	816 6
2		749 25	1150 5	891 0	1150 5	749 25	1150 5
5		1215 0	2820 0	1782 0	2820 0	1215 0	2820 0
FORAGE							
Potential Forage Production 3/	M AUM s/Yr						
Decade 1		77 5	75 0	79 0	75 0	79 1	73 1
2		Unknown	82 0	78 9	81 5	78 9	73 3
5		Unknown	85 0	79 4	84 6	86 5	74 4
Structural Improvements	Number						
Decade 1		27	138	138	138	27	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Nonstructural Improvements	Acres						
Decade 1		N/A	13097	12477	12832	12530	8760
2		N/A	4337	3717	4072	3770	0
5		N/A	4337	3717	4072	3770	0
Wild Horses	Number						
Decade 1		60	60	60	60	60	60
2		60	60	60	60	60	60
5		60	60	60	60	60	60

3/ Forage production as displayed is the "potential," based on estimates by allotment, that could be achieved with the proposed schedule of range and riparian improvements by alternative These potentials may not be achieved and are at the minimum, directly dependent upon the implementation of the proposed improvements in the first decade It is reasonable to expect that some or all allotments may experience up to a 10% reduction in AUM s during the first decade to allow the accomplishment of riparian management objectives

4/ Steelhead Habitat Capability Index, thousands of smolt.

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I-Preferred	A	C MOD
FOREST RESIDUES							
Existing Residues	Million Tons	19 5	20 4	19 9	20 0	19 6	19 6
Minimum Site Requirements	Million Tons	10 4	10 4	10 4	10 4	10 4	10 4
Residues Removed							
Activity	Million Tons						
Decade 1		*3 7*	*4 7*	*4 2*	*4 3*	*3 9*	*4 1*
2		3 7	3 7	3 7	4 1	3 7	3 7
5		2 7	3 5	2.3	3 3	2 8	3 5
Natural							
Decade 1		1 2	1 0	1 2	1 0	1 2	1 3
2		1 1	0 9	1 1	0 9	1 1	1 2
5		0 7	0 6	0 7	0 6	0 7	0 8
Total Residues Remaining							
Decade 1		14 5	14 6	14 5	14 7	14 5	14 2
2		13 6	14 0	13 7	13 8	13 6	13 4
5		13 0	13 1	13 3	13 1	13 0	12 7
FUELWOOD							
Fuelwood	M Cords/Yr						
Decade 1		14 0	15 0	13 1	13 0	14 0	12 0
2		12 4	14 0	12 3	12 0	12 4	10 0
5		11 6	13 0	10 0	11 0	11 6	9 0
LANDS							
Special Use Permits	Number	105	105	105	105	105	105
MINERALS AND ENERGY							
Oil and Gas	M Acres Leased						
Decade 1		147	140	140	140	140	140
2		687	670	670	670	670	167
5		157	140	140	140	140	140
Geothermal	Acres Leased						
Decade 1		0	0	0	0	0	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Minerals Access Restrictions	Percent						
Withdrawn		4	4	4	4	4	4
High		*11*	*8*	*8*	*9*	*11*	*18*
Moderate		11	27	14	28	11	39
Low		74	63	74	59	74	40
OLD GROWTH 5/							
Old Growth in wilderness and wilderness study (F1, F2, F3, F4, D8, D12)	M Acres						
Ponderosa Pine			2 3	2 3	2 3	2 3	2 3
Mixed conifer			18 2	18 2	18 2	18 2	18 2
Total			20 5	20 5	20 5	20 5	20 5
Allocated to Old Growth management area (F6, D4, G5)							
Existing Old Growth	M Acres						
Ponderosa Pine			7 0	N/A 6/	6 9	N/A 6/	14 0
Mixed conifer			10 8	N/A	11 1	N/A	25 0
Juniper		*0 7*	0 7	0 7	0.7	0 7	0.7
Capable Old Growth 7/			---	N/A	1 3	N/A	5 3
Total			18 7	28 3	20 0	37 0 8/	45 0

5/ Management Indicator Species (MIS) for Old Growth on the Forest is the Pileated woodpecker The common flicker is the MIS for old growth juniper on the Grassland

6/ NA - Data not available

7/ That which does not currently meet the characteristics described for "suitable", but exists on a site "capable" of producing it some time in the future

8/ This was based on managing these stands with timber harvest with long rotations

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I-Preferred	A	C MOD
Old Growth in roadless management areas with no programed harvest (F5, F8, F10, F11, D4, G5)	M Acres						
Ponderosa Pine			1 1	N/A	4 1	N/A	5 4
Mixed Conifer			2 0	N/A	12 5	N/A	12 9
Juniper			0 5	0 5	0 5	0 5	0 5
Total			3 6	N/A	17 1	N/A	18 8
Existing Old Growth areas in areas programmed for harvest (F7, F9, F11B, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28)	M Acres						
Ponderosa Pine			12 8	N/A	9 8	N/A	1 5
Mixed conifer			39 6	N/A	28 8	N/A	14 5
Total			52 4	N/A	38 6	N/A	16 0
Total Existing Old Growth	M Acres						
Pondersoa Pine							
Decade 1		23 2	23 2	23 2	23 2	23 2	23 2
2		18 0	16 2	18 5	18 2	20 0	19 2
5		5 0	9 2	13 0	13 0	12 0	19 0
Mixed Conifer							
Decade 1		70 6	70 6	70 6	70 6	70 6	70 6
2		62 0	64 4	64 0	65 7	53 0	66 6
5		35 0	33 2	42 0	42 1	41 0	59 2
Total Existing Old Growth Forest	M Acres						
Decade 5		40 0	42 4	55 0	55 1	53 0	78 2
Total Existing and Capable Old Growth							
Decade 1	M Acres	93 8	93 8	93 8	95 1	93 8	99 1

RECREATION

Developed Recreation Supply/Demand	M RVD's	S	D	S	D	S	D	S	D	S	D	S	D
Decade 1		141 0	129 8	159 4	129 8	149 0	129 8	159 4	129 8	141 0	129 8	159 4	129 8
2		141 0	145 9	159 4	145 9	149 0	145 9	159 4	145 9	141 0	145 9	159 4	145 9
5		141 0	191 9	159 4	191 9	149 0	191 9	159 4	191 9	141 0	191 9	159 4	191 9
Dispersed Recreation Roaded Natural Roaded Modified Supply/Demand	M RVD's												
Decade 1		1477 3	373 8	1230 3	373 8	1220 3	373 8	1204 1	373 8	1232 6	373 8	1125 3	373 0
2		1477 3	411 4	1230 3	411 8	1220 3	411 4	1204 1	411 4	1232 6	411 4	1125 3	411 4
5		1477 3	520 2	1230 3	520 2	1220 3	520 2	1204 1	520 2	1232 6	520 2	1125 3	520 2
Semiprimitive, Nonmotorized Supply/Demand	M RVD s												
Decade 1		11 1	34 2	11 4	34 2	35 2	34 2	47 2	34 2	11 1	34 2	55 4	34 2
2		11 1	37 4	11 4	37 4	35 2	37 4	47 2	37 4	11 1	37 4	55 4	37 4
5		11 1	48 1	11 4	48 1	35 2	48 1	47 2	48 1	11 1	48 1	55 4	48 1
Semiprimitive, Motorized Supply/Demand	M RVD's												
Decade 1		0	18 0	0	18 0	7 0	18 0	0	18 0	0	18 0	7 0	18 0
2		0	19 4	0	19 4	7 0	19 4	0	19 4	0	19 4	7 0	19 4
5		0	25 1	0	25 1	7 0	25 1	0	25 1	0	25 1	7 0	25 1

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I Preferred	A	C-MOD
Hunting Use	WFUD s						
Decade 1		Unknown	173,200	172,500	169,100	176,400	170,600
2		Unknown	168,000	169,500	166,600	172,400	170,600
5		Unknown	143,200	164,600	161,400	163,000	189,900
Resident Fishing Use	WFUD s						
Decade 1		76,400	94,300	82,900	94,300	76,400	94,300
2		84,900	109,100	93,600	109,100	84,900	109,100
5		99,500	123,800	108,300	123,800	99,500	123,800
Anadromous Fishing Use	WFUD's						
Decade 1		5644	5644	5644	5644	5644	5644
2		10,968	10,968	10,968	10,968	10,968	10,968
5		27,158	27,158	27,158	27,158	27,158	27,158
Trails Summer Non-Motorized	Miles						
Construction							
Decade 1		0	109 6	132	186 9	0	186 9
2		0	182 4	0	184 9	0	184 9
5		0	0	0	0	0	0
Reconstruction							
Decade 1		9	20 5	29 3	13 0	9	13 0
2		9	20 5	15 0	25 0	9	25 0
5		9	38 8	15 0	25 0	9	25 0
Total Available							
Decade 1		96	206 4	228	283 7	96	283 7
2		96	388 8	228	468 6	96	468 8
5		96	388 8	228	468 6	96	468 6
Trails-Summer ATV	Miles						
Construction							
Decade 1		0	95	0	95	0	95
2		0	95	0	95	0	95
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	0	0	0	0	0
2		0	15	0	15	0	15
5		0	15	0	15	0	15
Total Available							
Decade 1		0	90	0	90	0	90
2		0	190	0	190	0	190
5		0	190	0	190	0	190
Trails Winter X-Country	Miles						
Construction							
Decade 1		0	100	0	100	0	100
2		0	40	0	40	0	40
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	5	0	5	0	5
2		0	20	0	20	0	20
5		0	20	0	20	0	20
Total Available							
Decade 1		0	109	0	109	0	109
2		0	149	0	149	0	149
5		0	149	0	149	0	149
Trails-Winter Snowmobile	Miles						
Construction							
Decade 1		0	210	0	210	0	210
2		0	40	0	40	0	40
5		0	0	0	0	0	0
Reconstruction							
Decade 1		0	10	0	10	0	10
2		0	40	0	40	0	40
5		0	40	0	40	0	40
Total Available							
Decade 1		0	285	0	285	0	285
2		0	325	0	325	0	325
5			325		325		325
Wild and Scenic Rivers	Acres						
Wild		0	0	0	0	0	0
Scenic		1480	2845	1480	2845	1480	1480
Recreation		2550	2550	2550	2550	2550	2550
Further Study							

TABLE B-8-1 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B-MOD	E DEP	I-Preferred	A	C-MOD
RESEARCH NATURAL AREAS 9/							
Ochoco Divide	Acres	2035	2035	2035	2035	2035	2035
The Island	Acres	39	0	39	39	39	39
Haystack Butte	Acres	0	0	58	58	0	58
Dry Mountain	Acres	0	0	1187	1187	0	1187
Stinger Creek	Acres	0	0	453	453	0	453
Silver Creek	Acres	0	0	844	844	0	844
SCENIC							
Preservation	M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70 7	96 8	102 2	155 8
Partial Retention	M Acres	71 4	28 1	59 4	32 4	71 4	81 5
Modification and Maximum Modification	M Acres	743 2	827 8	781 8	784 9	743 2	687 1
SOCIAL AND ECONOMIC							
Social							
Change in Jobs 10/	Number	Unknown	176	196	118	57	-101
Change in Income	Million $	Unknown	2 9	3 0	1 6	0 9	-2 2
Economic							
Total National Forest Planned Budget	Million Dollars						
Decade 1		12 0	12 1	10 5	10 2	10 9	9 5
2		Unknown	10 7	9 2	9 3	10 3	8 8
5		Unknown	11 1	8 7	9 7	10 0	9 0
Returns to Government	Million $						
Decade 1		19 5	19 7	20 2	19 4	17 2	14 0
2		Unknown	23 1	22 7	22 3	21 1	16 5
5		Unknown	22 6	18 4	21 5	20 3	18 8
Present Net Value (PNV)	Million $	380	452	471	475	421	395
Payment to Counties	Million $	Unknown	4.9	5.1	4 9	4 3	3 5
SOIL							
Soil Loss (Off Forest)	M Tons/Yr						
By Major Activity							
Timber Harvest & Roads							
Decade 1		1 9	1 7	1 8	1 7	1 5	1 7
2		1 5	2 2	1 3	2 1	1 8	1 9
5		1 3	2 1	1 2	1 9	1 5	1 9

9/ RNA = that would be recommended for inclusion in the National Forest System (FSM 4063)

10/ Change in jobs relative to the "current situation" discussed

TABLE B-8-1 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B MOD	E DEP	I-Preferred	A	C-MOD
TIMBER							
Lands Tentatively Suitable for Timber Production	Thousand Acres	552 3 11/	533 2	533 2	533 2	533 2	533 2
Lands Suitable for Timber Production	Thousand Acres	534 0 11/	511 3	495 0	493 7	488 6	471 4
Lands with Timber Yield Reductions	Thousand Acres						
Full Yield		413 8 12/	484 5	0	0	0	0
50-99%		88 8 11/	26 8	495 0	491 9	488 6	471 4
1-49%		32 4 11/	0	0	1 8	0	0
Long-Term Sustained Yield Capacity	Million CF	31 1 11/	21 8	19 3	19 0	19 5	15 6
Allowable Sale Quantity	Million BF						
Decade 1		N/A	130	123	115	115	94
Total Pine	Million BF						
Decade 1			85	87	82	79	63
Allowable Sale Quantity	Million CF						
Decade 1		N/A	21 8	20 6	19 0	19 3	15 6
2		N/A	21 8	19 7	19 0	19 3	15 6
5		N/A	21 8	16 1	19 0	19 3	15 6
Potential Yield 13/	Million BF	136 5	N/A	N/A	N/A	N/A	N/A
Timber Sale Program Quantity	Million BF						
Decade 1		N/A	141 0	135 0	125 0	126 0	103 0
Timber Sale Program Quantity	Million CF						
Decade 1		N/A	23 8	22 9	20 9	21 4	17 1
2			23 3	21 4	20 5	21 4	16 6
5			23 1	17 1	20 1	20 4	16 5
Available Timber Harvest Prescriptions in First Decade	Thousand Acres 14/						
Even-aged							
Clearcut		0	25 3	14.4	8 7	18 7	15 0
Shelterwood		118 6	49 8	25 4	21 1	18 2	3 6
Overstory Removal		63 5	21 2	113 2	53 1	105 6	31 6
Uneven-aged							
Selection		Unknown	67 5	4 0	62 2	0 9	98 4
Reforestation	Thousand Acres						
Decade 1		118 6	75 1	40 0	29 8	37 0	18 6
2		71 7	30 1	42 0	24 8	60 0	18 4
5		30 6	52 0	48 0	29 9	52 0	26 8
Timber Stand Improvement	Thousand Acres						
Decade 1		48 0	53 2	19 0	53 0	40 0	68 3
2		66 0	48 2	13 0	54 0	12 0	61 5

11/ For the NC alternative, these lands are the regulated commercial forest lands These lands were not classified using the suitability criteria, but were arrived at using the 1972 land classification system provided for by Amendment #1 of the 1985 Timber Plan These lands are the standard, special and marginal components of commercial forest lands

12/ For the NC alternative, these lands are the standard component of the regulated commercial forest base

13/ Potential yield applies only to the "No Change" alternative and comes from the Timber Resource Plan The potential yield for the next ten years is the maximum harvest that could be planned to achieve the optimum perpetual sustained yield harvesting level attainable with intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment.

14/ See Appendix E, Selection of Harvest Cutting Methods

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B MOD	E DEP	I Preferred	A	C-MOD
TRANSPORTATION SYSTEM							
Arterial and Collector Road Construction	Miles/Decade						
Decade 1		8	14	4	8	8	4
2		12	12	0	6	12	0
5		0	0	0	0	0	0
Arterial and Collector Road Reconstruction	Miles/Decade						
Decade 1		174	174	168	174	174	168
2		168	168	163	168	168	163
5		148	148	148	148	148	148
Forest Service Roads, Open and Maintained	Total Miles						
Decade 1		4774	4800	4776	4734	4774	4743
2		4992	5072	4962	4935	4992	4982
5		5326	5484	5253	5304	5326	5187
Passenger Car Use, Open and Maintained	Total Miles						
Decade 1		844	850	840	844	844	840
2		856	862	840	850	856	840
5		856	869	840	850	856	840
High Clearance Use, Open and Maintained	Total Miles						
Decade 1		3236	3037	3046	2332	3236	2384
2		3210	2993	2936	2210	3210	2099
5		2736	2492	2331	2269	2736	1123
Roads Closed, Seasonally or Yearlong	Total Miles						
Decade 1		694	913	890	1558	694	1520
2		926	1217	1186	1875	926	2043
5		1734	2123	2082	2185	1734	3224
UNROADED AREAS							
(Roadless Criteria Acres)							
Acres Remaining Unroaded	M Acres						
Lookout Mountain							
Decade 1		166	76	29	157	166	166
2		166	76	29	76	166	166
5		166	76	29	76	166	166
Rock Creek/Cottonwood Creek							
Decade 1		*0*	*0*	197	118	*0*	197
2		0	0	197	118	0	197
5		0	0	197	118	0	197
Deschutes Canyon/Steelhead Falls							
Decade 1		100	51	25	51	100	100
2		100	51	25	51	100	100
5		100	51	25	51	100	100
Silver Creek							
Decade 1		25	31	32	31	25	32
2		25	31	32	31	25	32
5		25	31	32	31	25	32
Green Mountain (SPM)							
Decade 1		0	0	70	0	0	70
2		0	0	70	0	0	70
5		*0*	*0*	70	*0*	*0*	70

TABLE B-8-1 (Continued)

Resource/Activity/Effect	Units of Measure	ALTERNATIVES					
		NC	B-MOD	E DEP	I Preferred	A	C MOD
WATER							
Water Quality							
Watershed Condition	% above Threshold						
Decade 1		21	0	0	0	0	0
2		0	0	0	0	0	0
5		0	0	0	0	0	0
Watershed/Riparian Improvement	Acres/Yr						
Decade 1		360	890	740	890	360	890
2		360	87	120	87	360	87
5		32	32	32	32	32	32
Total in Enhanced Condition	M Acres						
Decade 1			10 0		10 0		10 0
2			11 2		11 2		11 2
5		5 4	17 5	9 4	17 5	5 4	17 5
Water Yield	M Acre Feet/Yr						
Decade 1		591	585	584	575	588	572
2		575	574	572	563	580	560
5		559	582	566	567	574	562
Relative Risk of Affecting Watersheds	Ranking 1 - 6, 1 highest, 6 lowest						
Decade 1		1	2	2	3	2	3
2		3	3	3	4	3	4
5		2	2	4	4	3	4
WILDERNESS							
Existing Wilderness	Acres						
Bridge Creek		5400	5400	5400	5400	5400	5400
Black Canyon		13,400	13,400	13,400	13,400	13,400	13,400
Mill Creek		17,400	17,400	17,400	17,400	17,400	17,400
Recommended Wilderness	Acres						
Deschutes Canyon/Steelhead Falls		0	0	2500	0	0	10000
Total Wilderness Capacity		36,200	36,200	38,700	36,200	36,200	46,200
Wilderness Supply	MVRD's	25 7	25 7	26 6	25 7	25 7	28 3
Wilderness Demand	M RVD's	S D	S D	S D	S D	S D	S D
Supply/Demand							
Semiprimitive							
Decade 1		25 7 16 5	25 7 16 5	26 6 16 5	25 7 16 5	25 7 16 5	28 3 16 5
2		25 7 19 2	25 7 19 2	26 6 19 2	25 7 19 2	25 7 19 2	28 3 19 2
5		25 7 27 5	25 7 27 5	26 6 27 5	25 7 27 5	25 7 27 5	28 3 27 5
Wilderness 15/	Acres						
Primitive Trailed							
Decade 1		0	3300	0	3300	0	3300
2		0	3300	0	3300	0	3300
5		0	3300	0	3300	0	3300
Primitive Nontrailed							
Decade 1		0	3000	0	3000	0	3000
2		0	3000	0	3000	0	3000
5		0	3000	0	3000	0	3000
Semiprimitive							
Decade 1		36,200	29,900	38,700	29,900	36,200	39,900
2		36,200	29,900	38,700	29,900	36,200	39,900
5		36,200	29,900	38,700	29,900	36,200	39,900

15/ Black Canyon's WROS classification is presently incomplete and is presently displayed in total as semiprimitive

TABLE B-8-1 (Continued)

		ALTERNATIVES					
Resource/Activity/Effect	Units of Measure	NC	B-MOD	E DEP	I Preferred	A	C-MOD
WILDLIFE							
Deer Population	Number						
Decade 1		Unknown	22,600	22,600	22,600	22,600	22,600
2		Unknown	22,600	22,600	22,600	22,600	22,600
5		Unknown	17,206	22,600	22,600	22,600	22,600
Elk Population	Number						
Decade 1		Unknown	3210	3170	3000	3370	3740
2		Unknown	2950	3030	2870	3160	3660
5		Unknown	1700	2780	2620	2690	3700
Wildlife Habitat Improvement	Acres/Yr						
Decade 1		Unknown	768	302	768	132	468
2		Unknown	400	100	400	100	200
5		Unknown	100	100	100	100	150
Snag Habitat for Cavity Nesters (Average across Forest)	% of Potential						
Decade 1		Unknown	43	46	47	46	51
2		Unknown	41	50	49	52	59
5		Unknown	33	55	54	52	69
Habitat for Old Growth Dependent Species							
Allocated Old Growth	Acres	32,860	18,740	26,340	19,990	36,970	45,030
Supplemental Feeding Areas			18,000	26,340	19,250	36,970	45030
Unallocated Old Growth 16/							
Decade 1		26,500	24,100	N/A	37,600	N/A	39,300
2		26,500	24,100	N/A	37,600	N/A	39,300
5		26,500	24,100	N/A	37,600	N/A	39,300
Total Habitat 17/							
Decade 1		59,360	60,840	N/A	76,840	N/A	129,360
2		59,360	60,840	N/A	76,840	N/A	129,360
5		59,360	60,840	N/A	76,840	N/A	129,360
Eagle Roosting Areas (Bald and Golden)	Acres	570	570	570	570	570	570

16/ Old Growth in management areas with no programmed timber harvest.

17/ Total Old Growth in management areas which is allocated, Old Growth in management areas not allocated but with no programmed timber harvest, and supplemental feeding areas

** The outputs, effects, activities, and costs included in this table are estimates and projections based on available inventory data, use of various modeling techniques and analyses, professional judgement and are subject to the annual budgetary process

TABLE B-8-2
COMPARISON OF OUTPUTS AND PERCENT OF POTENTIAL CAPABILITY

	PNV Millions	Timber Harvest MMCF	MAUM's 1/	Elk 1/	Scenic Corridors (M Acres)	SPNM/Additional Wilderness (M Acres)	Old Growth M Acres	Excellent Riparian Acres
Maximum PNV Benchmark	512 100%	22 8 98%	82 0 78%	1510 35%	0	0	39 42%	17 1 90%
Maximum Timber Benchmark	480 94%	23 4 100%	80 8 77%	1270 30%	0	0	39 42%	1 9 10%
Maximum Recreation Benchmark (Unroaded)	424 83%	15 5 66%	71 0 67%	4040 95%	0	0	75 80%	17 1 90%
Maximum Big Game Benchmark	429 84%	17 1 73%	71 0 67%	4270 100%	0	0	40 43%	17 1 90%
Maximum Range Benchmark	454 89%	22 1 94%	105 3 100%	1350 32%	0	0	39 42%	1 9 10%
ALTERNATIVES								
NC	380 74%	N/A	77 5 74%	Unknown	83 5 81%	29 1 44%	40 0 43%	5 4 28%
B Mod	452 88%	21 8 93%	75 0 71%	1700 40%	27 0 26%	15 8 24%	42 4 45%	17 1 90%
E-Dep	*471* 92%	*20 6* 88%	*79 0* 75%	*2780* 65%	*47 7* 46%	*51 5* 77%	*55 0* 59%	*9 4* 50%
I	475 93%	19 0 81%	75 0 71%	2620 61%	44.0 43%	27 6 42%	55 1 59%	17 1 90%
A	421 82%	19 3 82%	77 5 74%	2690 63%	83 5 81%	29 1 44%	53 0 57%	5 4 28%
C	395 77%	15 6 66%	73 1 69%	3700 87%	102 7 100%	66 5 100%	78 2 83%	17 1 90%

1/ 5th Decade

priced output levels and their efficiency in producing them. Market related benefits in any alternative are attributed mostly to timber. The nonmarket benefits are primarily related to fish and wildlife, and recreation (Table B-8-4). Table B-8-4 also shows that the market resources provide most of the discounted benefits for all alternatives. For example, their contribution ranges from a high at 70 percent of the total economic benefits in Alternative B-Mod to a low of 60 percent in Alternative C-Mod.

Noncash benefits is yet another aspect of discounted benefits. Noncash benefits refer to the benefits individual resource users receive who are charged less for the resource than they are willing to pay, or current market prices indicate they should pay. They are the difference between the full economic value of the resource and the fees actually paid to use that resource. Noncash benefits are measured by the difference between total discounted benefits less the discounted receipts that are generated by each alternative. The Forest receives revenues for stumpage, grazing permits, campground fees, mineral leases, and other special use permits. Yet, the Forest generates benefits to users which are not realized in terms of cash flows. This is because dollar prices are assigned to nonmarket resources on the Forest in order to reflect their full economic value even though none or only part of that value is collected as fees under current laws and policies. Timber is the only resource for which the discounted benefits are equivalent to discounted revenues. For all of the other resources, recreation being the primary one, discounted benefits exceed revenues. Table B-8-5 displays the relationships between total receipts, net receipts, and noncash benefits for each alternative in order of decreasing net receipts. The size of the noncash benefit is directly related to the amount of recreation (primarily) and range (secondarily) benefits generated by each alternative.

Differences in PNV between Benchmarks

The Max Recreation Benchmark (unroaded, big game) (BR3) has a PNV of $454 million. This is $58 million less than the Max PNV Benchmark (B7G). The decrease in PNV is a result of managing 61,000 acres in an unroaded condition Although this management results in less costs associated with timber and roads and higher economic benefits associated with recreation, fish and wildlife, the foregone timber values far outweigh these advantages, causing a reduction in PNV.

TABLE B-8-3

PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES
(Million Dollars)
(Ranked by Decreasing PNV)

Alternative/ Benchmark	Present Net Value	Change	Discounted Costs	Change	Discounted Benefits	Change
Max PNV Benchmark 7	512		241		754	
Alternative I	475	-37	227	-14	701	-53
Alternative E-Dep	471	-4	221	-6	693	-8
Alternative B-Mod	452	-19	262	+41	714	+21
Alternative A	421	-31	236	-26	657	-57
Alternative C-MOD	395	-26	213	-23	608	-49
No Change	380	-15	245	+32	653	+45

TABLE B-8-4
DISCOUNTED BENEFITS AND COSTS BY RESOURCE GROUPS
(Millions of Dollars) 1/

	ALTERNATIVES (Ranked by Decreasing PNV)					
	I	E Dep	B Mod	A	C-MOD	NC
PNV	475	471	452	421	395	380
DISCOUNTED PRICED BENEFITS BY RESOURCE						
Timber	422 6	415 9	446 1	392 4	322 4	413
Developed & Dispersed Recreation	84 8	85 1	76 7	75 7	86 4	72 3
Fish & Wildlife	154 8	152 1	151 0	149 7	161 5	103
Range	20 5	20 5	20 8	20 2	19 1	18 6
Minerals	19 0	19 0	19 0	19 0	19 0	18 2
DISCOUNTED COSTS BY MAJOR CATEGORIES						
Timber	49 6	50 7	70 1	64 8	41 1	69
Roads	86 2	82 8	95 7	84 0	80 5	87
Developed & Dispersed Recreation	11 7	8 2	11 3	5 2	12 7	5 1
Fish & Wildlife	6 9	6 9	7 4	5 7	9 4	6
Range	8 1	8 3	8 3	7 9	7 5	8
Other 2/	59 4	59 9	63 5	63 7	57 7	55
Soil & Water	4 8	4 7	5 1	4 6	4 4	4

1/ Direct comparisons of benefits and costs by individual resource provide broad indications of specific relationships, but they may be misleading because many costs are nonseparable under multiple-use management

2/ These costs include general administration, cultural resources, lands and minerals, human resources, and protection

The Max Timber Benchmark (BT7) has a PNV of $480 million which is $32 million less than B7G. The decrease in PNV is a result of the intensity of timber management. The timber benchmark manages the timber resource much more intensively than does the Max PNV benchmark. This results in higher harvest levels and, as a result, higher timber generated receipts, but the timber and road cost associated with these higher harvest levels outweigh the benefits generated. This higher intensity of timber management also results in less benefits being generated from fish and wildlife resources. The combined effect results in a lower PNV.

The Max Range Benchmark (BF5) has a PNV of $424 million, $88 million less than the Max PNV benchmark's. As with the Max timber benchmark, this benchmark manages a resource more intensively than is economically efficient. In this case it is the forage resource not the timber resource as it was with BT6. This benchmark manages both the timbered and non-forest lands for maximum forage production. This results in a minor increase in forage values and major benefits foregone from timber, fish and wildlife resources.

The Max Big Game Benchmark (BE3) has a PNV of $429 million, $83 million less than the Max PNV benchmark. This benchmark manages the timber resource to maximum big game habitat. As a result, it forgoes much of the timber value for a relatively smaller increase in value from big game. This results in a decrease in PNV.

Changes from Draft to Final

Updated timber yield tables and analysis area acres have resulted in the ASQ and PNV's of the Max PNV and timber benchmarks being much closer together in the FEIS as compared with the DEIS.

Differences in Present Net Values

Present Net Value (PNV) is the primary quantitative measure of economic efficiency used for all benchmarks and alternatives. It is also an important measure of the dollar value of the alternatives. PNV has been calculated to be the sum of all market and nonmarket priced values, less all management costs for the 50-year planning horizon, discounted to present values using a four percent interest rate. The relationship between PNV and net public benefits is discussed in Section 4.

The Max PNV benchmark and six alternatives are ranked by decreasing PNV in Table B-8-3. Table B-8-4 provides further detail on discounted costs and benefits by resource group. The Max PNV benchmark is provided as a reference point only. It is an estimate of the discounted net economic returns the Forest could receive for its priced resources if they were managed solely to maximize Present Net Value.

The main factor influencing patterns in PNV, benefits, and costs is timber management. Timber values represent from 53 percent to 65 percent of the total dollar values in the alternatives. Values produced from selling timber are, in general, far in excess of related costs. As timber harvest levels decrease across alternatives, discounted costs and benefits, and PNV usually decrease as well. This pattern is due in large part to non-timber resource objectives restricting timber practices and harvests Although recreation related benefits (including hunting and fishing) do make up a significant portion of the total dollar benefits (28 percent to 41 percent), increases in these dollar benefits do not make up for the PNV lost from timber. Therefore, the greater the non-timber resource objectives, the lower are the timber discounted benefits and costs, and PNV.

This general pattern is modified by the intensity of the timber management activities employed. Some alternatives schedule timber practices and harvests at the most economically efficient level, given other resource objectives (Alternatives C-Modified, I, and E-Departure). Other alternatives apply more intensive timber practices to achieve the highest timber volumes possible, given other resource objectives (Alternatives A, B-Modified, and NC). This results in higher timber benefits, but also higher costs and lower PNV. In each of these two groups of alternatives the general pattern discussed above holds. The exact combination of non-timber resource objectives and timber management intensity determines the ranking in PNV of these two groups together.

The PNV of the NC Alternative is an estimate. It is

also based on a programmed harvest level of 129 MMBF. If the estimate was based on the potential yield of 136 5 MMBF, the PNV would be significantly higher.

The Forest and Grassland are considered to have potential energy resources However, very little testing and development has taken place to date. No estimates have been made of future extractions, so energy values were not included in the economic analysis, but oil and gas leasing provides significant returns to the Treasury and to counties. The alternatives have little effect on mineral activities.

Differences in Costs

Capital investment costs include trails, roads, reforestation, timber stand improvement, prescribed burning, and physical structures for range, recreation, fish, and wildlife. Other costs include operating and maintaining facilities, program management, and support costs associated with management of other resources. Capital investment costs pertain mostly to roads and timber stand management. For example, from 76 percent (Alternative C-Modified) to 95 percent (Alternative A) of capital investment costs are associated with road construction and timber management. The majority of operation and maintenance costs are program management, followed by support funds necessary to carry out timber programs.

Because most costs are associated with timber management, the higher the timber output, the higher the costs. Generally, capital investment costs decrease significantly over time due to declining road construction and timber stand improvement practices. Operation and maintenance costs remain fairly constant over time except for Alternative E-Departure, where timber volume declines over time.

Fixed costs represent a relatively small portion of the total costs (20 percent to 30 percent). The remainder of the cost for each alternative varies with the objectives of the alternative.

Costs associated with timber practices and harvests constitute a large portion of the total costs. Alternative B-Modified has the highest cost of any alternative, and only 29 percent of the discounted cost is directly attributed to resources other than timber and roads. Road construction and reconstruction is almost entirely tied to timber harvests on this Forest. Alternative C-Modified has the lowest cost of any alternative and the highest benefits associated with amenity outputs, yet only 35 percent of the costs can be attributed to resources other than timber.

Differences in Economic Benefits and Cash Flows

The total economic benefits of the alternatives come from priced resources which include both outputs termed "market" outputs, and those with "assigned" values. Market values represent the unit price of an output that is normally exchanged in a market. On this Forest, timber is the primary market output, accounting for over 90 percent of the market outputs and 50 percent to 65 percent of the total economic benefits of the alternatives. Other market outputs include livestock grazing, campground use, special use permits, and minerals leasing. Assigned values represent the unit price of an output not normally exchanged in a market. Various analytical techniques were used to estimate values that people would be willing to pay for these benefits. Outputs with assigned values include dispersed recreation, wilderness use, hunting, fishing, and water quality improvement. Hunting and fishing are the major assigned values, comprising from 16 to 26 percent of the total economic benefits. The remaining 18 to 24 percent are split in different proportions, depending on the alternative, among livestock grazing, developed recreation use, dispersed roaded recreational use, and dispersed non-roaded recreational use.

Total market values range from 62 percent (Alternative C-Modified) to 70 percent (Alternative B-Modified) of the total economic benefits. Alternatives in the high end of this fairly narrow range have relatively high timber benefits and/or relatively lower fish, wildlife, or recreational values. The opposite is true for alternatives in the low end of the range

Cash receipts are revenues returned to the Forest and Grassland for stumpage, grazing permits, campground fees, leasable minerals, and special use permits However, the Forest generates economic

benefits to users which are not realized in terms of cash flows. These are referred to as "noncash benefits". They refer to the benefits individual resource users receive when they are charged less for the resource than they would be willing to pay, or current market prices indicate they should pay. Noncash benefits are the difference between the full economic value of the resource and the fees actually paid to use that resource. Table B-8-5 displays the relationships between total receipts, total budget costs, net receipts, and noncash benefits for each alternative in order of decreasing net receipts. All alternatives receive more money then they spend (net receipts are positive). Fish and wildlife provides the most noncash benefits in all alternatives, followed by recreation, then range. Timber provides nearly all of the cash receipts.

Generally the proportion noncash benefits contribute to total economic benefits increases as net receipts decrease. The decrease in net receipts as noncash benefits increase is a result of more land and resources being allocated to producing noncash benefits, thus lessening the resources available to produce cash receipts.

Table B-8-5 (Decade One) as compared to Table B-8-3 shows that alternatives with higher net receipts in Decade One generally have higher PNV's. This trend holds true in all but one case.

This case involves Alternative NC. In Table B-8-3, Alternative NC has the lowest PNV but in Table B-8-5 it has the third highest net receipts. The cause of this is two-fold; first, it has the lowest non-cash benefits of all the alternatives, and second, Alternative NC is different from the other alternatives in that it does not ensure meeting all management requirements. This allows more of the higher value ponderosa pine stands to be harvested in Decade One. However, to satisfy particular harvest scheduling requirements, cash receipts drop off dramatically after the first decade. Table B-8-5 shows that the net receipts for Alternative NC drop in rank from third in the first decade, to last in the fifth decade. Alternative NC also harvests timber at levels beyond that which is efficient in order to meet current sale levels. This results in higher total receipts, but also higher costs resulting in lower PNV's. As a result, Alternative NC has relatively high net receipts in Decade One, but a relatively low PNV.

Effect of Nonpriced Outputs on PNV between Alternatives

The differences in PNV between the alternatives can also partly be attributed to the levels of nonpriced outputs which they provide. While these outputs can not be valued in dollar terms, their output levels can often be measured in terms of other units. Table B-8-6 presents information which is useful in understanding the relationships between some of the key nonpriced outputs and Present Net Value. It is important to keep in mind that this table is intended to present only general relationships between the nonpriced benefits and PNV. The differences in the output levels and effects should not be interpreted as absolute measurable tradeoffs.

Note that the provisions of some nonpriced benefits are complementary to the production of priced outputs while the provisions of others are contradictory. The contradictory relationships generally mean that more nonpriced outputs can only be provided at the expense of producing fewer priced outputs (primarily timber) and, therefore, lower PNV's. It is a subjective decision as to whether the foregone priced benefits are compensated for by the increased outputs of nonpriced benefits.

Maintaining and enhancing the lifestyles of Central Oregonians was identified as one of the more important nonpriced benefits. This is comprised of several components, including economic stability, the opportunity for diverse recreation experiences in a visually pleasing environment, and clean air and water. For this discussion we will cover these as separate nonpriced outputs and in no particular order of importance.

Maintaining and enhancing economic viability can mean many things to different people and can be measured in various ways. Table B-8-6 presents the change in the number of jobs in the local economy during the first decade that could result from the implementation of an alternative. To some extent, the payments to county also provide some insight

TABLE B-8-5
FIRST AND FIFTH DECADE AVERAGE ANNUAL CASH FLOWS 1/
AND
NONCASH BENEFITS BY ALTERNATIVE
(Million Dollars)
(Alternatives Are Ranked in Order of Decreasing Net Receipts)

	ALTERNATIVES					
	I	E-Dep	NC	B-Mod	A	C-MOD
DECADE 1						
Total Receipts	19 4	20 2	20 2	17 9	17 2	14 0
Total Costs	12 0	12 8	13 1	14 5	13 0	11 4
Net Receipts	7 4	7 4	7 1	3 5	4 2	2 6
Non-cash Benefits to Users	10 8	10 9	10 3	10 7	10 5	11 0
DECADE 5						
Total Receipts	21 5	18 4	18 7	25 3	20 2	18 7
Total Costs	10 9	9 5	10 9	12 4	10 7	10 0
Net Receipts	10 5	8 9	7 8	12 8	9 5	8 7
Non-cash Benefits to Users	13 6	13 2	11 6	12 5	12 5	14 3

1/ Payments to counties and expenditures by cooperators are excluded

TABLE *B-8-6*

PNV AND RESOURCE OUTPUTS

	Maxi-*mum* Outputs	NC	B-MOD	E-DEP	I Pre-ferred	A	C-MOD
PNV (MM $)	512	380	452	471	475	421	395
Change in Jobs from Current Situation	234	Unknown	176	196	118	57	-101
Payments to Counties (MM $)	60	50	49	51	49	43	35
1st Decade Average Annual ASQ MMCF MMBF	 234 142	 N/A N/A	 218 130	 206 123	 190 115	 193 115	 156 94
Elk (No of Elk 5th Decade)	4040	Unknown	1700	2780	2620	2690	3700
Deer (No of Deer 5th Decade)	22,600	Unknown	17,210	22,600	22,600	22,600	22,600
Forage Production (1st Decade MAUM's/Yr)	1053	775	750	790	750	775	731
Old Growth (M Acres 5th Decade)	940	400	424	550	551	530	782
Snag Habitat for Cavity Nesters (% of potential, 5th Decade)	70	52	33	55	54	52	69
Riparian Areas in Excellent Condition (M Acres 5th Decade)	54	54	175	94	175	54	175
Roadless - Allocated (M Acres) 1/	599	291	107	273	384	312	410
Scenic Corridors (M Acres) 2/	1027	835	344	462	417	835	1011
Timber Harvest 3/		1821	1638	1570	1451	1434	1465

1/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F4, G8)

2/ Total acreage for lands allocated to managment areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

3/ First decade - Acres with timber harvest prescription

into the economic base from which the local Governments can provide services to residents of the area In general, both of these have complementary relationships with the production of priced benefits. "Payments to counties" is calculated as 25 percent of total Forest Service receipts, 95 percent of which are related to harvesting timber. In turn, many jobs in the local economy are directly related to the amount of timber and recreation supplied from the Ochoco National Forest. Table B-8-6 indicates that, as the production of priced timber decreases, so do the payments to counties and potential number of jobs in the economy. The ranking of jobs and payments to counties does not necessarily fall on the ranking of PNV, because some alternatives' timber harvest levels and species mix may have a positive effect on jobs and payments to counties but a negative effect on PNV.

The ease of accessibility to personal use firewood from the Forest is also a component of the Central Oregon lifestyle. This is considered a nonpriced benefit. Different alternatives investigated various ways of supplying this material. To the extent that personal use firewood permits are priced below what this material would normally sell for on the competitive market, the rationing of personal use firewood supplies has a slight downward pressure on PNV (although the amount of decrease in PNV would be small).

The maintenance or enhancement of scenic quality in sensitive scenic areas is another nonpriced benefit In Table B-8-6 this output is presented in terms of the amount of acres of retention and partial retention scenic quality objectives met in each alternative. While some timber harvesting is acceptable, and even necessary, in order to meet the management objectives in scenic areas, the provision of scenic quality on the Forest usually comes at some expense to the amount of timber that could be harvested. As more acres are allocated to scenic management across the alternatives, the PNV tends to be lower

The provision and maintenance of old growth and snag habitat for pileated woodpeckers and other cavity dwellers is also considered a nonpriced benefit. Timber harvesting is excluded from old growth areas and timber volumes reduced to provide snag habitat. Table B-8-6 depicts the amount of habitat provided for these species for each alternative. Generally, as the amount of acres managed for their habitat increases, PNV decreases.

The maintenance and enhancement of clean air and water, and the protection of historical and cultural resources, are also, at least to some extent, contradictory to the harvesting of timber. While the provision of these benefits has not been a serious problem in the past, alternatives which greatly increase the amount of acres harvested will make it more difficult to protect these resources. Table B-8-6 shows that, as ASQ increases, so do the number of acres harvested.

Economic Impacts on the Local Communities

Changes in the levels of timber harvests, recreation use, grazing, and Forest Service expenditures on the Ochoco National Forest have the potential to impact the employment and income levels in the local economy. Many of the local communities are particularly dependent upon the Forest based timber resource as the mainstay of their economies. Therefore, the potential economic impacts on the local economy of Central Oregon resulting from the implementation of any one of the alternatives is an important element in the process of selecting a preferred alternative. It was identified as one of the ICO's at the outset of the planning process. The following paragraphs examine this issue.

The primary economic impacts resulting from changes in output levels on the Ochoco National Forest are felt in Crook and Harney Counties and small portions of Wheeler, Jefferson and Grant Counties. Crook, Harney, and Wheeler Counties will be used as a surrogate for the total area of influence. (For more detail on the economic impact analysis, refer to Section 5).

The primary economic impact resulting from changes in output levels in the Ochoco National Forest are minor when compared to the total employment base of the counties. Total employment for the three

counties is estimated to be approximately 9,100 jobs. Approximately 20 percent of these jobs rely on Ochoco National Forest outputs.

All alternatives have less than two percent change in jobs. In terms of payments to counties the impact is much more significant. The Forest's contributions range from $3.5 million in Alternative C-Mod to a maximum of $5 million in Alternative E-Departure in the first decade. Looking at the wood products sector (logging, sawmill and mill works), the counties largest employer, the impact of the alternatives is slightly more significant. The change in jobs for this sector of the economy ranges from a decrease of three percent in Alternative C-Modified to an increase of four percent in Alternative B-Modified.

The timber (primary) and recreation (secondary) resources are the forest based outputs which are influencing the local economy. Since the recreation use levels will not change that dramatically in the short term from one alternative to another, it is the amount of timber that each alternative proposes to sell which most heavily influences the jobs and income levels during the first decade. Over the longer run (20 to 50 years), the differences between the alternatives in their recreation output levels increase and, therefore, become an important factor accounting for the variation in potential for long term economic opportunities.

The potential impacts on timber related jobs in the local economy are estimated as a function of the change in the amount of board feet sold by an alternative as compared to current sale levels. Timber volume is regulated in cubic feet for all alternatives. In all alternatives, diameter of harvested material will be decreasing over time. There are proportionally more board feet than cubic feet in larger material. As a result, board feet will be declining in all alternatives, even if managed under nondeclining yield. Since jobs and income are tied to board feet timber harvest, all alternatives will exert some downward pressure on local economies after the first decade. With regard to the timber related impacts, not only is the amount of wood offered for sale an important factor, but so is the species mix. Given the same amount of timber volume, pine would have more positive economic effects than mixed conifer. This is a result of pine being remilled in the local communities, thus creating more jobs and income per million board feet than does mixed conifer. Because the mix of species does not vary significantly between alternatives the effect between alternatives on local economics will be minimal.

The Ochoco National Forest is locally and regionally an important provider of recreation opportunities. Current estimates show the State's population to be increasing at an annual rate of roughly two percent. To the extent that an alternative emphasizes the development of capacity for diverse recreation opportunities, recreation use on the Forest is likely to increase at a comparable rate. So the service industry in the local economy can be expected to grow over the long run to facilitate the recreation visitors, although the jobs will generally be lower paying than the wood processing jobs.

Another means by which the Forest Service can impact the local economy is through its payments to local governments in lieu of taxes. The Forest Service pays 25 percent of its total receipts to county governments. As was discussed above, most of the Ochoco National Forest receipts are generated by the selling of timber. To the extent that an alternative emphasizes the production of timber, the local governments will benefit financially. Stumpage receipts are not only related to the amount of volume which an alternative proposes to sell, but also the mix of species. With that in mind payments to counties by alternative will respond similarly to the change in jobs from the current situation between alternatives.

Responses to Major Issues, Concerns, and Resource Use and Development Opportunities

This section defines indicators that are used to show differences in how alternatives respond to the Issues, Concerns and Opportunities (ICO's). It also discusses indicators that are of central concern to

the nation as a whole. Appendix A fully discusses each of these ICO's and the relevance of the response indicators. The major ICO's with the greatest influence on the alternatives, and their associated response indicators are as follows.

1. Timber Supply and Forest Management:

   allowable sale quantity in cubic feet, first and fifth decade

   allowable sale quantity in board feet, first decade

   average annual salvage

   uneven-age management acres.

2. Social and Economic Wants and Needs of Local Communities:

   Present Net Value (PNV)

   number of Forest-dependent jobs

   payments to counties.

3. Livestock Grazing and Allotment Management:

   Permitted Livestock Use in AUM's, first and fifth decades.

4. Riparian Area Management:

   acres of riparian area in excellent condition, first and fifth decades.

5. Transportation System:

   miles of primary road, end of first decade.

6. Big Game Habitat:

   potential deer population, fifth decade

   potential elk population, first and fifth decades.

7. Roadless Areas and Wilderness Study Areas:

   acres allocated to roadless recreation.

8. Scenic or Visual Resources:

   acres allocated with scenic resource emphasis.

9. Old Growth:

   acres allocated/dedicated to old growth emphasis.

10. Fuelwood Supply:

    annual firewood supply in M acres, first and fifth decades.

11. Snag Dependent Wildlife:

    average percent of potential cavity nester habitat, first and fifth decades.

12. Winter Sports:

    areas available for winter recreation pursuits.

13. Anadromous Fish

    production of Steelhead smolt (smolt/meter sq.), first and fifth decade.

14. Historic Trail Preservation

    acres allocated for Summit Historic Trail.

15. Off Road Vehicle (ORV) Use

    miles of ATV trail, first and fifth decades.

16. Round Mountain

    area with recreation and scenic resource emphasis, planning period.

Interalternative Comparisons and Major Trade-offs

Introduction

This section summarizes relationships between economic values and the responses of the alternatives to the issues, concerns, and opportunities (ICO's). The purpose is to identify economic and noneconomic comparisons and trade-offs that can be quantified as ICO response indicators. To provide a partial framework for assessing comparisons and trade-offs, the long-term resource demands of the national, regional, and local communities have been summarized. Selected economic values and quantified indicators of responsiveness to ICO's are tabulated (Table B-8-7). Finally, differences and similarities

TABLE B-8-7
INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO ISSUES, CONCERNS, AND OPPORTUNITIES

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Allowable Sale Quantity (ASQ)							
1st Decade	MMCF	N/A	21 8	20 6	19 0	19 3	15 6
5th Decade	MMCF	N/A	21 8	16 1	19 0	19 3	15 6
1st Decade	MMBF	N/A	130 0	123 0	115 0	115 0	94 0
Average Annual Salvage	MMBF		8	1 5	7	1 4	6
Uneven-Age Mgmt	M Acres	0	120	0	100	0	170
PNV	Million $	380	452	471	475	421	395
Estimated County Receipts	M $'s	Un-known	4 5	5 1	4 9	4 3	3 5
Estimated Change in Jobs	#	Un-known	176	196	118	57	-101
Livestock Use	M AUM's/Yr						
1st Decade		77 5	70 0	79 0	70 0	77 5	73 1
5th Decade		77 5	80 0	79 4	80 0	79 1	74 4
Riparian Areas in Excellent Condition							
1st Decade	M Acres	---	10 0	---	10 0	---	10 0
5th Decade	M Acres	5 4	17 5	9 4	17 5	5 4	17 5
Miles of Primary Road Open and Maintained -End of Planning Period	#Miles	4774	4800	4776	4734	4774	4743
Miles of Roads Closed	#Miles						
1st Decade		694	913	890	1558	694	1520
5th Decade		1734	2123	2082	2185	1734	3224
Deer Population							
5th Decade	#	Un-known	17,210	22,600	22,600	22,600	22,600
Elk Population	#						
1st Decade			3210	3170	3000	3370	3740
5th Decade		Un-known	1700	2780	2620	2690	3700
Acres Allocated-Unroaded 1/	M Acres	29 1	10 7	27 3	38 4	31 2	41 0

Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Scenic Resources							
Preservation	M Acres	38 3	39 5	43 3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70 7	96 8	102 2	155 6
Partial Retention	M Acres	71 4	28 1	59 4	32 4	71 4	61 5
Allocated 2/	M Acres		34 4	46 2	41.7	83 5	101 1
Old Growth (Allocated) 3/	M Acres 32,860		18,740	26,340	19,996	36,970	45,030
Fuelwood Supply	M Cords						
1st Decade		14 0	15 0	13 1	13 0	14 0	12 0
Snag Habitat for Cavity Nesters	% of Potential						
1st Decade		Unknown	43	46	47	46	51
5th Decade		Unknown	33	55	54	52	69
Area Allocated To Recreation Emphasis 4/	Acres		28,630	35,065	58,120	31,950	48,710
Anadromous Steelhead	SHCI 5/ (M Smolt)						
1st Decade		121	121	121	121	121	121
5th Decade		220	220	220	220	220	220
Total Miles of ATV Trails	#Miles						
1st Decade		None	95	0	95	0	95
5th Decade		None	190	0	190	0	190
Round Mountain Recreation Emphasis 6/	Acres	N/A	1,000	0	1,000	0	0

1/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F11, G8)

2/ Total acreage for lands allocated to management areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

3/ Total acreage for lands allocated to management areas with old growth emphasis (D4, F6, G5)

4/ Total acreage for lands allocated to management areas with recreation emphasis (D9, D10, D11, F7, F8, F10, F11, F13, F14, F16, F17, F19, G8, G11, G12, G14)

5/ SHCI Steelhead Habitat Capability Index, thousands of smolt

6/ Acres on Round Mountain with recreation emphasis (applies to Round Mountain National Recreation Trail)

among individual alternatives are summarized in terms of major trade-offs among competing objectives or responses to expressed issues, management concerns, or resource use and development opportunities. A complete understanding of differences among alternatives requires reading all of Chapters 2 and 4.

National, Regional, and Local Overview

National projections predict demand will rise for all outputs from National Forests (RPA). At the same time, there is also strong demand to protect and enhance environmental quality. Demands and prices for commodity production are generally determined in national and regional markets. Demand for timber from this Forest is high. Most timber sales are competitively bid to prices significantly higher than appraised prices. When national and regional markets are strong, prices are frequently bid upwards of $200 per thousand board feet for ponderosa pine. Demand for livestock forage is also high since the Forest and Grassland are the primary sources of summer forage in this area. All allotments are currently grazed, and the desire to utilize additional forage, or take over any unused allotments, is always high.

Demands for outdoor recreation uses are essentially local or regional. Recreationists on this Forest are predominantly local. The main exceptions are the fall hunting seasons which draw hunters from more populated areas of the state. Total recreation use of the Forest is predicted to rise about 59 percent in the next 50 years (see Tables 3-14 & 3-15, FEIS, Chapter 3).

Timber Supply and Forest Management

Comparison of Past, Present and Alternative Timber Harvest Levels

The potential yield (PY) under the current timber management plan is the total harvest level that could be sustained assuming intensive forestry practices on all available acres. This includes adjustments to meet multiple resource objectives This was calculated to be 20.86 MMCF (139.5 MMBF) and adjusted to 20.4 MMCF (136.5 MMBF) in 1984, as a result of the Oregon Wilderness Bill. A similar value was not calculated for the alternatives It would be equivalent to a maximum timber FORPLAN run for each alternative if unsuitable [1/] acres were included in the available acreage base.

The programmed allowable harvest under the current timber management plan is that part of the potential yield scheduled for harvest in a specific year (see Table B-8-8) It was calculated for the current plan by: (1) reducing the acreage base by the acres of marginal land [1/] that we did not plan to treat, and (2) by reducing yields based on difference in acres of intensive management (planting of genetically improved stock and precommercial thinning) predicted under the potential yield and what was actually planned to be accomplished (This process was known as the "earned harvest effect" (EHE)). This could be adjusted annually if there was significant change in acres of intensive management practices or in marginal land treated from what was programmed. This was originally calculated to be 19.86 MMCF (132.7 MMBF) and was adjusted in 1984 to 19.46 MMCF (129.8 MMBF). This is equivalent to the Allowable Sale Quantity (ASQ) plus the salvage volume.

Table B-8-8 displays the past actual sold and cut volume, planned harvest level from the existing plan, and range of harvest levels for each alternative. The range of harvest levels shown shows the highest and lowest predicted harvest level in board feet for the first decade All volumes are average annual figures for a particular decade. This table also displays the estimated volume of ponderosa pine for this same period. Additional timber resource information by alternative and benchmark is also presented in Table B-8-9.

The local industry is most interested in the ponderosa pine volume, and it has the greatest impact on the local economy, since much of the pine lumber is remanufactured to molding and other products locally.

[1/] The current plan did not have a category called "unsuitable" so there was no reduction in the available land base for lands that could not be reforested It did have a category called "marginal" which included steep slopes and critical soils, and stagnated submerchantable lodgepole Some harvesting was programmed from these lands but it was a separate slope component and could not be substituted for "standard" volume or vice versa

TABLE B-8-8
COMPARISON - PAST, PRESENT, AND ALTERNATIVE TIMBER OUTPUTS 1/
(First Decade Volumes in MMBF)

TIMBER OUTPUT COMPONENT	ACTUAL 1979-88 Annual Ave.		EXISTING 1980 TM Plan	ALTERNATIVES PLANNED VOLUME BY ALTERNATIVE FOR FIRST DECADE					
	Sold	Cut	P A H 2/	NC	B-MOD	E DEP	I	A	C-MOD
SAWTIMBER (Chargeable)									
Green sales (ASQ)3/	136 9	111 6	127 1	127 1	130	123	115	115	94
Est. pine volume 4/	109 1	87 5	95	95	85	87	82	79	63
Salvage sales	include	above	2 7	2.7	4	5	4	4	3
SALVAGE SALES & SAWTIMBER (Est. percent change in next five decades) 6/	136 9 5/	111 6	129 8	129 8	134 (-7)	128 (-30)	119 (-10)	119 (-10)	97 (-10)
SAWTIMBER (Nonchargeable) negligable in existing or planned program	0	0	0	0	0	0	0	0	0
SUBMERCHANTABLE (Post, poles, cull)	1 3	1 3	Unestimated in existing or planned progam						
CONVERTIBLE PRODUCTS Firewood 7/	2 7	2 7	unestimated	unesti-mated	7	7	6	7	6
TOTAL (TSPQ)	138 2	110 1			141	135	125	126	103

1/ Note that due to different bases for calculation, these figures may not be directly comparable However, they may be used to show changes in specific comonents for calculations, over time All calculations were done in cubic feet. The volumes in this table are estimates based on board foot/cubic foot ratio

2/ Yield of timber projected for the period of 1980 to 1989, as calculated for the 1980 Timber Management Plan and adjusted for 1984 Oregon Wilderness Bill The Programmed Allowable Harvest (P A H) is the sawtimber from green and slaveage sales scheduled for harvest.

3/ Allowable sale quantity calculated for the current land and resource management plan direction, projected into the future using new scientific information, such as yield tables and suitability for timber harvest, and using FORPLAN analysis model

4/ Estimated volume of ponderosa pine that is included in green sale volume

5/ Average volume sold was not adjusted for "buy-back" volume

6/ Reduction in all but E DEP is due to change in BF/CF ratio and estimated reduction in salvage volume as more stands become managed Change in E DEP is mostly due to the planned departure from even flow

7/ Actual firewood volume is based on years 1985 to 1988 Essentially all of this was sold as personal use Planned volume is the estimated amount if firewood available Typically less than half of this will be utilized

TABLE B-8-9
Timber Resource Management Information by Benchmark and Alternative

		Inventory			First Decade Average Annual ASQ			LTSYC			Average Annual Net Growth		
Benchmark or Alternative 1/	Selected Suitable Lands (M Acres)	Begin (MMCF)	Begin/Acre (CF)	End (MMCF)	(MMCF)	% of Col (2)	(MMBF)	(MMCF)	% of Decade Col (4)	Met	CF/Acre Present	CF/Acre 2030	2030 MMCF
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Benchmark													
Max Timber	518	1152	2 2	730	23 4	2 0	142	23 4	3 2	2	27	43	22 3
Max PNV	518	1147	2 2	762	22 7	2 0	139	22 7	3 0	1	30	39	20 1
Alternative													
NC	534 2/	N/A	N/A	N/A	N/A	N/A	N/A	31 1	N/A	N/A	25	N/A	N/A
B MOD	511	1115	2 2	799	21 8	2 0	130	21 8	2 7	1	22	41	20 9
E-DEP	495	984	2 0	760	20 6	2 1	123	19 3	2 5	1	26	35	17 4
I Preferred	494	990	1 9	792	19 0	1 9	115	19 0	2 4	1	28	37	18 2
A	489	970	2 0	740	19 3	2 0	115	19 5	2 6	2	24	39	19 2
C-MOD	459	895	1 9	751	15 6	1 7	94	15 6	2 1	1	30	28	13 4

	Area and % of Suitable Land by Yield Level						First Decade				
	Full Yield		50-90% Yield		Under 50% Yield						
Benchmark or Alternative 1/	M Acres	% Col (1)	M Acres	% Col (1)	M Acres	% Col (1)	Clearcut M Acres	Shelter-woodM Acres	Overstory Removal M Acres	Selection M Acres	Harvest Total % Col (1)
Column	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Benchmark											
Max Timber	506	98	12	2	0	0	22	45	64	3	26
Max PNV	506	98	12	2	0	0	13	17	88	25	28
Alternative											
NC	413	77	89	17	32	6	0	119	64	0	34
B-MOD	484	95	27	5	0	0	25	50	21	68	32
E-DEP	0	0	495	100	0	0	14	26	113	4	32
I Preferred	0	0	492	99	2	1	9	21	53	62	29
A	0	0	489	100	0	0	19	18	106	1	29
C-MOD	0	0	459	100	0	0	15	4	32	96	32

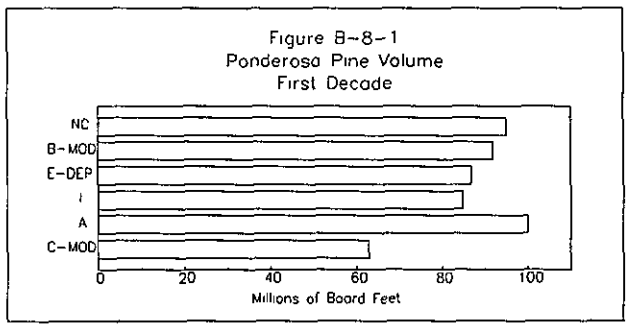
1/ Tentatively suitable land for all alternatives is 533 M Acres

2/ This is based on 1972 land classification system and adjusted for Amendment #1 of the Timber Plan

It is estimated that the sell volume has included 90 to 100 MMBF of pine in recent years. The current inventory shows 67 percent of the total volume is in ponderosa pine (see Appendix E). So the pine harvest in all alternatives will be 67 plus or minus five percent of the total harvest volume. However, the actual pine volume scheduled for harvest will vary considerably by alternative during the next five decades.

Effects of the Alternatives on the Ponderosa Pine Harvest

The range of ponderosa pine volume by alternative is displayed in Figure B-8-1



Alternative A has the highest volume of pine during the first decade due to the large proportion of harvesting in the first decade in two-story pine types. The volume decreases by about 30 MMBF after the first decade and remains at a relatively low level for the next four decades.

Alternative B-Modified would provide about 85 MMBF of pine during the first decade Alternative B-Modified would maintain the highest level of pine during the first five decades of all the alternatives.

Alternative E-Departure has a first decade volume of 87 MMBF and declines to an estimated 52 MMBF in the fourth decade.

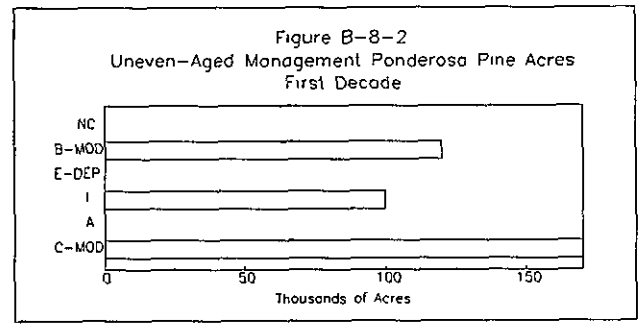
Alternative C-Modified would provide about 63 MMBF in the first decade, remaining constant through the fifth decade.

The pine volume in the long term (decades six and beyond) depends on harvest level and intensity of management Alternative I provides for a stabilization of the ponderosa pine harvest over time, as do the other alternatives.

Uneven-aged Management

Uneven-aged management has been included in Alternatives B-Modified, C-Modified and I. This silvicultural system was included in these alternatives in response to public interest in its application as an alternative to clearcutting. Expectations would be increased size of ponderosa pine crop trees (20 inch DBH), improved conditions of forested habitat for wildlife and more desirable scenic qualities.

The range of acreage of ponderosa pine which would be managed with uneven-aged silvicultural systems is shown in Table B-8-7 and Figure B-8-2.



Social and Economic Wants and Needs of Local Communities

This section compares and discusses the economic consequences of the alternatives. The comparisons focus on present net value (PNV), market and nonmarket values, costs, net receipts, returns to treasury, and non-cash benefits. Each alternative has non-quantifiable benefits and costs which should also be considered when attempting to rank the alternatives in terms of net public benefits. This section also discusses the social effects of the alternatives.

Differences in Present Net Values

Present net value (PNV) is the primary quantitative measure of economic efficiency used for all benchmarks and alternatives. It is also an important measure of the dollar value of the alternatives. PNV has

been calculated to be the sum of all market and nonmarket priced values, less all management costs for the 50-year planning horizon, discounted to present values using a four percent interest rate. The relationship between PNV and net public benefits is discussed in Section 4 of this appendix.

The Max PNV benchmark and six alternatives are ranked by decreasing PNV in Table B-8-10. Table B-8-12 provides further detail on discounted costs and benefits by resource group. The Max PNV benchmark is provided as a reference point only. It is an estimate of the discounted net economic returns the Forest could receive for its priced resources if they were managed solely to maximize present net value.

The main factor influencing patterns in PNV, benefits, and costs is timber management. Timber values represent from 53 percent to 65 percent of the total dollar values in the alternatives. Values produced from selling timber are, in general, far in excess of related costs As timber harvest levels decrease across alternatives, discounted costs and benefits, PNV usually decrease as well. This pattern is due mainly to non-timber resource objectives restricting timber practices and harvests. Although recreation related benefits (including hunting and fishing) do make up a significant portion of the total dollar benefits (28% to 41%), increases in these dollar benefits do not make up for the PNV lost from timber. Therefore, the greater the non-timber resource objectives, the lower the timber discounted benefits and costs, and PNV.

This general pattern is modified by the intensity of the timber management activities employed. Some alternatives schedule timber practices and harvests at the most economically efficient level, given other resource objectives (Alternatives C-Modified, I, and E-Departure). Other alternatives apply more intensive timber practices to achieve the highest timber volumes possible, given other resource objectives (Alternatives A, B-Modified, and NC). This results in higher timber benefits, but also higher costs and lowered PNV. In each of these two groups of alternatives the general pattern discussed above holds. The exact combination of non-timber resource objectives and timber management intensity determines the ranking in PNV of these two groups together.

The PNV of the NC Alternative is an estimate. It is also based on a programmed harvest level of 129 MMBF. If the estimate was based on the potential yield of 136 5 MMBF, the PNV would be significantly higher.

The Forest and Grassland are considered to have potential energy resources. However, very little testing and development has taken place to date. No estimates have been made of future extractions, so energy values were not included in the economic analysis. However, oil and gas leasing provides significant returns to the Treasury and to counties. The alternatives have little effect on mineral activities.

Differences in Costs

Capital investment costs include trails, roads, reforestation, timber stand improvement, prescribed burning, and physical structures for range, recreation, fish, and wildlife. Other costs include operating and maintaining facilities, program management, and support costs associated with management of other resources. Capital investment costs pertain mostly to roads and timber stand management. For example, 76 percent (Alternative C-Mod) to 95 percent (Alternative A) of capital investment costs are associated with road construction and timber management. The majority of operation and maintenance costs are program management, followed by support funds necessary to carry out timber programs.

Because most costs are associated with timber management, the higher the timber output, the higher the costs. Generally, capital investment costs decrease significantly over time due to declining road construction and timber stand improvement practices. Operation and maintenance costs remain fairly constant over time except for alternative E-departure's where timber volume declines over time.

Fixed costs represent a relatively small portion of the total costs (20% to 30%). The remainder of the cost for each alternative varies with the objectives of the alternative.

Costs associated with timber practices and harvests constitute a large portion of the total costs Alternative B-Modified has the highest cost of any alternative and only 29 percent of the discounted cost is directly attributed to resources other than timber and roads. Road construction and reconstruction is almost entirely tied to timber harvests on this Forest. Alternative C-Modified has the lowest cost of any alternative and the highest benefits associated with amenity outputs, yet only 35 percent of the costs can be attributed to resources other than timber.

Differences in Economic Benefits and Cash Flows

The total economic benefits of the alternatives come from priced resources which include both "market" outputs, and those with "assigned" values. Market values represent the unit price of an output that is normally exchanged in a market. On this Forest, timber is the primary market output, accounting for over 90 percent of the market outputs and 50 percent to 65 percent of the total economic benefits of the alternatives. Other market outputs include livestock grazing, campground use, special use permits, and minerals leasing. Assigned values represent the unit price of an output not normally exchanged in a market. Various analytical techniques were used to estimate values that people would be willing to pay for these benefits. Outputs with assigned values include dispersed recreation, wilderness use, hunting, fishing, and water quality improvement. Hunting and fishing are the major assigned values, comprising from 16 to 26 percent of the total economic benefits. The remaining 18 to 24 percent is split in different proportions, depending on the alternative, among livestock grazing, developed recreational use, dispersed roaded recreational use, and dispersed non-roaded recreational use.

Total market values range from 62 percent (Alternative C-Modified) to 70 percent (Alternative B-Modified) of the total economic benefits. Alternatives in the high end of this fairly narrow range have relatively high timber benefits and/or relatively lower fish, wildlife, or recreational values. The opposite is true for alternatives in the low end of the range.

Cash receipts are revenues returned to the Forest and Grassland for stumpage, grazing permits, campground fees, leasable minerals, and special use permits. However, the Forest generates economic benefits to users which are not realized in terms of cash flows. These are referred to as "noncash benefits." They refer to the benefits individual resource users receive when they are charged less for the resource than they would be willing to pay, or current market prices indicate they should pay. Noncash benefits are the difference between the full economic value of the resource and the fees actually paid to use that resource. Table B-8-11 displays the relationships between total receipts, total budget costs, net receipts, and noncash benefits for each alternative in order of decreasing net receipts. All alternatives receive more money than they spend (net receipts are positive). Fish and wildlife provide the most noncash benefits in all alternatives, followed by recreation, then range. Timber provides nearly all of the cash receipts.

Generally the proportion noncash benefits contribute to total economic benefits increases as net receipts decrease. The decrease in net receipts as noncash benefits increase is a result of more land and resources being allocated to producing noncash benefits, thus lessening the resources available to produce cash receipts.

Table B-8-11 (decade one) as compared to Table B-8-10 shows that alternatives with higher net receipts in decade one generally have higher PNV's This trend holds true in all but one case.

This case involves Alternative NC. In Table B-8-10, Alternative NC has the lowest PNV, but in Table B-8-11, it has the third highest net receipts. The cause of this is two-fold: first, it has the lowest noncash benefits of all the alternatives, and secondly, Alternative NC is different from the other alternatives in that it does not ensure meeting all management requirements. This allows more of the higher value ponderosa pine stands to be harvested in decade one. However, to satisfy particular harvest scheduling requirements, cash receipts drop off dramatically after the first decade. Table B-8-11 shows that the net receipts for Alternative NC drop in rank

TABLE B-8-10

PRESENT NET VALUE AND DISCOUNTED COSTS AND BENEFITS OF ALTERNATIVES

(Million Dollars)

(Ranked by Decreasing PNV)

Alternative/ Benchmark	Present Net Value	Change	Discounted Costs	Change	Discounted Benefits	Change
Max PNV Benchmark 7	512		241		754	
Alternative I	475	-37	227	-14	701	-53
Alternative E-Dep	471	-4	221	-6	693	-8
Alternative B-Mod	452	-19	262	+41	714	+21
Alternative A	421	-31	236	-26	657	-57
Alternative C-MOD	395	-26	213	-23	608	-49
No Change	380	-15	245	+32	653	+45

TABLE B-8-11
FIRST AND FIFTH DECADE AVERAGE ANNUAL CASH FLOWS 1/ AND NONCASH BENEFITS BY ALTERNATIVE

(Million Dollars)

(Alternatives Are Ranked in Order of Decreasing Net Receipts)

	ALTERNATIVES					
	I	E-Dep	NC	B-Mod	A	C-MOD
DECADE 1 Total Receipts	19 4	20.2	20 2	17 9	17 2	14 0
Total Costs	12 0	12.8	13 1	14 5	13 0	11 4
Net Receipts	7.4	7 4	7 1	3 5	4 2	2 6
Non-cash Benefits to Users	10 8	10 9	10 3	10 7	10 5	11 0
DECADE 5 Total Receipts	21 5	18 4	18 7	25 3	20 2	18 7
Total Costs	10 9	9 5	10 9	12 4	10 7	10 0
Net Receipts	10 5	8 9	7 8	12 8	9 5	8 7
Non-cash Benefits to Users	13 6	13 2	11 6	12 5	12 5	14 3

1/ Payments to counties and expenditures by cooperators are excluded

TABLE B-8-12
DISCOUNTED BENEFITS AND COSTS BY RESOURCE GROUPS
(Millions of Dollars) 1/

	ALTERNATIVES (Ranked by Decreasing PNV)					
	I	E-Dep	B-Mod	A	C-MOD	NC
PNV	475	471	452	421	395	380
DISCOUNTED PRICED BENEFITS BY RESOURCE						
Timber	422 6	415 9	446 1	392 4	322 4	413
Developed & Dispersed Recreation	84 8	85 1	76 7	75 7	86 4	72 3
Fish & Wildlife	154.8	152 1	151 0	149 7	161 5	103
Range	20 5	20 5	20 8	20 2	19 1	18 6
Minerals	19 0	19 0	19 0	19 0	19 0	18 2
DISCOUNTED COSTS BY MAJOR CATEGORIES						
Timber	49 6	50 7	70 1	64 8	41 1	69
Roads	86 2	82 8	95 7	84 0	80 5	87
Developed & Dispersed Recreation	11 7	8 2	11 3	5 2	12 7	5 1
Fish & Wildlife	6 9	6 9	7 4	5 7	9 4	6
Range	8 1	8 3	8 3	7 9	7 5	9
Other 2/	59 4	59 9	63 5	63 7	57 7	55
Soil & Water	4.8	4.7	5 1	4 6	4 4	4

1/ Direct comparisons of benefits and costs by individual resource provide broad indications of specific relationships, but they may be misleading because many costs are nonseparable under multiple-use management

2/ These costs include general administration, cultural resources, lands and minerals, human resources, and protection

from third in the first decade, to last in the fifth decade. Alternative NC also harvests timber at levels beyond that which is efficient in order to meet current sale levels. This results in higher total receipts, but also higher costs resulting in lower PNV's. As a result, Alternative NC has relatively high net receipts in decade one, but a relatively low PNV.

When decade five from Table B-8-11 is compared with Table B-8-10, the relationship between net receipts and PNV's is not as strong as it was for the first decade. The ranking of alternatives from highest net receipts to lowest net receipts shows the same changes from decade one to decade five. Alternatives E-Departure and NC have higher net receipts in the first decade than in later decades, while Alternative B is ranked higher by net receipts in decade five than in decade one. Because of the PNV discounting computations, high returns in early decades will affect the PNV more than high returns in later decades. The exception is NC, because the drop in net receipts is so sharp the net receipts in decades two to five outweigh the high first decade receipts, thus lowering the PNV.

Comparing the first and the fifth decades in Table B-8-11, all alternatives show an increase in net receipts. The major factor is a decrease in costs because much less road building is necessary in the fifth decade. Also, real stumpage prices increase over time.

Noncash benefits for all alternatives increase from decade one to decade five. Part of this increase is a result of a projected increase in recreation demand. The rest of the increase can be attributed to habitat management for big game and fish. The time lag between habitat improvement and an increase in hunting and fishing causes benefits to show up most dramatically in future decades. The percent increase between decades one and five in noncash benefits ranges from 13 percent in the high commodity alternatives, to 28 percent in Alternative C, an amenity oriented alternative.

Social Effects

Direct Effects

The direct effects of the alternatives include the following:

Employment levels produced by the alternative's mix of outputs (see Table B-8-13);

The amount of the Forest budget;

The amount of 25 percent monies paid to the counties.

TABLE B-8-13
CHANGES IN EMPLOYMENT FOR VARIOUS ECONOMIC SECTORS BY ALTERNATIVE
(Number of Jobs - First Decade)

	B-MOD	E-DEP	I Preferred	A	C-MOD
Logging	14	9	5	5	-7
Sawmills	25	18	10	9	-14
Remanufacturing	35	30	8	3	-55
Retail Trade produced by Wood Products Industries and 25% monies	15	16	6	3	-22
Retail Trade produced by Recreation	21	49	45	18	51
Total, All Sectors	176	196	118	57	-101

Indirect Effects

The previously mentioned effects of the various alternatives would produce effects on the social fabric of the area as follows.

Effects on Occupational Lifestyles

For loggers and sawmill workers, Alternative B-Modified would increase employment by 44 jobs, which is around four percent of total logging and sawmill employment. Alternatives A, I, and E-Departure would produce increase of 14, 15, and 28 jobs respectively.

For workers in remanufacturing operations, the changes range from a three percent employment gain (Alternative B-Modified) to a three percent loss (Alternative C-Modified). None of these changes is considered to be significant. However, the remanufacturing industry will be affected by the Forest Plans of several Forests. This matter is discussed in the Cumulative Effects section in Chapter 4 of this FEIS.

Merchants benefit from any alternative. The smallest gain, 21 jobs, is in Alternative A; the largest gain, 65 jobs, occurs in Alternative E-Departure. Small town merchants hire a smaller proportion of employees than do other business. Therefore, these figures are considered to understate the gains to the merchants. When these merchants do hire employees, they often work part time and for low wages. These jobs are often taken by women. Often these jobs provide a secondary income for a family.

Effects on Leisure Lifestyles

Alternative C-Modified would provide for the most recreational activities. Elk and fish are at the highest levels of any of the alternatives, as are opportunities for roadless recreation. Landscapes appear most natural to the driver or hiker. Fuelwood gathering is the one activity which is at its lowest.

At the other end of the scale, Alternative A provides, in general, the least recreational opportunities. Roadless areas and fish are at the lowest levels. Unlike the other alternatives, there is no construction of trails for hiking, ATV's, cross-country skiing, or snowmobiling.

Generally speaking, Alternative B-Modified provides the next lowest level of recreational opportunities. Roadless areas and elk are low. The scenery is the lowest of all the alternatives. However, fuelwood is at its highest; and trail construction and increased numbers of fish improve the picture.

Alternatives E-Departure and I provide an intermediate situation. Alternative I provides more roadless areas, trails, and fish; while Alternative E-Departure offers slightly more elk plus a provision for a semiprimitive motorized area.

Effects on Social Structure: Community Cohesion and Stability

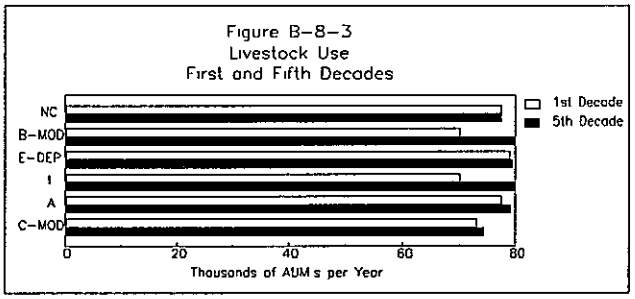
"Community Cohesion" is an estimation of whether a given alternative will tend to unify or polarize a community. While a diversity of opinions in a community is generally desirable, it is assumed that polarization of the community is harmful and that cohesion is beneficial. It is further assumed that polarization will be caused by the adoption of an alternative which greatly favors one point of view over others. In contrast, the selection of an alternative that meets to some extent the desires of diverse participants is assumed to produce cohesion.

Judging by this criterion, Alternatives B-Modified and C-Modified would produce polarization. The public response to E-Departure, the Draft Preferred Alternative, included many negative comments about its "departure" harvest schedule. Under Alternative A, existing polarization would not diminish. Alternative I is the one alternative judged likely to promote some degree of community cohesion.

Livestock Grazing and Allotment Management

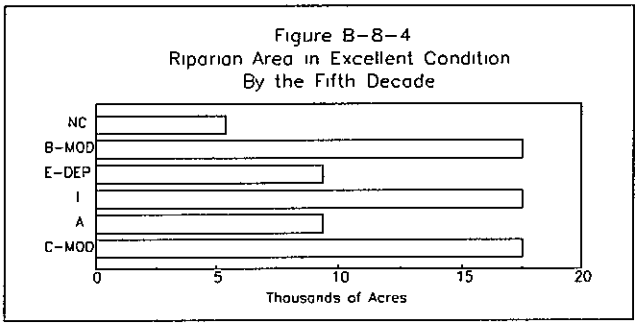
Alternatives E-Departure, I and B-Modified all seek to increase the forage available over time. Alternative B-Modified is the most aggressive of the three in its emphasis on forage production. Alternative C-Modified emphasizes amenities over commodity resource use and accordingly shows the lowest forage

production for livestock. Alternatives NC and A maintain about the current level of forage production over time.



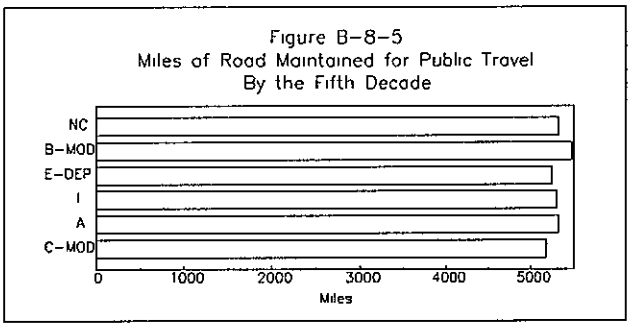
Riparian Area Management

All alternatives show some progress toward meeting the public and management concerns over livestock impacts to riparian areas. Alternatives NC and A would improve the least amount of riparian area over time, generally limiting the rehabilitation and enhancement to anadromous fisheries. Alternative E-Departure would improve more acreage by adding additional enhancement work on key trout fisheries, as well as to anadromous fisheries. Alternatives B-Modified, I and C-Modified would include rehabilitation and enhancement to bring 17,500 acres to "excellent" condition by the fifth decade. The desired future condition for these three alternatives would be "excellent" for all of the 20,240 acres of riparian area on the Forest and Grassland.



Transportation System

The primary difference between the alternatives is in the management strategy for the miles of road maintained open for public travel. All alternatives close and or restrict use on some roads to protect the investment, to provide for public safety, to reduce soil erosion and degradation of water quality, and to increase the wildlife habitat effective in key areas on the Forest and Grassland.



Big Game Habitat

A number of the alternatives provide for big game habitat through the dedication of or emphasis on management for winter range characteristics. The indicator for the responsiveness of the alternatives to this issue is the potential population levels of elk and deer that could be maintained. Table B-8-7 and Figure B-8-6 illustrate the responsiveness of each of the alternatives.

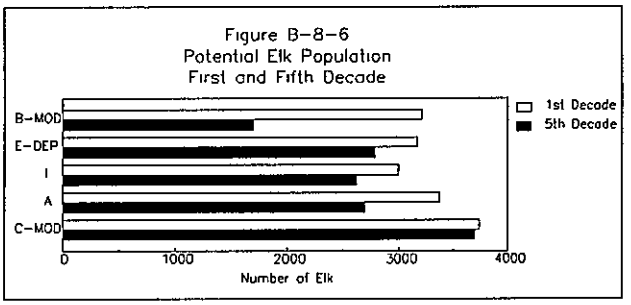
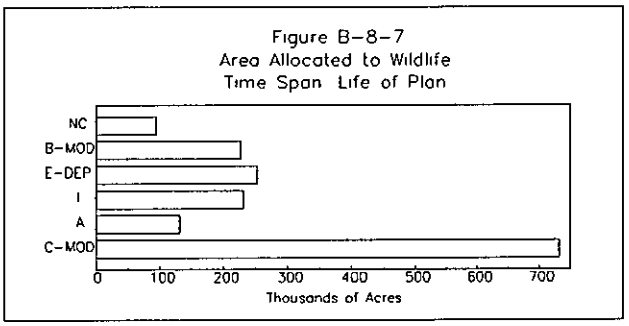


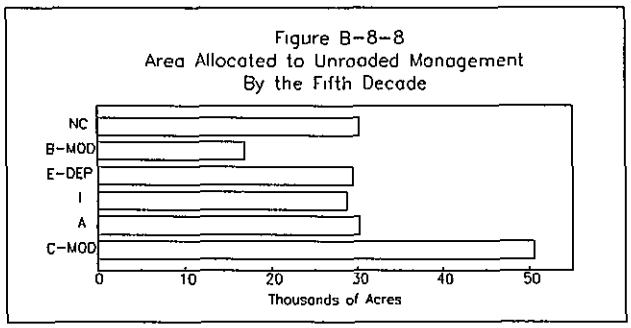
Table B-8-7 and Figure B-8-7 illustrate the areas allocated or dedicated to a wildlife management strategy (includes old growth and eagle roosting areas but is reflective of emphasis for big game).



Roadless Areas and Wilderness Study Areas

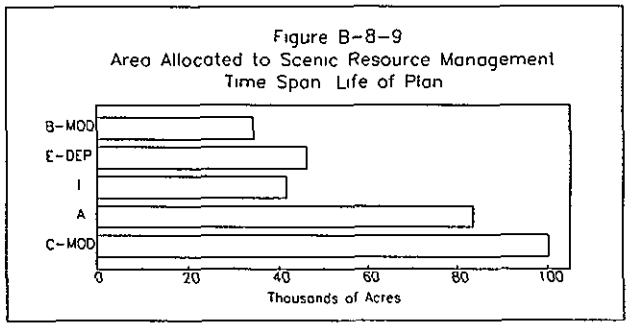
A number of the alternatives allocate or manage areas for unroaded recreation (nonmotorized and without roads). Table B-8-8 and Figure B-8-8 illustrate the area that will be maintained in an unroaded condition for the life of the planning period.

The North Fork of the Crooked River Wilderness Study Area, 1,125 acres, is incorporated in all the alternatives.



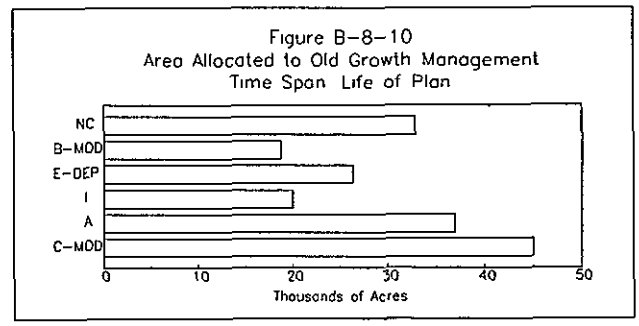
Scenic or Visual Resources

Public and management concerns for the maintenance of the scenic qualities on the Forest and Grassland resulted in provisions for scenic resource emphasis along key travel corridors for a number of the alternatives. This is in addition to the visual quality objectives assigned to all alternatives. Table B-8-7 and Figure B-8-9 illustrate the area allocated or dedicated to a visual resource management emphasis.



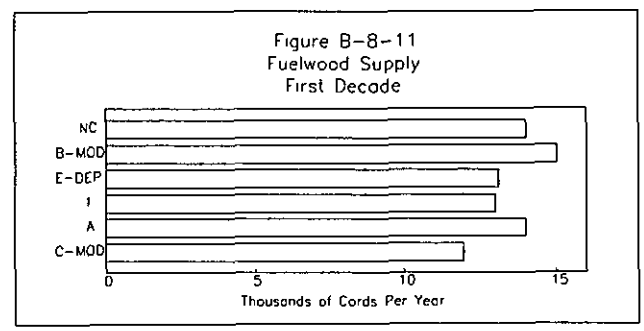
Old Growth

Old Growth areas have been designated according the Regional definition for all all the alternatives considered in this FEIS. The range of acreage allocated is presented in Table B-8-7 and Figure B-8-10. Those alternatives with higher emphasis on commodity outputs, such as Alternative B-Modified, have lower allocations with total existing old growth rapidly depleting over time. On the other end of the spectrum, alternatives such as C-Modified with amenity value emphasis, allocate larger areas to old growth and will retain larger acreages over time.



Fuelwood Supply

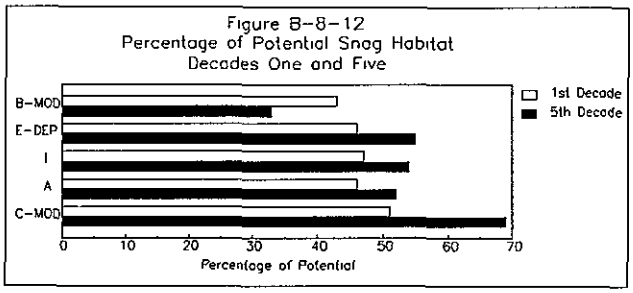
All the alternatives would supply a portion of the fuelwood demand on the Forest and Grassland Those alternatives that have higher levels of timber harvest activity would supply a higher percentage of the demand. The amenity alternative, C-Modified, would provide the least amount of fuelwood. Those alternatives such as I, which would stabilize the timber supply over time, would provide a more consistent supply than alternatives which depart from an even flow of timber harvest and experience a long-term reduction in harvest. A similar reduction in available fuelwood would shadow the decline in timber harvest.



The fuelwood supply for each alternative for decades one and five is presented in Table B-8-7 and is illustrated in Figure B-8-11.

Snag Dependent Wildlife

All the alternatives provide for the maintenance of a portion of the potential snag dependent species habitat. The ability of any alternative to provide snag habitat is directly related to its timber harvest strategy. Those alternatives with the higher timber harvest levels over time will have less ability to provide a portion of the potential habitat. The percentage of potential snag habitat is presented by alternative in Table B-8-7 and is illustrated in Figure B-8-12



Winter Sports

All the alternatives are responsive, to a degree, to the public interest in having areas available for winter recreation. All the alternatives except for NC and A would provide for winter recreation at Bandit Springs through a 1,580-acre management area allocation. This area is presently closed to snowmobilers to allow for cross-country skiing and similar nonmotorized winter recreation pursuits.

The top of Lookout Mountain would be open to snowmobile use on all the alternatives except for C-Modified and E-Departure.

Anadromous Fish

All the alternatives provide for the rehabilitation of key riparian areas along all anadromous fisheries, and schedule enhancement activities to provide for maintenance or enhancement of steelhead production. Estimated smolt production over time is displayed in Table B-8-7. It is planned to be the same for all the alternatives, that is anadromous fish production is assured at this level for all alternatives.

Historic Trail Preservation

The Summit Historic Trail is presently designated as a National Historic Trail and would retain that status for all the alternatives. Alternative I allocates 9,560 acres to protect the existing integrity of the trail and to preserve its historic and related scenic qualities.

Off-Road Vehicle (ORV) Use

The off-road vehicle use issue is an administrative problem for all the alternatives. At this point in time it is more of a social issue than one of resource impacts All the alternatives would have adequate regulations in place to deal with resource impacts. Off-road use by ATV's, snowmobiles and motorbikes is seen as not being compatible with some resource emphases. Off-road use would be prohibited on all the alternatives for areas allocated as wilderness, wilderness study areas, and wild and scenic rivers - a total of 41,355 acres amounting to four percent of the Forest and Grassland.

Off-road use would be restricted to designated routes and prohibited from December 1 to May 1 for eagle roosting management areas (570 acres) for all alternatives.

The Bandit Springs area, in Alternatives B-Modified, E-Departure, I and C-Modified, would prohibit snowmobile use on 1,580 acres.

Alternative I would include a number of additional off-road vehicle use closures and restrictions. Motorized use would be prohibited on an additional eight management areas, a total of 35,580 acres amounting to four percent of the Forest and Grassland. Off-road use would be restricted to the summer months (closed December through April) to protect such resources as big game winter range on 186,790 acres amounting to 20 percent of the Forest and Grassland.

Alternatives B-Modified, C-Modified and I would begin to develop an ATV trail system to manage off-road use. The Forest and Grassland program for ATV trails is illustrated in Tables B-8-1 and B-8-7. The intent would be to move towards designating off-road use on specified trail networks and special areas over time. Alternatives NC, A and E-Departure would control ORV use through existing regulations with no special programs planned.

Round Mountain

None of the alternatives provide for any special resource allocations for the Round Mountain area, except for Alternatives B-Modified and I which allocate 1,000 acres along the Round Mountain National Recreation Trail corridor to provide for management of its scenic and recreational values. Activities and uses which take place on Round Mountain are considered to be part of the multiple uses which occur in the general forest.

Appendix C

Roadless Area Evaluation

APPENDIX C
ROADLESS AREA EVALUATION

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Appendix C

Roadless Area Evaluation

Introduction

According to the Oregon Wilderness Act of 1984:

"... with respect to the National Forest System lands ... which were reviewed by the Department of Agriculture in the second Roadless Area Review and Evaluation (RARE II), .. (RARE II) shall be deemed for the purpose of the initial land management plans ... to be an adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of Agriculture shall not be required to review the wilderness option prior to the revision of the [Forest] plans, but shall review the wilderness options when the plans are revised which will ordinarily occur on a ten-year cycle ... [Roadless areas] shall be managed for multiple use in accordance with land management plans pursuant to Section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, provided that such areas need not be managed for the purpose of protecting their suitability for wilderness designation prior to or during revision of the land management plans ..."

(Public Law 98-328)

Appendix C describes each of the roadless areas on the Forest studied during the Roadless Area Review and Evaluation process (RARE II). It discusses the resources and values considered in each area, the range of alternative land uses considered for these during development of the proposed Forest Plan, and the effects of those alternatives on each area.

Approximately 115,700 roadless acres were evaluated during the RARE II process. Only the Black Canyon portion of the Canyon's area was recommended for Wilderness through RARE II. The Deschutes Canyon-Steelhead Falls area was recommended for further planning. The remaining areas were recommended for nonwilderness uses.

During the Unit Planning process, the Mill Creek, Lookout Mountain, Black Canyon, and Silver Creek areas were designated as special management areas to provide high quality backpacking and hiking experiences away from roads and motorized vehicles Roadless characteristics and wilderness qualities were also to be maintained in the Deschutes Canyon-Steelhead Falls area until this analysis is completed. The remaining six areas were to be managed for big game habitat and timber production.

The Oregon Wilderness Act of 1984 (Public Law 98-328) designated the Mill Creek, Bridge Creek, and Black Canyon areas as wilderness. The other areas not designated as wilderness may be managed for nonwilderness multiple use as determined through this environmental analysis. These areas, except Deschutes Canyon-Steelhead Falls, will not be considered for Wilderness during this initial planning period. The Deschutes Canyon-Steelhead Falls further planning area will be considered for a wilderness recommendation during this process.

Boundaries of the original RARE II areas have been adjusted to reflect changes from logging or other approved management activities that do not conform to the criteria for roadless areas.

Under the authority and direction of the current Ochoco-Crooked River Land Management Plan (February 2, 1979), specific timber sale plans have

been implemented in the Broadway area, and it is therefore no longer considered a roadless area and has not been analyzed as such in the development of alternatives.

This appendix describes the resource composition, use and potential, and environmental consequences of the alternatives for each of the remaining roadless areas (Lookout Mountain, Rock Creek, Cottonwood, Silver Creek, Green Mountain, and Deschutes Canyon-Steelhead Falls) in detail. As of December 1988, approximately 54,700 acres of the Forest and Grassland remain as roadless.

Acreage Comparisons

Table C-1 displays individual roadless area acres, how the acreages relate to the original RARE II acres, and the reasons for any changes.

TABLE C-1
Acreage Comparisons by Roadless Area

Area	Original RARE II Roadless Acres	Additions	Subtractions	Roadless Criteria Boundary Acres
Lookout Mountain	15,260	1/ 393 2/ 961	1/ 681 3/ 1,660	14,273
Rock Creek	9,286	1/ 742 2/ 1,932	1/ 287 3/ 259	11,414
Cottonwood (Portion of Black Canyon Roadless Area)	11,051	1/ 422 2/ 232	1/ 1,831 3/ 97	9,777
Silver Creek	11,670	1/ 1,147 2/ 2,742	5/ 7,100	7,459
Broadway	4/ 8,680			
Green Mountain	6,630			6,630
Deschutes Canyon/ Steelhead Falls	6/ 10,000			10,000

1/ More accurate mapping
2/ Old partial cutting - area remains substantially intact
3/ Older roading and cutting - areas show substantial impact
4/ No longer roadless due to sold timber sale
(Fry Timber Sale - 14 1 MMBF - Sold 1985)
5/ No longer roadless due to sold timber sale
(D-Creek Timber Sale - 7 7 MMBF - Sold 1985)
(Short Timber Sale - 7 8 MMBF - Sold 1985)
6/ Includes Forest Service acres only

Lookout Mountain

Description

Location and Access

The Lookout Mountain unroaded area consists of approximately 14,273 acres in Crook County on the Big Summit Ranger District. It is 25 miles east of Prineville, off U.S. Highway 26, and is accessed primarily from National Forest Road 42 and a few of its tributaries. Trail access into the area can be found across Road 42 from the Big Summit Ranger Station. A series of closed and abandoned old roads are also utilized for nonmotorized access into the southern and eastern parts of this area. Private land borders on the southwest, but otherwise National Forest lands surround the roadless area. Access is normally not available through the private land

History

The Lookout Mountain unroaded area has never been intensively managed for commodities production, and is presently considered and managed as a 16,577-acre "Special Management Area" for dispersed recreation and backcountry values. It was included in the RARE II inventory as #06214, but was not recommended for wilderness designation during that process and was not included in the Oregon Wilderness Act of 1984. The Senate Committee on Energy and Natural Resources recommended that the Forest Service "examine the feasibility of continuing the current use in the National Forest Plan and determine the land allocation in the Forest Plan." Approximately 987 acres have been removed from the original RARE II acreage due to on-the-ground surveys and increased accuracy of mapping.

Geography and Topography

Lookout Mountain has unique topographic features that make it easy to distinguish from surrounding landforms. From the Big Summit Ranger Station, with a low elevation of 3,793 feet, it rises toward the southeast through dense vegetation of mixed conifer forests to a high point of 6,926 feet, where exposed, nontimbered grasslands and rock outcrops can be found. From this point, the terrain drops rapidly to the south, exceeding 100 percent slopes in isolated sections. A large acreage of relatively flat, open terrain lies in the center of the roadless area and is the favored area for winter sports activities.

From here the terrain drops off shortly again towards the northeast to the boundary of the roadless area, which borders another unique topographic feature - Big Summit Prairie.

Soils

The Lookout Mountain area contains several soil types that are common to much of The Blue Mountains of eastern Oregon, derived to a large extent, from volcanic ash depositions of thousands of years ago.

All soil types (referred to as soil mapping units) within the Lookout Mountain area, fall within three general categories:

Higher elevation soils;

Low to mid elevation soils - deep; and

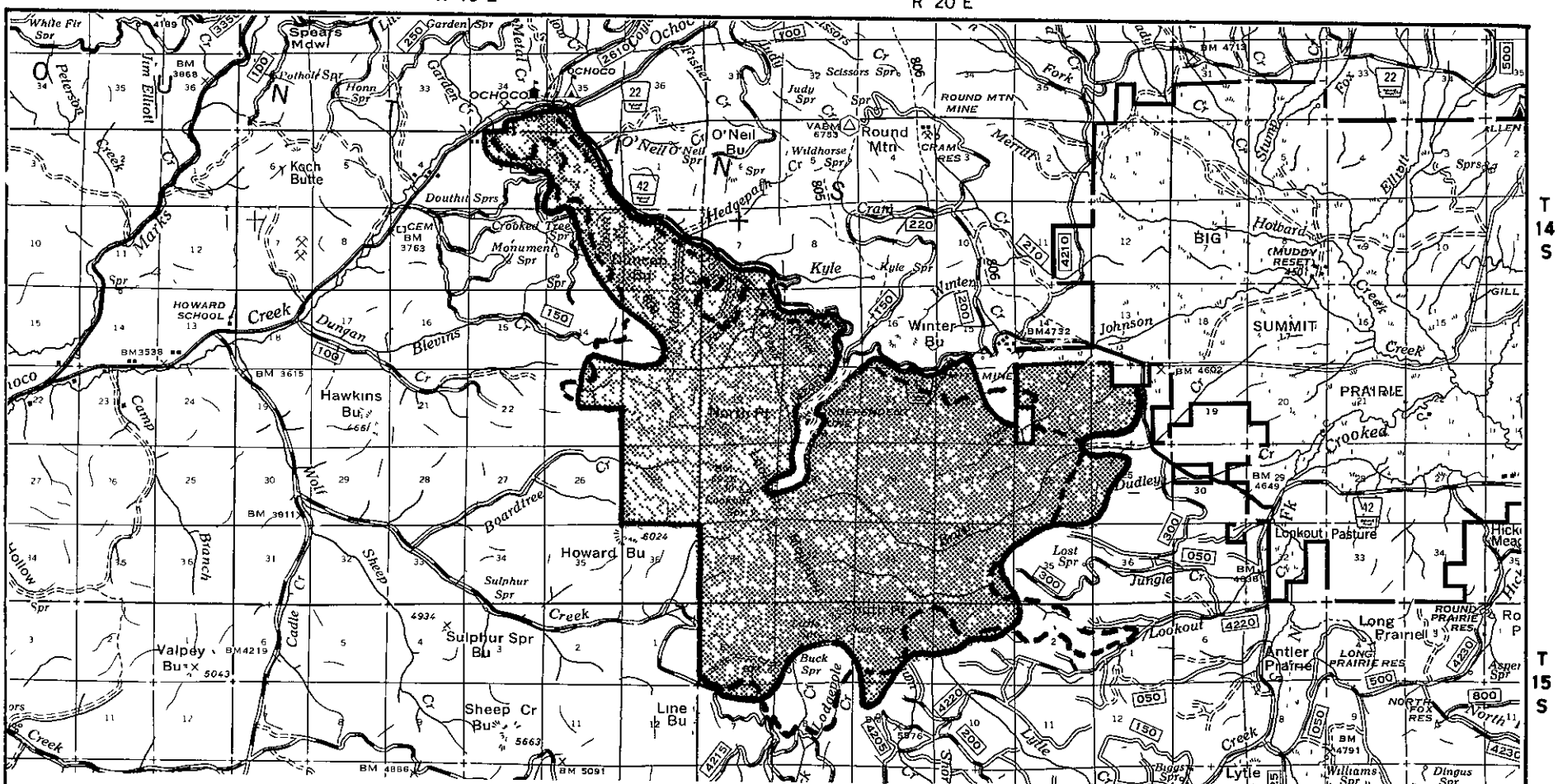
Low to mid elevation soils - shallow.

Higher elevation soils are contained in gentle to moderately steep, upland slopes and are derived from mixtures of ash, loess and residuum. Surface soils are very thin to moderately thick, sandy loams, loams and silt loams. Subsoils are absent to thin, gravelly to very gravelly loams, silt loams and silty clay loams.

Deep soils at low to mid elevations are represented by moderately deep to deep soils derived from volcanic ash over loess and residuum. Typically, these

Figure C-1

LOOKOUT MOUNTAIN


R 19 E
R 20 E
T 14 S
T 15 S
C-4
OCHOCO
Spears Mdw
Koch Butte
O'Neil Bu
Round Mtn
ROUND MTN MINE
Douthit Sprs
Hedgepath
Kyle
Winter Bu
BIG
SUMMIT
PRAIRIE
Crooked
Hawkins Bu
Howard Bu
Sulphur Spr Bu
Valpey Bu
Sheep Cr Bu
Line Bu
Dudley
Lookout Pasture
Lookout
Antler Prairie
Long Prairie
LONG PRAIRIE RES
ROUND PRAIRIE RES
NORTH FOX RES
Lytle
Williams Spr
Dingus Spr
Marks Creek
Camp Creek
Wolf Creek
Boardtree Creek
Sheep Creek
Little Creek
Jim Elliott Creek
Garden Cr
Dungan
Blevins
Howard School
Crooked Tree Spr
Monument Spr
Judy Spr
Scissors Spr
Wildhorse Spr
Kyle Spr
Lost Spr
Jungle Cr
Buck Spr
Hotbard
(MUDDY RESET)
Johnson
Elliott
Fork
Stump
Merritt
Trail
Ochoco
Peterson
Honn Spr
Dolhoff Spr
Garden Spr
Metal Cr
Zero Cr
Judy
Scissors
Fisher
Sulphur Spr
Cadle Cr
Branch
Hollow
Spr
Creek
Cr
Fk
Mdw
Bu
Spr
Sprs
BM 3868
BM 3763
BM 3538
BM 3615
BM 3911
BM 4219
BM 4886
BM 5091
BM 4732
BM 4602
BM 4649
BM 4713
BM 4791
VABM 6793
5043
5663
5876
4934
4681
6024
4220
4210
4230
4236
4215
4205
CEM
CRAM RES
Lit
Sheep
Cadle
Valpey
Sulphur Spr
Howard
Line
Lytle
Williams
Dingus
Long Prairie
Antler Prairie
Lookout
Dudley
Crooked
Prairie
Summit
Big
Hotbard
Johnson
Winter
Kyle
Hedgepath
Douthit
Koch
Spears
Ochoco
Round Mtn
O'Neil
Hawkins
Howard School
Marks
Dungan
Blevins
Camp
Wolf
Boardtree
Sheep
Cadle
Valpey
Sulphur
Howard
Line
Lytle
Williams
Dingus
Long
Antler
Lookout
Dudley
Crooked
Prairie
Summit
Big
Hotbard
Johnson
Winter
Kyle
Hedgepath
Douthit
Koch
Spears
Ochoco
Round

soils occur on northerly aspects of gentle to steep terrain.

Shallow soils at low to mid elevations contain thin surface layers of nongravelly to gravelly loams and subsoils that are either nonexistent or very thin clay loams to clays. These soils occur on all aspects of gentle, sloping basalt flow surfaces.

More than one-half of the acreage in the Lookout Mountain Roadless area exhibits severe erosion hazards.

Vegetation and Ecosystem Type

No less than twenty-eight different plant communities exist within the Lookout Mountain unroaded area, and contain a wide variety of plant species in various stages of succession. Many of these communities were historically maintained by fire, and are now undergoing change toward climax vegetation represented by species once restricted to isolated areas protected from fire.

Table C-2 contains a list of those plant communities, by acres, that exist in the Lookout Mountain roadless

TABLE C-2
LOOKOUT MOUNTAIN PLANT COMMUNITIES

Descriptor	Plant Community	Acres
Meadows	Dry Meadow (w/ tufted hairgrass, Kentucky bluegrass)	122
	Moist Meadows (w/ tufted hairgrass, ovalhead sedge, California catgrass)	27
Low elevation, nonforest	Bluegrass scabland (w/ sandberg bluegrass)	131
	Bunchgrass on shallow soil, gentle slopes	250
	Stiff sage scabland (w/ stiff sagebrush)	259
	Low sagebrush-bunchgrass	67
	Juniper-bunchgrass	284
	Juniper-stiff sage	9
	Juniper-low sagebrush	18
	Juniper-big sagebrush	6
Forested-ponderosa pine dominant, firs absent (to present)	Ponderosa pine, wheatgrass	48
	Ponderosa pine - fescue	30
	Ponderosa pine - bitterbrush, Ross sedge	3
	Ponderosa pine - blue wildrye	9
	Ponderosa pine - Douglas-fir - elk sedge	391
	Ponderosa pine - Douglas-fir - snowberry - oceanspray	887
	Mixed conifer - pinegrass - residual soils (w/ white fir, Douglas-fir, ponderosa pine)	700
	Mixed conifer - pinegrass ash soils (w/ western larch, white fir, Douglas-fir, ponderosa pine)	5,334
	Lodgepole - grouse huckleberry (w/ sub-alpine fir, Engelmann spruce)	749
	Lodgepole - pinegrass - grouse huckleberry (w/ white fir)	394
	White fir - twinflower (w/ Douglas-fir western larch, Columbia brome)	1,873
	White fir - grouse huckleberry	780
	White fir - big huckleberry	116
	Sub-alpine fir - grouse huckleberry (w/ Englemann spruce, larch)	12
	Subalpine fir - big huckleberry (w/ Engelmann spruce, Douglas-fir, larch)	36
	Alpine sagebrush - sedge (w/ Yarrow)	428
	Alpine sedge (w/ Hood sedge, Yarrow)	1,310

area, according to resource inventories. They are organized by similarities in dominant plants and environment.

Current Uses

Recreation

Existing management of the Lookout Mountain unroaded area allows for semiprimitive recreational activities in the summer. Other activities currently occurring include mining and grazing by sheep, cattle, and wild horses.

Current recreation use is subdivided among primary user groups of cross-country skiers, snowmobilers, horseback rider, hikers, deer and elk hunters, and mountain bikers. Skiers and snowmobilers comprise the largest group of users. The estimated capacity with current access and trail system is 7.8 thousand recreation visitor days (MRVD's). With a fully developed trail system, this area could support approximately 19.5 MRVD's.

Minerals

Two semi-active mines lie within the boundary of the roadless area. These operate only at minimum levels in order to meet annual assessment requirements.

Livestock

Both a sheep and cattle allotment overlay into the Lookout Mountain unroaded area. The Brush Creek cattle allotment provides for 533 animal unit months (AUM's) of grazing for local permittees. The Canyon Creek sheep allotment provides 3,850 sheep months of grazing.

Scenic Resources

From the west, Lookout Mountain appears somewhat ominous as it rises above the surrounding topography, especially during the winter months when snow-covered mountain meadows and rock outcrops become easily distinguishable from surrounding dense, mixed conifer forest.

Within the interior of the unroaded area, a variety of landforms and vegetative patterns are apparent. At the lower elevations, especially on southern exposures, open stands of ponderosa pine are still dominant. Even though this particular character type is slowly disappearing due to the elimination of fire, native grasses of fescue and wheatgrass, along with introduced species such as Kentucky bluegrass, complement these stands, providing a relaxing park-like setting.

At the mid to upper elevations, very dense stands of mixed conifer provide an extreme contrast to open pine stands. Large numbers of trees per acre, combined with a species mixture of ponderosa pine, Douglas-fir, western larch, white fir, and some lodgepole pine, provide a textural and color quality that is the dominant vegetation feature in the Lookout Mountain roadless area. As succession proceeds in a similar fashion to stands of ponderosa pine, white fir will become the dominant species in these stands, with western larch and ponderosa pine becoming insignificant components over time.

Interspersed throughout this large acreage of dense mixed conifer are small open meadows and draw bottoms that occasionally support groves of quaking aspen, providing the visitor with a refreshing and welcome change of scenery.

Approximately 2,500 acres of nonforested grasslands, alpine meadows and basalt rock outcrops are the dominant visual feature above 6,000 feet in elevation. Color and textural differences between these areas and adjacent timbered stands of subalpine fir, Engelmann spruce, lodgepole pine, and other more common mixed conifer species, provide a distinct visual character representation of many high altitude settings in the Blue Mountains of Eastern Oregon.

Spectacular scenery is abundant from the top of Lookout Mountain. Especially inviting is the view of the Oregon Cascade mountains to the west. No less than eleven major peaks are visible from this point. The area offers scenic beauty along all of the access trails while looking both into and out of the area.

Wildlife

The Lookout Mountain area is well-known locally for it's production of trophy, multi-antlered bull elk.

This is probably the most significant wildlife attraction in the area. Mule deer, ruffed grouse, black bear and bobcat are other hunted wildlife species that draw visitors to the area.

Nongame species inhabiting the area include pileated woodpeckers, badgers, a variety of hawk species, an occasional eagle, and numerous other indigenous animal species common to the Ochoco Mountains.

History

Gold and cinnabar mining were once very important activities in and around the Lookout Mountain area. The historic significance is well-known and documented. Several small communities grew up, then quickly vanished. The remnants of these past activities are still apparent and are adjacent to the roadless area. Of particular attraction are the two existing operational mines, Amity and Independence, which still contain remnants of buildings and other structures associated with past mining activities.

Wilderness Capability (Potential)

Manageability and Boundaries

Three different boundaries have been defined for the Lookout Mountain roadless area. They are:

RARE II Boundary - 15,260 acres

Roadless Criteria Boundary - 14,273

Manageable Boundary for Semiprimitive Recreation -15,660 acres

The Roadless Criteria Boundary is an updated RARE II boundary. The acreage differences shown are due to recent on-the-ground surveys which added some acres and deleted others because of (a) more accurate mapping and (b) re-examination of areas of past human disturbance. The boundaries resulting from these two categories are difficult to identify on the ground, especially on the south and east ends, because of indistinct topography and vegetation. The Manageable Boundary for Semiprimitive Recreation has been designated along more easily identifiable features such as roads, land survey lines, ridgetops and draws.

Natural Integrity and Appearance, Opportunities for Solitude

Even though the Lookout Mountain unroaded area has never been intensively managed for commodities production, such as timber, man's activities are apparent to the extent that most visitors would notice them. Approximately 6.1 miles of primitive road traverse the area, primarily in that portion most heavily used by sight-seers and outdoor recreationists - the summit of Lookout Mountain. Old stumps cut from previous salvage logging are visible to observant visitors, even though distributed in random fashion. Two operational mines are also distinct man-made features in easily observable locations.

National Forest Road 42 borders the unroaded area to the north and is the most heavily used timber haul road on the Big Summit Ranger District. Sites and sounds of human activity are obvious along this north face. As one approaches the top and walks into the interior or in the southern reaches of the area, the sites and sounds of this road are lost.

The most serious alteration of natural conditions in the Lookout Mountain roadless area relates to the initiation of fire prevention management at the turn of the century. Reduction of natural fire frequencies has resulted in vegetative changes that are not easily reversible. Natural fuel building is now such that allowing fires to burn uncontrolled could have serious, if not catastrophic effects on the roadless area and adjacent lands. Plant species changes are occurring rapidly to the point where once insignificant numbers of fire-intolerant Douglas-fir and white fir are becoming dominant vegetative features within the majority of roadless area timber stands. Within 75 to 100 years, succession to climax will be essen-

tially complete, barring some natural or human-induced disturbance. Ponderosa pine and western larch will be secondary species and, in fact, nonexistent within certain areas.

Primitive Recreational Opportunities and Challenging Experiences

The Lookout Mountain unroaded area has a Recreation Opportunity Spectrum (ROS) classification of semiprimitive, nonmotorized, under existing allocations. The estimated carrying capacity is 14.3 MRVD's without additional developments. Opportunities for additional primitive and unconfined recreation are somewhat restricted to certain uses, such as hiking, hunting, fishing, backpacking and photography. Because of the limited area conducive to snowmobiling and ski touring, conflicts are already apparent, and it is assumed that significant increases in these uses will further aggravate the problem. Opportunities for challenging experiences, such as mountain climbing and survival training, are limited, but dependent on the individual perceptions, age, and skills of visitors.

Wilderness Availability

Recreation

Current trends for Central Oregon indicate an increase in demand for winter sports, such as snowmobiling, cross-country skiing, day hiking, nature study, mountain biking, big game hunting, and recreational driving. The area offers a variety of terrain for day hiking, mountain biking, and nature study. The potential for satisfying increased demand for winter sports is limited by the existing natural terrain and vegetation. Alternate trail construction and redistribution of areas by user groups are potential methods for increasing carrying capacity for winter sports.

The potential for satisfying increased big game hunter demand within the area is significant, assuming that there is a direct relationship with potential numbers of elk produced, which can be increased by an estimated 36 percent over existing levels.

Wildlife

The Lookout Mountain unroaded area currently is capable of producing and maintaining an estimated 197 Rocky Mountain elk. Potentially, this can be increased to approximately 267 over time, but with a possible decrease in trophy, multi-antlered bulls.

Under existing land allocations, 5,316 acres of suitable old growth are available for supporting dependent species such as the pileated woodpecker. There is a potential for increasing old growth habitat to an estimated 10,200 acres, over time.

For cavity nesting bird species, current snag habitat is at the 100% level for maximum potential production of primary cavity users.

Fisheries

All Class II streams within the Lookout Mountain unroaded area support rainbow trout. One stream, Brush Creek, also supports brook trout. There are currently 38 acres of riparian areas in a degraded condition and 290 acres in an acceptable condition within the roadless area Potentially, all 328 acres can be improved to produce more fish.

Water

All water resources within the unroaded area contribute to irrigation use downstream, which is essential to the agricultural stability of central Oregon. However, under current conditions, annual supplies of water for this use exceed demand. The Lookout Mountain roadless area contributes an estimated 9,940 acre feet of water per year for downstream use. At sustained yield timber harvest levels, there is a potential for increasing this by 248 acre feet per year. The maximum conceivable increase, which would result only from a type conversion to grasslands, is estimated at 5,600 acre feet per year.

Livestock

Both a sheep and a cattle allotment overlay into the unroaded area, and currently support 3,850 sheep months and 533 Animal Unit Months, respectively. Potentially, these can be increased by 28 percent through use of transitory range and improved water developments.

Timber

There are currently 10,224 acres of land suitable for timber production within the Lookout Mountain unroaded area. No timber harvest currently occurs. There is approximately 187 million board feet of standing volume at present and the potential long-term sustained yield is estimated at 2.75 million board feet per year.

Minerals and Energy

There are currently 200 gold and cinnabar claims held within the management area, and activity has been increasing in the last few years. There is some potential for a major gold or mercury operation in the area. The potential for energy production from wood is significant, based on potential yield of .5 to .7 million cubic feet per year.

Cultural Resources

The most significant cultural resource known to the area are remnants of an old fire lookout at the top of Lookout Mountain, with several trails and old roads leading to it No prehistoric sites are known to be in the area, and the potential is unknown.

Management Considerations

Fire

Natural fire frequencies once played a significant role in development and maintenance of vegetation within the Lookout Mountain area. The following range of natural fire cycles by vegetation type provides an indication of the importance of fire in preventing excessive fuel accumulations and maintenance of several tree and shrub species.

Ponderosa pine	5-25 years
Mixed conifer	20-70 years
Grass, tree, shrub	5-15 years

Since the implementation of fire prevention measures at the turn of the century, fuels have been allowed to accumulate at unnatural rates, creating the potential for a major conflagration, given a certain set of environmental conditions.

TABLE C-3
RESOURCE POTENTIAL SUMMARY

	Current Levels	Potential Levels
RECREATION	Moderate but high during hunting season	7 8 MVRD's No trails 19 5 MVRD's Developed trails
WILDLIFE		
Old Growth Dependent Species	5,316 acres of suitable old growth	10,200 of capable lands for old growth
Big Game (Rocky Mtn Elk)	197 animals	267 animals
Fish (Resident and anadromous)	High	Unknown
WATER	9,940 Acre Feet	10,188 Acre Feet with 25% timber harvest level, 15,540 acre feet with conversion to grassland
LIVESTOCK	3,850 Sheep Months 533 AUM's	4,928 Sheep Months 682 AUM's with transitory range and water development
TIMBER	No timber production currently Standing volume is 187 MMBF	2 75 MMBF/year sustained yield
MINERALS AND ENERGY	200 mineral claims with little activity	High potential for mercury 1,080 acres Mod potential for mercury 2,510 acres Mod potential for gold 3,590 acres Prospectively valuable for oil and gas 3,840 acres
CULTURAL	No known prehistoric	No completed resource inventories

Insects and Disease

Infestations by a variety of insects have occurred, are occurring, and will most likely continue to occur in the Lookout Mountain roadless area. As recently as 5 years ago, a major infestation by mountain pine beetles resulted in the mortality of approximately 1,100 acres of lodgepole pine near the summit of Lookout Mountain. This was a natural event that, during historic times, was usually followed by an intense fire that prepared the site for stand regeneration.

The Lookout Mountain area, along with a large portion of central and eastern Oregon forest lands, is experiencing the end of a ten-year infestation of western spruce budworm. Continuous feeding by this insect causes a reduction in vigor and can kill trees over a period of time. Evidence shows that budworm outbreaks begin and are maintained on stands where species are unadapted to site conditions. Douglas-fir and white fir are the primary target species of the budworm. These species are dominant in the unroaded area due to a reduction in fire interactions in the environment. As long as this situation exists, there will be high potential for periodic outbreaks of spruce budworm.

Other insects that have potential for serious affects within the roadless area are:

Insect	Target Species
Larch casebearer	Western larch
Western pine beetle	Ponderosa & lodgepole pine
Tussock moth	Douglas-fir and white fir

Among the diseases occurring in the roadless area are:

Disease	Target Species
Various root rots caused by fungi	All
Indian paint fungus	White fir

Neither of these is expected to cause serious problems under the current management allocation.

Wilderness Evaluation

Public Interest and Congressional Direction

An estimated 1200 comments concerning Lookout Mountain were received. A wide variety of opinions were voiced. Among the letters with comments on this subject were those of the Crook County Courthouse, Crook County, Oregon Department of Fish and Wildlife (ODFW), Oregon State Economist, and the Oregon Department of Geology and Minerals.

There were many comments dealing with roading versus unroaded recreation. Some wanted total unroaded designation. Others urged roading into part of the area for fire and timber management.

Crook County Courthouse pointed out the exclusion of senior citizens and the handicapped when areas are roadless. The Crook County letter, however, urged keeping the area unroaded.

Some comments urged backcountry designation. The Oregon State Senate suggested protection for the area. Some even suggested wilderness designation for Lookout Mountain.

Others were concerned about winter recreation, and keeping the area open for snowmobiling.

There were comments urging new developments for the area, such as new trails, warming huts, a day use area, and a wheelchair platform at the tower site. Others pointed out that the area is being discovered by mountain bike enthusiasts and urged no further developments in the area.

Many respondents requested the area be kept open for "multiple use," in fairness to all users.

Most wished recreational values to be considered over timber interests. They stated that tourism outweighs the area's timber potential. They also requested protection for the old growth.

Prior to the time that this input was received, Congress had reviewed the Lookout Mountain roadless

TABLE C-4
Nearby Wilderness and Unroaded Areas

Wilderness Areas	Unroaded Areas *	Current Allocation	Approximate Distance from Lookout Mountain Roadless Area (Air Miles)	Acres
Bridge Creek			10	5,400
Mill Creek			7	17,400
Black Canyon			30	13,400
Strawberry Mtn			75	68,300
North Fork John Day River			95	120,800
Monument Rock			60	19,800
Mt Washington			70	52,600
Three Sisters			75	285,000
	Rock Creek	Big Game	20	11,414
	Cottonwood	Big Game	25	9,777
	Green Mountain	Big Game Production	12	6,630
	Silver Creek	Semiprimitive/ Nonmotorized	40	7,459
	Deschutes Canyon/ Steelhead Falls	Semiprimitive/ Nonmotorized	45	10,000

* Roadless Criteria Boundary Acres

area for inclusion in the National Wilderness System. Senate Report #98-465 states:

"This area is presently managed by the Ochoco National Forest as a "Special Management Area" for dispersed recreation and backcountry values. The area is not presently in the timber base. The Committee expects the Forest Service to examine the feasibility of continuing this use in the current National Forest Plan and determine the land allocation in the Forest Plan."

TABLE C-5
Distance From Population Centers

City	Population	Distance From Lookout Mtn Unroaded Area
Prineville	5,520	25
Bend	17,800	50
Redmond	6,615	40

Environmental Consequences

The variety of acre allocations shown in Table C-6 will result in an array of different outputs and environmental consequences for the Lookout Mountain area.

Table C-7 contains quantitative estimates of resource outputs and/or environmental consequences associated with each alternative. As an example, even though timber production per se is not an environmental consequence, the outputs shown indicate the increased productivity associated with long-term management of the timber resource in the Lookout Mountain area. Similarly, "Roads Built" by alternative is not an environmental consequence, but "Roads Open per square mile" indicates the emphasis of the prescription applied by alternative, which can result in an array of consequences for wildlife, water quality, and motorized recreation. Outputs shown for "Riparian" indicate the acres of riparian area that will be enhanced above minimum management requirements. Outputs shown for "Big Game" (number's of elk) reflect the management prescriptions applied to the area by alternative and are an index of the quality of habitat produced. Outputs for "Recreation" are Recreation Opportunity Spectrum classifications and indicate the type of recreational opportunities available by alternative For "Off-Road Vehicles," a plus or minus indicates either an increase or a decrease in this type of opportunity. Outputs for "Snags" indicates the percentage of snag habitat available for maximum

TABLE C-6
LOOKOUT MOUNTAIN ROADLESS AREA DESIGNATION
BY MANAGEMENT PRESCRIPTION

Lookout Mountain Roadless Area (B6214)
Total Roadless Criteria Acres - 14,273
Area Manageable For Semiprimitive Recreation = 16,577 2/

Management Prescription	Acres by Alternative				
	A/NC 1/	B-MOD 2/	C-MOD 2/	E-DEP 2/	I 2/
Dispersed Recreation					
Nonmotorized	16,581	7,550	16,260	2,950	15,660
Motorized	0	0	0	0	0
Timber/Range	0	8,110	0	12,110	0
Big Game	0	0	0	0	0
Old Growth for Dependent Wildlife	0	600	0	1200	600
Visual Retention (Road 42)	0	0	317	0	317
Visual Partial Retention (Road 42)	0	317	0	317	0
Total Acres	16,581	16,577	16,577	16,577	16,577

1/ Original acre allocation according to existing Ochoco-Crooked River Land Management Plan

2/ New manageable boundary acres

TABLE C-7
LOOKOUT MOUNTAIN SUMMARY OF RESOURCE OUTPUTS BY ALTERNATIVE

		ALTERNATIVE				
	Unit of Measure	A/NC	B-MOD	C-MOD	E-DEP	I
Timber 50 Year Period Sustained Yield	 MMBF/Yr MMCF	 0 0	 2 0 55	 0 0	 1 7 47	 0 0
Roads Built Open	 Miles /Sq Mi	 0 0	 65 All	 0 0	 60 All	 0 0
Range	AUM's Sheep Months	533 3,850	725 4,042	533 3,850	692 4,009	533 3,850
Riparian Exceeds Acceptable Condition (Excellent)	Acres	0	328	328	0	328
Big Game Elk	#	201	110	201	66	201
Recreation (ROS) SPNM RM/RN	 Acres Acres	2/ 16,581	3/ 7,550 9,027	3/ 16,577	3/ 2,950 13,627	3/ 16,577
Old Growth	Acres	6,898	2,690	7,069	1,285	3,029
Off-Road Vehicles 1/	+/-	-	+	-	+	-
Firewood	Cords	0	110	0	178	0
Snags	% of maximum potential	100%	20%	100%	100% 2,950 Ac 20% 11,323 Ac	100%
Future Wilderness Consideration		+	None	+	+ SPNM None RM/RN	+

1/ + or - indicates either a decrease or increase in this type of opportunity

2/ Original acre allocation according to existing Ochoco-Crooked River Land Management Plan

3/ New manageable boundary acres

MMCF - Million cubic feet
SPNM Semiprimitive Nonmotorized
AUM s Animal Unit Months

MMBF Million board feet
RM/RN - Roaded Modified/Roaded Natural

potential production of primary cavity users, by alternative. Outputs for "Old Growth," in acres, indicates either (a) the acres allocated by management for development alternatives, or (b) existing or potential old growth based on site capability. Outputs for remaining categories are self-explanatory.

Alternatives A, NC, and C-Modified

These alternatives would result in the highest amounts of semiprimitive environment. The entire Lookout Mountain roadless area would be allocated to this emphasis. No road building would occur and no scheduled timber harvest would result. Salvage harvest might be done, but only in order to maintain a healthy, attractive semiprimitive setting. All previously degraded riparian habitat (38 acres) would be improved to an acceptable condition by management. Big game habitat would change only through natural processes with a small projected increase in elk numbers (from 197 to 201). Old growth habitat would increase to a maximum of 10,200 acres, based on capability of the area. Snag habitat would increase to maximum potential for primary cavity nesters, but would fluctuate with natural environmental changes. Options for future wilderness designation would remain available.

Alternative B-Modified

This alternative would maintain the upper 7550 acres for semiprimitive recreational opportunities, reducing the potential by approximately 50 percent. The entire lower area would be managed with an emphasis on timber and livestock production. Approximately 65 miles of system roads would be built to access timber stands. A variety of timber management practices, such as uneven-aged selection harvest, clearcutting, shelterwoods, overstory removal, and thinning, would be applied to the lower timber stands in the Lookout Mountain area. This would reduce scenic quality and eliminate much of the opportunity for solitude. Natural processes would no longer be the major effect on succession, and species composition would be based on optimum commodities production. Even though all riparian areas would be maintained in an acceptable condition, stream sediment would increase. Forage production would increase by 192 AUM's due to transitory range from timber harvest and investments in water developments. A 'roaded modified' type of recreational setting would be provided over the lower area. Old growth habitat would be reduced to 2,690 acres.

Opportunities for motorized recreation would increase, as will winter sports opportunities. Approximately 110 cords of firewood per year would be available to local citizens. Snag habitat would be reduced to minimum management levels of 20 percent of maximum potential. Big game habitat would be reduced with a resulting decrease in elk numbers to 110 animals. Timber harvest would occur at an average per year rate of 2 MMBF. Once under a fully regulated condition, a sustained yield of .55 MMCF per year would be produced. Options for future wilderness designation would be foregone.

Alternative E-Departure

These alternatives would substantially reduce semiprimitive recreational opportunities, but would maintain a 2,950-acre parcel on top of Lookout Mountain to provide this experience. The majority of timbered lands would be managed for timber production. A full array of timber management activities would be fully evident on these acres. Natural succession would dominate only in the 2,950-acre parcel The sites and sounds of human activity would probably be noticeable from all areas. Motorized recreation and winter sports would increase with demand. Sixty miles of system roads would generally be open to provide access to recreationists and management. About 178 cords of firewood would be available yearly to local citizens. Snag habitat would be reduced to 20 percent on the majority of acres, but would remain at 100 percent potential levels in the 2,950-acre parcel. Old growth habitat would be maintained at about 1,285 acres. Stream sediment would increase from development activities, but would remain within constraints. All riparian habitat would be brought up to, and maintained in, an

acceptable condition. A "roaded modified" type of recreational setting would be available on the majority of the area. Options for future wilderness designation would be gone. Elk numbers will be reduced to about 66 animals.

Alternative I

This alternative would maintain the natural setting to provide high quality semiprimitive nonmotorized recreational opportunities in the summer. Some vegetative manipulation in the lower 8110 acres would be allowed for wildlife habitat improvement and for promoting healthy forests that are more resistant to catastrophic events. Snowmobile use would continue to be authorized during the winter months. Minimum standard roads might be designated for specific projects, but would be closed and seeded to improve wildlife habitat upon completion of the project. Projects would not dominate the landscape, nor be evident to the casual Forest visitor. As a result of these limited entries, the ponderosa pine and western larch that are valued for their appearance to recreationists would become more abundant over time. All riparian habitat (328 acres) would be improved to excellent condition by grazing management and other improvement practices. Big game habitat should be improved with these projects, and a large increase in elk populations might occur. The area would provide security from motorized activities in the summer, encouraging viewing of game and nongame species. This should also provide ideal backcountry trophy hunting opportunities. The existing old growth habitat would be maintained and levels are might increase as regulated harvest is excluded from the area. Snag habitat for cavity nesters would increase to maximum potentials, but would fluctuate with natural environmental changes. Options for future wilderness designations would remain for the upper 7550-acre area.

Rock Creek

Description

Location and Access

The Rock Creek unroaded area consists of approximately 11,414 acres in Wheeler County, Oregon, on the Paulina Ranger District. It is about 20 miles northeast of Paulina, 12 miles southeast of Dayville and is accessed primarily from National Forest Roads 38 and 32. A dirt road, #38-200, leads to Spanish Peak, which is a major viewing area for the interior of the unroaded area. Private land and public lands administered by the Bureau of Land Management border to the north, but otherwise the Rock Creek area is surrounded by National Forest lands.

History

The Rock Creek unroaded area has twice been considered for wilderness designation; once under RARE II and again during proceedings for the Oregon Wilderness Act of 1985. In both cases, the result was nonwilderness.

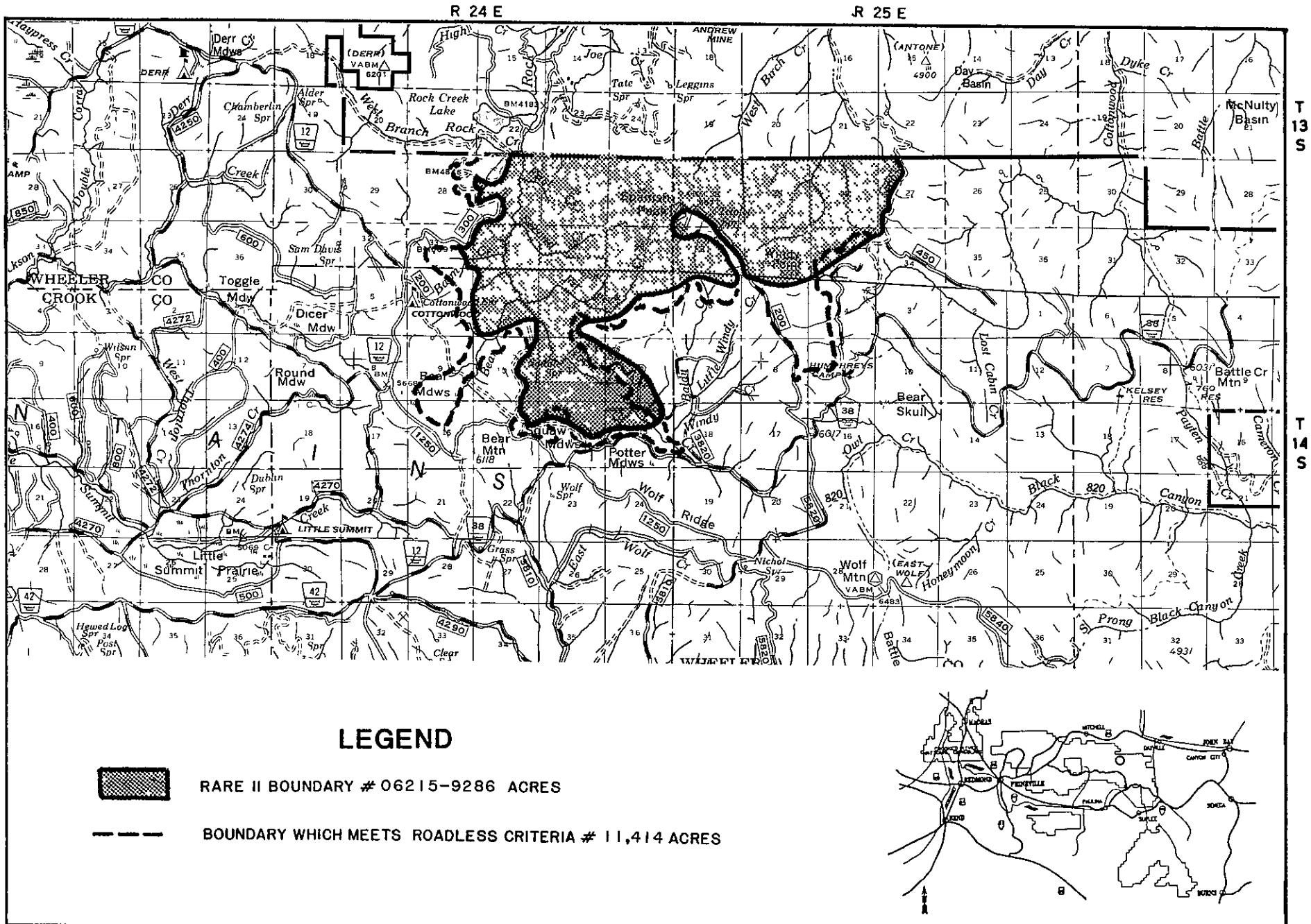
Under the existing land management plan, Rock Creek is allocated to many uses with an emphasis on big game production.

Geography and Topography

The Rock Creek area is a large north facing basin that includes the headwaters of Rock Creek and West Birch Creek Significant topographic features include: the 800 to 1000 foot deep Rock Creek canyon, which runs from the southern to the northern boundaries of the roadless area; the high ridges which run east, west, and southeast from Spanish

Figure C-2

ROCK CREEK


R 24 E
R 25 E
T 13 S
T 14 S
WHEELER
CROOK
CO
CO
Derr Mdws
Toggle Mdw
Dicer Mdw
Round Mdw
Bear Mdws
Bear Mtn
6118
Potter Mdws
Bear Skull
Battle Cr Mtn
McNulty Basin
Rock Creek Lake
Spanish Peaks
Cottonwood
Dublin Spr
Little Summit
Little Prairie
Wolf Mtn
Wolf Ridge
Black Canyon
Kelsey Res
760 Res
Derr
Chamberlin Spr
Alder Spr
Sam Davis Spr
Wilson Spr
Thornton
Summit
Dublin Spr
Wolf Spr
Grass Spr
Nichol Spr
Tate Spr
Leggins Spr
Andrew Mine
Antone
Day Basin
Dyke Cr
Cottonwood
Battle
Lost Cabin Cr
Payton
Cameron
Black Canyon
Honeymoon Cr
Hewed Log Spr
Post Spr
Clear
Double
Corral
Creek
Joe
Tate
Leggins
West Birch Cr
Day
Windy
Little Windy
Bear
Wolf
East Wolf
Out
Black Canyon
S Prong
Creek
Summit
Thornton
West Thornton
Bear
Windy
Little Windy

Peak and Windy Point; the 800-foot fault escarpment formed by the north face of Spanish Peak--with the hummocky topography left by massive debris slides at its base; and the steep, open ridges which run north/south between the tributaries of Birch Creek. Slopes in two-thirds of this area exceed 55 percent.

Elevations in the Rock Creek area range from over 6000 feet on the ridges surrounding Spanish Peak (6871), to canyon bottoms around 4200 feet in Rock Creek and 5500 feet in Birch creek where they cross the National Forest Boundary.

Soils

Three major soil types comprise most of the landbase within the Rock Creek roadless area. They are:

Soil Type	% of Area
Moderately deep and deep, sandy loam volcanic ash	50%
Very shallow loamy and clay nonforest soils	40%
Moderately deep loams and clays	10%S

Over 65% of these soils occur on slopes with potential erosion hazards.

Vegetation

Seventeen different plant communities exist within the Rock Creek unroaded area. Table C-8 lists those plant communities with acreages according to resource inventories. They are organized by similarity in dominant plants and environment.

Stream bottoms and north-facing slopes in the Rock Creek canyon are covered with dense mixed conifer forest. There are several stands dominated by lodgepole pine along Rock Creek. Ridges, and south and west facing slopes, are marked by shallow soils, basaltic cliffs, and mountain-mahogany/bunchgrass

TABLE C-8
ROCK CREEK PLANT COMMUNITIES

Descriptor	Plant Community	Acres
Meadows	Moist Meadows (w/ tufted hairgrass, ovalhead sedge, California oatgrass)	9
Low elevation, nonforest	Bluegrass scabland (w/ sandberg bluegrass)	36
	Bluegrass on deep soil, steep slopes (with Yarrow, Wyeth buckwheat)	9
	Stiff sage scabland (w/ stiff sagebrush)	235
	Low sagebrush-bunchgrass	275
	Juniper-bunchgrass	45
	Juniper-stiff sage scabland	39
	Big sagebrush - bunchgrass	336
	Curlleaf mountain mahogany - grass (with pinegrass)	73
Forested-ponderosa pine dominant, firs absent (to present)	Ponderosa pine, wheatgrass	425
	Ponderosa pine - fescue	1,273
	Ponderosa pine - Douglas-fir - elk sedge	688
	Mixed conifer - pinegrass - residual soils (w/ white fir, Douglas-fir, ponderosa pine)	1,261
	Mixed conifer - pinegrass ash soils (w/ western larch, white fir, Douglas-fir, ponderosa pine)	756
	White fir - twinflower - forb (w/ Douglas-fir western larch, Columbia brome)	5,447
	Lodgepole pinegrass -grouse huckleberry (with white fir)	12
	Alpine sagebrush - sedge (w/ elk sedge, yarrow)	495

interspersed with open ponderosa pine/Douglas-fir forest. The high ridges are dominated by native annuals and bunchgrass perpetuated by late snowpack, with "stringers" of mountain-mahogany and mixed conifer forest. The north slopes of Spanish Peak are covered with open talus slides and weather battered Douglas-fir which grades into closed ponderosa pine/mixed conifer stands on the gentler slopes of the landslide debris. Most of the Birch Creek watershed contains dense mixed conifer forest, with open ponderosa/Douglas-fir on the ridgetops.

Current Uses

Existing management of the Rock Creek area allows for a wide range of uses to occur, even though the magnitude of some uses is constrained by limited access.

Recreation

Backpacking, big-game hunting, horseback riding, hiking and fishing are the principal recreational uses presently occurring. No indicators of present use have been measured, but is estimated to be considerably less than the current potential of 3.1 thousand recreation visitor days. The potential for this area, with a completed trail system accessing all major areas, is estimated at 15.5 MRVD"s.

The area is served by 17 miles of unmaintained or user-maintained routes. Approximately 85 percent of the area is capable of supporting semiprimitive, nonmotorized recreation. The remainder supports semiprimitive motorized recreation in the southern plateau areas.

Outstanding views of the Rock Creek, Cottonwood, and Black Canyon roadless areas, large portions of the Ochoco and Malheur National Forests, the John Day River Valley, and the desert country south of the Ochoco National Forest are available from the high ridges and peaks in the Spanish Peak area.

Minerals and Energy

There has been no mineral development in the area. About 7,800 acres of oil and gas leases are held on the Rock Creek area.

Special Use Permits

One special use permit to operate and maintain a 1/4 mile water diversion ditch is held in the Rock Creek area.

Timber Production

Past timber activities have been limited primarily to salvage and selective harvest prescriptions.

Livestock Production

The Rock Creek area provides an equivalent of 410 AUM's for two existing grazing allotments.

History

Historic features include the old China ditch, built by Chinese laborers during the mid-1800's to supply water to the Spanish Gulch mining district, and a historic wagon road used to transport produce from the John Day River valley to the Paulina area. Indian artifacts are located at numerous sites in the Rock Creek area.

Fish

Rock Creek, and its major tributaries within the roadless area, provide 18.2 miles of excellent condition Class I and II streams to the John Day River. The tributaries of Birch Creek within the roadless area provide an additional 1.2 miles of excellent condition Class II stream to the John Day River. Both Rock Creek and Birch Creek support significant trout populations and is also important for spawning steelhead. It is an important supply of high quality water to the John Day River fisheries.

Wildlife

The diverse habitat types found in the Rock Creek area support a corresponding diversity of reclusive and old-growth dependent wildlife species. The area is believed to support wintering and/or breeding bald eagles and wolverines--both on the Oregon Threatened and Endangered Species list. Species of special interest which are known to nest in the area include: pileated woodpecker, goshawk, prairie falcon, and blue and ruffed grouse. Forty to fifty percent of the area is considered to be elk winter range. The Rock Creek area contains excellent habitat for a small population of older age class elk.

Wilderness Capability (Potential)

Managability and Boundaries

Three different boundaries have been defined for the Rock Creek unroaded area. They are:

RARE II Boundary - 9,286 acres

Roadless Criteria Boundary - 11,414 acres

Manageable Boundary for Semiprimitive Recreation - 9,336 acres

The current boundary is an updated RARE II boundary. The acreage differences shown are due to recent on-the-ground surveys which added some acres and deleted others because of (a) more accurate mapping and (b) re-examination of areas of past human disturbance. The boundaries of these two categories are difficult to identify on the ground, except on the north boundary, because of indistinct topography and vegetation. The Manageable Boundary for Semiprimitive Recreation has been designated along more easily identifiable features such as roads, land survey lines, ridgetops and draws.

The Rock Creek unroaded area boundary is well defined by topographic features, roads, and the surveyed National Forest boundary. Topographic features serve to shield the roadless area from intrusion of activities taking place outside the area. Most of the Rock Creek and Birch Creek watersheds, which are administered by the Forest Service, lie within the roadless boundary.

A corridor along the high-clearance road to the top of Spanish Peak is the only substantial intrusion into the roadless area. This road provides access to the communications facility near the top of Spanish Peak, access to an undeveloped campsite used by one of the livestock permittees, and views of the surrounding country to motorized visitors. Elimination of this intrusion by closing and obliterating the road is possible but not necessary to manage the area for semiprimitive recreation.

Natural Integrity and Appearance, Opportunities for Solitude

The most extensive effect on the natural integrity of the Rock Creek area has been made by the elimination of fire as the principal factor controlling vegetative change.

The overall appearance of the area is very natural away from localized disturbances. Trails, low standard roads, fences, and timber harvest activities are apparent but not overwhelming to most users on approximately 15 percent of the area. Developments outside the roadless area are apparent only to observant visitors. Historic and prehistoric cultural features, and the effects of past activities on natural processes, are apparent only to the most observant visitors at close range.

The dense vegetation and rugged topography in the area provides barriers against intrusion by the sight or sounds of other Forest users. Nonmotorized users within the roadless area will not be apparent to other users at distances greater than 200 yards in most cases. The sounds of aircraft overflights, timber harvest activities, and motor vehicles will be heard at times from some parts of the roadless area. Activities which occur outside the roadless area will only be visible from a few places, to observant visitors.

Primitive Recreational Opportunities and Challenging Experiences

Opportunities for semiprimitive nonmotorized recreation in the area include: backpacking, hiking, fishing, big-game and upland bird hunting, plant and wildlife observation, photography, riding (horse and bicycle), and backcountry ski camping.

Semiprimitive motorized recreational opportunities include on- and off-trail use of over-snow, two-, three-, and four-wheel off-road vehicles (ORV's). Motorized recreation may be combined with some of the described nonmotorized activities, or as recreation by itself. These activities are limited by

terrain to approximately 15 percent of the roadless area. The estimated carrying capacity is 1.9 MRVD's.

The Rock Creek area's steep and diverse topography, limited trail system, isolation, and low visitor density provide challenges in off-trail navigation and safe travel which require good judgement, self-reliance, and a high level of backcountry skills for most activities. All these factors are further accentuated by winter conditions. Winter recreation in this area requires complete self-reliance and a very high skill level for safe travel.

Special Features, Historical and Scientific Study

The wildlife supported by the Rock Creek area are species dependent on high quality streams (e g. resident and anadramous fish), or upon old growth habitat or lack of human disturbance (bear, cougar, wolverine, some raptors, and "trophy" elk, among others). Rock Creek provides relatively large, contiguous areas of these habitats with minimal human intrusion.

The E. O. Waterman mining ditch is a significant feature of the Spanish Gulch Mining District. The Dayville-Beaver Creek wagon road is one of a very few remnants of pre-Forest Service development in the local area. Both of these nineteenth century cultural features have been largely obliterated by other activities where they cross private and public land outside the roadless area. Within the roadless area, fifty years of disuse has reduced the obtrusiveness of these developments, but the integrity of their original form remains largely intact for scientific and interpretive purposes.

Wilderness Availability

Recreation

Present recreational use includes low levels of backpacking, hiking, fishing, big-game and upland bird hunting, plant and wildlife observation, photography, riding (horse and bicycle), and backcountry ski camping (sometimes in combination with summer and winter ORV use).

Demand for semiprimitive recreation in this area is projected to increase within the planning period, as pressure on other similar areas increases.

Carrying capacity for this area is estimated at 3.1 MRVD's per year for the manageable area without a developed trail system. Developing trails to major portions of the area could increase the capacity to 15.5 MRVD's. Present use levels have not been quantified.

Wildlife

Wildlife of particular significance in the Rock Creek area are those dependent on snags, old growth, and riparian habitats, those affected by human contacts, or activities; big game; and resident and anadromous fish. A list of old growth dependent and nonadaptive species believed to occupy the area includes: pileated woodpecker, black-backed three-toed woodpecker, northern three-toed woodpecker, flammulated owl, northern flying squirrel, mountain lion, marten, and fisher.

Forty to fifty percent of the area is considered elk winter range. The entire unroaded area is summer, or transitional, range for deer and elk. Forty-five to fifty percent of the summer range consists of good to excellent cover, well distributed over the area. Fifty to sixty percent of the winter range consists of good to excellent thermal cover. The distribution of cover in winter range is somewhat more clumped than in summer range. Because of the area's inaccessibility, it supports a higher proportion of the older age class animals attractive to trophy hunters.

Tributaries to Rock Creek and Birch Creek provide 19.4 miles of Class I and II streams in the unroaded area, with abundant spawning beds, riparian vegetation, and stream banks in excellent condition.

Dead and defective tree (snag) habitat within the unroaded area is capable of supporting greater than 80 percent of the biological potential for cavity dependent wildlife.

Water

There are no existing uses of water within the unroaded area. A special use permit to divert water from Rock Creek at the northern boundary of the unroaded area, for irrigation use, caused the small area affected to be removed from the RARE II roadless area boundary. Water rights are held to tributaries of Rock Creek within the roadless area, but they have not been exercised within the past 20-30 years. The quality, timing, and amounts of water provided to the John Day River by Rock Creek and Birch Creek have been identified by the Oregon Department of Fish and Wildlife (ODFW) as important to maintaining the quality of the John Day fisheries.

Livestock

The unroaded area is part of two grazing allotments used to graze sheep and cattle on 38,761 acres, in and out of the area. The roadless area currently supports 410 AUM's of the 962 AUM total allowed by the grazing permits.

Timber

The Rock Creek unroaded area contains 6,467 acres of suitable forest land, mostly in old growth mixed conifer species. Net annual sustained yield, in existing conditions, is estimated to be .42 MMCF.

Minerals and Energy

Oil and gas leases are held on 7,800 acres of the Rock Creek area. There has been no mineral development in the area, and none is known to be planned.

Cultural Resources

Cultural resource inventories are incomplete in the Rock Creek area.

The E.O. Waterman mining ditch and the Dayville-Beaver Creek wagon road are known to be significant historic features which are minimally disturbed only where they are within the Rock Creek area.

TABLE C-9
RESOURCE POTENTIAL SUMMARY

	Current Levels	Potential Levels
RECREATION	Low to moderate (nonquantified)	3 1 MVRD's No trails 15 5 MVRD's Developed trails
WILDLIFE		
Old Growth Dependent Species		912 acres of suitable old growth3,036 of capable lands for old growth
Big Game (Rocky Mtn Elk)		107 animals 161 animals
Fish (Resident and anadromous)		High Unknown
WATER	7,872 Acre Feet	8,840 acre feet with 25% timber harvest level, 12,224 acre feet with conversion to grassland
LIVESTOCK	410 AUM's	443 AUM's with transitory range 558 AUM's with transitory range and water developments
TIMBER	No timber production currently Standing volume is approximately 142 MMBF	42 million cubic feet per year sustained yield
MINERALS AND ENERGY	No current mineral development 7800 acres of oil and gas leases	Prospectively valuable for oil and gas
CULTURAL	Significant historic, some prehistoric	High potential based on existing findings No completed resource inventories

Management Considerations

Fire

Natural fire frequencies once played a significant role in development and maintenance of vegetation within the Rock Creek area. The following range of natural fire cycles by vegetation type provides an indication of the importance of fire in preventing excessive fuel accumulations, and maintenance of seral tree and shrub species.

Ponderosa pine	5-25 years
Mixed conifer	20-70 years
Grass, tree shrub	5-15 years

Since the implementation of fire prevention measures at the turn of the century, fuels have been allowed to accumulate at unnatural rates, creating the potential for a major conflagration, given a certain set of environmental conditions.

Insects and Disease

Both natural and unnatural infestations by a variety of insects have occurred, are occurring, and will most likely continue to occur in the Rock Creek unroaded area. As recently as five years ago, an infestation of mountain pine beetles resulted in the mortality of lodgepole pine along Rock Creek. This was a natural event that, during historic times, was usually followed by an intense fire that served to prepare the site for stand regeneration.

The Rock Creek area, along with a large portion of central and eastern Oregon forest lands, are currently in the midst of an infestation of spruce budworm, an insect introduced to the western United States from the east coast at the turn of the century. Continuous feeding by this insect causes a reduction in vigor and can inflict death over a period of time. Evidence shows that budworm outbreaks begin and are maintained on stands where species are unadapted to site conditions. Douglas-fir and white fir are the primary target species of the budworm. These species are dominant in the roadless area due to loss of fire interactions in the environment. As long as this situation exists, there will be high potential for periodic outbreaks of spruce budworm.

Other insects that have potential for serious affects within the unroaded area are:

Insect	Target Species
Larch Casebearer	Western Larch
Western Pine Beetle	Ponderosa and Lodgepole Pine
Tussock Moth	Douglas-fir and White Fir

Among the diseases occurring in the unroaded area are:

Disease	Target Species
Various root rots caused by fungus:	All
Indian Paint Fungus	White Fir

Neither of these is expected to cause serious problems under the current management allocation.

Wilderness Evaluation

Public Interest

Public comments received concerning Rock Creek were usually in conjunction with the Cottonwood roadless area Many perceive these two areas as one, sometimes referred to as the "Ochoco Canyon," even though a road divides the two. Two hundred forty-two comments were received on Rock Creek and Cottonwood Creek, and 44 addressed the 'Ochoco Canyons." Among these was a comment by ODFW which suggested managing the entire area for semi-primitive nonmotorized recreation.

The comments favored keeping Rock and Cottonwood Creeks roadless. Wilderness designation for the area was desired by a few who wished to tie it to Black Canyon Wilderness. Adjacent roads no longer needed were recommended to be closed.

TABLE C-10
Nearby Wilderness and Unroaded Areas

Wilderness Areas	Unroaded Areas *	Current Allocation	Approximate Distance from Rock Creek Roadless Area (Air Miles)	Acres
Bridge Creek			18	5,400
Mill Creek			30	17,400
Black Canyon			3	13,400
Strawberry Mtn			60	68,300
North Fork John Day River			95	120,800
Monument Rock			50	19,800
Mt Washington			85	52,600
Three Sisters			90	285,000
	Lookout Mountain	Semiprimitive/ Nonmotorized	20	14,273
	Cottonwood	Big Game Production	1	9,777
	Green Mountain	Big Game Production	34	6,630
	Silver Creek	Semiprimitive/ Nonmotorized	35	7,459
	Deschutes Canyon/ Steelhead Falls	Semiprimitive/ Nonmotorized	65	10,000

* Roadless Criteria Boundary Acres

Some recommended limited entry for logging, with roads gated or otherwise closed. Some requested the trail system be upgraded.

Reaction to timber harvest in the Rock and Cottonwood Creeks area was mixed. Some urged balloon or helicopter logging only. Others stated that the area should be logged with an emphasis on wildlife, on a 5-10 year entry. Some recommended clearcuts of under 20 acres, leaving culls standing for wildlife.

Individuals and groups provided strong support for the allocation of this area to management for wilderness, roadless, or other relatively undeveloped forms of management. This input reflected strongly held feelings about this particular area. The most common comments related to wildlife concerns were: that habitat for nonadaptive and old growth dependent wildlife should be provided in more and larger continuous areas, that on- and off-site impacts on fisheries would be too great under allocations which emphasized big game numbers or timber outputs; that old growth, nonadaptive, riparian, and stream habitat were more important than big game production in determining wildlife management objectives for the area; and that increasing numbers of elk was not the best game management goal for the area.

TABLE C-11
Distance From Population Centers

City	Population	Distance From Rock Creek Unroaded Area
Prineville	5,520	95
Bend	17,800	130
Redmond	6,615	115

Environmental Consequences

The variety of acre allocations shown in Table C-12 will result in an array of different outputs and environmental consequences for the Rock Creek area.

Table C-13 contains quantitative estimates of resource outputs and/or environmental consequences associated with each alternative. As an example, even though timber production per se is not an environmental consequence, the outputs shown indicate the increased productivity associated with long-term management of the timber resource in the Rock Creek area (e.g. 1.7 vs. 2.1 MMBF for B-Modified). Similarly, "Roads Built" by alternative is not an environmental consequence, but "Roads Open per square mile" indicates the emphasis of the prescription applied by alternative, which can result in an array of consequences for wildlife, water quality, and motorized recreation. Outputs shown for "Riparian" indicate the acres of riparian area that will be enhanced above minimum management requirements. Outputs shown for "Big Game" (number's of elk) reflect the management prescriptions applied to the area by alternative and are an index of the quality of habitat produced. Outputs for "Recreation" are Recreation Opportunity Spectrum classifications and indicate the type of recreational opportunities available by alternative. For "Off-Road Vehicles," a plus or minus indicates either an increase or a decrease in this type of opportunity. Outputs for "Snags" indicates the percentage of snag habitat available for maximum potential *production of primary cavity users, by alternative.* Outputs for "Old Growth," in acres, indicates either (a) the acres allocated by management for development alternatives, or (b) existing or potential old growth based on site capability. Outputs for remaining categories are self-explanatory.

Alternatives A And NC

These alternatives would result in a big game management emphasis for the Rock Creek area. Opportunities for semiprimitive experiences would be substantially reduced. The sites and sounds of man's intrusion would be obvious. The forces of natural succession would be substantially reduced because of vegetation manipulation for habitat. At least 50 percent of the area would be in an open (noncover) condition. Water quality would decrease as a result of road building and timber harvest, but would remain acceptable. About 382 acres of riparian habitat would be enhanced to an "exceeds acceptable" condition. Approximately 42 miles of road would be built, but only 2 miles per square mile would remain open, in order to maintain big game habitat. Elk production would increase, with the emphasis on summer range, to 96 animals. About 912 acres of old growth habitat would be maintained over time. Snag habitat would remain at relatively high levels of 80 percent of potential. Forage production would increase by about 26 AUM's, due to increased transitory range and water developments. Motorized recreation and winter sports opportunities would increase because of access, but within limits to protect wildlife habitat. A "roaded modified" type of recreational setting would be available. Approximately 155 cords of firewood would be annually available to local citizens. Timber harvest would occur at an average rate of 1.48 MMBF per year for Alternative 'A'. A sustained yield of 1.84 MMBF would be available once the area is in a regulated condition. Future options for wilderness consideration would be foregone.

Alternative B-Modified

This alternative would result in a timber/range management emphasis for the Rock Creek area. Opportunities for semiprimitive experiences would be eliminated. The sites and sounds of human activities would dominate the area. Old growth habitat would be reduced, from the current 3,036 acres, to minimum management levels of 358 acres. Vegetation manipulation would occur for maximum production of commodities (timber and forage). Natural succession would no longer be a dominant factor. About 42 miles of road would be built and generally kept open. Water quality would decrease as a result of road building and timber management activities, *but would remain within limits established for the*

TABLE C-12
ROCK CREEK ROADLESS AREA DESIGNATION BY MANAGEMENT PRESCRIPTION

Total Roadless Criteria Acres - 11,414
Area Manageable For Semiprimitive Recreation = 9,336

	Acres by Alternative 1/				
Management Prescription	A / NC	B-MOD	C-MOD	E-DEP	I
Dispersed Recreation					
Nonmotorized	0	0	9,336	9,336	6,198
Motorized	0	0	0	0	0
Timber/Range	0	11,414	0	0	5,216
Big Game	11,414	0	2,078	2,078	0

1/ Based on Roadless Criteria Acres

TABLE C-13
ROCK CREEK SUMMARY OF RESOURCE OUTPUTS BY ALTERNATIVE

		ALTERNATIVE				
	Unit of Measure	A / NC	B-MOD	C-MOD	E-DEP	I
Timber						
50 Year Period	MMBF/Yr	1 48	1 7	3	3	8
Sustained Yield	MMCF	37	42	07	06	2
Roads						
Built	Miles	42	42	8	8	16
Open	/Sq Mi	2	All	All	All	All
Range	AUM's	436	558	415	415	446
Riparian						
Exceeds Acceptable Condition (Excellent)	Acres	382	382	351	351	382
Big Game						
Elk (5th Decade)	#	161	103	127	127	79
Recreation (ROS)						
SPNM	Acres			9,336	9,336	6,198
RM/RN	Acres	11,414	11,414	2,078	2,078	5,216
Old Growth	Acres	912	358	3,036	3,036	2,390
Off-Road Vehicles 1/		+	+	-	-	+
Firewood	Cords	155	179	33	33	81
Snags	% of maximum potential	80%	20%	100% 9,336 Ac 80% 2,078 Ac	100% 9,336 Ac 20% 2,078 Ac	100% 6,198 Ac 20% 5,216 Ac
Future Wilderness Consideration		None	None	+	+	+

1/ + or - Indicates an increase or decrease in this type of opportunity

MMBF Million board feet
MMCF - Million cubic feet
RM/RN Roaded Modified/Roaded Natural
SPNM - Semiprimitive Nonmotorized
AUM's- Animal Unit Months

entire Ochoco National Forest. Elk populations would decrease to about 6 animals, over time. Three hundred and eight-two acres of riparian habitat would be improved to an "excellent" condition. Snag habitat would be reduced to 20 percent of potential for maximum production of primary cavity nesters, which is a minimum management level. Forage production would increase by 148 AUM's to 558 AUM's due to transitory range and water developments. Motorized recreation and winter sports opportunities will increase within a "roaded modified" recreational setting. About 179 cords of firewood would be annually available to local citizens. Timber harvest would occur at an average rate of about 1.7 MMBF per year. About .42 MMCF (sustained yield) would be available once the area was in a regulated condition. Options for future wilderness condition would be foregone.

Alternative C-Modified and E-Departure

These alternatives would result in semiprimitive management emphasis for 9,336 acres of the Rock Creek area, and a big game emphasis for the remaining 2,078 acres. No road building, or scheduled timber harvest would occur in the semiprimitive area, but about 8 miles of road would be built in the big game emphasis area. The sites and sounds of man's activities would generally be minimal in the unroaded portion, and natural forces would continue to have a strong influence over succession. Old growth habitat would evolve naturally towards climax, with a maximum capability of about 3,036 acres, barring natural catastrophes such as fire or insect infestation in the unroaded area. Also within the unroaded area, snag habitat would be based on natural tree mortality and fluctuate around maximum levels. Options for future wilderness consideration would also remain available.

Within the developed, roaded portion, vegetation would appear manipulated in order to produce big game habitat. At least 50 percent of the area would be in an open (noncover) condition. Forage production would increase only slightly, to about 415 AUM's due to transitory range. Snag habitat would be maintained at 80 percent of potential, a relatively high level. Opportunities of motorized and winter sports recreation would increase within a "roaded modified" recreation setting. Timber production would occur at an average rate of .3 MMBF per year with a sustained yield of .07 MMCF per year. Stream sediment would increase within constraints.

For the entire 11,414-acre combined area, elk production would increase to about 127 animals over time. About 351 acres of riparian habitat would be improved to "excellent condition."

Alternative I

This alternative would emphasize semiprimitive nonmotorized management in the 6,198-acre core area, while managing the timber stands in the 4,516-acre southern plateau area and the 700-acre northern productive area. The sights and sounds of human intrusion would be obvious in the harvested portions, and might indirectly carry into the lower reaches of the unroaded portion. Old growth would be reduced from the current 3,036 acres to 2,390 acres. Natural succession would continue to dominate the timber stands within the unroaded area. Managed stands outside the core area would dominate. About 16 miles of road would be constructed and generally kept open. The potential for a minor decrease in water quality would exist as a result of timber harvest and road building. Elk numbers would decrease in time due to: 1) timber harvest, and 2) silvicultural treatments that maximize future timber volumes, and that decrease cover and security. Snag habitat would be reduced in the harvest areas, which would reduce potential for cavity nesters. Forage production would increase in the harvest areas as transition range. Motorized recreational opportunities would be increased within the harvest areas of the southern plateau, as would the potential to supply firewood. Options for future wilderness would be maintained in the roadless core area, but would be less desirable than if the whole area was managed for SPNM opportunity.

Cottonwood

Description

The Cottonwood unroaded area consists of approximately 9,777 acres in Wheeler and Grant Counties, Oregon, on the Paulina Ranger District. It is about 23 miles northwest of Paulina, 27 miles northwest of Mitchell and 8 miles southeast of Dayville. It is accessed primarily by National Forest Road 38. Private lands, and lands administered by the Bureau of Land Management, border to the north, east, and southeast. All other borders are surrounded by National Forest lands.

History

Prior to the Oregon Wilderness Act of 1984, the Cottonwood unroaded area was part of a much larger parcel referred to as the Canyons roadless area. This larger area also contained the now officially designated Black Canyon Wilderness Area. The Canyons roadless area was subdivided into Cottonwood and Black Canyon because of a major developed road that bisected it.

The Cottonwood roadless area was included in the RARE II inventory as #B6220, but was not recommended for wilderness designation and was not included in the Oregon Wilderness Act of 1984.

Under the existing Silvies Land Management Plan, Cottonwood is allocated to big game emphasis.

Geography and Topography

The Cottonwood unroaded area is comprised largely of a north-facing basin that includes the headwaters of Cottonwood Creek, Tunnel Creek, Brown Creek, Deep Creek and Battle Creek.

The most significant topographic features are the ridges and canyons which form a steep, deeply dissected landscape. The terraced cliffs of Young's Butte drop over 1700 feet toward the South Fork of the John Day River. Slopes in more than two-thirds of the area exceed forty percent. Eighty-five percent of the area is located on slopes with potentially severe erosion hazards. The soils are comprised of 50 percent moderately deep and deep fine sandy loam volcanic ash, 25 percent shallow and moderately deep loams and clays, and 25 percent very shallow loamy and clay nonforest soils.

The highest point in the Cottonwood area is the top of Battle Creek Mountain, at just over 6000 feet. Elevations of over 5000 feet, on many ridges, drop to around 3500 feet in the canyon bottoms where Cottonwood Creek and several others cross the Forest boundary.

Vegetation

Nine different plant communities exist within the Cottonwood unroaded area. Table C-14 contains a list of those plant communities with acreages according to resource inventories. They are organized by similarity in dominant plants and environment.

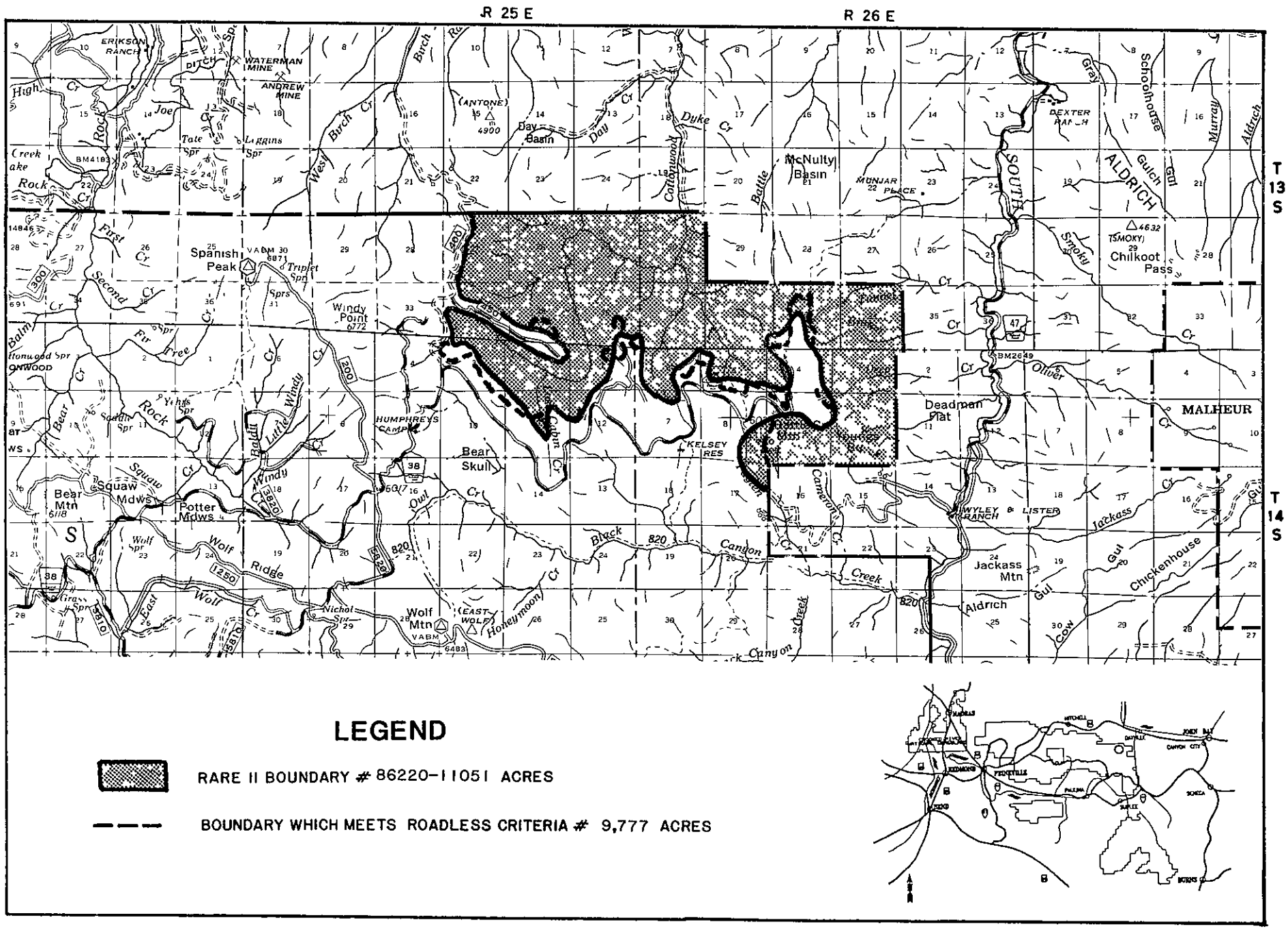
Stream bottoms and north-facing slopes in the Cottonwood area are covered with dense mixed conifer and ponderosa pine/Douglas-fir forest. Most south- and east-facing slopes, and ridgetops, are marked by shallow soils and mountain-mahogany/bunchgrass interspersed with open ponderosa pine/Douglas-fir forest. The terraces of Young's Butte are covered with scattered juniper, mountain mahogany, native bunchgrass, and a variety of smaller shrubs.

Current Uses

Existing management of the Cottonwood area allows for a wide range of uses, even though the magnitude of some uses is constrained by limited access.

Figure C-3

COTTONWOOD



LEGEND

RARE II BOUNDARY # 86220-11051 ACRES

BOUNDARY WHICH MEETS ROADLESS CRITERIA # 9,777 ACRES

TABLE C-14
COTTONWOOD PLANT COMMUNITIES

Descriptor	Plant Community	Acres
Low elevation, nonforest	Stiff sage scabland (w/ stiff sagebrush)	64
	Bunchgrass on shallow soil, gentle slopes (w/ fescue, sandberg bluegrass, Yarrow)	88
	Juniper-bunchgrass	1,684
	Juniper-low sagebrush	67
Forested-ponderosa pine dominant, firs absent (to present)	Mixed conifer - pinegrass - residual soils (w/ white fir, Douglas-fir, ponderosa pine)	3,867
	Mixed conifer - pinegrass ash soils (w/ western larch, white fir, Douglas-fir, ponderosa pine)	737
	White fir - twinflower (w/ Douglas-fir western larch, Columbia brome)	728

Recreation

Backpacking, big game hunting, horseback riding, hiking and fishing are now the principal recreational uses. Recreational use is low and no indications have been measured, but is estimated to be considerably less than the current potential of 1.6 MRVD's without a developed trail system. This potential increases to 15.9 MRVD's with a developed trail system that accesses the interior of the area from various points.

The area is served by 4.8 miles of maintained trails. Approximately 95 percent of the area is capable of supporting semiprimitive, nonmotorized recreation. The remainder supports semiprimitive, motorized recreation.

Minerals and Energy

There has been no mineral development in the area. About 2,980 acres of oil and gas leases are held on the Cottonwood area.

Timber

Over most of the Cottonwood area, few timber-related activities have occurred.

Livestock Production

The Cottonwood area provides an equivalent of 252 AUM's for four grazing allotments.

Scenic Resources

Outstanding views of Cottonwood Canyon, Black Canyon Wilderness Area, the John Day River Valley, and the canyon of the South Fork of the John Day River exist from the high points and ridges in the Cottonwood area.

Wildlife

The diverse variety of habitat types found in the Cottonwood area support a corresponding diversity of reclusive and old growth dependent wildlife species. The area is believed to support wolverine, black bear, and mountain lions. Bird species of special interest which are known to nest in the area include: pileated woodpecker, goshawk, prairie falcon, and blue and ruffed grouse. Sixty to seventy percent of the area is considered to be elk winter range. The Cottonwood area contains excellent habitat for a small population of older age class elk.

Fish

Cottonwood Creek, and its major tributaries within the area, provide 10.7 miles of excellent condition Class I and II streams to the John Day River. Stream habitat in the Cottonwood drainage supports significant trout and steelhead populations, and this drainage supplies important high quality water to John Day River fisheries.

History

Artifacts remaining from early Native American use are located at a number of sites in the Cottonwood area, along with historical features associated with early use and development on the Forest

Wilderness Capability (Potential)

Manageability and Boundaries

Three different boundaries have been defined for the Cottonwood unroaded area. They are:

RARE II Boundary - 11,051 acres

Roadless Criteria Boundary - 9,777 acres

Manageable Boundary for Semiprimitive Recreation - 9,737

The Roadless Criteria boundary is the updated RARE II boundary. The acreage differences shown are due to recent on-the-ground surveys, which added some acres and deleted others because of (a) more accurate mapping and (b) re-examination of areas of past human disturbance. The boundaries of these two categories are difficult to identify on the ground, except on the north and east boundaries, because of indistinct topography and vegetation. The Manageable Boundary for Semiprimitive Recreation has been designated along more easily identifiable features, such as roads, land survey lines, ridgetops and draws.

The Cottonwood unroaded area boundary is well defined by topographic features, roads, and surveyed National Forest boundary. Topographic features serve to shield the unroaded area from intrusion of activities taking place outside the area. Most of the Cottonwood Creek watershed which is administered by the Forest Service lies within the roadless boundary.

Corridors along the high-clearance road which follows Cougar Ridge, and the high-standard road on the main ridge of Battle Creek Mountain, are substantial intrusions into the roadless areas. These roads were constructed to provide access for timber harvest Currently, they are used for motorized access to Cottonwood Canyon by livestock permittees, recreationists, and hunters. Approximately 730 acres of timber harvest units and temporary roads are associated with the road on Battle Creek Mountain. Closure and obliteration of the road on Cougar Ridge is possible, but would cause minor inconvenience to some Forest users. The higher standard roads and the effects of logging on Battle Creek Mountain would be very difficult and expensive to restore to a natural appearance.

Natural Integrity and Appearance, Opportunities for Solitude

The most extensive effect on the natural integrity of the Cottonwood area has been made by the elimination of fire as the principal influence on vegetative change.

The overall appearance of the area is very natural, away from localized disturbances. Trails, low standard roads, and timber harvest activities are apparent, but not overwhelming, to most users. They involve less than five percent of the area. Developments outside the unroaded area are apparent from some points. Prehistoric cultural features and the effects of past activities on natural processes are apparent only to the most observant visitors at close range.

The dense vegetation and rugged topography in the area provide substantial barriers against intrusion by the sight or sounds of other Forest users. Nonmotorized users within the unroaded area will not be apparent to other users at distances greater than 200 yards, in most cases. Opportunities exist to reduce the probability of contacts by avoiding the few established trails and dispersed camps. The sounds of aircraft overflights, timber harvest activities, and motor vehicles will be heard at times from some parts of the unroaded area. Activities which occur outside the unroaded area will only be visible from a few places to observant visitors.

Primitive Recreation Opportunities and Challenging Experiences

Opportunities for semiprimitive nonmotorized recreation in the area include: backpacking, hiking, fishing, big game and upland bird hunting, riding (horse and bicycle), photography and observation of plants and wildlife. The estimated carrying capacity is 1.6 MRVD's without a developed trail system and is estimated at 15.9 MRVD's if a trail system was developed to access the interior from different points.

Semiprimitive motorized recreational opportunities include on- and off-trail use of two-, three-, and four-wheel off-road vehicles (ORV's). Motorized recreation may be combined with some of the described nonmotorized activities, or as recreation by itself. These activities are limited by dense vegetation and steep terrain to approximately five percent of the unroaded area.

The Cottonwood area's steep and diverse topography, limited trail system development, isolation, and low visitor density provide challenges in off-trail navigation and travel which require good judgement, self-reliance, and backcountry skills for most activities.

Special Features

The wildlife supported by the Cottonwood area are species dependent upon high quality streams (e.g. resident and anadramous fish), or upon old growth habitat or lack of human disturbance (wolverine, bear, mountain lion, some raptors, and "trophy" elk, among others). The Cottonwood area provides relatively large, contiguous areas of these habitats with minimal human intrusion.

Wilderness Availability

Recreation

Present recreational use includes low levels of backpacking, hiking, fishing, big-game and upland bird hunting, plant and wildlife observation, photography, and riding, sometimes in combination with ORV use.

Demand for semiprimitive recreation in this area is projected to increase within the planning period, as pressure on other similar areas increases.

Carrying capacity for this area is estimated at 15.9 MRVD's per year for the manageable area with a fully developed trail system. Present use levels have not been quantified.

Wildlife

Wildlife species dependent on snags, old growth, and riparian habitats; those adversely affected by human contacts, or activities; big game; and resident and anadromous fish are wildlife of particular significance in the Cottonwood area. A list of old growth dependent, and nonadaptive, species believed to occupy the area includes: pileated woodpecker, black-backed three-toed woodpecker, northern three-toed woodpecker, flammulated owl, northern flying squirrel, mountain lion, marten, and fisher. Black bear and wolverine are also believed to be in the area.

Sixty to seventy percent of the area is considered elk winter range. The entire roadless area is summer (transitional) range for deer and elk. Forty to fifty percent of the summer and winter range consists of

good to excellent cover, well distributed over the area. Because of the area's inaccessibility, it supports a higher proportion of the older age class animals attractive to trophy hunters.

Tributaries to Cottonwood provide 10.7 miles of Class I and II streams in the roadless area, with abundant spawning beds, riparian vegetation, and stream banks in excellent condition.

Dead and defective tree (snag) habitat within the roadless area is capable of supporting greater than 80 percent of the biological potential for cavity dependent wildlife.

Water

There are no existing uses of water within the roadless area. The quality, timing, and amounts of water provided to the John Day River by Cottonwood have been identified by Oregon Department of Fish and Wildlife as important to maintaining the quality of the John Day fisheries.

Livestock

The 9777 acres in the Cottonwood area are a part of a 32,340-acre grazing allotment used for sheep and cattle. The roadless area is capable of supporting 252 AUM's of the 690 Aum total allowed by the grazing permits.

Timber

The Cottonwood unroaded area contains 6,640 acres of suitable forest land, mostly in old growth mixed conifer species. Net annual sustained yield is estimated to be .33 MMCF.

Minerals and Energy

There has been no mineral development in the area, and none is known to be planned. Some of the area has been leased for oil and gas or recommended for lease. No activity has occurred in this area.

TABLE C-15
RESOURCE POTENTIAL SUMMARY

	Current Levels	Potential Levels
RECREATION	Low to moderate (nonquantified)	1 6 MVRD's No trails 15 9 MVRD's Fully developed trail system
WILDLIFE		
Old Growth Dependent Species	2,858 acres of suitable old growth	6,568 of capable lands for old growth
Big Game (Rocky Mtn Elk)	86 animals	134 animals
Fish (Resident and anadromous)	High	Unknown
WATER	6,742 Acre Feet	7,463 acre feet with 25% timber harvest level, 9,955 acre feet with conversion to grassland
LIVESTOCK	252 AUM's	272 AUM's with transitory range 343 AUM's with transitory range and water developments
TIMBER	No timber production currently Standing volume is approximately 106 MMBF	33 million cubic feet per year sustained yield
MINERALS AND ENERGY	No current mineral development. 2,980 acres of oil and gas leases	Prospectively valuable for oil and gas
CULTURAL	Some historic, some prehistoric	High potential based on existing findings No completed resource inventories

Cultural Resources

Cultural resource inventories are incomplete for the Cottonwood area.

Artifacts remaining from early Native American use are located at a number of sites in the Cottonwood area, along with historical features associated with early use and development of the Forest. Their integrity remains largely intact for scientific and interpretive purposes, but they are not known to be of major significance.

Management Considerations

Fire

Natural fire frequencies once played a significant role in development and maintenance of vegetation within the Cottonwood area. The following range of natural fire cycles by vegetation type provides an indication of the importance of fire in preventing excessive fuel accumulations and maintenance of seral tree and shrub species.

Ponderosa pine	5-25 years
Mixed conifer	20-70 years
Grass, tree shrub	5-15 years

Since the implementation of fire prevention measures at the turn of the century, fuels have been allowed to accumulate at unnatural rates, creating the potential for a major conflagration, given a certain set of environmental conditions.

Insects and Disease

Both natural and unnatural infestations by a variety of insects have occurred, are occurring, and will most likely continue to occur in the Cottonwood unroaded area.

The Cottonwood area, along with a large portion of central and eastern Oregon forest lands, is currently in the midst of an infestation of spruce budworm, an insect introduced to the western United States from the east coast at the turn of the century. Continuous feeding by this insect causes a reduction in vigor and can kill a tree in time.

TABLE C-16
Nearby Wilderness and Unroaded Areas

Wilderness Areas	Unroaded Areas *	Current Allocation	Approximate Distance from Cottonwood Roadless Area (Air Miles)	Acres
Bridge Creek			24	5,400
Mill Creek			36	17,400
Black Canyon			1	13,400
Strawberry Mtn			71	68,300
North Fork John Day River			95	120,800
Monument Rock			50	19,800
Mt Washington			90	52,600
Three Sisters			95	285,000
	Rock Creek	Big Game Production	1	11,414
	Lookout Mountain	Semiprimitive/ Nonmotorized	30	14,273
	Green Mountain	Big Game Production	40	6,630
	Silver Creek	Semiprimitive/ Nonmotorized	35	7,459
	Deschutes Canyon/ Steelhead Falls	Semiprimitive/ Nonmotorized	70	10,000

* Roadless Criteria Boundary Acres

Other insects with potential for serious damage are:

Insect	Target Species
Larch Casebearer	Western Larch
Western Pine Beetle	Ponderosa and Lodgepole Pine
Tussock Moth	Douglas-fir and White Fir

Among the diseases occurring in the roadless area are·

Disease	Target Species
Various root rots caused by fungi:	All
Indian Paint Fungus	White Fir

Neither of these is expected to cause serious problems under the current management allocation.

Wilderness Evaluation

Public Interest

Public comments received on the DEIS and Proposed Forest Plan concerning Cottonwood were usually in conjunction with the Rock Creek roadless area and are discussed there.

TABLE C-17
Distance From Population Centers

City	Population	Distance From Cottonwood Unroaded Area
Prineville	5,520	95
Bend	17,800	130
Redmond	6,615	115

Environmental Consequences

The variety of acre allocations shown in Table C-18 will result in an array of different outputs and environmental consequences for the Cottonwood area.

Table C-19 contains quantitative estimates of resource outputs and/or environmental consequences associated with each alternative. As an example, even though timber production per se is not an environmental consequence, the two different outputs shown indicate the increased productivity associated with long term management of the timber resource in the Cottonwood area (e g. 1.47 vs. 1.67 MMBF for B-Modified). Similarly, "Roads Built" by alternative is not an environmental consequence, but "Roads Open per square mile" indicates the emphasis of the prescription applied by alternative, which can result in an array of consequences for wildlife, water quality, and motorized recreation. Outputs shown for "Riparian" indicate the acres of riparian area to be enhanced above minimum management requirements. Outputs shown for "Big Game" (number's of elk) reflect the management prescriptions applied to the area by alternative and are an index of the quality of habitat produced. Outputs for "Recreation" are Recreation Opportunity Spectrum classifications and indicate the type of recreational experiences available by alternative. For "Off-Road Vehicles," a plus or minus indicates either an increase or a decrease in this type of opportunity Outputs for "Snags" indicate the percentage of snag habitat available for maximum potential production of primary cavity users, by alternative. Outputs for "Old Growth," in acres, indicate either (a) the acres allocated by management for development alternatives, or (b) existing or potential old growth based on site capability. Outputs for remaining categories are self-explanatory.

TABLE C-18
COTTONWOOD ROADLESS AREA DESIGNATION BY MANAGEMENT PRESCRIPTION

Total Roadless Criteria Acres - 9,777
Area Manageable For Semiprimitive Recreation = 9,737

	Acres by Alternative 1/				
Management Prescription	A / NC	B-MOD	C-MOD	E-DEP	I
Dispersed Recreation Nonmotorized Motorized	0 0	0 0	9,737 0	9,737 0	6,592 0
Timber/Range	0	9,777	0	0	3,185
Big Game	9,777	0	40	40	0

1/ Based on Total Roadless Criteria Acres

TABLE C-19
COTTONWOOD SUMMARY OF RESOURCE OUTPUTS BY ALTERNATIVE

		ALTERNATIVE				
	Unit of Measure	A / NC	B-MOD	C-MOD	E-DEP	I
Timber 50 Year Period Sustained Yield	MMBF/Yr MMCF	1 27 3	1 47 33	0 0	0 0	41 10
Roads Built Open	Miles /Sq Mi	39 2	34 All	0 0	0 0	11 All
Range	AUM's	268	343	252	252	297
Riparian Exceeds Acceptable (Excellent) Condition	Acres	0	0	0	0	0
Big Game Elk (5th Decade)	#	137	68	89	89	99
Recreation (ROS) SPNM RM/RN	Acres Acres	9,777	9,777	9,737 40	9,737 40	6,592 3,185
Old Growth	Acres	850	465	3,832	3,832	2,188
Off-Road Vehicles 1/	+/-	+	+	-	-	+
Firewood	Cords	133	154	0	0	50
Snags	% of maximum potential	80%	20%	100%	100%	90%
Future Wilderness Consideration		None	None	+	+	+

1/ + or - Indicates an increase or decrease in this type of opportunity

MMBF - Million board feet
MMCF - Million cubic feet
RM/RN Roaded Modified/Roaded Natural
SPNM - Semiprimitive Nonmotorized
AUM s- Animal Unit Months

Alternatives A and NC

This alternative would result in a big game management emphasis for the Cottonwood area. Opportunities for semiprimitive experiences would be substantially reduced. The sites and sounds of human intrusion would be obvious. Manipulation of vegetation for habitat production would substantially reduce the importance of natural succession. At least 50 percent of the area would be in an open (noncover) condition. Water quality would decrease as a result of road building and timber management, but would remain within limits. All riparian habitat would be maintained in an "acceptable" condition. Approximately 39 miles of road would be built to access the area, but only 2 miles per square mile would remain open. Elk production will increase to 137 animals. About 850 acres of old growth habitat would be maintained over time. Snag habitat would be maintained at relatively high levels - 80 percent of potential. Forage production would increase slightly, by about 16 AUM's due to increased transitory range. Motorized recreation and winter sports opportunities would increase because of access, but within limits to protect wildlife habitat. A "roaded modified" type of recreational setting would be available. Approximately 133 cords of firewood would be annually available to local citizens. Timber harvest would occur at an average rate of 1.27 MMBF per year, with an eventual long-term sustained yield of about .3 MMCF per year. Future options for wilderness designation would be foregone.

Alternative B-Modified

This alternative would result in a timber/range management emphasis for the Cottonwood area. Opportunities for semiprimitive experiences would be eliminated. The sites and sounds of human intrusion would dominate the area. Vegetation manipulation would occur for maximum production of commodities (timber and forage). Natural succession would no longer be a dominant factor About 34 miles of road would be built and generally remain open. Water quality would decrease as a result of road building and timber management activities, but within constraints. All riparian habitat would remain in an "acceptable" condition Elk numbers would decrease to about 5 animals over time. A minimum management level of 465 acres of old growth habitat would be maintained, and snag habitat would be reduced to 20 percent of potential, also a minimum management level. Forage production would increase by about 75 AUM's due to transitory range from timber harvest and increased investments in water developments. Motorized recreation and winter sports opportunities would increase within a "roaded modified" recreation setting. Timber harvest would occur at an average rate of 1 47 MMBF per year. Sustained yields of .33 MMCF would be produced once the area was in a fully managed condition. Options for future wilderness designation would be foregone. About 154 cords of firewood would be available annually to local citizens

Alternatives C-Modified and E-Departure

These alternatives would maintain the Cottonwood area (9,737 acres manageable boundary) in a semiprimitive condition. The sites and sounds of human activities would be minimal. No road building or scheduled timber harvest would occur, and vegetation would continue to evolve under the forces of natural succession. Climax conditions would be reached, but fire-induced forces would eventually reduce areas to seral conditions because of natural fuel accumulations, insect and disease infestations, and predicted fire frequencies About 3,832 acres of old growth habitat would naturally evolve, based on site capabilities. Snag habitat would be based on natural tree mortality and fluctuate around maximum levels. Elk production would increase slightly, to about 89 animals over time. Opportunities for motorized recreation would be reduced. Other winter sports opportunities would remain at about current levels Opportunities for future wilderness designation would remain.

Alternative I

This alternative would emphasize semiprimitive nonmotorized recreation management in the 6,592-

acre core area, while managing the timber stands in the 1,365-acre southern plateau area and the 1,820-acre northern productive area. The sights and sounds of human intrusion would be obvious in the harvested portions and might indirectly carry into the lower reaches of the unroaded portion, especially during helicopter logging. Old growth would be reduced from the current 3,832 acres to 2,188 acres. Natural succession would continue to dominate the timber stands within the unroaded area. Managed stands outside this core area would dominate. About 11 miles of road would be constructed and generally remain open. The potential for a minor decrease in water quality would exist as a result of timber harvest and road building. Elk numbers would increase slightly to 99 animals Snag habitat would be reduced in the harvest areas, which would reduce potential for cavity nesters. Forage production would increase in the harvest areas as transition range. Motorized recreational opportunities would be increased within the harvest areas of the southern plateau as would the potential to supply firewood. Options for future wilderness would be maintained in the roadless core area, but would be less desirable than if the whole area was managed for semiprimitive nonmotorized opportunity.

Silver Creek

Description

Location and Access

The Silver Creek area consists of approximately 7,459 acres in Harney County, Oregon, on the Snow Mountain Ranger District. It is about 40 air miles northwest of Burns and can be reached from National Forest Road 45, Road 4540 and Road 4150 via Howard Point. Private land and land administered by the Bureau of Land Management borders three sections to the southeast, but otherwise the entire area is surrounded by National Forest lands.

History

The Silver Creek area was included in RARE II studies and was not designated for further study. Under the existing Silvies-Malheur Land Use Plan, 2,510 acres are allocated to an unroaded management emphasis, 4,949 acres are allocated to a timber/range emphasis.

Geography and Topography

In general, the Silver Creek area contains gently sloping plateaus dissected by steep canyons, which are partially rimmed by basalt rock outcops. It is the major confluence for Silver Creek, a Class I stream, and contains major stream lengths for Delinquent, Short, and Dodson Creeks. Elevations range from 4,400 to 5,600 feet and the major aspect is south.

Soils

Soil on the tablelands is generally shallow gravelly silt, or sandy loam Sideslopes and draws have similar

soil characteristics but at greater depths. The side drainages and upper portions of the main tributaries contain many large boulders. Parent materials are rhyolites and/or welded tuffs.

Vegetation

Eleven different plant communities exist within the Silver Creek roadless area. Table C-20 contains a list of those plant communities with acreages according to resource inventories.

Current Uses

Livestock

The most pronounced use occurring in the Silver Creek area is livestock grazing. It contributes approximately 574 AUM's to five permittees within two allotments.

Recreation

Recreational use is low, but the potential is approximately 5,594 RVD's. The primary activities occurring are fishing, big game hunting, hiking and horseback riding. The area has no developed campsites or trail system.

Research Natural Area

Approximately 845 acres of the area currently provides a study area for ecosystem management.

Minerals and Energy

No oil and gas leases are held on the area. No mining development or exploration has occurred. Potential for mineral deposits is negligible.

Timber

Mature ponderosa pine with a pine understory dominates 72% of the area. Fifteen percent is open and the balance is mixed conifer stands. In the Silver Creek area, few timber related activities have occurred.

Wildlife

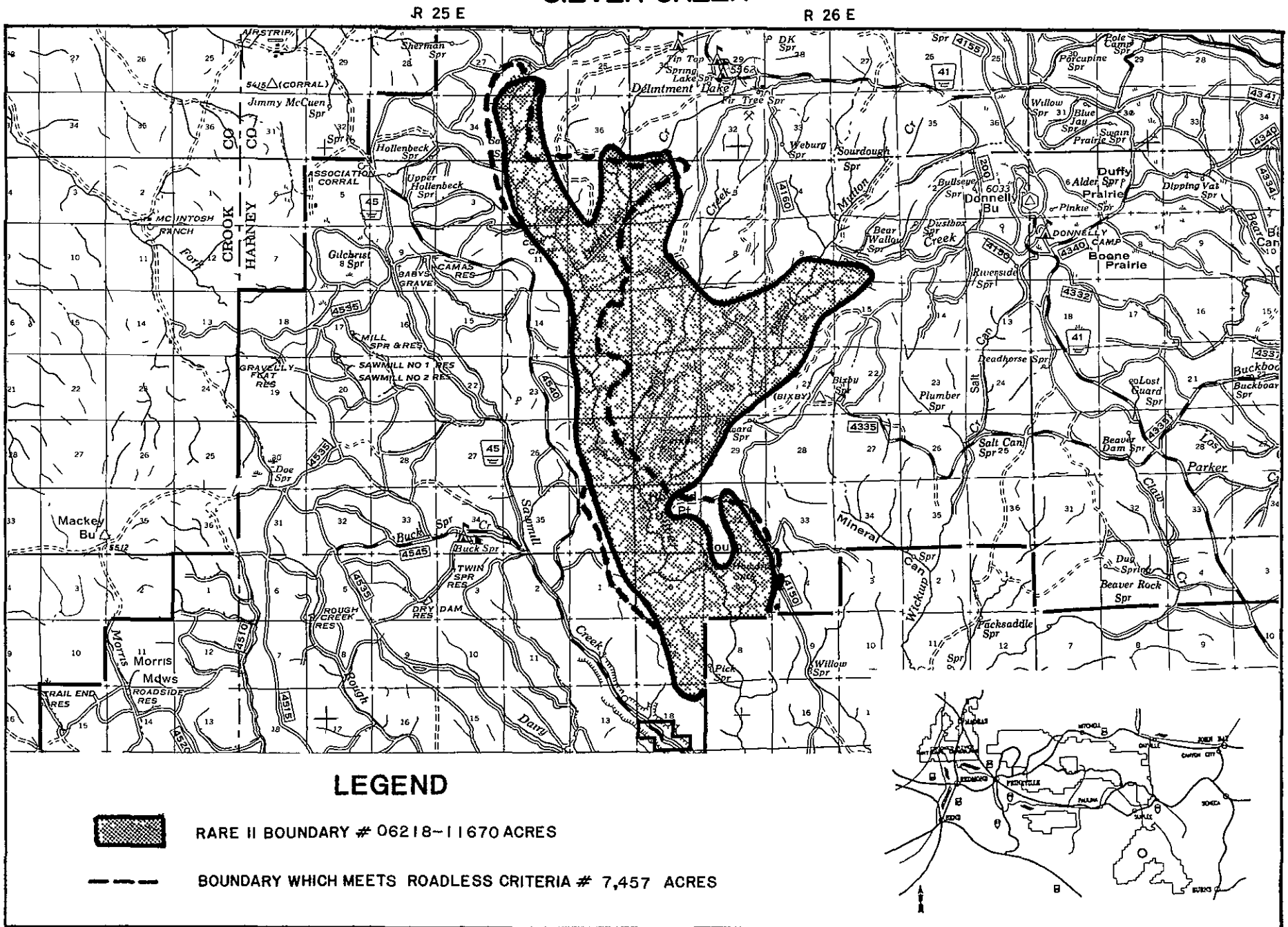
The Silver Creek area supports a year-round mule deer population. A resident elk herd and antelope

TABLE C-20
SILVER CREEK PLANT COMMUNITIES

Descriptor	Plant Community	Acres
Meadows	Moist Meadows (w/ tufted hairgrass, oathead sedge, California oatgrass)	75
Low elevation, nonforest	Bunchgrass on shallow soil, gentle slopes	56
	Low sagebrush-bunchgrass	53
	Juniper-low sagebrush	973
	Juniper-big sagebrush	313
	Big sagebrush - bunchgrass	51
Forested-ponderosa pine dominant, firs absent (to present)	Ponderosa pine, wheatgrass	1,891
	Ponderosa pine - fescue	465
	Ponderosa pine - Bitterbrush - elk sedge	3,068
	Mixed conifer - pinegrass - residual soils	1,261

* The two major ecosystem types represented in the area considered for a Research Natural Area contain
1 Ponderosa pine / bitterbrush
2 Ponderosa pine / pinegrass

SILVER CREEK



LEGEND

RARE II BOUNDARY # 06218-11670 ACRES

BOUNDARY WHICH MEETS ROADLESS CRITERIA # 7,457 ACRES

may be found adjacent to the open ridges on the south end of the area. There is a small beaver population.

Fish

A resident rainbow trout population has light fishing pressure due to limited access. It is found principally in Silver Creek, but there are limited numbers of fish in the feeder streams also.

Geology

An interesting geologic feature exists in the area in the form of Soda Spring. This spring emits water which has a high mineral content similar to soda. Algae growth in this spring is greater than in other spring locations throughout the Forest.

Cultural Resources

There are no known cultural features. It is possible, however, that the area has been frequented by Native Americans over time.

Wilderness Capability (Potential)

Manageability and Boundaries

Three different boundaries have been defined for the Silver Creek unroaded area. They are·

RARE II Boundary - 11,670 acres

Roadless Criteria Boundary - 7,459 acres

Manageable Boundary for Semiprimitive Recreation - 3,226 acres

The RARE II and Roadless Criteria boundaries are, by definition, the same. The acreage differences shown are due to recent on-the-ground surveys which added some acres and deleted others because of more accurate mapping and of re-examination of areas of past human disturbance The boundaries of these two categories are difficult to identify on the ground, except on the north boundary, because of indistinct topography and vegetation. The Manageable Boundary for Semiprimitive Recreation has been designated along more easily identifiable features such as roads, land survey lines, ridgetops and draws.

Natural Integrity and Appearance, Opportunities for Solitude

Livestock grazing and control of wildfires are the only elements affecting the natural integrity of the Silver Creek area.

The Silver Creek area has a very natural overall appearance, except where livestock grazing occurs. This activity occurs during the summer season for a period of one to two months within the roadless area. Forest management activities outside the area are usually not visible due to the terrain and timber canopy.

The activity of nonmotorized visitors will usually not be apparent due to vegetative cover and topography. The sounds of aircraft, timber harvest activity, and motor vehicles will be heard at times. The area has no trails to direct or concentrate visitors.

Primitive Recreational Opportunities and Challenging Experiences

Opportunities for semiprimitive nonmotorized recreation include camping, hiking, fishing, horseback riding and big game hunting. The estimated carrying capacity is 7.1 MRVD's

Opportunities for semiprimitive motorized recreation are limited to off-trail use. The vegetation and steep terrain limit this use to about 5% of the roadless area. The estimated carrying capacity is 400 RVD's.

The Silver Creek area does not challenge backcountry skills. The lack of a trail system may challenge safe travel, good judgement, and physical condition.

Wilderness Availability

Recreation

Present recreational use includes low levels of backpacking, hiking, fishing, big game and upland bird hunting, plant and wildlife observation, photography, and riding, sometimes in combination with ORV use

Demand for semiprimitive recreation in this area is projected to increase within the planning period, as pressure on other similar areas increases.

Carrying capacity for this area is estimated at 2.3 MRVD's per year for the manageable area with a fully developed trail system. Present use levels have not been quantified.

Wildlife

Wildlife species dependent on snags, old growth, and riparian habitats; those adversely affected by human contacts or activities; big game; and resident and anadromous fish are wildlife of particular significance in the Silver Creek area. A list of old growth dependent, and nonadaptive, species believed to occupy the area includes: pileated woodpecker, black-backed three-toed woodpecker, northern three-toed woodpecker, flammulated owl, northern flying squirrel, mountain lion, marten, and fisher. Black bear and wolverine are also believed to be in the area.

Because of the area's inaccessibility, it supports a higher proportion of the older age class animals attractive to trophy hunters.

Silver Creek provides opportunities for brook trout fishing. The potential for this fishery has not been assessed. Riparian vegetation and stream banks are in excellent condition.

Dead and defective tree (snag) habitat within the unroaded area is capable of supporting greater than 80% of the biological potential for cavity dependent wildlife.

TABLE C-21
RESOURCE POTENTIAL SUMMARY

	Current Levels	Potential Levels
RECREATION	Low (nonquantified)	1 7 MVRD's No trails 2.3 MVRD's Developed trails
WILDLIFE		
Old Growth Dependent Species	1,643 acres of suitable old growth	2,035 of capable lands for old growth
Big Game (Rocky Mtn Elk)	No current production	21 animals
Fish (Resident and anadromous)	Moderate	Unknown
WATER	5,147 Acre Feet	5,596 acre feet with 25% timber harvest level, 7,084 acre feet with conversion to grassland
LIVESTOCK	553 AUM's	597 AUM's with transitory range 1,569 AUM's with transitory range and water developments
TIMBER	No timber production currently Standing volume is approximately 58 MMBF	26 million cubic feet per year sustained yield
MINERALS AND ENERGY	No current mineral development 5,450 acres of oil and gas leases	Prospectively valuable for oil and gas
CULTURAL	Some minor historic, probably prehistoric	No completed resource inventories

Water
There are no existing uses of water within the unroaded area.

Livestock
The Silver Creek area is capable of supporting 597 AUM's with transitory range. With water developments the capacity increases to 1,569 AUM's.

Timber
The Silver Creek area is dominated by old growth/mixed conifer forest. Net annual sustained yield is estimated to be 1.3 MMBF.

Minerals and Energy
There has been no mineral development in the area, and none is known to be planned. Oil and gas leases have been obtained on 5,450 acres of the area. The area is classified as being prospectively valuable for oil and gas.

Cultural Resources
Cultural resource inventories have not been initiated in the Silver Creek area. Minor occurrences of prehistoric artifacts probably exist.

Management Considerations

Fire
Natural fire frequencies for most of the area range from 5 to 25 years. Since the implementation of fire prevention measures at the turn of the century, fuels have been allowed to accumulate at unnatural rates, creating the potential for a major conflagration, given a certain set of environmental conditions.

Insects and Disease
Forest insects most likely to do damage in the Silver Creek area include various species of bark beetles. These can be kept to endemic levels with natural fire interaction in existing ecosystems.

Elytroderma, a native needle disease agent on ponderosa pine, has had a historic, cyclical influence on the area, as has dwarf mistletoe.

Wilderness Evaluation

Public Interest
Ninety-three comments were received on the Silver Creek area. Among the respondents were the Oregon State Economist and Crook County.

Most of the comments dealt with the size of the roadless allocation in the area. Various recommendations were made ranging from dedication of 14,125 acres of Silver Creek as wilderness to opening the entire area to timber harvest.

Most of the comments, however, recommended retaining Silver Creek as roadless, and protecting the old growth and watershed values.

Those urging harvest of the old growth in the area suggested that it be spread over a two- to three-decade period to lessen impacts on riparian zones.

The Oregon State Economist agreed with semi-primitive nonmotorized recreation management and acreage allocated to that in Alternative E-Departure for Silver Creek.

Crook County desired the addition of roadless allocation acres to the Silver Creek roadless area identified in the DEIS.

TABLE C-22
Nearby Wilderness and Unroaded Areas

Wilderness Areas	Unroaded Areas *	Current Allocation	Approximate Distance from Silver Creek Roadless Area (Air Miles)	Acres
Bridge Creek			45	5,400
Mill Creek			55	17,400
Black Canyon			30	13,400
Strawberry Mtn			50	68,300
North Fork John Day River			125	120,800
Monument Rock			80	19,800
Mt Washington			100	52,600
Three Sisters			90	285,000
	Rock Creek	Big Game Production	35	11,414
	Cottonwood	Big Game Production	31	9,777
	Green Mountain	Big Game Production	60	6,630
	Lookout Mountain	Semiprimitive/ Nonmotorized	40	14,273
	Deschutes Canyon/ Steelhead Falls	Semiprimitive/ Nonmotorized	80	10,000

* Roadless Criteria Boundary Acres

Environmental Consequences

The variety of acre allocations shown in Table C-24 will result in an array of different outputs and environmental consequences for the Silver Creek area.

Table C-25 contains quantitative estimates of resource outputs and/or environmental consequences associated with each alternative. As an example, even though timber production per se is not an environmental consequence, the two different outputs shown indicate the increased productivity associated with long-term management of the timber resource in the Silver Creek area (e g. 1.4 vs. 1.62 MMBF for B and B-Departure). Similarly, "Roads Built" by alternative is not an environmental consequence, but "Roads Open per square mile" indicates the emphasis of the prescription applied by alternative, which can result in an array of consequences for wildlife, water quality, and motorized recreation. Outputs shown for "Riparian" indicate the acres of riparian area that will be enhanced above minimum management requirements. Outputs shown for "Big Game" (number's of elk) reflect the management prescriptions applied to the area by alternative and are an index of the quality of habitat produced. Outputs for "Recreation" are Recreation Opportunity Spectrum classifications and indicate the type of recreational experiences available by alternative. For "Off-Road Vehicles," a plus

TABLE C-23
Distance From Population Centers

City	Population	Distance From Silver Creek Unroaded Area
Prineville	5,520	100
Bend	17,800	125
Redmond	6,615	120

or minus indicates either an increase or a decrease in this type of opportunity. Outputs for "Snags" indicate the percentage of snag habitat available for maximum potential production of primary cavity users, by alternative. Outputs for "Old Growth," in acres, indicate either (a) the acres allocated by management for development alternatives, or (b) existing or potential old growth based on site capability. Outputs for remaining categories are self-explanatory.

Alternatives A and NC

This alternative would result in two different management emphases for the Silver Creek area. Out of the 7,459 total roadless criteria acres, 2,510 acres would be managed for semiprimitive nonmotorized recreation. The remaining 4,949 acres would be managed with a timber/range emphasis. This would foreclose on future options for wilderness consideration because of the limited size.

In the semiprimitive area, no road building or scheduled timber harvest would occur. The sites and sounds of human activities would still be somewhat noticeable because of the dimensions of the area, but would be substantially reduced below that of adjacent areas. Old growth habitat would decrease from 2,035 acres to 1,879 acres. Snag habitat would be based on natural tree mortality, and would generally be at optimum levels. Motorized recreational opportunities would decrease and winter sports opportunities would remain the same. Forage production would generally decrease as a result of tree canopy closure. Lack of fire or other disturbances would lead to species changes in tree stands from mostly ponderosa pine to a mixture of ponderosa pine, Douglas-fir, and white fir. Natural fuel buildup would result in a high fire risk condition, with an eventual fire induced return to seral conditions, depending on the degree of fire management/prevention in the area. Big game production would increase slightly due to increased cover.

In the developed area, tree stand composition would generally be based on maximum timber production. Trees would be widely spaced at regular intervals. Ponderosa pine would be the dominant species. About eight miles of road would be built and generally remain open. Forage production would increase, because of timber management activities and water developments, to 685 AUM's. Elk numbers would decrease due to reduced cover and increased activity. Snag habitat would be managed at minimum management levels - 20 percent of potential. Motorized and winter sports opportunities would increase within a "roaded modified" recreational setting. Timber harvest would occur at an average rate of .67 MMBF per year with a sustained yield of .86 MMBF. Options for future wilderness designation would be eliminated.

Alternatives C-Modified and E-Departure

These alternatives are all similar in that the Silver Creek area is divided into three different management emphasis areas. For these alternatives, 3,226 acres would be managed for semiprimitive, nonmotorized recreation. Natural succession would remain intact, and old growth habitat will increase to about 2,035 acres under Alternative C-Modified, and to about 1879 acres under Alternative E-Departure. Human intrusions would be minimal, with no road construction or scheduled timber harvest. Motorized recreation would decrease and winter sports opportunities would remain the same.

Also, for all of these alternatives, 845 acres would be managed as a Research Natural Area. This is similar to semiprimitive in that no scheduled timber harvest or road building would occur. Natural succession would proceed, substantially unaltered, except for research purposes (such as prescribed burning)

For Alternative 'C-Modified', the remaining 3,388 acres would be managed for a big game emphasis. About 6 miles of road would be built for access, and timber management would proceed with an objective of habitat manipulation Much of the area (at least 50%) would be in an open condition. Elk production would increase slightly, due to increased cover Snag habitat would be available at relatively high levels - 80 percent of maximum. Timber harvest

TABLE C-24
SILVER CREEK ROADLESS AREA DESIGNATION BY MANAGEMENT PRESCRIPTION

Total Roadless Criteria Acres - 7,459
Area manageable for Semiprimitive Recreation - 3,226

	Acres by Alternative 1/				
Management Prescription	A/NC	B-MOD	C-MOD	E-DEP	I
Dispersed Recreation					
Nonmotorized	2,510	3,110	3,226	3,226	3,110
Motorized	0	0	0	0	0
Timber/Range	4,949	3,504	0	3,388	3,504
Big Game	0	0	3,388	0	0
Research Natural Area	0	845	845	845	845

1/ Based on Roadless Criteria Acres

TABLE C-25
SILVER CREEK SUMMARY OF RESOURCE OUTPUTS BY ALTERNATIVE

		ALTERNATIVE				
	Unit of Measure	A/NC	B-MOD	C-MOD	E-DEP	I
Timber						
50 Year Period	MMBF/Yr	67	47	41	47	.47
Sustained Yield	MMCF	17	12	12	12	12
Roads						
Built	Miles	8	6	6	6	6
Open	/Sq Mi	All	All	2	All	All
Range	AUM's	685	644	573	644	644
Riparian						
Excellent Condition	Acres	0	505	505	505	505
Big Game						
Elk (5th Decade)	#	16	20	21	21	20
Recreation (ROS)						
SPNM	Acres	2,510	3,110	3,226	4,071	3,110
RM/RN	Acres	9,949	3,504	3,388	3,388	3,504
Old Growth	Acres	1,879	1,475	2,035	1,879	1,931
Off-Road Vehicles 1/	+/-	+ RM/RN	+ RM/RN	+ RM/RN	+ RM/RN	+ RM/RN
Firewood	Cords	70	40	43	50	40
Snags	% of max potential	100% 2,510 Ac 20% 4,949 Ac	100% 3,110 Ac 20% 3,504 Ac	100% 3,226 Ac 80% 3,388 Ac	100% 4,071 Ac 20% 3,388 Ac	100% 3,110 40% 3,504 Ac
Future Wilderness Consideration		None	None	None	None	None

1/ + or - indicates either an increase or decrease in this type of opportunity

MMBF Million board feet
MMCF - Million cubic feet
RM/RN Roaded Modified/Roaded Natural
SPNM - Semiprimitive Nonmotorized
AUM s- Animal Unit Months

would occur at an average rate of .41 MMBF per year with a sustained yield of .12 MMCF. The area would appear managed and stream sediment would increase, but would remain within constraints.

For Alternative 'E-DEPARTURE', the remaining 3,388 acres would be managed for a timber/range emphasis. Human intrusion into the area would be obvious. About six miles of road would be built for access, and timber management would proceed with an objective of maximum commodities production. Most of the area would be in an open condition, as trees would be spaced at wide, regular intervals. Snag habitat would be held at 20 percent of potential, or minimum management levels. Forage production would increase by 91 AUM's due to transitory range and water developments. Timber harvest would occur at an average rate of .47 MMBF per year with a long-term sustained yield of .59 MMBF per year.

In total, the Silver Creek area would be subdivided by these alternatives into different management areas. The end result would be a likely foreclosure on future wilderness options because of the area's dimensions.

Alternatives B-Modified and I

These alternatives would maintain 3,110 acres in a roadless condition, managed for semiprimitive, nonmotorized recreational opportunities. Natural succession would continue in this area, and the old growth ecosystem would be maintained at capacity in this portion of the area, barring a catastrophic event. The 845-acre Research Natural Area (RNA) would be maintained for research purposes with no harvest or other management activities except for research. Snag levels would be at the 100 percent level.

The remaining 3,504 acres would be managed for timber and range production. This portion of the area would receive additional scheduled timber harvest to the already partially harvested timber stands. Additional roading would be required. Snag levels would drop off to the 20 percent level for Alternative B-Modified, and to 40 percent for Alternative I.

Overall, the unique portion of the roadless ecosystem would be maintained for both wildlife and people searching for solitude This small island in the midst of the intensively managed area of timber would become a refuge for both game and nongame animals, and for people. Options for wilderness designation would be moot due to the small size of the area.

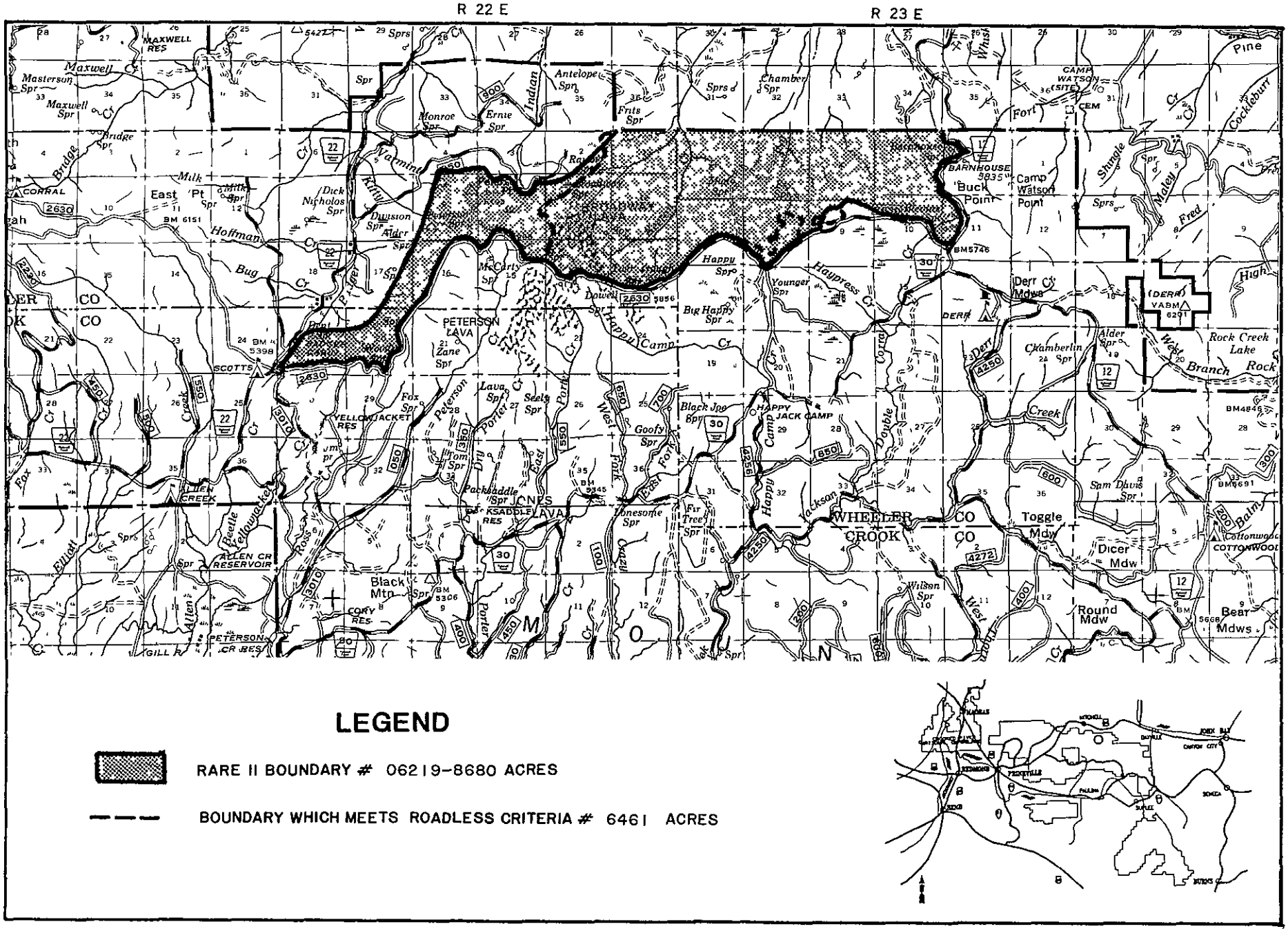
Broadway

The Broadway area consists of approximately 6,461 acres in Wheeler County, Oregon, on the Paulina Ranger District. It is about 12 miles southeast of Mitchell and 23 miles north of the town of Paulina. Under the authority and direction of the current Ochoco-Crooked River Land Management Plan (February 2, 1979), specific timber sale plans have been implemented in the area, and it is therefore no longer considered a roadless area and has not been analyzed as a roadless area in the development of alternatives.

The specific timber sale implemented in the area is Fry Timber Sale, 14.1 MMBF, sold fiscal year 1985.

Figure C-5

BROADWAY



LEGEND

RARE II BOUNDARY # 06219-8680 ACRES

BOUNDARY WHICH MEETS ROADLESS CRITERIA # 6461 ACRES

Green Mountain

Description

Location and Access

The Green Mountain unroaded area consists of approximately 6,630 acres in Crook County, Oregon, on the Prineville Ranger District It is about 12 air miles northwest of the city of Prineville and can be reached from National Forest Road 33 and one of its tributaries, Road 3380. Five sections of the roadless area border private land to the west, but otherwise it is surrounded by National Forest lands.

History

The Green Mountain unroaded area was included in RARE II studies and received a nonwilderness allocation. It was not included in the Oregon Wilderness Act of 1984.

Geography, Topography, and Soils

The terrain is rough and broken as a consequence of the canyons draining the area. Elevations vary from 3,500 feet in the valley bottom to 5,600 feet at the crest of Green Mountain. Three-fourths of the area is located on slopes with potentially severe erosion hazards. The soils comprise nearly 40 percent moderately deep, sandy loam, volcanic ash soils, 10 percent moderately deep loams and clays, and over 50 percent very shallow loamy and clayey nonforest soils.

Streams in the area include the main branches of McKay, Poppy, Water Trough and Lincoln Canyons.

Vegetation

Six different plant communities exist within the Green Mountain unroaded area. Below is a list of those plant communities and acreages, according to resource inventories.

Current Uses

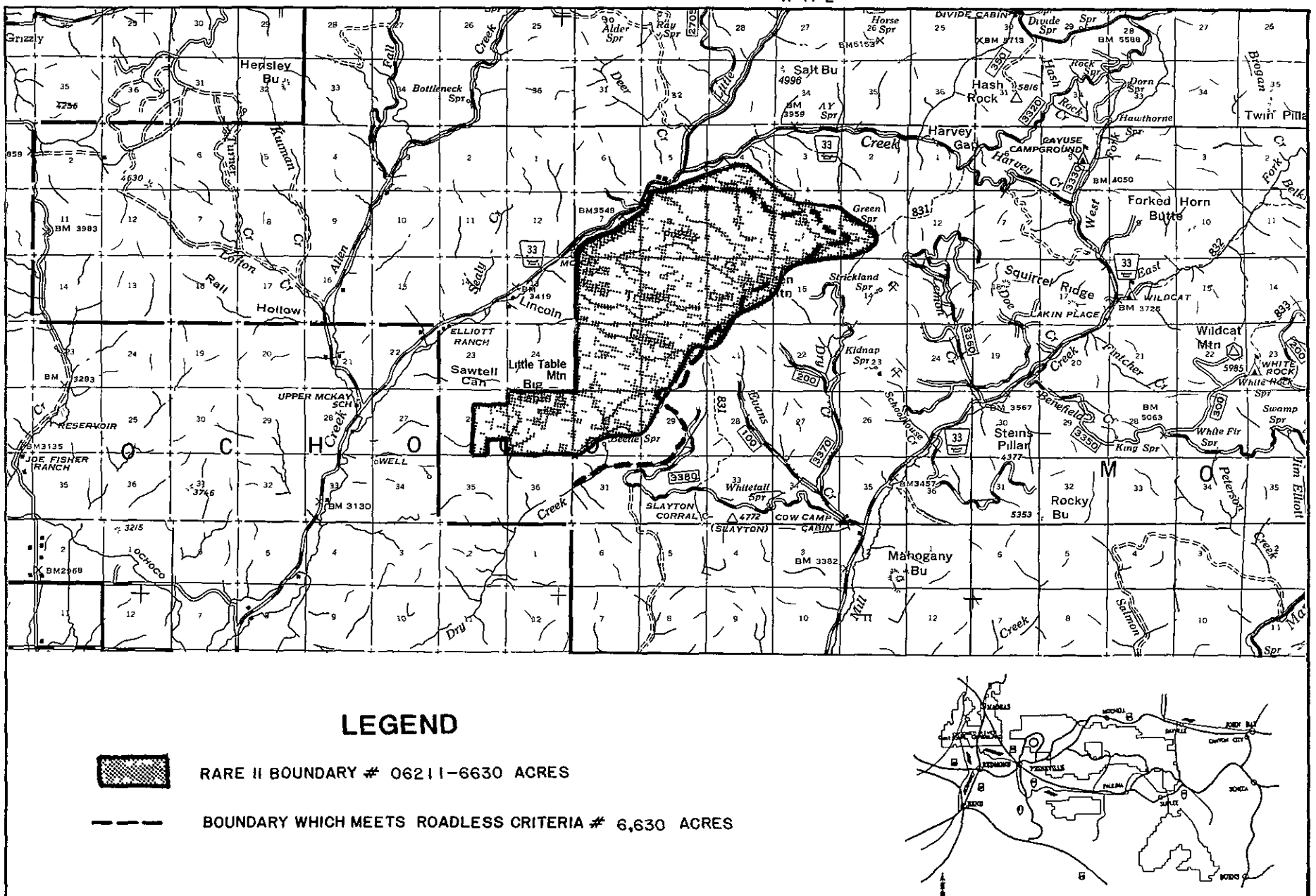
Existing management of the Green Mountain area allows for a wide range of uses with an emphasis on big game production.

TABLE C-26
GREEN MOUNTAIN PLANT COMMUNITIES

Descriptor	Plant Community	Acres
Low elevation, nonforest	Juniper-bunchgrass	410
Forested-ponderosa pine dominant, firs absent (to present)	Ponderosa pine, wheatgrass	290
	Ponderosa pine - fescue	2,316
	Ponderosa pine - Douglas-fir - elk sedge	1,178
	Mixed conifer - pinegrass - residual soils	713
	Mixed conifer - pinegrass ash soil	1,723

Figure C-6

GREEN MOUNTAIN



LEGEND

RARE II BOUNDARY # 06211-6630 ACRES

BOUNDARY WHICH MEETS ROADLESS CRITERIA # 6,630 ACRES

Recreation
Off-road vehicle use along the Green Mountain trail constitutes the majority of the recreational use. Hunting provides another significant recreational use.

Special Use Permits
A special use permit for a .09-acre water transmission line is held within the Green Mountain unroaded area.

Livestock Production
The Green Mountain area provides an equivalent of 650 AUM's for two existing grazing allotments.

Timber Production
Intensive timber management has never occurred in the Green Mountain area because of the steep, rugged topography. As a result of previous wildfires, some areas have been planted with ponderosa pine and later thinned to recommended spacing.

Wildlife
Green Mountain, because of its unroaded character and vegetative mosaic, provides excellent habitat for deer and elk, with approximately 50 percent of the area located within a big game winter range. Additionally, the area provides habitat for numerous nongame birds and mammals, and designated old growth areas provide sufficient habitat for nonadaptive wildlife species.

Wilderness Capability (Potential)

Manageability and Boundaries
Three different boundaries have been defined for the Green Mountain unroaded area. They are:

RARE II Boundary - 6,630 acres
Roadless Criteria Boundary - 6,630 acres
Manageable Boundary for Semiprimitive Recreation - 7,000 acres

The RARE II and Roadless Criteria acres are the same. The boundary differences shown are due to recent on-the-ground surveys which added some areas and deleted others. This resulted from (a) more accurate mapping, (b) re-examinaton of areas of past human disturbance and (c) disassociated areas included in RARE II by error. The boundaries of these two categories are difficult to identify on the ground, except on the north and east, because of indistinct topography and vegetation. The Manageable Boundary for Semiprimitive Recreation has been designated along more easily identifiable features such as roads, land survey lines, ridgetops and draws

Natural Integrity and Appearance, Opportunities for Solitude
The most extensive effect on the natural integrity of the Green Mountain area has been accomplished by the elimination of fire as a principal factor controlling vegetation changes.

The mixed stands of timber on the north slopes, coupled with the vegetative mosaic of the south slopes and associated draw bottoms, contribute to a high natural diversity for the area.

The opportunity for solitude is limited because of the size of the area. However, the broken terrain

provides an opportunity to travel throughout the area with minimal disruption from activities occurring adjacent to Green Mountain.

Primitive Recreational Opportunities and Challenging Experiences

There is very little opportunity for primitive recreation due to the small size and proximity to roads. ORV use is the main recreational use in the area, with occasional horseback riding and mountain biking. If motorized use were restricted, foot and horse travel would likely increase. Little change in hunting would result if motorized use was restricted.

The area is relatively small, and therefore is limited in offering challenging experiences. It is difficult to have a feeling of self-reliance or challenge knowing that the improved road system of Road 33 is just a short distance away.

Wilderness Availability

Recreation

Present recreational use is dominated by ORV use on the Green Mountain Trail. Carrying capacity for this area is estimated at 6.5 MRVD's per year for the manageable area with a fully developed trail system. Present use levels have not been quantified.

Wildlife

Wildlife species dependent on snags, old growth, and riparian habitats; those adversely affected by human contacts, or activities; big game; and resident and anadromous fish are wildlife of particular significance in the Silver Creek area. A list of old growth dependent, and nonadaptive, species believed to occupy the area includes: pileated woodpecker, black-backed three-toed woodpecker, northern three-toed woodpecker, flammulated owl, north-

TABLE C-27
RESOURCE POTENTIAL SUMMARY

	Current Levels	Potential Levels
RECREATION	Low to moderate (nonquantified) Primarily off-road vehicles	6 5 MRVD's No trails
WILDLIFE		
Old Growth Dependent Species	1,570 acres of suitable old growth	3,756 of capable lands for old growth
Big Game (Rocky Mtn Elk)	35 animals	62 animals
Fish (Resident and anadromous)	Low	Limited
WATER	4,509 Acre Feet	4,887 acre feet with 25% timber harvest level, 6,197 acre feet with conversion to grassland.
LIVESTOCK	650 AUM's	702 AUM's with transitory range 884 AUM's with transitory range and water developments
TIMBER	No timber production currently Standing volume is approximately 54 MMBF	2 million cubic feet per year sustained yield
MINERALS AND ENERGY	No current mineral or energy developments	Moderate potential for mercury and gold 3,200 acres Prospectively valuable for oil and gas
CULTURAL	Low historic, low prehistoric	No completed resource inventories

ern flyingsquirrel, mountain lion, marten, and fisher. Black bear and wolverine are also believed to be in the area.

Because of the area's inaccessibility, it supports a higher proportion of the older age class animals attractive to trophy hunters.

The fishery resource is limited.

Dead and defective tree (snag) habitat within the unroaded area is capable of supporting 80 percent of the biological potential for cavity dependent wildlife.

Water

There are no existing uses of water within the unroaded area.

Livestock

The Green Mountain area is capable of supporting 702 AUM's with transitory range. With water developments the capacity increases to 884 AUM's.

Timber

The Green Mountain area is dominated by old growth/ mixed conifer forest Net annual sustained yield is estimated to be .2 MMCF.

Minerals and Energy

There has been no mineral development in the area, and none is known to be planned. None of the area has been subjected to oil and gas leasing.

Cultural Resources

Cultural resource inventories have not been initiated in the Green Mountain area. Minor occurrences of prehistoric artifacts probably exist.

Management Considerations

Fire

Natural fire frequencies once played a significant role in development and maintenance of vegetation within the Green Mountain area. The following range of natural fire cycles by vegetation type provides an indication of the importance of fire in preventing excessive fuel accumulations and maintenance of seral tree and shrub species.

Ponderosa pine	5-25 years
Mixed conifer	20-70 years
Grass, tree shrub	5-15 years

Since the implementation of fire prevention measures at the turn of the century, fuels have been allowed to accumulate at unnatural rates, creating the potential for a major conflagration, given a certain set of environmental conditions.

Insects and Disease

Within the area, heavy infestations of root rot have been identified in localized areas. Additionally, the north slope along Poppy Creek contains varying degrees of Douglas-fir mistletoe, and spruce budworm occurs throughout the area.

Wilderness Availability

Public Interest

During the public review for the DEIS and Proposed Forest Plan, 41 letters, including one from ODFW, contained comments on Green Mountain. Most recommended semiprimitive nonmotorized recreation management, very few supported semiprimitive motorized recreation management for the area.

Some urged roaded recreation blended with timber and recreational activities be emphasized in the area These respondents suggested a limited amount

of logging to maintain the natural appearance of the area.

Others desired protection from ORV's for Green Mountain. Those who supported motorized recreation urged further regulations to keep ORV's on established trails and out of wetland areas.

The damage to the Green Mountain trail system was noted be some. Recommendations were made to reconstruct trails or to ban motorized use in the area.

Several respondents voiced concern about protection of an old growth grove on the top of Green Mountain.

The status of the Rattle Pop timber sale was questioned and opposition was voiced to clearcutting in that area

Environmental Consequences

The variety of acre allocations shown in Table C-30 would result in an array of different outputs and environmental consequences for the Green Mountain area.

Table C-31 contains quantitative estimates of resource outputs and/or environmental consequences associated with each alternative. As an example, even though timber production per se is not an environmental consequence, the two different outputs shown indicate the increased productivity associated with long term management of the timber resource in the Green Mountain area (e.g. .98 vs. 1.0 MMBF for B-Departure). Similarly, "Roads Built" by alternative is not an environmental consequence, but "Roads Open per square mile" indicates the emphasis of the prescription applied by alternative, which can result in an array of consequences for

TABLE C-28
Nearby Wilderness and Unroaded Areas

Wilderness Areas	Unroaded Areas *	Current Allocation	Approximate Distance from Green Mountain Roadless Area (Air Miles)	Acres
Bridge Creek			20	5,400
Mill Creek			2	17,400
Black Canyon			45	13,400
Strawberry Mtn			80	68,300
North Fork John Day River			95	120,800
Monument Rock			50	19,800
Mt Washington			75	52,600
Three Sisters			80	285,000
	Rock Creek	Big Game Production	42	11,414
	Cottonwood	Big Game	43	9,777
	Lookout Mountain	Semiprimitive/ Nonmotorized	15	14,273
	Silver Creek	Semiprimitive/ Nonmotorized	60	7,459
	Deschutes Canyon/ Steelhead Falls	Semiprimitive/ Nonmotorized	27	10,000

* Roadless Criteria Boundary Acres

TABLE C-29
Distance From Population Centers

City	Population	Distance From Green Mtn Unroaded Area
Prineville	5,520	12
Bend	17,800	47
Redmond	6,615	30

wildlife, water quality,and motorized recreation. Outputs shown for "Riparian" indicate the acres of riparian area that will be enhanced above minimum management requirements. Outputs shown for "Big Game" (number's of elk) reflect the management prescriptions applied to the area by alternative and are an index of the quality of habitat produced. Outputs for "Recreation" are Recreation Opportunity Spectrum classifications and indicate the type of recreational experiences available by alternative. For "Off-Road Vehicles," a plus or minus indicates either an increase or a decrease in this type of opportunity. Outputs for "Snags" indicate the percentage of snag habitat available for maximum potential production of primary cavity users, by alternative. Outputs for "Old Growth," in acres, indicates either (a) the acres allocated by management for development alternatives, or (b) existing or potential old growth based on site capability. Outputs for remaining categories are self-explanatory.

Alternatives A and NC

These alternatives would result in a big game management emphasis for the Green Mountain area. Vegetation would appear manipulated in order to provide habitat conditions for big game. Natural succession would no longer proceed unhindered over most of the area, with the exception of 498 acres managed for old growth habitat. Timber harvest and road building would be evident and therefore, opportunities for semiprimitive recreation would be very limited Options for future wilderness consideration would be foregone.

AlternativesB-Modified and I

These alternatives would result in a timber/range management emphasis for the Green Mountain area. Timber stands would be managed for maximum commodities production and an extensive road system would be visible and open. About 278 acres of old growth would be maintained over time.

Alternatives C-Modified and E-Departure

These alternatives would result in a semiprimitive motorized management emphasis for the Green Mountain area. Primitive type roads would be built and timber harvest would occur, but with an objective of maintaining a visual character consistent with a semiprimitive environment. Timber stands would have an uneven, more natural appearance, rather than an even, regulated appearance. About 844 acres of old growth habitat would be maintained over time. Options for future wilderness consideration would be foregone.

TABLE C-30
GREEN MOUNTAIN ROADLESS AREA DESIGNATION BY MANAGEMENT PRESCRIPTION

Total Roadless Criteria Acres - 6,630
Area Manageable for Semiprimitive Recreation = 7,000

	Acres by Alternative 1/				
Management Prescription	A/NC	B-MOD	C-MOD	E-DEP	I
Dispersed Recreation					
Nonmotorized	0	0	0	0	0
Motorized	0	0	7,000	7,000	0
Timber/Range	0	7,000	0	0	7,000
Big Game	7,000	0	0	0	0

1/ Based on Area Manageable for Semiprimitive Recreation

TABLE C-31
GREEN MOUNTAIN SUMMARY OF RESOURCE OUTPUTS BY ALTERNATIVE

		ALTERNATIVE				
	Unit of Measure	A/NC	B-MOD	C-MOD	E-DEP	I
Timber						
50 Year Period	MMBF/yr	85	98	4	18	98
Sustained Yield	MMCF	18	2	33	33	2
Roads						
Built	Miles	27	23	18	18	23
Open	/Sq Mile	2	All	All	All	All
Range	AUM's	691	884	650	650	884
Riparian						
Exceeds Acceptable Condition (Excellent)	Acres	0	0	0	0	0
Big Game						
Elk (5th Decade)	Number	62	11	32	32	11
Recreation (ROS)						
SPM	Acres			7,000	7,000	
RM/RN	Acres	7,000	7,000			7,000
Old Growth	Acres	498	278	844	844	278
Off-Road Vehicles 1/	+/-	+	+	+	+	+
Firewood	Cords	89	103	42	20	103
Snags	% of maximum potential	80%	20%	80%	80%	20%
Future Wilderness Consideration		None	None	None	None	None

1/ + or - Indicates an increase or decrease in that type of opportunity

MMBF Million board feet
MMCF - Million cubic feet
RM/RN - Roaded Modified/Roaded Natural
SPNM - Semiprimitive Nonmotorized
AUM s- Animal Unit Months

Deschutes Canyon Steelhead Falls Wilderness Study Area

Introduction

This report is an analysis of the Deschutes Canyon-Steelhead Falls Wilderness Study Area #6321. It provides the information concerning suitability, availability, need, and manageability to determine which management option to recommend from the following options:

1. Wilderness designation for the full area,
2. Wilderness designation for a modified area,
3. Special management area to maintain roadless character for semiprimitive nonmotorized recreation, or
4. Nonwilderness resource management.

This report is also designed to assist in developing long term management direction for each of the alternatives considered in the Ochoco National Forest and Crooked River National Grassland's Forest Plan Final Environmental Impact Statement. The area was initially overlooked during the RARE II process due to the large percentage of the land that contained impacts of early development, homesteading and previous overgrazing. Public support for this area influenced the decision to inventory it as area #6321 in 1978, and later designated as a "further planning area."

The Bureau of Land Management (BLM) inventoried the Steelhead Falls area (WSA OR 005-14) during its Wilderness Inventory Program in 1978. In 1982, it was agreed that the Deschutes Canyon area would be jointly studied by the Forest Service and BLM with the Forest Service being the lead agency.

While the wilderness study was underway, the Crooked River National Grassland completed its Land Management Plan EIS in 1982. The plan recommended that lands in the area under Forest Service jurisdiction should not become wilderness, but rather be used for dispersed recreation. This decision was appealed by various conservation groups on the grounds that the RARE II process had not been completed and the entire area had not been analyzed for wilderness designation. The appeal was upheld.

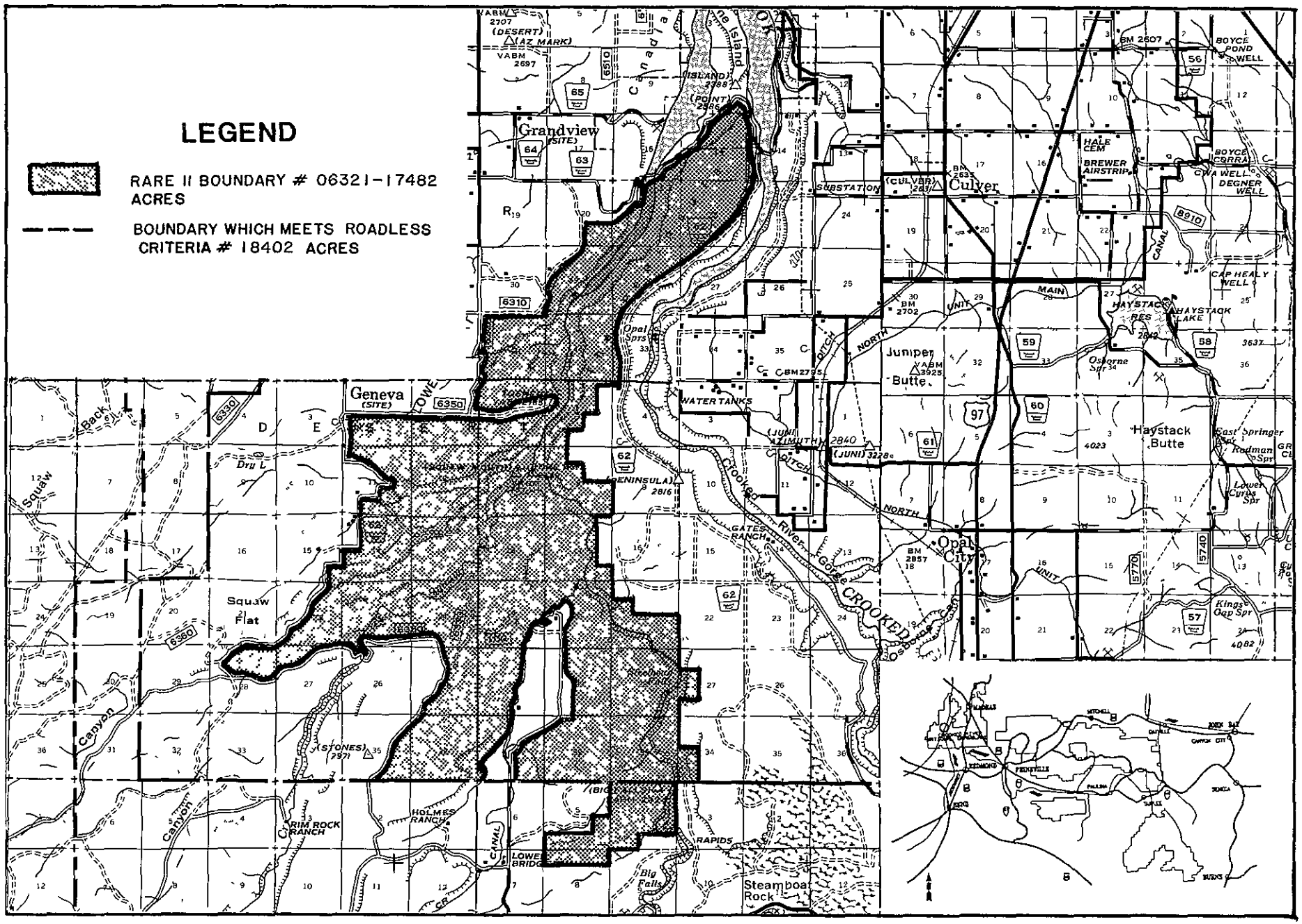
This report is the result of the combined efforts of both agencies, focusing on the wilderness characteristics and potentials for wilderness manageability. Total area included in this further planning area is 18,402 acres. (BLM - 3,240 acres, State of Oregon - 40 acres, Private Lands - 4,891, F S. - 10,231.)

Summary

Results of this study indicate that the study area in its entirety is not very suitable or manageable for wilderness. There are many conditions, both past and current, that restrict the study area's manageability as wilderness: 1) included private land, 2) proximity to heavily developed areas like the Cove Palisades State Park, 3) the remains of early homesteading, and 4) existing improvements for current activities such as roads, powerlines, and fences. Wilderness management for the entire area would be very difficult or impossible. Management of this area as wilderness would eliminate the majority of the grazing due to the need for daily water haul by a motorized vehicle.

In order to consider a more manageable situation, the study area was further analyzed by dividing it into smaller areas called units, identified by letters A through M (see Figure C-13). Implementing a boundary change to exclude units A through K eliminates

DESCHUTES CANYON–STEELHEAD FALLS


R 12 E
T 13 S
C-57
LEGEND
RARE II BOUNDARY # 06321-17482 ACRES
BOUNDARY WHICH MEETS ROADLESS CRITERIA # 18402 ACRES
Grandview (SITE)
Geneva (SITE)
Culver
Juniper Butte
Haystack Butte
Opal City
Squaw Flat
Steamboat Rock
Big Falls
RAPIDS
Crooked River
Deschutes River
Canyon
Squaw Back
Dry L
Opal Spr
Lower Curtis Spr
Redman Spr
Kings Opp Spr
East Springer
Osborne Spr
Haystack Res
Haystack Lake
Boyce Pond Well
Cap Healy Well
CWA Well
Degner Well
Hale Cem
Brewer Airstrip
Rim Rock Ranch
Holmes Ranch
Gates Ranch
Lower Bridge
Main Canal
North Unit Canal
Water Tanks
Substation
Peninsula
Island
Point
Stones
Culver
Juni
Juni
Juni

the majority of the incompatible activities and features. Conflicts with motorized recreational uses, potential intensive range projects, and impacts on private property have also been minimized with this boundary adjustment proposal. Even with this boundary change, a good portion of the grazing would be eliminated due to the need for daily water haul. This modified area (Area II, Figure C-12) establishes a more suitable, manageable area for potential wilderness designation. A few potential wilderness manageability problems still exist in Area II.

A third area was developed and analyzed to eliminate conflicting, nonconforming features and the included private lands. This enhanced modified area (Area III, Figure C-14) is the preferred area to recommend for wilderness. This area contains approximately 5,200 acres, including 2,500 acres of land administered by the Grassland, 2,660 acres by the BLM, and 40 acres by the State of Oregon.

All other alternatives considered protecting the canyon areas either as a Scenic River Corridor with riparian enhancement in Squaw Creek, or with a semiprimitive nonmotorized recreation management emphasis. The degree of further management on the plateau area varies by alternative, from a no further development semiprimitive nonmotorized area, to a full grazing emphasis. In all cases, the canyons receive protection from development and motorized use.

Description

Location and Access

The Deschutes Canyon-Steelhead Falls Study Area (6321) is located in a triangle formed by the towns of Madras, Redmond and Sisters, in Central Oregon. The study area is roughly triangular in shape, about seven miles wide by eleven miles long. The study area boundary is a combination of property lines and roads (see Figure C-8, page C-82).

The Deschutes River and the one-half mile corridor associated with it (one-quarter mile each side of the high water line) has been designated as a National Scenic River by the Oregon Wild and Scenic Rivers Bill. This same bill federally designated the Crooked River as a Recreation River corridor.

The 18,402-acre area is composed of rocky sagebrush and juniper plateaus, and steep, rocky canyons with dramatic views. The Deschutes River and its tributary Squaw Creek meander in the canyon bottoms.

The land now receives widely varying use, including farming, grazing, hunting, hiking, and fishing. Twenty-seven percent of the study area is privately owned. The west half of the area is critical deer winter range, and the canyons are also winter habitat range for bald eagles.

The area is surrounded by the Crooked River Ranch (a private resort area) to the east, Lake Billy Chinook to the north, and by low-density rural populations to the west and south.

Some of the plateaus and valleys of the study area were once homesteaded, but many areas have returned to a more natural appearance. The rugged canyons do not contain road intrusions and remain essentially in a natural condition.

The general area of the Deschutes River Canyon Wilderness Study Area is accessible from all directions: Crooked River Ranch on the east, Road 63 through Cove Palisades State Park to the north, Road 6300 road systems on the west, and Lower Bridge Road to the south. There is no direct road access to the river on the Crooked River National Grassland. Year-round access is available to Steelhead Falls from a Crooked River Ranch road.

Although roads provide many convenient access opportunities to the plateaus, good access into the river is limited due to the steep cliffs and long rimrock areas. There are five routes into the canyon that are most frequently used. Users in these locations have developed path-of-least-resistance trails to the river:

1. Crooked River Ranch - BLM site at Steelhead Falls

2. Lower Bridge Road - access across private land to the west bank in the Steelhead Falls area.
3. Road 6370 - trail to Alder Springs on Squaw Creek - then down to the Deschutes River.
4. Road 6350 Geneva Overlook - trail down to river.
5. Road 6310 - trail down side canyon to the river.

Travel up and down the river is moderately difficult due to willow and alder thickets, rocky slopes, talus and cliffs. User-developed trails exist along the river in the easier areas.

History

Prehistoric Occupation

Cultural resources within the Deschutes River study area represent approximately 8,000 years of human land use and occupation. Earliest use was probably by hunter-gatherers from nearby basin-lake or river cultures.

Euro-American Occupation

Land surveyors under contract to the Federal government were the first to systematically observe, record, and report information about the soils and vegetation of central Oregon. This was in 1869, and the 1870's, and they crisscrossed the country establishing township, section, and even quarter section corners. Soon, rumors of the lush western grasslands already spread by the U.S. Army were being confirmed by the official and specific surveyors' notes. This was encouraging to the homesteading movement of the 1880's and soon the pioneers came. They staked out their 160 acres, cleared the bunchgrass off the land and began grain farming. Also a family found that they could not make a decent income on a 160-acre farm. The early travelers and surveyors had not recorded rainfall amounts, which as it turned out were inadequate for grain.

So the crops began to fail and homesteaders left, abandoning their farms and homes. The results were devastating and far reaching. Farmers had already removed much of the natural ground cover, including bluebunch wheatgrass. In the 50 years since then, bluebunch wheatgrass has been impossible to restore. Although Jefferson County issued a moratorium (in the 1920's) on land takeover by tax delinquency, by 1935 about 35 percent of the 700 homesteads and ranches were taken over by Federal Land Banks and private mortgage banks in foreclosures. The balance of the land was still in private ownership.

Legislation soon began at the urging of local county officials. They had lost their tax base, the land was idle and bare. This was the time of the dustbowl and it was happening in Central Oregon, as well as in Oklahoma, Texas, Wyoming, Nebraska and the Dakotas. So the Federal government began, in 1935, to buy the land back from the homesteaders. This was done under the Resettlement Administration. On July 22, 1937, the Bankhead-Jones Farm Tenant Act was passed, authorizing and directing the Secretary of Agriculture to "develop a program of land conservation and land utilization.... in order thereby to correct maladjustments in land use." The repurchased lands were titled Land Utilization Projects, and management and restoration began under the jurisdiction of the Soil Conservation Service in 1937.

In January 1954, the jurisdiction of certain Land Utilization projects was transferred to the Forest Service.

On June 20, 1960, nineteen Land Utilization projects were officially designated as National Grasslands. Four days later the Secretary of Agriculture issued an Administrative Order that stated that all Forest Service regulations and policies apply to the Grasslands as well as issuing broad management guidelines. These guidelines provided that Soil Conservation Service concepts would be continued by directing that the Forest Service "... demonstrate sound and practical principles of land use for the areas in which the [grasslands] are located ..." and "... exert a favorable influence for securing sound land conservation practices on associated private lands..." In addition, this Administrative Order provided for multiple use management of the resources that occurred on the national grasslands. "The national grasslands shall be administered under sound and progressive principles of land conservation and

multiple use..." This additional direction had to be provided due to the fact that the Multiple Use Sustained Yield Act was passed on June 12, 1960, eight days before the grasslands became a permanent part of the Forest Service.

Geology

The geology of this area is, in general, that of younger volcanic formations superimposed on recent lake sediments and river deposits. The walls of the three canyons that converge at Cove Palisades State Park (the Deschutes, Crooked River, and Metolius River Canyons) have excellent examples of recent volcanic formations (lavas) and recent lake and river sediments. There are also examples of intricate relationships that exist between older and younger volcanic flows.

A visitor to this area can travel back through geologic time and history by descending from the top of the plateau near Culver, Oregon to the canyon bottom. Hundreds of thousands of years of geologic time and history can be seen with remarkable detail. Some of the features visible in this "geologic journey through time" include:

Faulting

Disconformities (ancient erosional surfaces)

Ancient depositional surfaces

Cross-bedding (caused by wind deposition) in ancient sand deposits.

Contract-metamorphic zones (changes in mineralization and texture of rock due to intensive heat) between volcanic flows and the sedimentary lake and river deposits over which lava flowed.

Spectacular examples of columnar jointing in lava flows (due to unusual cooling conditions).

Other geologic features that can be observed in these canyons include examples of massive and smaller landslides and mass-wasting landforms, along with spectacular discharges of many springs from the sides of these canyons into the rivers. Some of these spring discharges result in beautiful waterfalls or pools of water, enhancing the scenic quality of the geologic formations in this canyon.

Topography

The unit is characterized by plateaus eroded by the Deschutes River and Squaw Creek which is a tributary of this river. The plateaus are about 2700 to 2900 feet above sea level, and range from flat to gently rolling. The Deschutes River drops, from about 2400 feet above sea level at the southern end of the study area, to 1945 feet on Lake Billy Chinook at the northern end. Squaw Creek drops from about 2500 feet to 2100 feet in elevation where it flows into the Deschutes River. The canyons become deeper as the river and creek flow northward (see Figure C-9, page C-83). One of the highest viewpoints is called Geneva at 2785 feet. It is located along the western canyon rim and looks down 735 feet into the canyon to the river. Back from the canyon rims one can look across from plateau to plateau and barely perceive the existence of the canyon.

Soils

Soils in the upland areas are generally shallow, somewhat rocky, and of low productivity. Surface layers are composed of ash, weathered material and some aeolian (windblown) accumulation. They are well drained. Surface soils lie over a volcanic (basalt) substrate.

Soils over 50 percent of the area are arid, light brown loams less than 20 inches deep to a sandstone bedrock. These contain less than 10 percent cobbles and gravels.

About 30 percent of the area soils are brownish gray to dark brown grassland soils. These average 20 inches deep and gradually increase in gravel content to a calcium hardpan at 25-30 inches.

The remaining 20 percent of the area is rubble or scabland. These have very shallow, stony soil.

Vegetation

The vegetation varies greatly from the plateaus to the canyon bottoms. The vegetation on top consists of juniper, big sage, bitterbrush, rabbitbrush, and numerous grass species.

The canyon walls are very sparsely vegetated due to the near vertical character of the slope and the constant erosive forces and natural weathering of the basalt cliffs. There are numerous talus slopes at the base of the cliffs that are devoid of vegetation.

Riparian vegetation occurs along the streambanks. The riparian vegetation includes willow, alder, juniper, spirea sedges, wildrose, Redoiser Dogwood, and Penstemon.

There are also a few ponderosa pine and unusually large juniper along the streambank. There is one small side canyon in the southwest corner of the study area which has a small, open stand of ponderosa pine.

Grazing has eliminated the shrubby vegetation in a few places along the streambanks and has also contributed to bank erosion.

Upland and canyon sideslope plant associations are:

CJSB-11 Western juniper/big sagebrush/bluebunch wheatgrass - Idaho fescue (mound), and Sandberg bluegrass (swale).

SD91-31 Stiff sagebrush/Sandberg bluegrass - bigseed lomatum, scabland.

CJS2-31 Western juniper/sagebrush - rock spirea/ bluebunch wheatgrass - arrowleaf balsamroot, (steep s. canyon).

CJS2-32 Western juniper/big sagebrush - green rabbitbrush/Idaho fescue - arrowleaf balsamroot, (steep n. canyon).

CJS2-91 Western juniper/gray rabbitbush - big sagebrush/crested wheatgrass. (This is the only non-native type).

Streamside riparian vegetation types occur along perennial and intermittent water in canyons and foothills and are characterized by rose, currant, willow, snowberry, alder, dogwood, Kentucky bluegrass, monkey flower, bedstraw, veronica herbaceous sage and other riparian forbs and grasses.

Seeps and springs are characterized by western juniper, big sage, willow, mockorange, baltic rush, Kentucky bluegrass, sedge and numerous other forbs and grasses.

According to the Baily-Kuchler Classification System, the Deschutes Canyon-Steelhead Falls Study Area contains 17,482 acres of the Intermountain-Sagebrush/sagebrush-steppe ecosystem. The classification of ecosystems is based upon climate, vegetation, soils, and landform.

Wild and Scenic Rivers

The one-half mile corridor along the Deschutes River was designated as a national Scenic River corridor by the Omnibus Oregon Wild and Scenic Rivers Bill of 1988.

Current Uses

The public lands within the area are currently used for grazing, hunting, fishing, hiking, sightseeing and nature studies.

Privately owned land (27 percent of the entire area) within the study area is used for dryland and irrigated farming or ranching, or is combined with Federal land into grazing allotments.

Both Forest Service and BLM public land is partially fenced into grazing allotments. There are three small BLM allotments (111 AUMs total), three Forest Service allotments (759 AUMs total), and parts of three other Forest Service allotments (526 AUMs).

Currently, recreational use of the area is low. However, the area has a high level of significance to a variety of users. The area is not well known and most users are local people, or people introduced to the area. No comprehensive Recreation Visitor Days estimates are available. However recent fish and wildlife data indicated over 4,000 RVD's from fishing occur annually within this study area.

Types of recreational use are varied. Most use is during deer hunting season due to easy access and short distance to local population centers. Limited bird hunting occurs, although there are only small populations of upland game birds. Fishing is excellent for trout and other game fish. On the opening weekend of fishing season there are fishermen at most accessible fishing locations.

The majority of campers and hikers in the area use the river canyon and stream areas. However, hiking the canyon bottoms is rough and difficult in many areas, so some hikers walk overland to their destination. Distant landmarks provide many points of reference for cross country hiking.

Bird watching for songbirds, waterfowl, and raptors encompassing over 200 different species is a popular recreational activity.

Four-wheel drive and motorcycle travel is another recreational pursuit, although the area is bisected by many small drainages. Plateaus covered with rock also limit vehicle use mainly to existing roads and established trails.

Appearance

Landform

The main canyons are very scenic with steep cliffs and talus slopes. The canyons terrace down in multiple layers in many places. Although the smaller side canyons are not as deep as the Deschutes Canyon, they often have unusual geologic formations and layering. The plateaus are rolling and bisected by side canyons. The upland plateaus also offer many spectacular views of the Cascade Mountains.

Water

The Deschutes River and Squaw Creek are the scenic focal points of the area. The water changes from the quiet pools to rushing whitewater rapids and falls.

Vegetation

The study area vegetation is composed mainly of juniper, sagebrush and grasses. The size of juniper and distribution of sagebrush and bitterbrush forms a mosaic pattern depending on historic fire frequency and extent.

The predominate colors are dusty desert greens, golds and browns. The area is also highlighted with golden yellows when bitterbrush and rabbitbrush are blooming. Tall pines in the canyon bottoms are an interesting contrast to the steep canyon walls. Green riparian canyon vegetation creates an oasis effect that forms a strong color contrast with the surrounding canyon desert vegetation.

Surroundings

Lands immediately surrounding the study area are generally rural. The primary industries of the local communities of Madras, Culver, Metolius, and Terrebonne are farming and ranching. Timber is another local industry that helps support the towns of Redmond, Madras, Prineville, and Sisters.

Seven miles east of the study area is Highway 97, which is a major route north to the Columbia River and south to California.

Bordering the study area to the east is the 11,000-acre Crooked River Ranch. This popular resort development area is divided into 2,600 lots. Most have been purchased. Currently there are approximately 250 year-round residences and 90 vacation homes constructed. The resort also offers a golf course, club house, and other facilities.

The land south and west of the planning area is either undeveloped Federal or private land, or is farmed in small areas by isolated land owners. Some undeveloped private and public land is fenced together into large Federal grazing allotments.

Immediately north of the study area is Cove Palisades State Park and Lake Billy Chinook which are popular developed camping and boating areas. Lake Chinook Village and Airpark is a small private resort area located just north of the study area, west of the peninsula.

Four miles north, across the Metolius River Canyon, is the southern border of the Warm Springs Indian Reservation.

Wildlife

This plateau and canyon country provides both dryland range and complex riparian habitat types that support a large number and variety of wildlife species.

Mule deer, coyote, cottontail and jack rabbits, ground squirrels, marmot, and porcupine are commonly seen on the upland areas. In addition, beaver, river otter, badger, owls and numerous song birds frequent the river and stream edges. Eagles and hawks may be observed within the canyon, and swallows nest along the cliff edges.

The streams and rivers contain at least four species of game fish (German Brown, Rainbow, Dolly Varden, and Kokanee) as well as nongame species such as squawfish and suckers. Reptiles include garter, gopher, racer, and rattlesnakes, and several species of lizards.

The bald eagle is the only federally listed threatened or endangered fish or wildlife species known to occur in the area.

Major Streams, Lakes, and Scenic Landmarks

Two rivers and one creek are associated with this study area. The Crooked River is to the east of the study area, and its gorge rim top forms part of the eastern study area boundary along the area labeled "The Penninsula" (Figure C-7). The Deschutes River flows from the southeast corner of the study area and along the west side of "The Penninsula," where it also empties into Lake Billy Chinook. Squaw Creek flows from the southwest part of the study area to the center of the study area, where it empties into the Deschutes River.

The Deschutes River flows through a canyon which has eroded through basalt and sandstone formations to a depth of approximately 400-1,000 feet. Side canyons enter the main river canyon and enhance the scenic quality of this canyon. The river channel occupies 85 percent to 95 percent of the canyon floor. Although the stream gradient is not steep, there are several short rapids and the river meanders.

Major landmarks within the canyons are the unusual columnar basalt or sandstone formations, numerous springs, and the confluences of the Deschutes River and Squaw Creek.

Both the Deschutes River and the Crooked River canyons have been found to have outstandingly remarkable features and have been designated as National Scenic and Recreation Rivers, respectively, by the Omnibus Oregon Wild and Scenic Rivers Bill.

Squaw Creek has been studied for eligibility as a Wild and Scenic River, and it also has been found to have outstandingly remarkable features that make it eligible for scenic river designation. The suitability study and a recommendation will be scheduled during the first decade of the planning period.

Plateaus permit a highly scenic view of the nearby Cascade Mountains, especially the Three Sisters, Mt. Washington, Three-Fingered Jack, and Mt. Jefferson. To the east, buttes such as Gray Butte, Juniper Butte, and the distant Ochoco Mountains also form a scenic skyline.

Wilderness Capability (Potential)

Manageability and Boundaries

There are many conditions both past and current that restrict the Study Area's manageability as wilderness. Included private land; proximity to heavily developed areas like the Cove Palisades State Park and Crooked River Ranches; the remains of early homesteading; and existing improvements for current activities, such as roads, powerlines, and fences make wilderness management for the entire Study Area very difficult or impossible.

In order to consider a more manageable area, the Study Area was further analyzed by dividing it into smaller areas called Units. These Units, identified

by letters A through M (see Figure C-14) were separately investigated for compatibility and manageability based upon the wilderness qualities such as naturalness, opportunities for solitude and primitive recreation. The following are the results of this analysis:

Unit A - Known as The Penninsula, this area contains a number of man made improvements such as dirt roads, allowing vehicles access and a large woodpole utility powerline which bisects the area in an east-west direction. In addition, the area was once homesteaded, as evidenced by rock walls and cleared fields. Modern off-site human impacts include powerlines, water tanks and water ponds.

Outside sights and sounds from Lake Billy Chinook significantly depreciate the quality of solitude and primitive recreational opportunities. These include powerboats on the lake as well as traffic on local roads below The Penninsula. Unit A has limited opportunities for experiencing solitude or primitive types of recreation. The quality of naturalness in this area is also depreciated by the imprints of man

Unit B - Approximately nine areas labeled "B" are located above the canyon rim on the east side of the Deschutes River.[1] This part of the study area is either heavily influenced or subject to influence by the Crooked River Ranch homes and related developments. Approximately 1500 feet of the Deschutes River runs through private, Crooked River Ranch property.

Additionally, there are several vehicle access routes bisecting these areas and conflicts would occur. For these reasons, manageability, naturalness, and the ability to experience solitude are very limited in area B.

Unit C - Area C is a 920-acre "arm" of public land projecting south of the study area. Its small size and shape and immediate proximity to working farms precludes the ability to experience outstanding opportunities for solitude or primitive, unconfined types of recreation. A pumping facility down by the river also significantly reduces the naturalness of this area.

Unit D - Most of this area is privately owned farmland. Public lands within area D are very limited, irregular in shape and easily accessed by vehicles from private and public land. Private farms can be seen and farm operations are also heard from most locations. These factors significantly affect its ability to offer naturalness, solitude, primitive types of recreation for manageability as wilderness.

Unit E - Area E is a high juniper covered plateau Although tall water storage tanks are visible in the distance from various locations there are no on-site signs of human activity. However, a large percentage of the area is privately owned, which creates size and shape manageability problems.

Although the area is in a natural condition, the ability to experience solitude or primitive types of recreation are limited due to its size, topography, vegetative features, close proximity to a public access road, and private lands within the same unit. Manageability of the area as wilderness would also be limited for these reasons.

Unit F - This small area is physically cut off from the rest of the study area by a constructed road. It is unlikely that this road could revert back to a natural condition. For this reason, this road itself became part of the boundary of area II.

Although area F itself is essentially natural in appearance, the ability to experience solitude is severely compromised due to its limited size, and by the presence of this road and occasional traffic on it. In addition, opportunities for primitive types of recreation are also limited.

Unit G - The southern half of area G contains limited naturalness because it is heavily influenced by ranching and farming activities. These impacts include roads, fences, powerlines, and water ponds.

The northern half contains the old Geneva townsite. Two old homestead structures also remain Most of the northern half of the area has primitive vehicle routes, fences, and water developments Opportunities for solitude and primitive recreation are insufficient due to limited topographic and vegetative screening qualities.

[1]This area includes the dispersed camping sites for high clearance vehicles in the Steelhead Falls area

Much of area G also contains privately owned ranchland and farmland. This presents a manageability problem, as well as potential conflicts with motor vehicles.

Unit H - Most of this unit is privately owned and has a cabin with a dirt road to it. A natural appearance dominates most of the area, due to the rolling topography which masks the human imprint on the area. The area is just south of an interesting side canyon of the Deschutes. The area's southern border is the road to Geneva Viewpoint. Unit H would present manageability problems however, because of the 160 acres of private land and the road to Geneva Viewpoint. Opportunities for outstanding solitude or primitive types of recreation are also limited, due to the limited size and shape of public lands in this unit.

Unit I - This 160 acres is very rocky juniper-covered private property with one cabin on it. This area could provide access to nearby areas having a high degree of naturalness and solitude. Access across this private land, however, would not be encouraged without the consent of the private landowner.

Unit J - This area is heavily imprinted by an airstrip with associated structures, a borrow pit, and numerous primitive vehicle routes. It is not natural in character or appearance and does not contain opportunities for solitude or primitive, unconfined types of recreation.

Unit K - This area is the upper part of Lake Billy Chinook where Lake Billy Chinook is backed up to a gauging station along the Deschutes River. Solitude could be interrupted at any time by a powerboat, or by vehicle traffic on the bridge just north of this area.

During the BLM Wilderness Intensive Inventory it was determined that 720 acres of this area is part of an active power withdrawal (project numbers 2030 and 2259). It is no longer considered under BLM jurisdiction and was excluded from the BLM Intensive Wilderness Inventory. Based on these facts and the dominant outside sights and sounds resulting from Lake Billy Chinook, it was determined that unit K contained limited opportunities for solitude and primitive, unconfined types of recreation, and was not manageable as wilderness.

Units L & M - These areas are privately owned and have been imprinted by a few roads and primitive vehicle routes. However, approximately 500 acres of these two Units have outstanding scenery with tall pines, and the meandering Deschutes River and Squaw Creek Canyons which have steep and generally vertical walls. These areas, even with their imprints, would be valuable additions, have generally retained their naturalness, and provide opportunities to experience solitude.

This analysis concludes that by implementing a boundary change to exclude Units A, B, C, D, E, F, G, H, I, J, and K; the majority of the incompatible activities can be eliminated. The remaining area (Area II, as shown in Figure C-13, page C-87) would be more capable and more manageable as wilderness. This area generally encompasses a high degree of natural appearance and integrity, few manageability problems, and has wilderness qualities Area II is the heart of the entire Study Area.

Area II, approximately 8,513 acres in size, contains 7,933 acres of public land administered by the U.S. Forest Service and BLM, 540 acres of private land, and 40 acres of State Fish & Wildlife Department lands. Conflicts with motorized recreational uses, potential intensive range projects, and conflicts with private property owners have been minimized but not eliminated with this boundary adjustment proposal.

A few potential wilderness manageability problems still exist in Area II. These include the following:

The wood pole utility powerline crossing Squaw Creek;

Private land of the Crooked River Ranch along 1500 feet of the Deschutes River in NENE Sec. 17, T.13S., R.12E;

Approximately 540 acres of private lands (Units L & M) along two portions of Squaw Creek;

Existing road systems on the plateau area in sections 22, 23, 24, 25, T.13S., R.11E., and sections 19 and 30, T.13S., R.12E; and

Allotment boundary and pasture fences would remain in the area. Grazing would continue if the area is designated for wilderness.

Area III, approximately 5200 acres, eliminates these nonconforming features and included private lands. This area is suitable and manageable as wilderness. Opportunities for solitude away from nonwilderness features are high in this area.

Within the Deschutes River Canyon, however, are two areas with outside sights and sounds that limit naturalness, solitude, and primitive types of recreation. Both are north of Steelhead Falls. The Crooked River Ranch property crosses to the west and contains a small portion of the Deschutes River. A subdivision with houses overlooks the eastern canyon rim. The other area is also private land that extends down from the western canyon rim, to the Deschutes River. A water pump, road and powerlines dominate the landscape in this location.

Within most of this canyon and the Squaw Creek canyons, however, the topographic and vegetative screening qualities completely shield visitors from all other outside imprints. One's attention becomes focused on the canyon walls, the meandering river, riparian vegetation and the sounds of the river rapids. Although the outside sights and sounds in the Deschutes Canyon do adversely affect naturalness, solitude, and primitive uncontained types of recreation within their immediate vicinity, they do not adversely affect these qualities beyond a short distance due to the excellent topographic and vegetative screening qualities within these canyons For these reasons wilderness qualities within both canyons was still determined to be high. There is concern that this area is too small and tied to the canyon to be managed as wilderness. The designation of wilderness in this confined small area may attract more attention than the area can support.

Natural Integrity

Natural integrity refers to long-term ecological processes and the extent that human influences have altered these processes.

The Deschutes Canyon and western plateaus remain essentially primeval in character. The area has been utilized by Euro-americans for 130 years, resulting in impacts ranging from imperceptible to substantially noticeable. Yet, due to low rainfall, shallow soil and the barriers of the Deschutes and Squaw Creek Canyons, the area remains essentially unaffected.

In general, the natural integrity of the canyon area is still intact. This is evidenced by the type and variety of plant and animal life present. There are several naturalist groups (Oregon Native Plant Society, Portland Audubon Society) currently using the canyons, primarily in undisturbed native communities, for field study of Central Oregon plants and animals.

Natural integrity on the plateaus has been somewhat compromised. Over time, the major deviations from "natural ecological processes" are due to fire suppression and overgrazing by both livestock and wildlife. These changes in ecological condition have resulted in the proliferation of shrubs and juniper trees over native bunch grasses. This area at one time appeared more open with juniper trees confined to rocky rims and canyons. More obvious changes in natural integrity have resulted from rock piles, rock fences, range improvements, such as water developments, fences, and vehicle ways. Some crested wheat plantings were also completed in the 1940's. These are noticeable, but have largely grown over with native shrubs and junipers.

The ecological connections between canyon and plateau, have not been well documented. It is known that deer herds primarily use the plateau areas, but also utilize the canyons for up to several weeks during very severe winters. Raptors also nest in canyon areas and use the plateaus for hunting territory. The Metolius deer herd, raptor species, and other native animals use these plateaus.

In summary, natural ecological processes are somewhat intact within the canyons. The natural integrity on the plateaus has been somewhat compromised.

Natural Appearance

Although portions of this study area contain some imprints of humans, a large portion of this area still appears to be natural. Many changes to the landscape have weathered and faded to obscurity.

A field survey was made, both within and outside the WSA, to inventory imprints which affect naturalness.

Evidence of past homesteads remain in places on the plateaus, indicated by piles and walls of rock which had been cleared to prepare the land for farming. These old fields are generally natural in appearance, since time has rendered them almost indistinguishable from the native surroundings, except for the remaining rock piles and rock fences.

There are several unimproved vehicle routes on the plateaus. They could be rehabilitated through scarification and reseeding.

There are two powerlines within the WSA that significantly detract from the area's natural appearance. These powerlines are one-and two-pole wood towers. They are difficult to distinguish from distances greater than one-quarter mile, except in places where they are skylighted on ridgelines.

Other imprints within the area include water troughs, fences, water ponds, and seeded fields.

Practically all of the canyon areas within the Deschutes and Squaw Creek Canyons have retained their natural appearance. Human imprints are limited and influence small areas due to excellent topographic and vegetative screening qualities. Some examples of these imprints include fences, an old mining building, an abandoned water pump sled, a road, and a powerline.

Natural appearance and integrity on 4,891 acres of private land (over 27 percent of this study area) is generally very limited except for private lands in the Squaw Creek and Grandview areas. Most of the remaining private lands are either dry farmed, irrigated, or managed for beef production. Most of these lands also contain homes, other ranch buildings, and roads leading to these locations. Human activity associated with these lands also depreciates both natural area solitude and primitive recreational opportunities on adjacent public lands.

It is not realistic to assume that all of these lands could be exchanged into public land ownership. Some of these private lands significantly depreciate naturalness, solitude, some types of primitive recreation, and adversely affect wilderness manageability.

Opportunities for a Wilderness Experience

Opportunities for Solitude

The Deschutes River, Squaw Creek, and their tributary side canyons, afford the best opportunity to be alone. They start out at the south end as small narrow canyons and become progressively deeper and wider downstream. It is difficult to follow the river or creek far because, in many places, the canyons get very narrow, steep, and rocky. Access into the canyons is also limited. There are three or four primary access points with unmaintained trails into established dispersed campsites. Encounters with other hikers and backpackers can be expected in the Deschutes and Squaw Creek Canyons. In order to find solitude, users have to travel into more difficult areas in the side canyons, away from trails and traditionally used camp spots. The side canyons offer the best opportunities to find a secluded spot. Some of the plateaus west of Deschutes Canyon are also good places to find secluded spots because they are outside major travel corridors and high use areas.

As soon as one travels from the high plateaus and into the inward oriented canyons, the topographic screening is dramatic. It is a completely different feeling. One's attention becomes focused on the river or stream in the bottom or focuses on the interesting canyon walls and riparian vegetation. The canyons also meander, creating more topographic screening. Topographic screening also exists on a few plateaus surrounding these canyon areas.

The juniper trees and tall sage hide many imprints once the viewer is several hundred feet away from

them. The small, unmaintained dirt road and fence near Geneva Point illustrate this point. The impact of human development such as water troughs, fences and trailers is also less intrusive and apparent, due to the sage and juniper vegetation in many areas.

Opportunities for Primitive Recreation

Opportunities for primitive and unconfined recreation are outstanding in portions of the study area. Topographic diversity is provided by the open rolling country and table top plateaus, bisected by deep canyons, ravines, and rimrock ridges. Rivers, waterfalls, springs, and streams flowing through riparian vegetation and numerous species of fish and wildlife provide outstanding opportunities for several different types of primitive recreation, such as hiking and fishing.

Within most of the Deschutes River and Squaw Creek Canyons, the topographic and vegetative screening qualities completely shield the visitors from all other outside imprints. One's attention becomes focused on the canyon walls, the meandering river, the sounds of river rapids and riparian vegetation. The outside sights and sounds in the Deschutes Canyon do not adversely affect naturalness beyond a short distance, due to the excellent topographic and vegetative screening qualities within these canyons.

Hiking and Backpack Camping

A valuable characteristic of this study area is its location and wide-open appearance. The looming snow capped peaks of the Cascades dominate the western landscape. In addition, the desert plateaus evoke a strong sense of a natural environment to the cross country hiker.

Feelings of discovery and challenge are enhanced as one hikes across the study area. From a distance the country appears relatively smooth and easily negotiable to the hiker. However, ravines, draws, streams, and precipitous cliffs, unnoticed from afar, reveal themselves as impediments to straight line travel. These features force the hiker to climb, wade, or backtrack.

Most camping occurs in the canyon bottoms where water is available. Easily accessible sites show some signs of regular camping use. However, more remote stretches are accessible only on game trails, and are seldom used. Springs and streams also provide excellent camping spots. Camping between towering walls of rock, highlighted by sounds of roaring water, provide campers with a sense of remoteness, despite the close proximity of population centers.

Fishing

Fishing in the study area is outstanding. There are four species of game fish. These include rainbow and German Brown trout, Dolly Varden, and Kokanee. Other species include squawfish and suckers. Numerous springs and pools, and the riparian vegetation provide excellent water quality and temperature for these species. However, some stretches of the river are rarely fished due to difficult access, rocky terrain, and rattlesnakes. For the intrepid fisherman willing to venture into these canyons, however, the chances of catching a large fish are good.

Hunting

This study area receives heavy deer hunting pressure in the fall, due to easy road access, mainly around the perimeter, and close proximity to local communities. However, most hunters do not venture far from the roads. A few parties backpack during hunting season, but hunter success ratios for deer is low because most deer are at higher elevations during hunting season.

Upland game hunting is also popular in the area although game bird populations are moderate to low.

Rock Climbing

Although the Deschutes Canyon area appears to have excellent opportunities for rock climbing with steep canyons and tall rock pinnacles, the structure of the rock does not lend itself to safe climbing. The rock, as evidenced by the talus piles beneath canyon walls, is easily separated from its parent slope. However, those hikers and climbers content to scale

less challenging escarpments than those found at nearby Smith Rock, will find many opportunities. Climbing out of box canyons and ravines and bouldering are some of the opportunities available to a person with an inkling to climb.

Bird Watching

Bird watching is outstanding. More than 200 species of birds have been identified in and around the study area. The river canyons, cliffs, plateaus, and grasslands within the study area provide habitat for a wide assortment of birds. Among these are owls, eagles, ospreys, hawks, swallows, water fowl, and numerous song birds. Bald eagles are the only known threatened and endangered species found in the area.

Sightseeing and Photography

Scenic views from the study area on a clear day are impressive. The Cascade peaks and surrounding desert country provide excellent scenery for sightseeing and photography. Opportunities for these activities are also excellent from the canyon rims. Visitors only need to walk a short distance to get a look at the dramatic views of the Deschutes River canyon.

Water Sports

Squaw Creek is too shallow and rough for rafting or kayaking. Although the Deschutes River is very rocky and rough, it is not known if kayaking or rafting is possible. In the summer, swimming in the cool clear pools is excellent and secluded in all but the most easily accessible spots.

Challenging Experiences

The study area offers some unusual opportunities for challenge Cross-country travel can be especially challenging in this area.

The Deschutes Canyon-Steelhead Falls area is an excellent area for a hiker to travel cross-country. The open country, with numerous landmarks, allows a hiker to set out on a course of his choosing without benefit of trails and signs. The challenge of discovery, the need to conquer natural barriers by climbing down ravines and fording rivers or streams, offers exciting opportunities to experience wild country like those who first passed through it. This activity, when combined with fishing, also provides a very different kind of primitive recreational experience, and is also very challenging.

Special Features

Features which contribute to the uniqueness of this area are:

-A significant and diverse sport fishery resource;

-numerous Native American and Historical sites;

-Metolius deer herd winter range;

-bald eagle winter range,

-great horned owl wildlife nesting area;

-opportunities for botanical and geological study; and

-desert and canyon ecosystems providing habitat for otter, raccoon, skunk, badger, bobcat, and beaver.

Wildlife species of interest are discussed in more detail in the wildlife section.

The bald eagle is the only federally listed threatened or endangered species known to occur within the study area. However, there are several unusual species located immediately upriver which have a high probability of occurring in the study area even though no comprehensive survey has been done.

Two species of rare plants, (*Artemisia ludoviciana* ssp *estesii*-Prairie sage and *Hackelia hispida*-rough stickseed) are believed to exist within the Study Area but have not been verified.

The *Hypsiglema torquata* (desert night snake), an animal on the review list has also been reported near the Study Area.

The following educational, historical, and scientific opportunities exist for a number of disciplines:

1) Geology

The study area is in a zone where a number of geologic strata merge

2) Archaeology

Several major archaeological surveys have been conducted in the Deschutes River Canyon. These surveys documented numerous native American and historical sites. However, a survey of the Deschutes River Canyon from the south end of Lake Billy Chinook to the southern Grassland border (including this study area) has never been conducted.

3) Terrestrial and Aquatic Biology

The interface between Cascade and Desert-Canyon ecosystems provides an unusually rich array of wildlife. Many species are dependant on the availability of caves, rock shelves, or talus, such as many raptor species which inhabit the area. The fisheries resource is also outstanding due to a high availability of riparian habitat river/creek characteristics and many natural springs and seeps which supplement the Deschutes River and Squaw Creek.

4) Botany

The springs, seeps, and shelter provided by these canyons support many interesting plants. Currently the Audubon Society of Portland, the Native Plant Society, and other naturalists use this area for study of native Central Oregon vegetation in a primarily undisturbed ecosystem. Due to warmer sheltered conditions of the canyons in spring, many plants are blooming up to a month earlier than in more exposed desert ecosystem plant species.

Effect of Size and Configuration

The study area totals 18,402 acres. Although this area is quite large, it is relatively narrow in several locations. The area generally follows the Deschutes River Canyon and its tributary, Squaw Creek. There are also several interesting side canyons. The study area varies in width from less than one-half mile to more than four miles, with an average of about two miles. Its length also varies from seven to ten miles.

Human activities on lands surrounding the study area adversely affect the quality of naturalness in some portions. Outside sights are particularly significant in some places. The Cove Palisades State Park is a popular water recreation area north of this study area. Motor boats can travel up to three miles on either side of The Peninsula, into and around the northern plateau rim of the study area. Sights and sounds from this recreational activity are significant and detract from naturalness in this portion of the study area.

The Crooked River Ranch borders most of the study area to the east. This ranch is a planned community with permanent residences and summer vacation homes. Some lots overlook the Deschutes River Canyon, and a few homes are visible from the canyon bottom and western canyon rim. However, most homes in this community can not be seen because they are away from this canyon rim and are surrounded by juniper trees.

There are two farms that visually dominate in the southern portion of this study area. Several roads, primitive vehicle routes, irrigation systems, and distant farmlands are also visible from high elevation points in this study area. There are also three water tanks located together, northeast of this study area (T.12S., R.12E., Section 3). These tanks are a silver-gray color and contrast sharply with the brown hills behind them.

Except for a few vantage points on the canyon rim, and the higher elevated plateaus, outside sights and sounds do not have a significant adverse affect on the overall naturalness of this study area. Vegetative screening from juniper trees and sagebrush helps camouflage many of these intrusive sights.

Within the Deschutes River Canyon, however, are two areas where outside sights and sounds do limit naturalness, solitude, and primitive types of recreation. Both are north of Steelhead Falls. The Crooked River Ranch property crosses to the west and contains a small portion of the Deschutes River. A subdivision with homes overlooks the eastern canyon rim. The other area is also private land that extends down from the western canyon rim, down to the Deschutes River. A water pump, road and powerlines dominate the landscape in this location. Vegetative and topographic screening limit the impacts of these intrusions.

Impacts of sounds on this study area are generally limited to the north end, where water ski boats and vehicle traffic can be seen and heard from the Cove Palisades State Park. Although these sights and sounds do not totally dominate these units, they do have an adverse effect on the quality of naturalness and solitude in these areas. Although aircraft may occasionally be heard in this study area, these sounds do not adversely affect naturalness or solitude.

Wilderness Availability

Recreation

Recreation use on the river is low, and the area does not significantly contribute to current recreational use patterns in central Oregon. However, the area has a high level of significance to users in Central Oregon. Low use could also be attributed to the area not being well known. Users tend to be local people. The area has a great potential for recreational opportunities. Total recreation visitor days information for most recreational activities in the Study Area is generally not available. However, recent Oregon Department of Fish and Wildlife data indicates that over 4,000 fishing visitor days occur annually in the Deschutes River and Squaw Creek areas.

The plateau portions of units A-O would classify as "semiprimitive motorized" characterization as delineated in the ROS Users Guide. These categories include the physical setting, evidence of humans, remoteness, capacity, size, ongoing activities, and experience potential.

Area II fits closer to the primitive end of the ROS spectrum but most of this area would classify as a semiprimitive nonmotorized area due to the proximity of the roads. Within the canyon areas, there is a high to moderate probability of experiencing isolation from the sights and sounds of humans, a closeness to nature and tranquility, and self-reliance through application of outdoor skills in an environment which offers challenge.

Wildlife

The variety of wildlife in the study area is similar to that found on the Grassland and other lands in the area. The study area, a large section of public land, affords an excellent opportunity to manage for all types of indigenous wildlife within its boundary.

Major wildlife habitat categories that occur on the study area include: Mule deer winter range (see Figure C-10, page C-84), riparian, fish, raptor, and cavity nester's habitat. There is also upland game and nongame habitat.

The Deschutes River and its tributary Squaw Creek (lower portion) support excellent cold water fisheries. Rainbow and German brown trout, dolly varden, and kokanee can be caught along the portion of the Deschutes River from Lake Billy Chinook to Steelhead Falls. The kokanee spawn upstream from Lake Billy Chinook within this study area. From Steelhead Falls up river, the predominant trout species is the German Brown trout. Nongame fish, such as Squawfish and suckers can also be found down river from Steelhead Falls, which precludes them from going further up river.

Some fishermen claim to have caught Chinook salmon in the study area, and claim that there are landlocked Chinook salmon spawning in the Deschutes River and Squaw Creek. The Oregon Department of Fish and Wildlife has netted Chinook salmon in Lake Billy Chinook, but has not been able to verify that they spawn in the Deschutes or Squaw Creek (based on personal conversation with Ted Fies, Oregon Department of Fish and Wildlife, Bend, Oregon).

This diverse fishery is maintained by adequate water flow levels on the Deschutes River and the excellent habitat condition, a result of the numerous springs, seeps and lush streambank riparian vegetation.

A portion of the Deschutes in the Study Area also supports an unusually large and vigorous population of fresh water mussels (Margaritifera sp.). In some places it completely covers the river bottom and sides. This freshwater mollusk has proliferated here for some time. It was well known and utilized by aboriginal peoples

Although the Grassland, on the East Cascades Plateau, contains less than eight percent of the winter deer range for the Metolius herd, it contains 70 percent of the winter population of about 5,600 animals. The study area comprises about one-third of this winter range. However, a large portion of the most heavily used winter range next to the Grassland is private property, where the government has no game habitat control. This makes the Grassland winter range, especially the study area portion, very critical winter habitat for this deer herd.

Possible habitat improvement on public deer winter range includes the use of prescribed fire to control juniper encroachment on large areas. This is discussed in more detail under the Fire section.

Upland birds include populations of chukar, quail, Hungarian partridge and doves.

The canyons, cliffs, talus slopes, and caves provide unique habitats for raptors. These are characterized by relatively high, secluded canyon environments, and predictable airflow patterns.

Many raptors, including golden eagles and numerous species of hawks, can be observed. Bald eagles commonly spend the summer at higher elevations and concentrate on Lake Billy Chinook and Lake Simtustus (downstream from Lake Billy Chinook) during the winter months. The Study Area is within the bald eagle's winter range. They are often observed soaring the canyons. Actual nesting populations of bald eagles within the Study Area are low, (3-4 documented sites). The bald eagle is the only federally listed threatened or endangered species known to occur on the Study Area (listed as threatened by the U.S. Fish and Wildlife Service).

Water

Two thousand two hundred acres of BLM public land are under a power site withdrawal. A power withdrawal classification on public land means that there is a potential for the canyons to be flooded through the creation of a power dam. This does not mean that the area will be inundated by a dam, only that one could be built if it becomes economically advantageous to do so. The Federal Energy Regulatory Commission could issue a Power Project Withdrawal to the utility company, giving them jurisdiction over these public lands.

On May 6, 1981, the Bureau of Land Management State Office requested that the Minerals Management Service Conservation Division, based in Portland, Oregon, consider a partial revocation of Power Site Reserves 26 and 480, and Power Site Classification 25. The Minerals Management Service denied this request July 27, 1981. The denial was due to their value for "waterpower potential." Correspondence with a representative of this agency (Mr. Kenneth J. St. Mary, Conservation Division, Waterpower Section) on October 13, 1982, indicated that the portion of the Deschutes River within this study area could be developed for hydroelectric power by diversion-conduit methods, by a high dam with an adjacent powerhouse, or by a series of low dams and adjacent powerhouses. Mr. St. Mary further stated that Steelhead Falls and Geneva Sites have been considered for such development, and are described in a 1969 report, *Review of Waterpower Classifications and Withdrawals, Deschutes River Basin,* Oregon. Mr. St. Mary concluded his memorandum by stating, "...Although this reach does have significant hydroelectric power potential, we are not aware of any active plans to develop this potential." (This letter is filed in both the USDA and BLM offices. The BLM public comment letter is OR-5-C-97.)

Dam construction would conflict with Wilderness Management designation of these areas.

United States Geologic Survey gauging station #76,500 is located in the Deschutes River near Culver and measures the combined flow of Squaw Creek and the Deschutes River before entering Lake Billy Chinook. Average discharge over 30 years is 655,700 acre ft./yr.

There is an irrigation diversion located within the Study Area at T.13S, R.12E., Sec. 20, NESE.

Spring runoff is controlled by upstream reservoirs on the Deschutes River.

Water flow in Squaw Creek and the Deschutes River greatly decreases after the spring runoff.

However, they are kept flowing by numerous springs and seeps along the banks.

Livestock

Currently the total AUMs present on both Forest Service and Bureau of Land Management allotments within the WSA total 1396 AUMs yearly. This is equivalent to 212 cows and calves for a five month grazing season.

Forest Service Allotments and AUM's

Part of Lower Desert Allotment (currently no permittee)	141
Part of Holmes-Squaw Creek Allotment (H. Dunnegan)	335
Part of Falls Allotment (D. Williams)	50
Peninsula Allotment (no term permittee)	495
Williams Allotment (H. Kidson)	211
Clevenger Allotment (B. Davis)	53
	1285

BLM Permittees
(Five small pastures along Deschutes River)

Glen Cooper	27
Benjamin Davis	26
Donald Williams	58
	111

There are a number of range improvements in these pastures and allotments. These include several wells, water pipelines, water troughs, and storage tanks, fences, and vehicle ways. Most of these developments are in fair or poor condition. Water must be trucked into most pastures on a daily basis.

Several crested wheat seedings, done in the 1940's are located within the area. These have largely been inundated by native shrub species or juniper seedlings.

There is no cattle access into the river canyon within the F.S. allotments. The Clevenger and Falls pastures in Sections 21, 28, and 33, T.13S., R.12E. extend to the canyon rim and include areas within the 1/2 mile corridor along the river. The Squaw Creek pasture also extends down to the river. However, due to topography the cattle do not travel down into the lower portion of the pasture or to the river. BLM allotments are located along the southern portions of the Deschutes River and allow cattle access to some segments of the river.

Ecological

The management strategy to maintain bald eagle winter range and nesting habitat is to continue to provide a secluded environment by restricting development near habitat areas.

Other species currently inhabiting the Study Area do so because the unique environment satisfies critical needs at one or more periods during their lifecycle. The winter range is very important for survival of the Metolius Deer herd. Restricting human harassment during winter months conserves energy for these animals.

Also range improvements, such as prescribed range burning, would provide increased deer forage in some areas. In very hard winters, deer are known to descend into Squaw Creek and the Deschutes River Canyon seeking food and shelter. Maintaining proper use by cattle in the riparian areas therefore has a direct effect on survival rates on this wintering herd.

Excellent water quality and riparian vegetation condition is necessary to maintain and support the diverse fishery resource in the Deschutes River and Squaw Creek segments of the Study Area.

Timber

There is no merchantable timber available in the Study Area. Isolated ponderosa pines grow in the Deschutes and Squaw Creek Canyons. There are 83 acres of noncommercial ponderosa pine timber land located within the Study Area near Squaw Flat.

There are juniper trees in the canyon and above the rim, but not in sufficient quantities to be utilized in the firewood program.

Minerals and Energy

No mining claims have been identified on the USFS/BLM public lands within this study area. The 1983 U.S. Geological Survey summary report (Mineral Investigation of the Deschutes Canyon RARE II Area (no. 6321) Jefferson and Deschutes Counties, Oregon on file at Supervisor's Office USFS, Prineville) states: "There are no producing or developing mines, or active mining claims in the Deschutes Canyon RARE II Study Area. Only two prospects were found; they have no identified potential for mineral resources. Thin diatomite deposits occur in the Pliocene Madras Formation. Development of sand and gravel deposits in the area could not favorably compete with similar deposits in the surrounding area which are closer to points of use."

The subsurface rights of all USFS/BLM public lands within this study remain with these respective public land managing agencies, according to the most current BLM Master Title Plat records reviewed on October 6, 1982.

A spot check of Leasable Mineral Plat Records (dated April 1984) indicates that oil and gas leases have either been issued or applied for on all federal lands within the area. No exploration activities have occurred in the area.

According to the most current information available, no geothermal resources are known to exist within the Study Area.

Cultural Resources

Surveys Completed

Several extensive cultural resource surveys have been conducted along the lower Deschutes drainage north of the Study Area, mostly in conjunction with development projects (Round Butte Dam and Reservoir Area). These surveys identified a large number of both Native American and Euro-American sites.

The lower Deschutes River and adjacent land in T.13S., R.12E., from Lake Billy Chinook to the southern boundary of the Crooked River National Grassland has never been systematically surveyed for cultural resources. The information described from surveys in the vicinity of Lake Billy Chinook suggests that structures, sites, and surface features relating to prehistorical and historical development of the greater central Oregon region are well represented. Parts of the Peninsula have been surveyed (Ochoco National Forest Report Cove Land Exchange). Several homestead sites were found there.

Along the river south of Lake Billy Chinook (T.13S., R.12E) Native American sites have been recorded on land administered by the Bureau of Land Management.

Typical Site Types

The Lower Deschutes River Cultural Resource Survey (Hibbs, 1976) identifies the general categories of sites indicative of typical aboriginal occupation: house depressions, rock shelters, campsites, shell middens, quarry sites, flaking stations, talus depressions, cairns, petroglyphs and pictographs.

Euro-American sites along the river are also numerous in type deriving primarily from mining, homesteading, stock grazing, roads and trails and hunting and fishing activities.

There are fifteen known historical sites in the Study Area. These are old homesteads on the plateaus. The land was originally prairie grassland and was homesteaded around 1900. After the government began managing the lands following the Great Depression, almost all the structures were dismantled, burned or bulldozed over, with much of the debris shoved down and covering the old wells. Very little remains of these homesteads except for the piles and walls of rocks made when the land was cleared for farming.

Hibbs, Gannon, Williams, 1976. *Lower Deschutes River Cultural Resources Survey.* Report on file at the Prineville District Office, BLM.

Land Use Authorization

Much of the canyon (2,200 acres) is under power withdrawals. The canyoned area closest to Lake Billy Chinook is under an active power withdrawal encompassing 720 acres (see Map 4 and the Water Resources section).

There are two utility powerline rights-of-way within the Study Area. One is a single wood-pole utility powerline that runs in an east-west direction for two miles, and also crosses Squaw Creek Canyon. The other powerline right-of-way is in the north end of the Peninsula, Unit A. The two wood-pole powerlines branch in two directions, north-south and east-west, for a total of 2.5 miles.

Numerous access roads exist in the plateau areas, none of which are under permit. They are mainly wheel tracks.

Land Ownership

The entire Study Area contains approximately 18,402 acres. Of this total: U.S. Forest Service (USFS) manages 10,231 acres, Bureau of Land Management (BLM) manages 3,240 acres, private parties (non-Federal) own 4,891 acres, and the State of Oregon owns 40 acres. See Figure C-8 for the location of these areas.

Management Considerations

Fire

Historically, fire was a key element of Grassland ecosystems. Most of the Grassland was probably burned on a frequency of less than thirty years by lightning-caused fires. Portions of the Grassland now support mature juniper stands with little or no grass or brush understory. These stands are generally fireproof and will only carry fire under high wind conditions. Fire will generally retard ecological succession of communities that would move toward a climax of juniper. Hall (1973) and Volland (1976) cite several plant communities which may move toward juniper dominance without the disturbing influence of fire or a similar agent. In the pioneer stage, grasses and forbs generally dominate. Rabbitbrushes and horsebrush may be common, depending on their frequency before burning and availability of seed after burning.

As succession proceeds into the seral stages, sagebrush and bitterbrush may become dominant, depending on the site. Grasses generally become less prominent, and composition may change from the pioneer types, such as bottlebrush squirreltail, to the wheatgrasses and fescues. Heavy grazing may enhance movement toward shrub and juniper dominance, and also reduce the frequency and cover of wheatgrass and fescue in favor of the pioneer grasses or the exotic cheatgrass. Scattered juniper of varying sizes and ages now appears.

Historic fire management in the Grassland's ecosystems has been suppression. This has retarded ecological succession. Historically, fire has long been a key element of juniper, shrub, and grass ecosystems.

With time and the absence of fire, succession would probably proceed to a juniper dominated climax in which the shrubs and grasses are very much subdued. Under present conditions, allowing fire to again become a part of the natural succession could become damaging if not reintroduced gradually in the form of planned ignitions.

Insects and Disease

There are no known problems with insects or disease. Potential for these problems is low.

Non-Federal Lands

It is not realistic to assume that all the private lands (4,891 acres) could be exchanged into public ownership. Most of this private land is a vital part of the local ranch/farm operations. Few of these lands would meet wilderness standards.

Wilderness Evaluation

Public Input

The information regarding the Deschutes Canyon-Steelhead Falls Area was gathered from several procedures.

The Bureau of Land Management conducted public meetings and gathered public comments for wilderness studies to determine potential for wilderness. The Forest Service conducted public meetings and gathered comments for the RARE II Analysis and the Crooked River National Grassland Unit Plan which included the Deschutes Canyon Area.

During the more recent planning efforts for Forest Planning, the two areas were combined into one WSA as directed by the Oregon Wilderness Act of 1984. A Memorandum of Understanding between the Forest Service and BLM was developed, and the Forest Service, by virtue of the percentage of land involved, was identified as the lead agency.

Information obtained prior to the joint effort was considered with input gained during Forest planning and during the BLM Wilderness Study. These are on file at the Forest Service Office.

When the BLM requested public input for the Steelhead Falls Study Area in 1980, they received letters from 62 individuals. Sixty expressed support of the proposal to designate Deschutes-Steelhead Falls as a wilderness study area Many desired the BLM canyon area to be managed as wilderness, even though it was less than 5,000 acres in size. Two comments were against the designation of WSA for the Deschutes Canyon. One expressed concern that wilderness would limit fish management activities.

The WSA was supported for wilderness designation by local chapters of several organizations, including the Oregon Environmental Council, Wilderness Society, Sierra Club, Mazamas, Audubon Society, Central Oregon Fly Fishers, and the SAGE Desert Study Group. These organizations exhibit varying degrees of involvement, from very active support specifically for the Deschutes Canyon, to general listing of support for a number of wilderness study areas,including the Deschutes Canyon/Steelhead Falls area.

The Jefferson County Comprehensive Plan recommended against any additional wilderness within the county.

During the public review period for the DEIS/Forest Plan, 135 letters were received with comments on Deschutes Canyon/Steelhead Falls WSA. Among these were letters from ODFW and the Oregon Parks and Recreation Division.

The majority favored wilderness designation for the river corridor, and many proposed enlarging the wilderness acreage to include all or part of the canyon rim and the Squaw Creek area. Most respondents felt that the proposed 5,200 acres was too small, and recommended a range of acreages up to 20,000 for the wilderness area.

Some of those responding did not favor wilderness designation, believing that semiprimitive nonmotorized recreation management was more appropriate.

Respondents generally opposed any development in the area and urged protection for the area's wildlife, scenic, and recreation values. They generally opposed livestock grazing and timber harvest in the area.

ODFW supported the 5,200 acres of wilderness classification proposed in Alternative E-Departure. This alternative proposed protection for the canyon rim.

The Oregon Parks and Recreation Division supported the Forest Service requirement to maintain wilderness values until the area was designated wilderness or released from consideration by Congress.

In summary, the Deschutes Canyon-Steelhead Falls WSA received some support for wilderness recommendation. Others felt the wilderness character had already been compromised. Most respondents did appreciate the scenic and recreational qualities of what they considered to be a rather noteworthy canyon area

Congressional Interest

This study area has not surfaced in any new bills presented at the Congressional level. It apparently has not generated Congressional interest to date. The release language of the Oregon Wilderness Act formally designated the WSA directing decisions on it be made through the Forest Plan.

Need for Ecosystem Representation

Ecosystem/landform diversity was determined by using the Baily/Kuchler system to classify ecosystem geography. The classification of ecosystems is based climate, vegetation, soils, and landform.

Utilizing the Baily-Kuchler Classification System, the Deschutes Canyon/Steelhead Falls Study Area contains 17,482 acres of Intermountain-Sagebrush/ sagebrush-steppe ecosystem. According to a BLM State Officer's Wilderness Report in August 1981, this ecosystem was not currently represented in the National Wilderness System. However, the Poker Jim Ridge managed by the U.S. Fish and Wildlife Service may be the first area with this ecosystem type that is recommended for wilderness designation. (Poker Jim Ridge is on the Hart Mountain National Wildlife Refuge in Southern Oregon, approximately sixty miles northeast of Lakeview) This area encompasses 15,500 acres and has been endorsed by the President. It is also pending before congress, according to the same BLM State Office report. In addition, this report identified 63 other BLM study areas encompassing over 1.7 million acres, (primarily within the State of Oregon) having the same ecosystem type. (A list of these study areas is available at the BLM State Office or the Prineville District Office.) Some of these study areas may eventually be included within the National Wilderness Preservation System. In addition, U.S. Forest Service correspondence, in response to an appeal over the most current Crooked River National Grassland preferred land use alternative for this area, indicated that the Jarbidge Wilderness, on the Humboldt National Forest in Nevada, also contains landforms, ecosystem, and wildlife similar to Deschutes Canyon Study Area. The same basic vegetative type, landform, waterflow, and ecosystem type can also be found in the Owyhee and Snake River Canyon areas.

Distance from Population Centers

Population centers are defined as standard metropolitan statistical areas having population areas of at least 100,000. There are six population centers within a one day drive (determined by Wilderness criteria to be five hours) to the Deschutes Canyon/Steelhead Falls Study Area These areas are: Eugene-Springfield, Portland, and Salem, Oregon; and Richland-Kennewick, Tacoma, and Yakima, Washington.

Nearby Wilderness Areas and Their Use

There are several wilderness areas managed by the Forest Service relatively close to the Deschutes Canyon-Steelhead Falls Study Area. These areas are Mt. Jefferson Wilderness 30 air miles to the northwest, Mt. Washington Wilderness approximately 30 air miles to the west, and the Three Sisters Wilderness approximately 40 air miles to the southwest along the Cascades. Black Canyon Wilderness approximately 80 air miles to the east, Mill Creek Wilderness approximately 30 air miles to the east and Bridge Creek Wilderness approximately 50 air miles to the east are recently designated in the Ochoco National Forest. Strawberry Mountain, also on the Oregon Wilderness Bill, lies approximately 120 air miles to the east and is located on the Malheur National Forest. These areas generally do not provide year-round recreation use as they are generally not accessible during the winter months.

Environmental Consequences

Some resources are determined to be unaffected, or insignificantly affected, by the different management activities prescribed by the various alternatives. The canyon area is protected from development in all alternatives by the lack of commodity production potential, steep terrain, and potential adverse impact to soil and water resources. The plateau area is currently partially developed for livestock production, with primitive roads, water developments, and fences. Commodity oriented alternatives further develop the plateaus. All wilderness alternatives call for the removal of roads and other nonconforming features when feasible. Wilderness designation also eliminates the opportunities to improve wildlife habitat. These wilderness alternatives would also withdraw the areas from mineral entry, and included energy leases would be terminated according to the lease stipulations.

Nonwilderness alternatives keep open the option to develop for energy production and mineral exploration, and allow opportunities to improve wildlife habitat. Since there is no commercial timber land included in any of the areas, timber is unaffected by the various alternatives. Cultural resources are protected in all alternatives and potential for impact varies only slightly in the plateau areas between alternatives. Possible ground disturbing activities on the plateaus vary from removing facilities for wilderness to a limited improved transportation system designed to accommodate grazing and protect or

TABLE C-32
DESCHUTES CANYON - STEELHEAD FALLS WILDERNESS STUDY AREA
Designation By Management Prescription

Total Acres - 18,402 (includes all ownership)
Wilderness Capability Acres - 10,000 (lands administered by the Grassland)
BLM Administered Land - 3,240 Acres

	Acres by Alternative 1/				
Management Prescription	A/NC	B-MOD	C-MOD	E-DEP	I
Dispersed Recreation					
Nonmotorized					
F S	9,350	700			5,138
BLM	3,240	2,031			
Timber/Range					
F S		8,650			
BLM		1,209			
Big Game					
F S				7,500	4,212
BLM				580	1,164
Wilderness					
F S			9,350	1,850	
BLM			3,240	2,660	
Wild & Scenic River					
F S	650	650	650	650	650
BLM	2,076	2,076	2,076	2,076	2,076

1/ Based on Wilderness Capability Acres

enhance wildlife habitat. Water quality should remain relatively constant due to the limited activity proposals in all alternatives.

The key resources affected by the differences between alternatives are wilderness, recreational opportunities, land uses, livestock grazing, and the associated social and economic effects. These will be discussed in the following alternatives comparison.

Alternatives A and NC

This alternative would focus on the current management situation. The existing direction for wilderness study requires that the wilderness quality and attributes be maintained, and current resource activities would continue at current levels.

Effects on Wilderness Attributes

The current wilderness attributes of the area would be protected. Nonconforming features and uses would continue at the current levels and no new commitments would be made that would adversely affect future designation as wilderness.

Effects on Nonwilderness Resources

Recreation

Motorized vehicles would be restricted in the canyon areas which are managed for semiprimitive, nonmotorized recreational opportunities. Limited motorized use of the plateau areas would continue. Hunting in the plateaus utilizing vehicles would continue.

Livestock Grazing

Grazing would continue at the current levels. Water would be trucked into the area on a daily basis.

Land Uses

Nonconforming features and uses would continue.

Land Ownership

Existing situation of ownership would continue.

Social/Economics

The existing conditions would remain unchanged.

Alternatives B-Modified and I

These alternatives were developed in response to public input to the DEIS and Proposed Forest Plan and to management concerns. The ideas incorporated into these alternatives focused on maintaining a pristine area while enlarging the area to make it more manageable for the more primitive backcountry recreation opportunities. Enlarging the area brought in features that were not acceptable for inclusion of wilderness but did not detract from the overall backcountry opportunities. Enlarging the area also included going outside this Wilderness Study Area, crossing the main access in this part of the Grassland to include the upper reaches of Squaw Creek. This portion offers additional canyon opportunities for backcountry recreation even though it is bisected by the access road. The road will be closed seasonally during the winter period that is so critical for the Metolius deer herd. The main Deschutes River and Crooked River canyons are protected through Wild and Scenic River management.

Effects on Wilderness Attributes

The area within the wilderness study area that is included in the Squaw Creek management area and the Wild and Scenic corridors will have the included wilderness attributes protected under the backcountry recreation emphasis. The area outside of the Squaw Creek management are not included in the Wild and Scenic River corridor will be managed for the wintering deer herds and may require vegetative manipulation that could conflict with preserving the wilderness attributes.

Effects on Nonwilderness Resources

Recreation

The Squaw Creek management area emphasizes the backcountry semiprimitive nonmotorized recreation opportunities. Trails will be developed to offer some challenge and maintain the pristine nature of the area as will as providing access to the Wild and Scenic River corridors. Current off-road motorized recreation will be eliminated.

Livestock Grazing
Grazing would continue at the current level unless conflicts with the wintering deer herds begin to occur. Trucking of water to maintain grazing will continue as needed.

Land Use
The powerlines thru the Squaw Creek area will be allowed to remain until they are no longer needed. The main access road through the Squaw Creek area will be open to use outside of the winter period which requires closure to protect the wintering deer herds.

Land Ownership
Private lands within the Squaw Creek management area should be acquired as they become available.

Social and Economic
A small increase in the local economy may occur from additional backcountry recreation opportunities as more people become aware of the Squaw Creek and the Wild and Scenic River areas.

Alternative C-Modified
This alternative emphasizes "nonmarket" resources such as water, visuals, fish, wildlife and dispersed recreation. The full area is recommended for wilderness in this alternative.

The total area will be closed to motorized vehicles and the access routes rehabilitated as necessary to prevent erosion and eliminate future motorized use. Overall, the area will appear similar to the existing condition with many of the non-conforming features and included private lands remaining. The plateaus will not offer a challenging, remote natural wilderness experience. There would be little opportunity for solitude away from the influence of the sounds and sights of human activity from the outside area.

Effects on Wilderness Attributes
There are many conditions both past and current that restrict the plateau portion of the study area's manageability as wilderness. Included private land, developed areas like the Cove Palisades State Park and Crooked River Ranches, the remains of early homesteading, and existing improvements such as roads, power lines, and fences make wilderness management for the entire study area very difficult.

The canyon areas offer opportunity for a more primitive type of recreational experience and can be managed for wilderness. This portion of the area generally has a high degree of natural appearance and natural integrity, with limited manageability problems.

Effect on Nonwilderness Resources
Recreation
Management under the Wilderness Recreation Opportunity Spectrum (WROS) would be directed toward the semiprimitive management classification objectives. These objectives would be accomplished in the canyon areas, but not in the plateaus. Current motorized use of public lands on the plateau area would need to be eliminated and this would create a difficult law enforcement problem.

Livestock
Livestock grazing would essentially be eliminated unless use of motorized vehicles on a daily basis to haul water could be approved. Current administration of wilderness areas allows occasional use of vehicles for established grazing needs Stock watering on the allotments within the study area requires hauling in water on a daily basis. There is a possible loss of 900 to 1000 AUM/year.

Land Use
Nonconforming features such as roads and power lines would need to be removed and their evidence obliterated as much as feasible. Power line rerouting will be very expensive. Private lands that become public through exchanges will require extensive work and costs to remove nonconforming features. Even after rehabilitation, most of these lands would still have very limited wilderness qualities.

Land Ownership
It is not realistic to assume that all private lands could be exchanged into public ownership. Most of these lands have features that do not conform to

wilderness standards and are important to the local ranch operations.

Social/Economic

The impact due to the loss of grazing could put three or four ranchers out of business. Extensive tracts of private lands exchanged into public ownership would no longer be included in the county tax base. There would be a loss of revenue with the loss of 1000 AUM/year. The loss of motorized access on the plateaus will shift the demand for this recreation to other areas.

Alternative E-Departure

This alternative emphasizes the "nonmarket" resources and roadless area management. The enhanced modified area (Area III), approximately 5200 acres, is recommended as wilderness. Of this 5200 acres approximately 2500 acres is administered by the Grassland, 2660 acres by the BLM, and 40 acres by the State of Oregon (see Figure C-14). Management of lands outside this recommended wilderness would be managed for big game/wildlife. The plateau area will show patterns of man's manipulation to improve wildlife habitat.

Effects on Wilderness Attributes

Area III is manageable area for wilderness, due to the elimination of the majority of the manageability problems. The adjusted boundary for this area eliminates the private lands and most of the nonconforming features on public administered lands. Opportunities for solitude and challenging experiences are great in this area with current use. Wilderness designation could attract too much use to maintain the wilderness standards due to the small size and the area that would concentrate use.

Effects on Nonwilderness Resources

Recreation

Management would be guided by the Wilderness Recreation Opportunity Spectrum (WROS) for the semiprimitive management classification objectives. These objectives can be met on the majority of the area. The plateau area outside wilderness will be managed for wildlife and range resources, and the transportation system would allow for the semiprimitive, motorized as well as some roaded natural recreation opportunities. Hunting opportunities will increase.

Livestock Grazing

Grazing would continue at the current level and would possibly be increased as range improvements in the plateau area increase capacities. The trucking of water to maintain grazing would continue as the watering tanks and access routes are outside the wilderness.

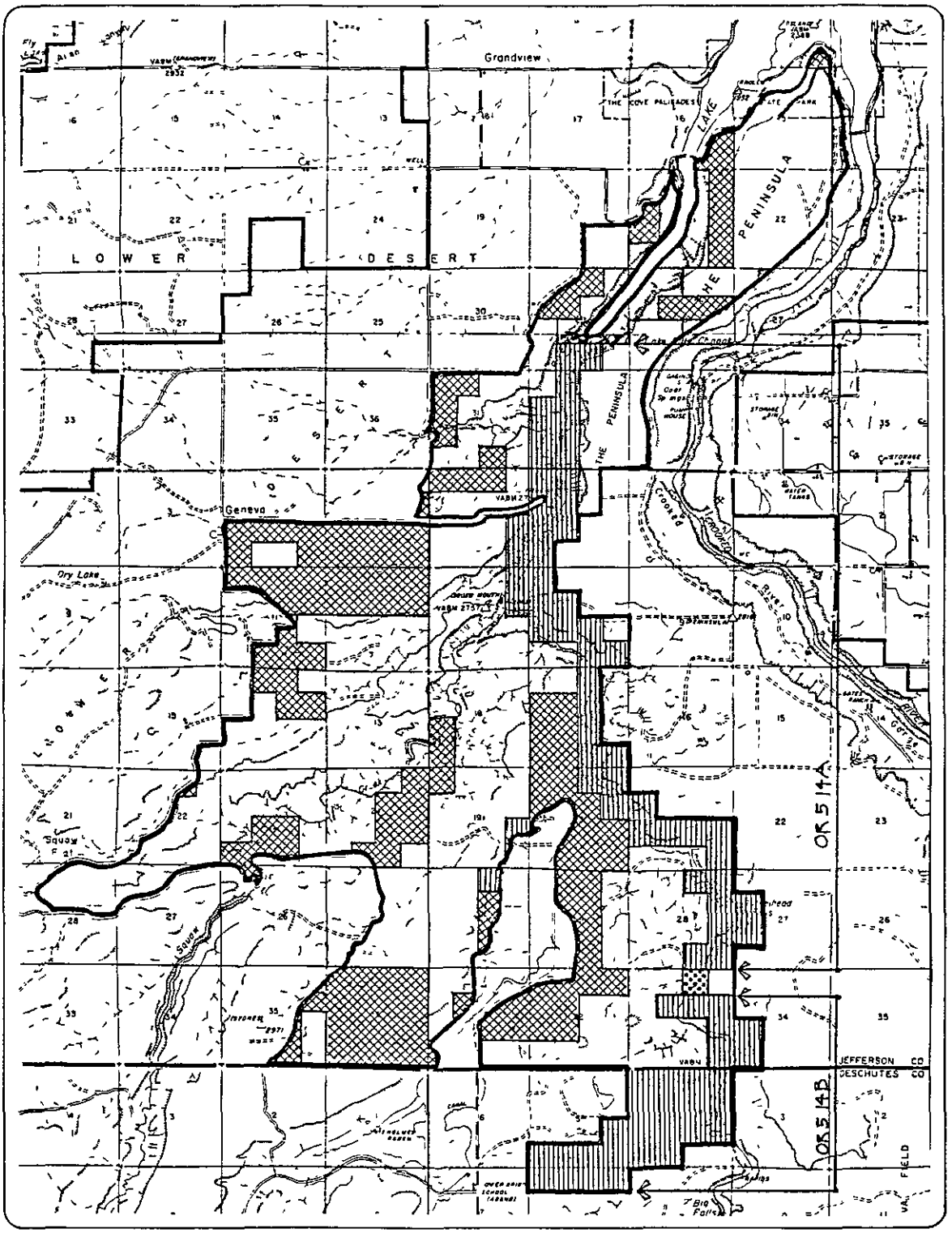
Land Uses

All nonconforming land uses, including access roads and power lines, are outside the wilderness.

Social/Economic

There will be no effect on the social/economic status by this alternative. The ranching community dependent on this area is unaffected and the people dependent on the power line will not be affected.

Figure C-8 DESCHUTES CANYON - STEELHEAD FALLS (LAND STATUS)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

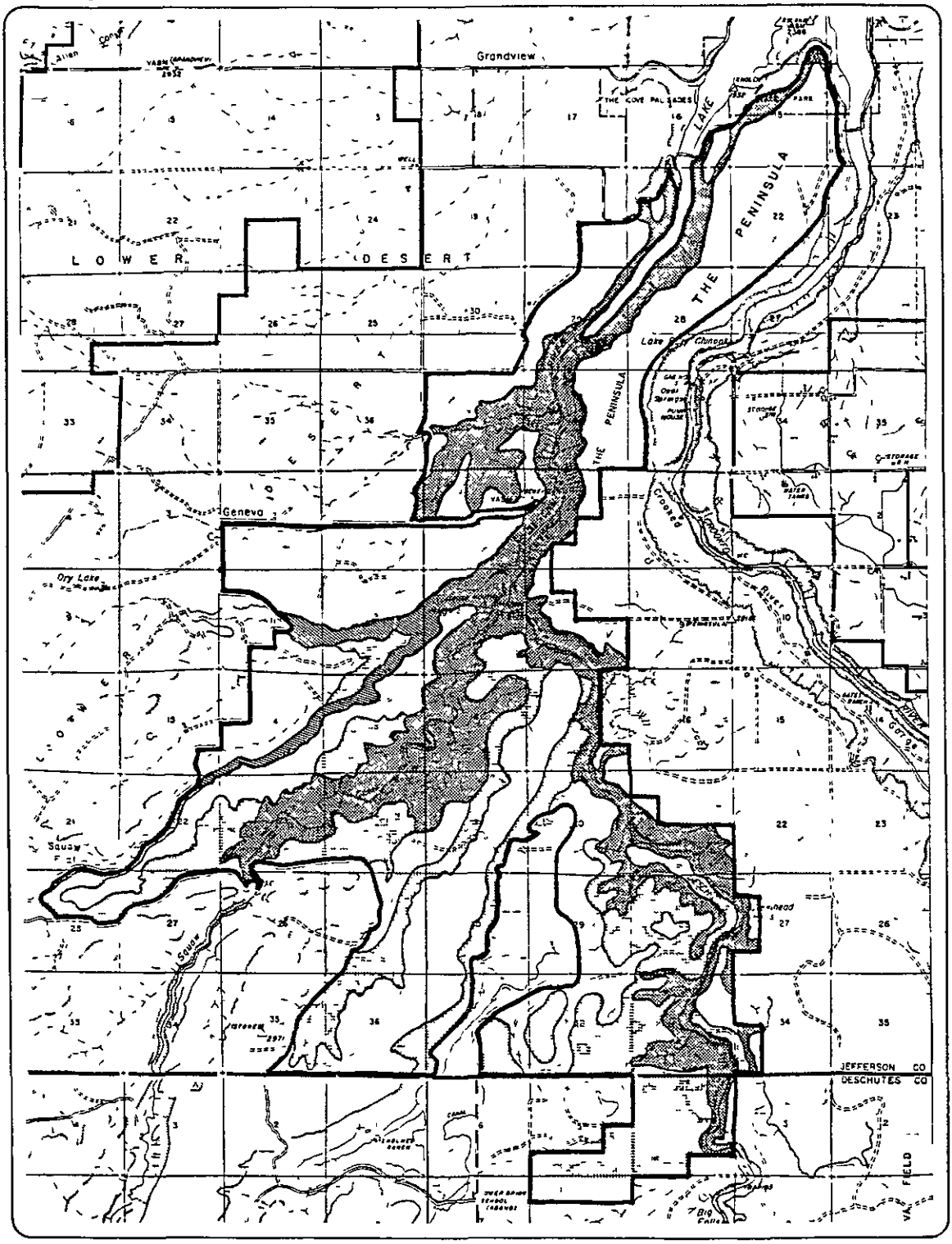
LAND STATUS

TLS 7-2-82
OCHOCO NF -
R-6, USDA

LEGEND

- U.S. FOREST SERVICE
- B L M.
- OREGON STATE GAME
- D O R POWER WITHDRAWAL (ACTIVE)
- PRIVATE

Figure C-9 DESCHUTES CANYON - STEELHEAD FALLS (TOPOGRAPHY)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

TOPOGRAPHY

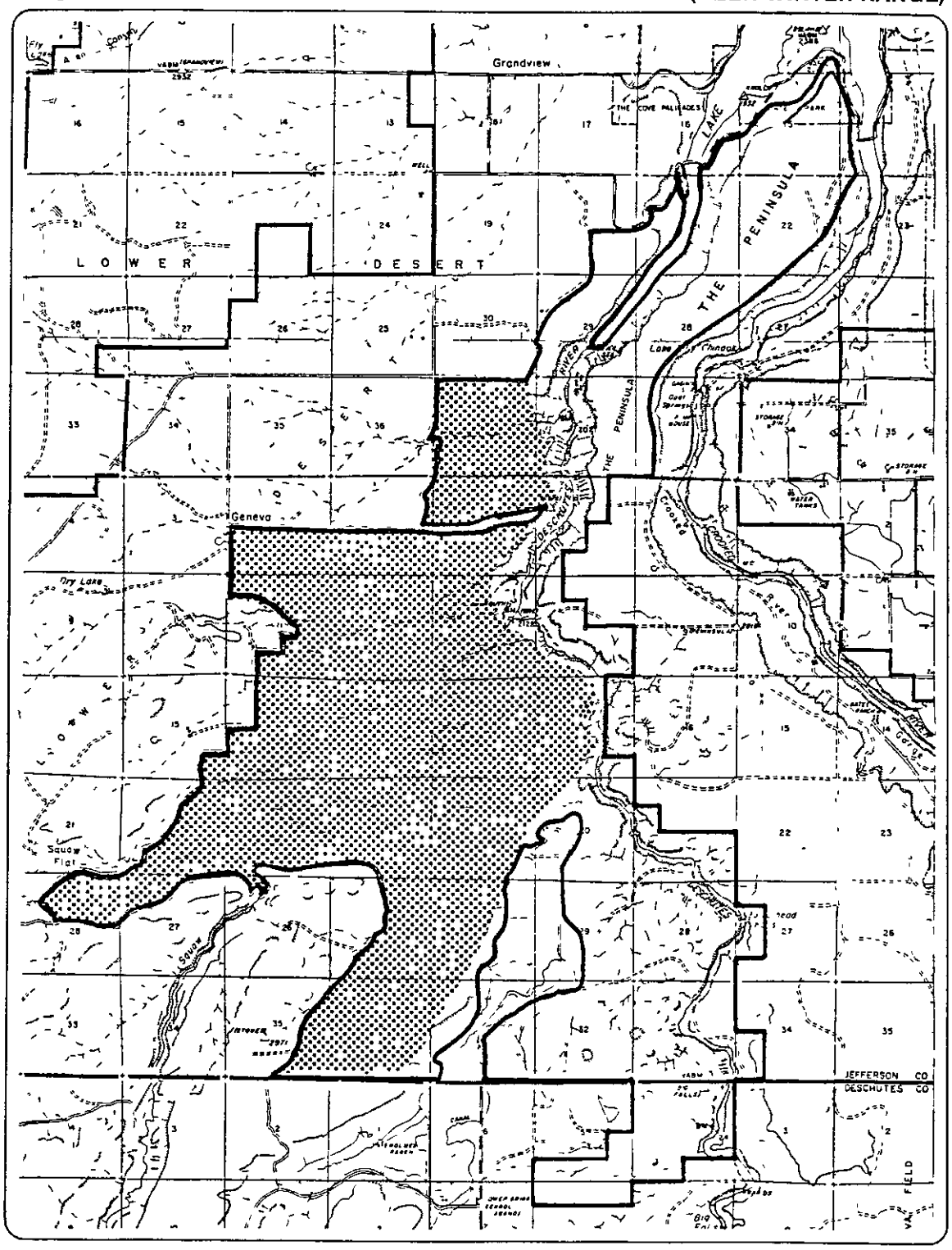
LEGEND

- 0 - 10% SLOPE
- 10 - 20% SLOPE
- 20% SLOPE, OR MORE

NOTE. THIS MAP SIMPLIFIED FOR CLARITY

TLS 7-2-82
OCHOCO N.F.
R-6 USDA

Figure C-10 DESCHUTES CANYON - STEELHEAD FALLS (DEER WINTER RANGE)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

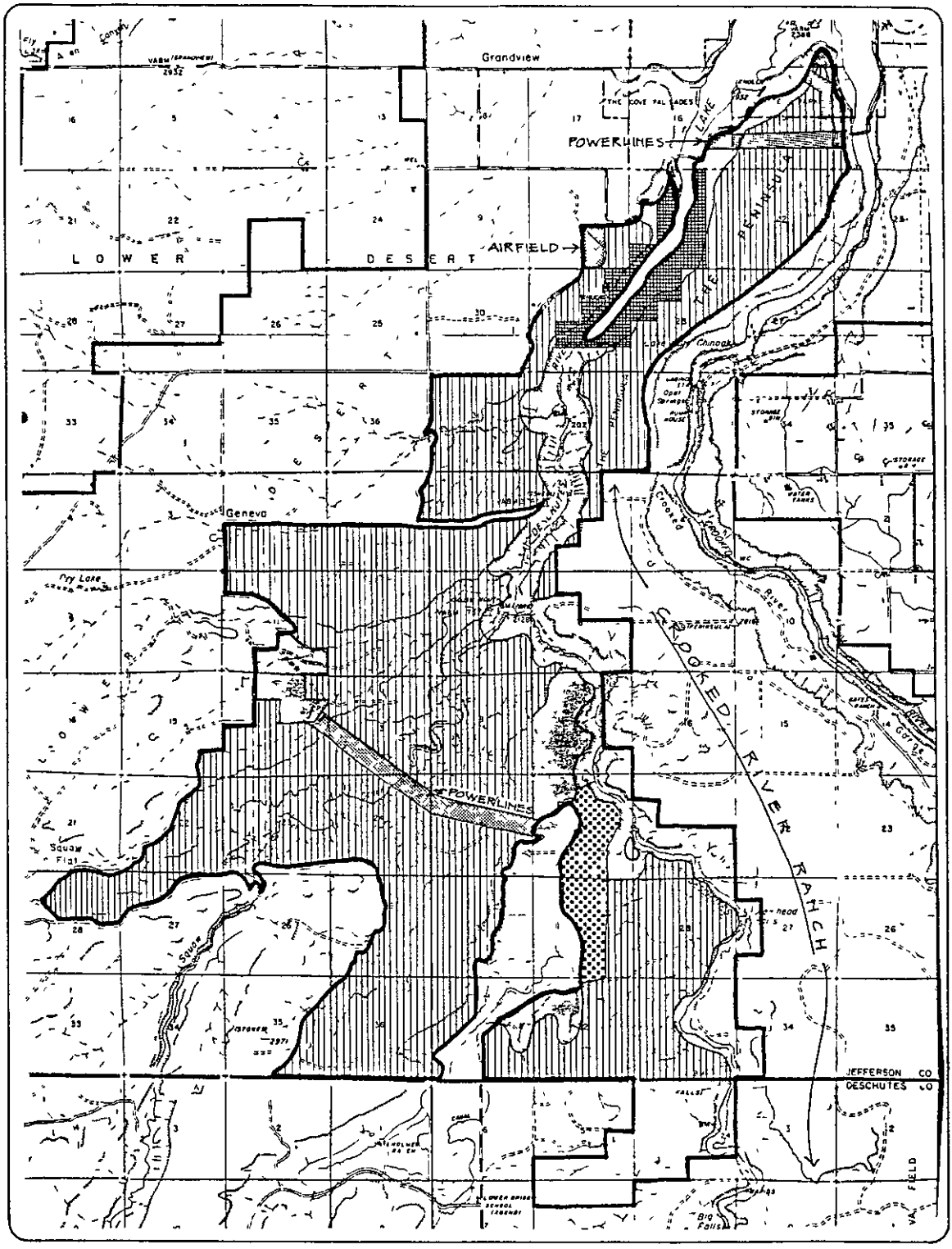
DEER WINTER RANGE

LEGEND

WINTER RANGE

TL.S 7-2-82
OCHOCO NF-
R-6 USDA

Figure C-11 DESCHUTES CANYON - STEELHEAD FALLS (COMMERCIAL USE OF LAND)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

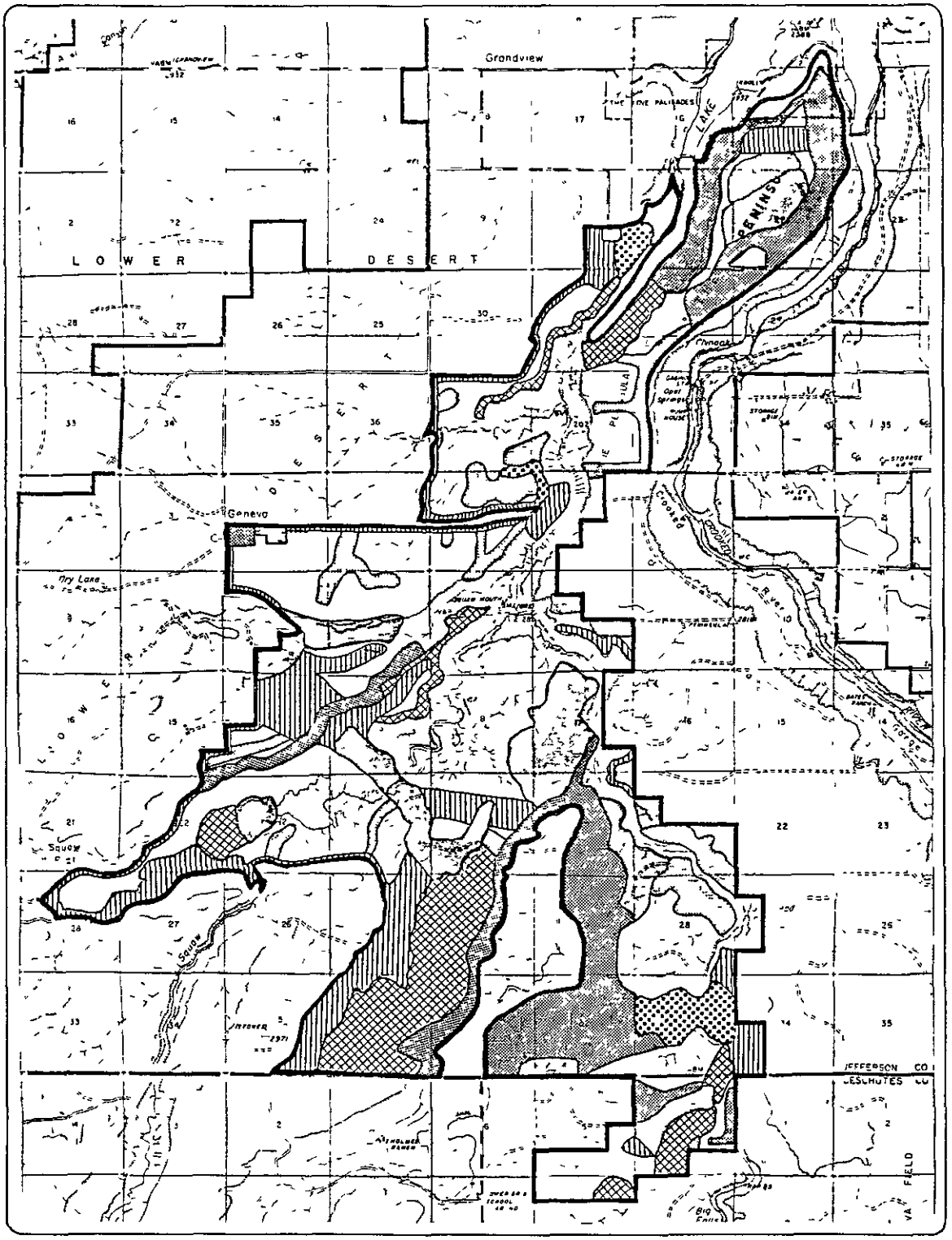
COMMERCIAL USE OF LAND

LEGEND

- RANCHING
- GRAZING
- SPECIAL USES
- FARMING
- ACTIVE POWER WITHDRAWAL

TLS 7-6-82
OCHOCO NF
R-6 USDA

Figure C-12 DESCHUTES CANYON - STEELHEAD FALLS (NATURALNESS MAP - AREAS IMPRINTED)



DESCHUTES CANYON - STEELHEAD FALLS W.S.A. - UNIT 6321

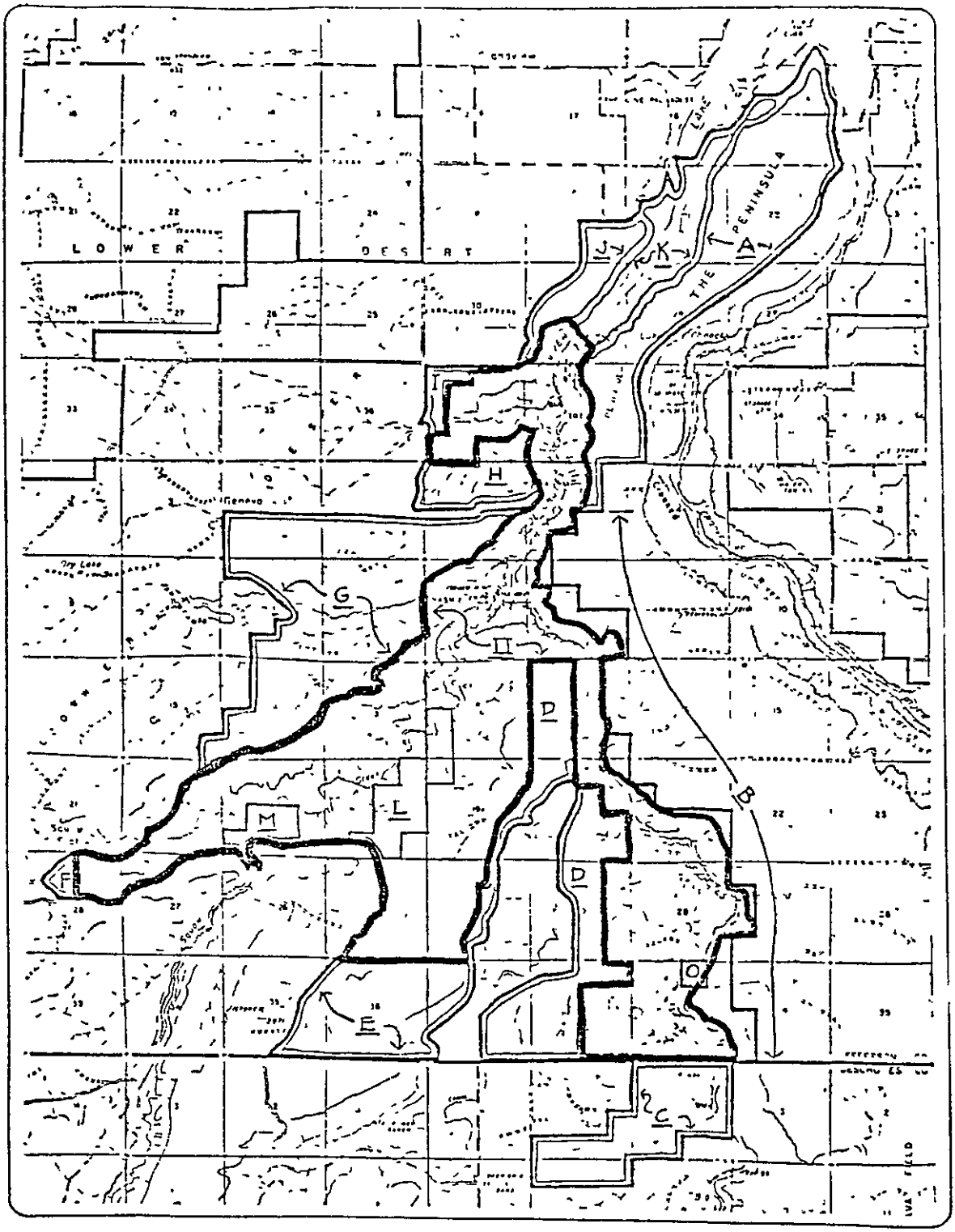
NATURALNESS MAP - AREAS IMPRINTED

LEGEND

- NO IMPRINTS
- ONE MINOR ON SITE IMPRINT
- ONE MAJOR ON SITE IMPRINT
- ONE MAJOR OFF SITE IMPRINT
- MULTIPLE MINOR ON SITE IMPRINTS
- MULTIPLE MAJOR & MINOR ON SITE IMPRINTS
- MULTIPLE MAJOR OFF SITE IMPRINTS

TLS 6-30-82
OCHOCO N.F. -
R-6, USDA

Figure C-13 DESCHUTES CANYON - STEELHEAD FALLS (BOUNDARY ALTERNATIVES)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 3321

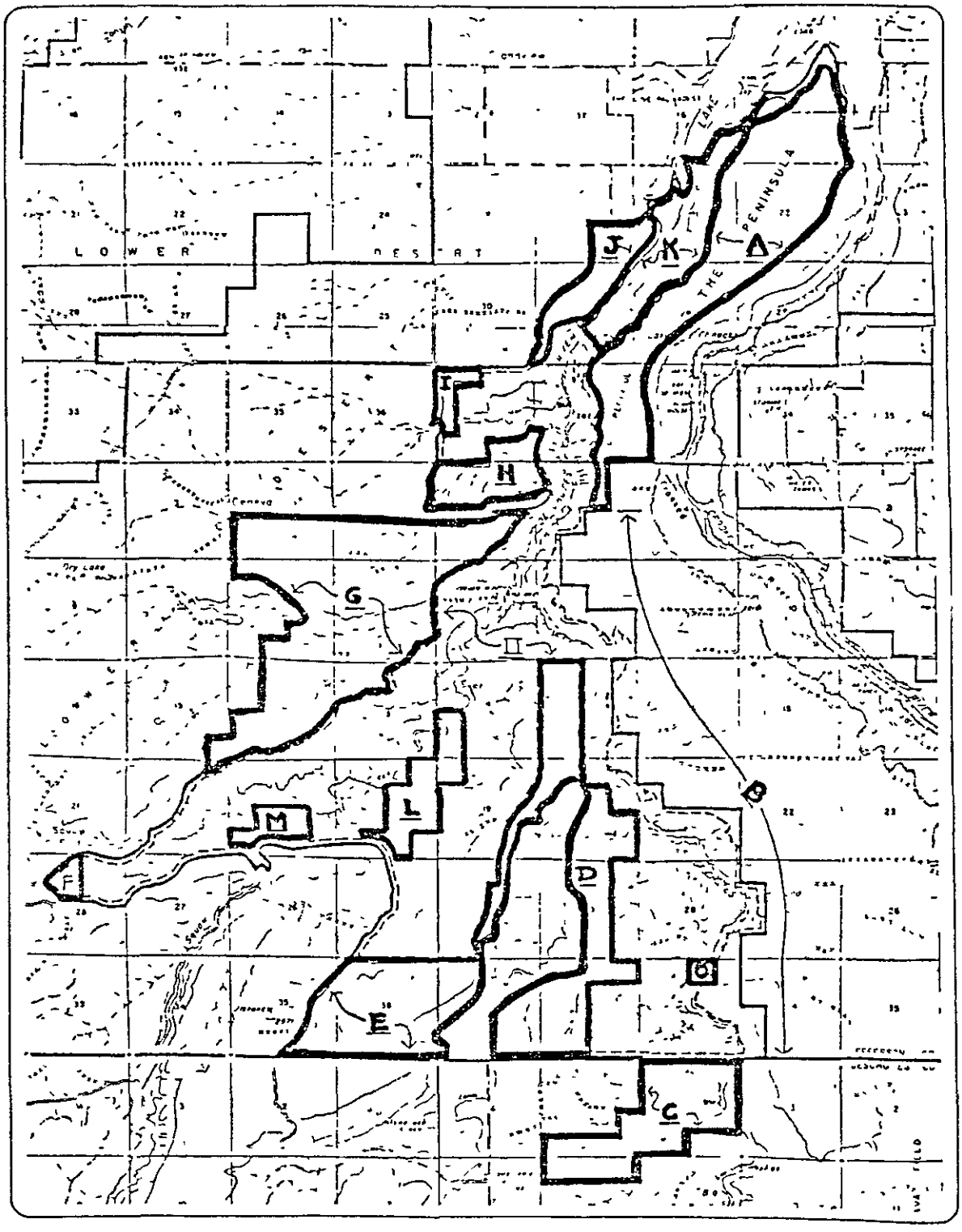
BOUNDARY ALTERNATIVES
AREA II (IN HEAVY LINE)

LEGEND

——— WSA - UNIT 6321 AREA I
AREA II
A-O AREAS DESCRIBED IN TEXT

TL 5 7-16-82
OCHOCO NF -
R-5 - USDA

Figure C-14 DESCHUTES CANYON - STEELHEAD FALLS (BOUNDARY ALTERNATIVES)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

BOUNDARY ALTERNATIVES

LEGEND

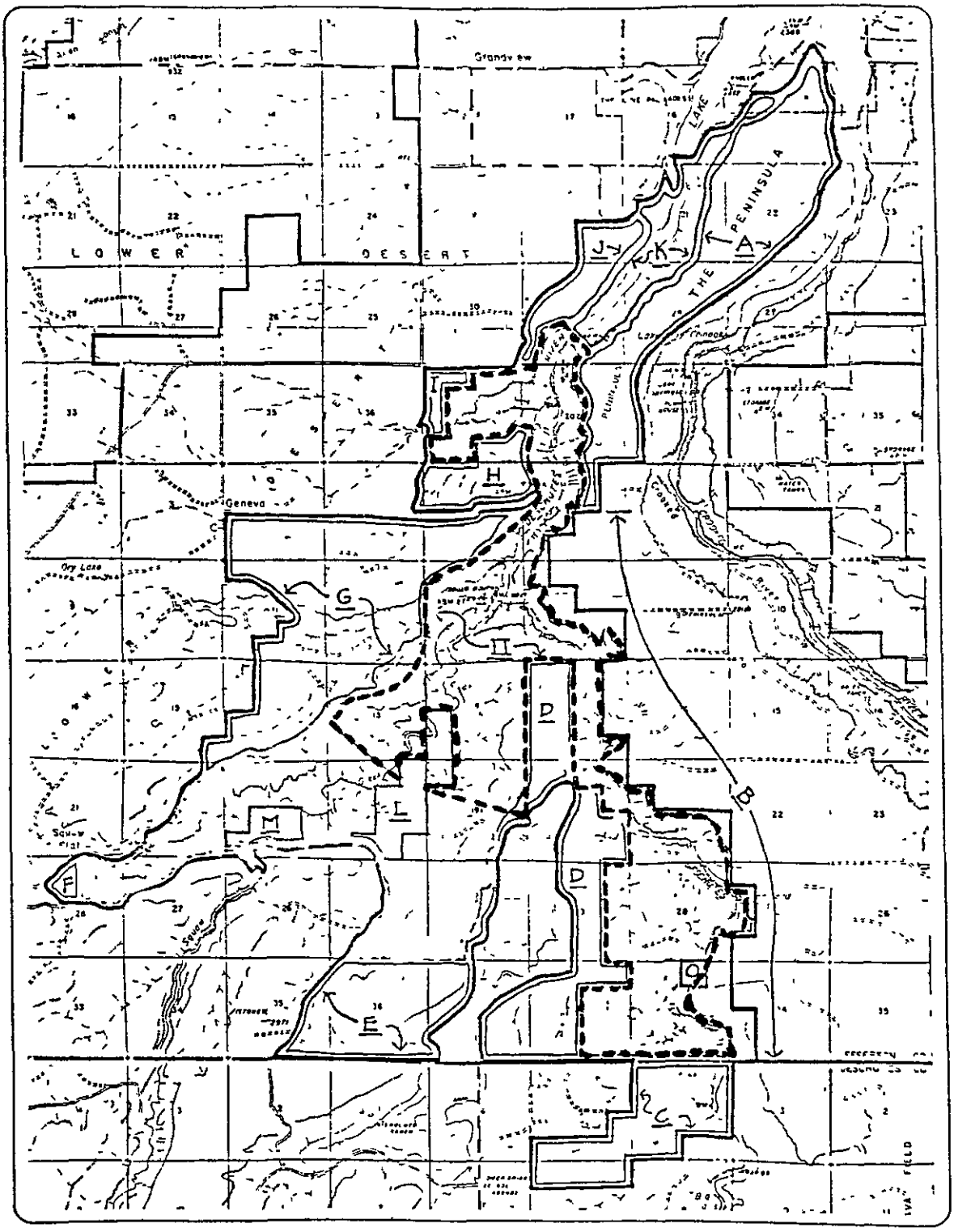
——— WSA - UNIT 6321 AREA I

- - - - - AREA II

—A-O— AREAS DESCRIBED IN TEXT

TL S 7-16-82
OCHOCO NF -
R-6 - USDA

Figure C-15 DESCHUTES CANYON - STEELHEAD FALLS (ENHANCED MODIFIED AREA)



DESCHUTES CANYON - STEELHEAD FALLS WSA - UNIT 6321

ENHANCED MODIFIED AREA
(AREA III)

LEGEND

——— WSA - UNIT 6321
- - - - - AREA III
A-O AREAS DESCRIBED IN TEXT

TLS 7-16-82
OCHOCO NF -
R-6 - USDA

Appendix D

Standards and Guidelines

APPENDIX D
FOREST AND GRASSLAND-WIDE STANDARDS AND GUIDELINES

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FEIS Appendix D

Forest-and Grassland-Wide Standards and Guidelines

Purpose

This appendix contains the Forest and Grassland standards and guidelines that are used by several of the alternatives identified in Chapter 2 of the FEIS. The standards and guidelines included in this appendix are associated with Alternatives E-Departure, A, and C-Modified. The Forest and Grassland-wide standards and guidelines are applied within all of these alternatives. The management area standards and guidelines are applied according to the amount of land allocated to each management area (See Table 2-7, Acreage in Management Areas by Alternative, in Chapter 2 of this FEIS).

The standards and guidelines in this appendix apply to the draft management areas and are identified by a 'D' in front of the management area number. For example, the draft management area known as General Forest is identified as MA-D1, draft management area number 1. Here are all of the draft management areas and their identifiers.

Management Area Name	**Identifier**
General Forest	MA-D1
Big Game Winter Range	MA-D2
Big Game Summer Range	MA-D3
Old Growth	MA-D4
Retention	MA-D5
Partial Retention - Foreground	MA-D6
Partial Retention - Middleground	MA-D7
Wilderness	MA-D7
Semiprimitive Nonmotorized	MA-D9
Semiprimitive Motorized	MA-D10
Developed Recreation	MA-D11
Research Natural Areas	MA-D12

Riparian in Acceptable Condition	MA-D13
Riparian in Excellent Condition	MA-D14

See Chapter 2 - Alternatives Including the Proposed Action, Comparison of Alternatives, for emphasis and desired future condition statements for each of the draft and final management areas.

Alternatives B-Modified and I use a different set of forest-wide and management area standards and guidelines. These are not included in this appendix since they are discussed in Chapter 4 of the Final Land and Resource Management Plan documents for the Forest and Grassland.

Between the Draft and Final EIS, some alternatives were dropped and others (three) were modified. Alternatives E-Departure, A, and C-Modified now include additional management areas; they are:

Black Canyon Wilderness	MA-F1
Bridge Creek Wilderness	MA-F2
Mill Creek Wilderness	MA-F3
North Fork Crooked River Wilderness Study Area	MA-F4
Eagle Roosting Areas	MA-F12
Bandit Springs Recreation Area	MA-F16
North Fork Crooked River Recreation Corridor	MA-F23
North Fork Crooked River Scenic Corridor	MA-F24
Facilities	MA-F28
Crooked River Recreation Area	MA-G6
Deschutes River Scenic Corridor	MA-G7

The standards and guidelines that apply to the above management areas are not included in this appendix, but can be found in Chapter 4 of the Final Land and Resource Management Plans for the Forest and Grassland. "F" refers to Forest, and "G" refers to Grassland.

Organization

Standards and guidelines state the bounds or constraints within which all practices are to be carried out. They are intended to supplement, but do not replace policy direction found in Forest Service Manuals and Handbooks, and the Regional Guide for the Pacific Northwest Region. They also must comply with applicable State and Federal laws and regulations.

Forest- and Grassland-wide, and management area standards and guidelines are grouped together by resource (or functional area), so that the user will have the total management direction available in one package, as opposed to sifting

through separate sections of the document in order to get a total understanding for a particular use. Management area standards and guidelines are more site-specific than Forest- and Grassland-wide standards and guidelines, and must be in compliance with them as well as higher order policy, regulation and law.

Some resource direction is only applicable on a Forest- and Grassland-wide basis and does not vary by management area. Hence, no management area standards and guidelines are presented for the following resources: Air Quality, Biological Diversity, Old Growth, and Social and Economic.

Air Quality

Forest-and Grassland-Wide Standards and Guidelines

Comply with regulations of the Clean Air Act, as amended, and coordinate activities with the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry.

Demonstrate reasonable progress in reducing total suspended particulate (TSP) emissions from prescribed burning. Monitor particulate emissions originating from Forest and Grassland activities.

Conduct prescribed burning in accordance with State smoke management plans.

Follow Regional standards and guidelines for smoke emissions as stated in Regional Vegetation Management Final Environmental Impact Statement.

Use the best available predictive methods and Modifiers and most cost-efficient technologies to minimize the impact of prescribed burning on designated smoke sensitive areas and Class I areas. Comply with regulations of the Oregon State Implementation Plan for Protection of Visibility in Class I Areas.

Protect the Forest air resources against pollution sources outside the Forest boundaries through application of the Prevention of Significant Deterioration (PSD) regulations contained in the Clean Air Act. Take appropriate action to contact the Oregon State Department of Environmental Quality when outside air pollution sources, in particular that originating on a regular seasonal basis from the Madras basin and Willamette Valley, exceed Forest standards.

Biological Diversity

Forest and Grassland-Wide Standards and Guidelines

Protect Research Natural Areas (RNA's) from influences which detract from their purposes. Monitor vegetation to insure that all major vegetative types and unique plant communities are preserved for future knowledge and gene pool diversity.

Manage and protect wildernesses in a manner that allows ecological processes, succession, fire, and similar influences to play a natural role, while protecting resources outside the areas from unnecessary risk of catastrophic fire.

A minimum of two percent of the Forest and Grassland, in addition to areas in wilderness and some RNA's, will be managed for old growth, representing climax or near climax forest stand conditions.

Identify and protect unique ecological situations, through the Forest and Grassland implementation and monitoring process. Examples of these include: eagle roosting, anadromous fish spawning, representative examples of old growth forest, aspen clones, river canyons, riparian areas and important connective habitat.

Disperse created openings and limit their size(s) to that described under the timber management guidelines.

Maintain soil productivity through management practices which reduce erosion, and the application of guidelines that limit use of heavy equipment and skid road densities.

Incorporate plant association information (Hall, 1973 and 1989; Hopkins, et al, 1983) and their management implications, into project design and implementation.

Protect fragile sites such as shallow soil areas (scablands) and natural meadows.

Incorporate and design habitat specific species requirements--such as those for cavity excavators--into guidelines and prescriptions for individual projects.

Monitor plant communities/associations to determine conditions and trends. Encourage recovery or prevent deterioration where activities may be leading to poor conditions, downward trends, the displacement of native plants or plant communities by undesirable weedy, annual or noxious vegetation, or where cover is unusually low for the particular plant associations (see Hall, 1973 and Hopkins et al, 1983). Manage aspen stands to produce a vigorous population, Forest-wide.

Limit the frequency of underburning of plant communities to the natural fire cycle, or less frequently, until research is completed on ecological effects of burning.

Cultural Resources

Forest-and Grassland-Wide Standards and Guidelines

Update the existing Cultural Resource Overview each decade to incorporate all known cultural resource information on each District. The Overview will provide a framework for evaluating cultural resources located through survey efforts, will assist in the development of a Forest Inventory Plan approved by the Oregon State Historic Preservation Office (SHPO), and will help to identify opportunities for site interpretation.

Conduct cultural resource surveys (inventories) in advance of all ground-disturbing actions. This will be accomplished through the implementation of the Interim Inventory Design (Dyrden 1988) or Forest Inventory Plan (when formally approved) during the earliest stages of the planning (NEPA) process for individual projects (e.g timber sales); both project and non-project areas will be surveyed. Submit project Cultural Resource Reports for SHPO review and Section 106 (National Historic Preservation Act, as amended) compliance prior to issuance of the Decision Notice and Environmental Assessment or Environmental Impact Statement.

Evaluate cultural resource properties located during inventory to determine their eligibility to the National Register of Historic Places. This will be accomplished through the Lithic Scatter Programmatic Memorandum of Agreement (PMOA), individual site and thematic Determinations of Eligibility.

Develop contexts and themes from which to evaluate all classes of sites through thematic Determinations of Eligibility. Develop management plans, Memorandums of Agreement, and PMOA's in cooperation with the State Historic Preservation Office, the Advisory Council on Historic Preservation, and other interested publics (Native Americans, local historical societies, groups and professional organizations) to facilitate cultural resource treatment and future management.

Document through the NEPA process the results of cultural resource surveys for all proposed ground-disturbing projects (Federal, Federally-funded or permitted) or projects determined to have an effect upon cultural resource sites or values.

Prepare a Determination of Effect for all projects and submit for Oregon SHPO review and consultation (i.e. No Effect, No Adverse Effect, or Adverse Effect).

Mitigate adverse effects to eligible and significant sites under consultation with the Oregon SHPO, Advisory Council on Historic Preservation, and interested publics. In ranked order of preference , the following treatment options will be considered:

Avoidance through project design modification or abandonment (No Effect).

Combination of project modification and scientific data recovery under an

approved data recovery plan (No Adverse Effect or Mitigation of Adverse Effect).

Data recovery and analysis such that cultural resource values are protected and preserved in forms useful to various scientific, government, ethnic and local groups (Mitigation of Adverse Effect).

Cultural resource sites, districts and thematic classes of such will be nominated to the National Register of Historic Places.

Schedule nominations incrementally until the Forest-wide inventory of cultural resources is completed.

Protect significant sites from degradation due to public use or natural deterioration.

Protection methods may include, but are not limited to, scientific study and collection, the use of fences or barriers, prudent use of signs, site stabilization, closure orders, site monitoring, area patrolling, and restriction of access to site locational information as provided for under the provisions of the Freedom of Information Act.

Interpret and enhance selected sites for the education and enjoyment of the general public. A priority will be given to sites within or adjacent to public use areas, and which are being degraded through natural or human impacts.

Produce scientifically accurate and culturally sensitive displays, brochures, posters, tours, lectures, etc.

Support the distribution of scientific reports, monographs, video tapes, and books for the benefit of interested members of the public.

Promote public-private partnerships which will benefit Forest visitors through enhancing and interpreting sites.

Burial Sites

Treat historic or prehistoric burial remains as follows:

Evaluate the site to determine if the skeletal material is human and to what time period or ethnic group it may be ascribed.

Contact local authorities, Native American Tribal Group(s), other ethnic groups and County Historical Societies where appropriate.

For Native American burials, reinter in-place with involvement by the appropriate representatives of a federally recognized Tribe or Native American group. Project planning for management activities in the site vicinity shall consider burial location in planning decisions and if necessary modify implementation so as to avoid direct and indirect impacts to the burial site.

Where reinterment in-place is not feasible or prudent, alternative locations for reinterment will be reviewed and selected in consultation with the appropriate Indian Tribal representatives. In situations where a direct link cannot be made

to an existing Federally recognized Tribe, this consultation shall take place with the nearest tribe or confederation.

Religious Freedom

Meet all requirements of the American Indian Religious Freedom Act (AIRFA). This law makes it the policy of the Federal government "to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise [their] traditional religions." This protection includes, but is not limited to, access to sites, use and possession of sacred objects, and the enactment of ceremonies and traditional rites. Related activities include the gathering and processing of plants for food, medicinal, or craft uses, the construction of sweat lodges, or "vision quest" structures, and the like.

AIRFA addresses the religious freedom of all Native Americans without regard for Federal tribal recognition, but does not convey exclusive use of areas or free use of Forest products In considering access to properties or sites within its boundaries, the Forest will examine other potential or existing uses and activities. Publicly owned properties, sites, objects of antiquity, etc. remain the property of the United States government. Activities which may effect such properties, sites, or objects are subject to existing laws, regulations and treaties.

Treaty Rights

Honor the rights reserved by the Confederated Tribes of Warm Springs Indians for lands ceded to the Federal Government through the Treaty of 1855.

On the ceded lands, the Tribes have the right to take fish in streams running through and bordering the Reservation and at all other usual and accustomed stations in common with the citizens of the United States.

The right of hunting, gathering roots and berries, and pasturing stock on unclaimed lands in common with citizens was also secured within the ceded lands.

Management Area Standards and Guidelines

(Forest Only)

Resource - Cultural Resources

Practice

Enhancement and Interpretation

Standard and Guideline

On-site interpretation and enhancement of cultural resources will not be done. Off-site interpretation and enhancement is permissible.

Applicable Management Area
MA-D8 Wilderness
MA-D12 Research Natural Areas
MA-D13 Riparian in Acceptable Condition

Standard and Guideline
Enhancement and interpretation of cultural resources will not be emphasized. Significant cultural resource sites and features may be enhanced and interpreted if the action does not detract from the management area objectives.

Applicable Management Area
MA-D4 Old Growth
MA-D9 Semiprimitive Nonmotorized
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Selectively enhance and interpret cultural resources, with priority on identifying sites that will complement the management emphasis of the specific areas.

Applicable Management Area
MA-D11 Developed Recreation
MA-D10 Semiprimitive Motorized

Standard and Guideline
Enhance and interpret cultural resources while meeting Forest-wide standards and guidelines.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D5 Retention Foreground
MA-D6 Partial Retention -Foreground
MA-D7 Partial Retention -Middleground

Practice
Structures

Standard and Guideline
Structures, such as old fences, that do not qualify for the National Register of Historic Places, will be removed or allowed to deteriorate naturally.

Applicable Management Area
MA-D8 Wilderness
MA-D12 Research Natural Areas

Management Area Standards and Guidelines
(Grassland Only)

Resource - Cultural Resources

Practice
Enhancement and interpretation

Standard and Guideline
Do not enhance or interpret cultural resources in this area.

Applicable Management Area
MA-D4 Old Growth
MA-D8 Wilderness
MA-D13 Riparian in Acceptable Condition

Standard and Guideline
Reserve cultural resources for the purposes of research Generally, do not enhance or interpret cultural resources.

Evaluate research proposals on a case-by-case basis.

Applicable Management Area
MA-D12 Research Natural Areas

Facilities

Forest-and Grassland-Wide Standards and Guidelines

Buildings, utility systems and related facilities should be planned, developed, maintained and operated for safe use, support of Forest and Grassland resource programs, and cost effectiveness. Historic buildings will be managed in accordance with the Programmatic Memorandum of Understanding (PMOA) for Depression-Era Administrative Buildings.

Construction of new buildings, or additions to existing buildings and utility systems, shall comply with approved site development plan.

Provide and manage administrative facilities in a manner sufficient to accomplish land and resource management and protection objectives of the Forest. Prepare administrative site development plans for all Forest administrative sites. Long-term development and maintenance costs will be a consideration in facilities planning.

Management Area Standards and Guidelines

(Forest Only)

Resource - Facilities

Practice

Construction, Reconstruction and Maintenance of Administrative Buildings and Structures

Standard and Guideline

No administrative buildings or structures allowed.

Applicable Management Area

MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline

Allow no administrative facilities within floodplains unless no feasible alternative sites exist (Executive Order 11988).

Applicable Management Area

MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

Locate and design facilities to blend into the natural terrain as much as possible; properly utilize the site; and provide for traffic control, sanitation, public safety, site protection, and use distribution. New and upgraded facilities will incorporate a barrier-free design in order to be accessible to the physically handicapped.

Applicable Management Area

MA-D11 Developed Recreation

Practice

Nonconforming Structures

Standard and Guideline

Except for facilities necessary to protect fragile resources, limit to trail shelters, sanitary and safety needs. All should be of simple design, and of native, rustic-like materials. Site Modification for facilities should be very minimal to none.

Applicable Management Area

MA-D9 Semiprimitive Nonmotorized

Management Area Standards and Guidelines
(Grassland Only)

Resource - Facilities

Practice
Construction, Reconstruction and Maintenance of Administrative Buildings and Structures

Standard and Guideline
Construct no buildings or other facilities.

Applicable Management Area
MA-D4 Old Growth
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D12 Research Natural Areas

Standard and Guideline
Develop no facilities.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Fire

Forest-and Grassland-Wide Standards and Guidelines

Fire Management

Planning
Use the National Fire Management Analysis System to determine the most cost-efficient fire protection organization. Reevaluate organization as conditions change and better information is developed. Due to the nature of intermixed land ownerships, including a number of wildland subdivisions, interagency cooperation must be considered in the planning process.

Prevention
Monitor current and recent fire reports to target specific risks. Coordinate

activities through the Central Oregon Fire Prevention Cooperative (or its equivalent).

Detection

Periodically review the mix of aerial and ground detection activities to maintain the most cost-effective combination.

Initial Attack

Apply aggressive suppression action to wildfires that threaten life, private property, public safety, improvements, or investments.

Where wildfires do not threaten to exceed acceptable sizes and intensities, apply the lowest cost suppression option.

If a wildfire escapes initial action and threatens to exceed established limits, prepare an escaped fire situation analysis. Weigh the cost of suppression against the resource potential losses. Suppression costs should be commensurate with the values threatened.

Secondary Attack Forces

Provide equipment and training for Forest Service employees outside of the fire management organization to assist in initial attack.

Fuel Treatments

Burn excess residues from management activities or natural events only after an interdisciplinary team evaluation of site needs and appropriate utilization efforts have been considered. As a guide, the Ochoco National Forest Residue Management Plan, 3/89, will be used for identifying site-specific treatment selections. All treatments will comply with Forest-wide Standards and Guidelines and Management Area Standards and Guidelines for Forest Residues, of this chapter.

A desired "protection" residues profile will be identified using an economic efficiency model, such as the Fuels Analysis Process recently developed by Region 6. This will be a guide for developing the appropriate share of cost in helping meet the overall desired residue profile(s) described in Forest-wide and management area standards and guidelines for "Forest Residues" (this Section)

Prescribed Fire

All planned prescribed fires will have prescriptions approved by the appropriate line officer.

Unplanned ignitions may be used as prescribed fires if: 1) a prescribed fire plan has been prepared and approved, 2) the fire is burning within prescription, and 3) there are enough personnel and equipment available to provide the staffing necessary to carry out the existing prescribed fire plan.

Conduct prescribed burns within existing Federal and State regulations affecting

the timing, duration, and dispersal of emissions. Coordination with adjacent local smoke management groups and local agency offices will be required.

Construct water diversions on firelines in hilly or steep terrain to drain water into areas with sufficient vegetation or other protection to avoid erosion.

Provide for a protective strip of undisturbed surface between the prescribed burn area and perennial water courses, considering local topographic, vegetation, and soil characteristics.

Avoid intense prescribed fires on soils that are highly erodible and/or are subject to the development of hydrophobic (nonwettable) conditions.

Fuelbreaks

Use existing transportation and topographic features as much as possible for planned fuel breaks

Use fuelbreaks only where risk analysis indicates this to be the most economically viable alternative treatment, and where doing so meets the objectives of management area prescriptions, listed in Section 2, this chapter.

Piling and Burning

Locate piles outside of the normal high water flow area of natural and man-made drainages or water courses.

Burn slash piles located within mapped floodplains within one year after piling.

Remove slash created within the normal highwater zone of a stream, unless needed for soil protection purposes.

Slash will not be piles on scablands unless there is no other feasible location, i.e. under circumstances dictated by topography or at a skyline landing (See Soils Standards and Guidelines).

Chipping, Burning, Lopping and Scattering

Dispose of material so it will not reach stream courses.

Disperse material over a wide area when practical.

Management Area Standards and Guidelines

(Forest Only)

Resource - Fire

Practice

Fire Suppression (P04)

Standard and Guideline

Confine and contain will be the principle suppression strategies on most natural ignition (lightning) fires. The control strategy will be invoked when lightning fires threaten to escape the Wilderness Areas or pose unacceptable risks to life or wilderness values. Utilize the "light hand on the land" techniques.

Suppression activities should minimize disturbances of the land surface.

Use of chainsaws, helicopters, air tankers, or pumps must be approved by the Forest Supervisor. Allow no heli-spot construction for initial attack.

Crawler tractors will not be used without prior approval from the Regional Forester.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Fire encroaching on research natural areas should be contained or controlled as quickly as possible. Confine and contain will be the principle suppression strategies on most natural ignition (lightning) fires.

Ground disturbing activity to suppress fires will be avoided if possible, and only water will be used as fire retardant.

Applicable Management Area

MA-D12 Research Natural Areas

Standard and Guideline

Wildfires within or threatening designated old growth areas will be suppressed with emphasis on the tactical strategy of "contain." The objective is to minimize the acreage affected by wildfire. Minimize damage from suppression activities

Applicable Management Area

MA-D4 Old Growth

Standard and Guideline

The confine, contain and control strategies may be considered as per preattack block economic efficiency analysis. However,confine and contain will receive emphasis. Emphasize minimum physical disturbance by suppression activities.

Applicable Management Area

MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized

Standard and Guideline

Suppression activities in these prescriptions should emphasize minimum physical disturbance. Confine, contain or control strategies are to be considered and utilized as directed in preattack block economic efficiency analysis.

Applicable Management Area

MA-D6 Partial Retention -Foreground

Standard and Guideline

Strategy is to control all wildfires. Suppression should emphasize minimum physical disturbance.

Applicable Management Area

MA-D11 Developed Recreation

Standard and Guideline

Suppression activities should be very limited within the riparian zone. The objective is to minimize soil and vegetation disturbance. Confine and contain are the principle strategies.

Applicable Management Area

MA-D13 Riparian in AcceptableCondition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

All three suppression strategies (confine, contain, or control) will be utilized in accordance with the economic efficiency analysis for each Preattack Block.

Applicable Management Area

MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D7 Partial Retention -Middleground

Standard and Guideline

Maximum acceptable individual wildfire size by Fire Intensity Level, and total area by decade can be found in Fire Management Direction Table, in Appendix A3, Forest Plan, for all management areas.

Practice

Treatment of Activity Fuels (P11)

Standard and Guideline

Fuel treatment (particularly mechanical treatments) should be very limited within riparian areas. In particular, activities which would reduce the shading potential or woody debris sources of the site should be avoided. Greater levels of wildfire risk are acceptable in these areas.

Nonmechanical treatments will receive preference. When mechanical treatments are necessary they shall be carefully managed to meet the objectives of the management area.

Applicable Management Area

MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

Projects will meet retention visual objectives and emphasis will be on nonmechanical treatments.

Applicable Management Area

MA-D5 Retention
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline

Use nonmechanical treatments where possible. Manage to meet visual quality objective of partial retention.

Applicable Management Area

MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D10 Semiprimitive Motorized

Standard and Guideline

Fuels usable by recreationists should be stacked or piled in convenient locations. Unusable fuels should be piled and burned.

Applicable Management Area

MA-D11 Developed Recreation

Standard and Guideline

Meet Forest-wide Standards and Guidelines.

Applicable Management Area

MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Practice
Treatment of Natural Fuels (P12)

Standard and Guideline
With the consent of PNW Station Director, manage prescribed fire in natural fuels to perpetuate conditions that the RNA represents, but with prudent measures to avoid catastrophic fire within, and outside the RNA.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Naturally caused ignitions may be allowed to burn if they meet conditions in an approved prescribed burn plan, if the funds are available, and the necessary staffing is available.

Planned ignitions may be utilized within wilderness areas if that is the best way of returning fire to its natural role, and thus reducing the fuels profile to one more natural and lessening the risk of damaging the wilderness resource. Planned ignitions within the Wilderness are also permitted if there is no other practical and economic way to lessen the likelihood of the escape of damaging wildfire from the Wilderness.

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Ponderosa pine old growth may treated with prescribed fire approximately every 25 years to control the encroachment of other tree species. Downed logs will be protected to the degree possible.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Fuel treatment (particularly mechanical treatments) should be very limited within riparian areas In particular, activities which would reduce the shading potential or woody debris sources of the site should be avoided. Greater levels of wildfire risk are acceptable in these areas.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

Maintain a vegetative type similar to natural conditions as identified through fire history and to meet specific visual resource management objectives on each corridor plan. Planned ignition prescribed burns will be scheduled as follows:

	Years
Ponderosa pine	20-25
Non-commercial	20-25
Grassland	20-25
Mixed Conifer	50-60
Tree shrub	Spot burning

Applicable Management Area

MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Standard and Guideline

Maintain a vegetation type similar to natural conditions as identified in the desired residue photos. Planned ignition prescribed burns should be scheduled as follows:

	Years
Ponderosa pine	20-25
Non-commercial	20-25
Grassland	20-25
Mixed Conifer	50-60
Tree shrub	Spot burning

Applicable Management Area

MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized

Standard and Guideline

Natural fuels on managed stands may be treated by prescribed fire where stand age is 25 years or more when necessary to maintain desired protection residue profile if this activity is consistent with other management objectives. Special emphasis is placed on consideration of cover objectives.

Applicable Management Area

MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Standard and Guideline

Natural fuels on managed stands may be treated by prescribed fire where stand age is 25 years or more, when necessary to maintain desired protection residue

profile if this activity is consistent with other management objectives.

Applicable Management Area
MA-D1 General Forest

Practice
Fuel Break Construction and Maintenance (P13,14)

Standard and Guideline
Limited shaded fuelbreak segments may be constructed along boundaries to take advantage of logical natural terrain features aiding in the prevention of fire spread across management area boundaries. The majority of such fuel break systems will be outside of the area.

Applicable Management Area
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D12 Research Natural Areas

Standard and Guideline
Construct and maintain no fuelbreaks.

Applicable Management Area
MA-D4 Old Growth
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Use fuel breaks only where they do not conflict with management area emphasis. Also, see Forest-wide Standards & Guidelines.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention -Foreground
MA-D7 Partial Retention -Middleground
MA-D11 Developed Recreation

Management Area Standards and Guidelines

(Grassland Only)

Resource - Fire

Practice
Suppression

Minimize acreage affected by wildfire. Suppress fires using the tactical strategy of control. Minimize damage from suppression activities.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Permit no suppression of natural fires on the Island RNA. Suppress natural fires on Haystack Butte if facilities or resources outside the RNA are threatened.

Use only water as a retardant.

Applicable Management Area
MA-D12 Research Natural Areas

Practice
Prevention

Standard and Guideline
Encourage State to post appropriate fire prevention. Inform visitors about fire prevention needs and regulations.

Applicable Management Area
MA-D11 Developed Recreation

Practice
Prescribed Fire

Standard and Guideline
Normally, utilize manual and mechanical methods of fire hazard reduction. Prescribed fire may be used under limited circumstances.

Applicable Management Area
MA-D11 Developed Recreation

Standard and Guideline
Allow the use of managed or naturally occurring fire as needed to perpetuate the plant community the RNA is meant to represent.

Where prescribed fire is used to perpetuate a plant community, it should mimic a natural fire, but be managed prudently to avoid catastrophe.

Allow fuels to accumulate at natural rates unless they threaten the objectives of the RNA.

Applicable Management Area
MA-D12 Research Natural Areas

Practice
Treatment of Natural Fuels

Standard and Guideline
Emphasize protecting cover needs.

Applicable Management Area
MA-D2 Big Game Winter Range

Forage and Livestock Use

Forest-and Grassland-Wide Standards and Guidelines

Forage Utilization

Utilization tables have been developed for "Primary Range" (Except Riparian) and "Riparian" (see Tables D-1 and D-2). In addition, special seasonal restrictions have been directed for individual management areas (i.e for fall green-up). See Management Area Standards and Guidelines, Forage for detailed information.

Administration and Grazing Systems

Identify allotments with riparian areas in less than satisfactory condition

Range allotment management plans will include a strategy for managing riparian areas to meet the emphasis and desired future condition stated in management area prescriptions (See MA-D14, Chapter 2, Alternatives Including the Proposed Alternative) The process recommended in *Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington,*

TABLE D-1
RIPARIAN FORAGE UTILIZATION

Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) By Existing Range Condition			
	Grassland Communities 2/		Shrubland Communities 3/	
Range Resource Management Level	Sat *	Unsat *	Sat.	Unsat
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range	40	0-30	30	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plan vigor include fencing and water development	45	0-35	40	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems	50	0-40	50	0-35

1/ This will be incorporated in annual operating plans and Allotment Management Plans Allotment Management Plans may include utilization standards which are either higher or lower than associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources. Includes cumulative annual use by big game livestock.

2/ Utilization based on percent of total annual forage production removed by weight

3/ Utilization based on percent of the current years growth removed Example measure length of current years growth of browsed and unbrowsed leaders and determine incidence of use Calculate percent of current years growth removed

* For satisfactory and unsatisfactory condition see Glossary in FEIS

TABLE D-2
PRIMARY RANGE (Except Riparian)

Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) 2/					
	Forested Communities		Grassland Communities		Shrubland Communities	
Range Resource Mgmt Level	Sat.	Unsat.	Sat.	Unsat.	Sat.	Unsat.
B - Livestock use managed within *current grazing capacity by riding*, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40	0-30	50	0-30	40	0-25
C - Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water developments.	45	0-35	55	0-35	45	0-30
D - Livestock managed to optimize forage production and utilization. *Cost-effective culture practices* improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems	50	0-40	55	0-40	50	0-35

1/ Incorporate into annual operating plans and allotment management plans Allotment management plans may include utilization standards that are either higher or lower when associated with intensive grazing systems and specific management objectives that meet other resource objectives

2/ Utilization based on percent by weight of total annual forage production removed for grass, grasslike, and forbs, and percent of current years growth removed for shrubs See example in riparian table for shrubs

* For satisfactory and unsatisfactory condition see Glossary in FEIS

1979, was used in establishing these conditions, and management objectives in grazing allotment plans should follow these. When the current riparian condition is less than that described, allotment objectives will include a schedule for improvement. Measurable objectives will be set for key parameters, such as stream surface shaded, streambank stability, and shrub cover. Allotment plans will address the monitoring needed to determine if the desired rate of improvement is occurring, and those plans currently not consistent with this direction will be developed or revised on a priority basis under a schedule established by the Forest Supervisor.

Develop, revise, and maintain allotment management plans to incorporate other Forest Plan direction.

Administer lands available and suitable for domestic livestock grazing according to the Forest Service grazing permit system.

Utilize intensive grazing management systems where feasible.

Coordinate transitory range management with timber management.

Encourage demonstration projects when they are compatible with other standards and guidelines.

Grazing on scablands will occur through planned use of other plant communities within an allotment. As a result, scablands will contribute some forage, however, they will not be considered or mapped as primary range in an allotment. The installation of structural improvements, or various types of livestock management will not be used to specifically concentrate livestock use on scablands.

Wild Horse Management

The Big Summit Ranger District Wild Horse territory will be managed for a base herd of 60 head of horses, as is outlined in the Wild Horse Management Plan, on file in the Ochoco National Forest Administrative Record, and Appendix I of the Forest Plan.

Management Area Standards and Guidelines

(Forest Only)

Resource - Forage

Practice
Forage Utilization

Standard and Guideline
No livestock grazing allowed.

Applicable Management Area
MA-D11 Developed Recreation
MA-D12 Research Natural Areas

Standard and Guideline
Follow Riparian Forage Utilization Table, Table D-1.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Follow Primary Range Utilization Table, Table D-2.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range
MA-D4 Old
MA-D5 Retention
MA-D6 Partial Retention Foreground
MA-D7 Partial Retention - Middleground
MA-D8 Wilderness
MA-D9 SemiprimiNonmotorized
MA-D10 Semiprimitive Motorized

Standard and Guideline
Reserve fall green up of grasses for big game use Grant no seasonal extensions for livestock

Applicable Management Area
MA-D2 Big Game Winter Range

Practice
Nonstructural Improvements

Standard and Guideline
None Programmed

Applicable Management Area
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention -Foreground
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D12 Research Natural Areas

Standard and Guideline
Allow nonstructural improvements such as seeding and burning unless they conflict with the management emphasis for the area.

Applicable Management Area
MA-D1 General Forest

MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D7 Partial Retention - Middleground

Practice
Structural Improvements

Standard and Guideline
Allow construction and maintenance of structures to exclude livestock from the area only, except in connection with approved research projects.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Encourage developments to disperse livestock away from riparian areas.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

Maintain existing developments. New developments can be constructed only to protect the wilderness resource or to alleviate problems or conflicts, and only with the approval of the Regional Forester. Use of power equipment for maintaining range improvements will be for exceptional needs only, and approved on a case by case basis by the Regional Forester. Use native or natural appearing materials and design improvements to blend into the surrounding landscape.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Allow new developments unless they conflict with the management emphasis for the specific management areas.

Applicable Management Area

MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation

Practice

Use of Motorized Equipment for Improvements and Maintenance

Standard and Guideline

Require permittees to maintain improvements with nonmotorized equipment except where requests to use motorized equipment have been approved by the Forest Supervisor on a case by case basis.

Applicable Management Area

MA-D8 Wilderness

Management Area Standards and Guidelines

(Grassland Only)

Resource - Forage

Practice
Utilization

Standard and Guideline
Continue to keep campground closed to livestock grazing.

Applicable Management Area
MA-D11 Developed Recreation

Standard and Guideline
Permit no grazing of domestic livestock within the RNA unless needed to maintain a specific vegetative type.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Give top priority to providing high quality forage by fall green-up for deer. Control spring sheep grazing to prevent reduction in forage species important to wintering deer.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Follow Table D-1, Riparian Forage Utilization Table.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Nonstructural Improvements

Standard and Guideline
None Programmed.

Applicable Management Area
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D11 Developed Recreation

Standard and Guideline
Allow mechanical and nonmechanical treatments that are compatible with the primary objectives of the management area.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D7 Partial Retention - Middleground

Practice
Structural Improvement

Standard and Guideline
Construct and maintain fences needed to exclude livestock.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Maintain existing improvements where they are not in conflict with the primary objectives of the management area.

Construct additional improvements where they will aid in improved livestock management.

Guidelines for constructing or reconstructing fences:

(1) Top wire: Not more than 40 inches above the ground.

Bottom wire: Smooth wire at least 16 inches above the ground.

(2) Use white-topped fence posts.

(3) Tie white flagging to top wire to increase visibility.

(4) Install no stays between posts.

After the livestock are off the Grassland in the fall, leave gates open to facilitate antelope passage (except where needed for road management objectives).

Applicable Management Area
MA-D2 Big Game Winter Range (Antelope)

Standard and Guideline
Encourage developments to disperse livestock away from riparian areas.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Maintain existing improvements. Permit new improvements only when they are compatible with the primary objectives of the management area.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Maintain existing developments where they are not in conflict with the primary objectives of the management area.

Construct additional developments as needed to aid in livestock distribution and facilitate using domestic livestock as a management tool to improve the palatability and availability of winter deer forage.

Applicable Management Area
MA-D2 Big Game Winter Range (Metolius Deer Winter Range)

Forest and Grassland Health

Forest and Grassland-Wide Standards and Guidelines

Use Integrated Pest Management (IPM) strategies to manage pests within the constraints of laws and regulations, and meet Forest management objectives. IPM strategies include manual, mechanical, cultural, biological, chemical, prescribed fire, and regulatory means. Select strategy through the environmental analysis process, and in compliance with the Regional Vegetation Management, Environmental Impact Statement, 1988.

Coordinate strategies with the Agricultural Pest Health Inspection Service (APHIS).

Pesticide application, if used, will conform with EPA regulations, label restrictions, and the Regional EIS on pesticide or herbicide applications.

Use the Integrated Pest Management strategies on forested types as shown in Table D-3. Exceptions for individual management areas are listed in management area standards and guidelines, Forest Health (Table D-4).

Noxious Weeds

Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity.

Management Area Standards and Guidelines

(Forest Only)

Maintenance of a healthy forest resource is important as it relates to the ability of the forest stands to meet the objectives of each management area. The major factor in the overall health of the forest is the vigor of the trees and other forest vegetation. If the majority of the trees in a given area have reached or exceeded their pathological age, or have densities that result in stagnated stands, then trees become vulnerable to attack by insects and disease.

The Ochoco National Forest will use a combination of silvicultural practices and the concept of Integrated Pest Management to manage the health of the Forest resource. Integrated Pest Management (IPM), is a process that incorporates all factors and strategies for evaluating and treating pest and host conditions to manage pest populations.

Stands of trees on the Ochoco Forest will be managed according to the objectives of each management area. The health of the Forest resource will be managed to meet the objectives, within the management constraints, for each management area. Some management areas will be more restrictive in treatment options, and may also accept more risk to the forest from pest damage.

Table D-4 will be used to guide forest health management practices for each management area. The table provides guidance for the identified major insects and diseases affecting the Ochoco National Forest.

TABLE D-3
FOREST PEST MANAGEMENT STRATEGIES

Host Type	Pest	Conditions Favoring Damage	Management Strategies
Ponderosa Pine	Mountain Pine Beetle	Overstocked Stands	Control stocking levels by thinning, cleaning, or prescribed burning Keep stands in vigorous condition, i e growth at least one inch per decade
	Western Pine Beetle	Overmature, low vigor trees	Employ rotations of 150 years or less when possible Where large, old trees are desired in the stand (1) Salvage infested trees as rapidly as possible, (2) remove high risk trees that exhibit declining crown vigor preferentially during normal entries, and (3) decrease intertree competition by thinning, cleaning, or under burning
	Western Dwarf Mistletoe	Multistoried host stands with already-infected overstories	Eliminate inoculum by regeneration harvest of infected stands If a seed tree system is employed, remove infected seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries
Lodgepole Pine	Mountain Pine Beetle	Stands of low vigor trees due to overstocking and old age	Keep lodgepole pine stands vigorous Control stocking by thinning, cleaning, or prescribed fire to insure that crop trees are free to grow Use rotations of 80 years or less
	Lodgepole Dwarf Misletoe	Multistoried host stands with already infected overstories	Eliminate inoculum by regeneration harvest of infected stands If a seed tree system is employed, remove seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries
Mixed Conifer*	Defoliating Insects (western spruce budworm and Douglas-fir tussock moth	Stands with major true fir/ Douglas-fir components, multistoried stands	Long-term strategy--develop stands composed of larch and pines Short-term strategy--treat infested fir stands with biological or chemical insecticides

Host Type	Pest	Conditions Favoring Damage	Management Strategies
	Root Diseases** (Laminated root rot, Armillaria root disease, and annosus root disease)	Stands with major true fir/ Douglas-fir components where inoculum is present	Remove all sosts in root disease centers and 50 foot buffers. Regenerate these areas with tolerant or resistant tree species For laminated root rot and Armillaria root disease, discriminate against white and Douglas-fir, favor pines and larch For annosus root disease, discriminate against white fir, favor any other species In areas where white fir management is desired, consider stump treatment with borax within 48 hours of cutting to prevent annosus infection
	Douglas-fir Dwarf Mistletoe	Multistoried host stands with alreasy infected overstories	Alternative I--eliminate inoculum by regeneration harvest If a seed tree system is employed and Douglas-fir regeneration is desired, remove infected seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries Alternative II--favor non-hosts (any species but Douglas-fir).
	Larch Dwarf Mistletoe	Multistoried host stands with alreasy infected overstories	Alternative I--eliminate inoculum by regeneration harvest. If a seed tree system is employed and western larch regeneration is to be managed, remove infected larch seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries Alternative II--favor non-hosts (any species but western larch and lodgepole pine)
	White Fir Stem Decays (mainly Indian paint fungus)	Stands that contain a major component of white fir and have a history of tree suppression and wounding	Do not manage high risk understories Eliminate and start over Where whit fir management is desired, keep rotations under 120 years and promote tree vigor throughout the life of the stand Avoid wounding of white fir crop trees

*Mixed conifer stands on the Ochoco National Forest are composed of white fir, Douglas-fir, western larch, lodgepole pine, and ponderosa pine with Engelmann spruce at high elevations Firs tend to dominate

**Fir engraver beetles and Douglas-fir beetles are common associates of root diseases Management of the diseases will usually also minimize beetle damage

TABLE D-4
FOREST HEALTH STANDARDS AND GUIDELINES AND ALLOWABLE TREATMENT OPTIONS FOR MAJOR PEST GROUPS BY MANAGEMENT AREA

		Treatment Options 1/				
		Pine		Mixed Conifer		
Management Area	Standards & Guidelines	BB 2/	DM 3/	DEF 4/	RR 5/	DM
D8 Wilderness	Insect and disease outbreaks will not be controlled unless treatement is necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the wilderness resource due to exotic pests FSM 2324 12 (1) Management of insects and diseases in wilderness will follow direction in FSM 2324 1	NT	NT	NT	NT	NT
D12 Research Natural Areas	Take no action to control insects or diseases, unless an outbreak will drastically alter the natural processes within the RNA Treatment to control insects and diseases within a research natural area must support and promote the basic objectives and purposes of establishing the area FSM 4063 3(8)	NT	NT	NT	NT	NT
D4 Old Growth	Generally, insects and diseases will not be controlled or suppressed Exceptions, may occur when treatment is necessary to prevent unacceptable damage to resources on adjacent lands or to the old growth resource Acceptable treatments are prescribed burning and use of synthestic or biological chemicals, based on site specific environmental analysis	PF	NT	S	NT	NT
D5, D6, D7 Visuals	All treatment strategies may be utilized to manage insects and diseases, to meet the management area objectives Emphasize strategies that improve aesthetics and safety Treatment of bark beetles and root diseases are emphasized	ALL H	ALL	ALL	ALL H	ALL
D9, D10 Roadless	Prescribed fire may be used to help reduce conditions favorable for bark beetle and dwarf mistletoe in ponderosa pine and root diseases in mixed conifer types Control of defoliators may also be done by spraying following an environmental analysis Use of salvage harvest is limited to catastrophic events	PF	PF	S	PF	NT
D11 Developed Recreation Sites	Utilize all methods to prevent or suppress insect and disease outbreaks Emphasize detection and treatment of bark beetle and root disease occurrences, as these relate to providing a safe environment Control of defoliators in the mixed conifer type is also emphasized to meet visual objectives	ALL H	ALL	ALL H	ALL H	ALL

Management Area	Standards & Guidelines	BB 2/	DM 3/	DEF 4/	RR 5/	DM
D13, D14 Riparian Areas	Utilize all methods, except chemical spraying, to prevent or suppress insect and disease outbreaks. Pest management activities must consider the effects on the stands ability to provide shade, bank stability, and large woody material to the stream Minimize use of mechanized equipment (tractors, backhoes, etc)	ALL L	ALL L	ALL	ALL	ALL L
D2, D3 Big Game Emphasis Areas	Take aggressive action to suppress insect or disease caused mortality, where action could prevent loss of winter thermal cover and is cost effective Design harvest and thinning schedule so that no more than 50% of stands would be in moderate to high susceptibility to bark beetle attack	ALL H	ALL L	ALL	ALL	ALL L
D22 General Forest	Utilize an integrated pest management approach to managing insect and disease conditions Aggressive monitoring and detection of pest conditions and populations will be done so corrective treatments can be prescribed early Emphasis will be on the prevention of stand and fuels conditions that will provide favorable habitat for pests to increase above endemic levels Sanitation and salvage harvest treatments will be used where they are appropriate and meet the objectives of the management area	ALL H	ALL H	ALL H	ALL H	ALL H

1/ Treatment Options
NT - No Treatment
PF - Prescribed Fire
S - Spraying
SC - Stocking Control
All- All Methods Used

Emphasis
H - High
L - Low

2/ BB - Bark Beetles

3/ DM - Dwarf Mistletoe

4/ DEF - Defoliators

5/ RR - Root Rots

Management Area Standards and Guidelines
(Grassland Only)

Resource - Grassland Health

Practice
Insects and Disease

Standard and Guideline
Take no action to control insects, disease or noxious weeds unless the outbreak drastically alters the natural ecological processes within the RNA.

Applicable Management Area
MA-D12 Research Natural Areas

Forest Residues

Forest-Wide Standards and Guidelines

Residue Management

Retain the kind and amount of residues needed on-site for the benefit of multiple resources (soil, water, wildlife).

If residues need to be removed, encourage the use of these residues for a mix of appropriate products.

Provide for individual firewood gathering and other family oriented endeavors centered around residue use.

Table D-5 shows Forest-wide averages and ranges of acceptable residue combinations identified from the Photo Series for Natural Forest Residues in Common Vegetation Types of the Pacific Northwest They provide target levels for average loadings in the stand size classes represented by the photos. These are arranged by stand types found on the Forest and provide general guidance on acceptable residue loads on both natural and managed stand conditions. The photo series can be consulted for specific break down into smaller size class combinations that are considered acceptable.

A series of desired residue profiles have been developed to meet the management emphasis for each of the 8 draft management areas on the Forest. See Management Area Standards and Guidelines, Forest Residues, and Table D-6.

Management Area Standards and Guidelines

(Forest Only)

Resource - Forest Residues

Practice

Residue Management

Standard and Guideline

Manage residues through the natural processes of accumulation and decomposition (including natural fire). In the event of activity fuel generation, residues shall be treated to a level consistent with the immediate surroundings in the wilderness and which will protect wilderness values.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Manage residues through the natural processes of accumulation and decomposition (including natural fire regimes). In the event of activity fuel generation, such residues shall be treated to a level consistent with the immediate surroundings. Vegetation and residue mosaic management guidelines may be developed for each area in the future. At that time a mix of desired residue profiles may be identified.

Applicable Management Area

MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D12 Research Natural Areas*

* Only with approval of PNW Station Director

Standard and Guideline

Manage residues to allow natural accumulations of dead and down woody debris Reduce fuel load only if created or natural fuels accumulate to a level likely to result in a catastrophic fire. Fuel reductions should leave adequate downed material to meet the criteria for old growth. Desired residue profiles for this prescription area are approximated by the residue photos in Table D-6 (except for Grassland Old Growth)

Applicable Management Area

MA-D4 Old Growth

TABLE D-5
TONS PER ACRE LOADINGS

	FUEL DIAMETER SIZE CLASSES (INCHES)		
Stand Type	Less Than or Equal To 3	Greater Than 3	Total
MIXED CONIFER Average Range	 4 82 3 30 - 5 80	 9 18 2 00 - 15 50	 14 0 6 8 - 20 9
LODGEPOLE Average Range	 4 75 2 20 - 9 00	 1 25 0 80 - 2 10	 6 0 3 0 - 11 1
PONDEROSA PINE & ASSOC Average Range	 3 28 0 40 - 5 80	 8 52 1 00 - 27 60	 11,8 1 4 -31 8
PONDEROSA Average Range	 2 38 0 70 - 4 50	 9 11 0 10 - 44 0	 11 5 0 8 - 48 5

TABLE D-6
DESIRED RESIDUES PROFILE

The desired residue profile references shown below are extracted from "Photo Series for Quantifying Forest Residues," a cooperative publication by the Pacific Northwest Forest and Range Experiment Station, U S Department of Agriculture, Forest Service, Portland, Oregon, (1976-1980) PNW 52, PNW 95, and PNW 105 This information may be technically confusing to some readers, but it is needed to provide specific direction in lieu of dulicating the photo series document

	STAND TYPE					
FUEL TYPE	PP	LP	MC	TS	GL	Management Area(s)
NATURAL (PNW 105)	7-PP-3 2-PP-4 8-PP-4 3-PP-3		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3 3-MC-3	1-JU-2		MA-F6
	3-LP-3 1/ 8-PP-4 2/					MA-F15
	1-PP-3 7-PP-3 1-PP-4 8-PP-4		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3	1-JU-2	1-JU-1	MA-F7 MA-F25 MA-F26 MA-F27
	1-PP-3		1-MC-3	1-JU-2	1-JU-1	MA-F13 MA-F14 MA-F28
	7-PP-3 2-PP-4 8-PP-4 3-PP-3		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3 3-MC-3		1-JU-2 2-JU-2	MA-F9 MA-F18 MA-F20 MA-F21

FUEL TYPE	PP	LP	MC	TS	GL	Management Area(s)
	7-PP-3	3-LP-3	3-PP&ASSOC-3			MA-F12 MA-F22
THINNING 3/						MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
THINNING (PNW 52 & 95)	1-PP-1TH 1-MC-3-PC 1-PP-1-TH		1-PP-1-TH			MA-F9 MA-F18 MA-F20 MA-F21 MA-F12 MA-F22
PARTIAL CUT (PNW 52)	1-PP-4-PC		1-MC-4-PC			MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
	2-PP-4-PC 3-PP-4-PC 4/		2-PP&ASSOC-4-PC			MA-F9 MA-F18 MA-F20 MA-F21
PARTIAL CUT (PNW 52 & 105)	3-PP&ASSOC-3 2-PP-4-PC	2-LP-3-PC	2-MC-3 (FOR LT 3") 5/ 1-MC-4 (FOR GT 3")			MA-F12 MA-F22
CLEARCUT (PNW 52 & 95)	2-LP-3-PC		1-MC-4-PC			MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
CLEARCUT (PNW 52)	2-PP&ASSOC-4-PC		2-PP&ASSOC-4-PC			MA-F9 MA-F18 MA-F20 MA-F21
	2-PP&ASSOC-4-PC	1-LP-3-CC 2-LP-3-PC	2-PP&ASSOC-4-PC			MA-12 MA-F22

1/ 3-LP-3 For discouraging livestock use
2/ 8-PP-4 For more open conditions
3/ All thinning photos contain too much slash
4/ Jackpot burn recommended if area is greater than 40 acres
5/ The fuel bed depth in this photo is too high Lopping is needed to bring high particle intercept to less than 18"

These are found in "Photo Series for Quantifying Forest Residues," a cooperative publication by the Pacific Northwest Forest and Range Experiment Station, U S Department of Agriculture, Forest Service, Portland, Oregon (1976-1980) PNW 52, PNW 95, and PNW 105

Standard and Guideline
Manage residues to allow natural accumulations of dead and down woody debris A natural appearance consistent with riparian stand types is the goal of activity fuel treatments and vegetation management. Desired residue profile for this management are are approximated by the residue photos in Table D-6.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Allow natural accumulations of dead and down woody debris. Desired residue profiles for this management area are approximated by the residue photos in Table D-6.

Applicable Management Area
MA-D5 Retention

Standard and Guideline
Manage residues to allow light natural accumulations of dead and down woody debris. A natural appearance consistent with stand types is the goal of activity fuel treatments and vegetation management. Desired residue profiles for this prescription area are approximated by the residue photos in Table D-6.

Applicable Management Area
MA-D6 Partial Retention - Foreground
MA-D11 Developed Recreation

Standard and Guideline
Manage residues to maintain site productivity, protect wildlife habitat, and reduce the loss of thermal cover to wildfire. Desired residue profiles for this management area are approximated by the residue photos in Table D-6.

Applicable Management Area
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Standard and Guideline
Manage residues to maintain site productivity, reduce the chance of wildfire damage to timber, enhance forage productivity and access, and provide for wildlife habitat needs. Desired residue profiles for this management area are approximated by the residue photos in Table D-6.

Applicable Management Area
MA-D1 General Forest
MA-D7 Partial Retention - Middleground

Fuelwood

Forest-and Grassland-Wide Standards and Guidelines

General

The fuelwood program should be considered as a means to meet resource objectives in appropriate areas, such as low productivity lodgepole pine stands and bug-killed material in mixed conifer understory.

Fuelwood availability, as well as public demand, will be considered during preparation, administration, and post sale activities associated with timber sales.

Permit removal of only standing dead or down lodgepole pine and juniper for firewood unless otherwise specified.

Sign wildlife trees, which are not to be cut, that are near roadsides or otherwise accessible to firewood cutters.

Commercial Fuelwood

Make commercial fuelwood sales available in areas less accessible to the general public, areas where National Forest funds are expended to make wood available, and areas where control is needed to meet environmental concerns. Examples are:

Contract areas with concentrations of slash where heavy equipment may be required for removal (timber sales, backlog slash, thinning areas).

More remote areas where hauling costs make large loads more economical to haul than small loads.

Areas where timing or environmental constraints require special control.

Beetle or insect infested low value green trees.

Personal Use

The following areas will be used for gathering personal firewood:

Areas with easy access (landings, extensive areas of dead trees, slash piles, forest fires, etc.).

Areas designated and reserved for fuelwood gathering.

Management Area Standards and Guidelines

(Forest Only)

Resource - Fuelwood

Practice
Commercial and Personal Gathering

Standard and Guideline
Commercial and personal use prohibited.

Applicable Management Area
MA-D4 Old Growth
MA-D12 Research Natural Areas

Standard and Guideline
Commercial use prohibited, personal use of down material for on-site use only.

Applicable Management Area
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
All firewood gathering prohibited from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Firewood gathering subject to permit regulations only.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Management Area Standards and Guidelines

(Grassland Only)

Resource - Fuelwood

Practice

Commercial and Personal Gathering

Standard and Guideline

Allow no fuelwood gathering.

Applicable Management Area

MA-D4 Old Growth
MA-D11 Developed Recreation (Cove Palisades State Park)
MA-D12 Research Natural Areas

Standard and Guideline

Allow fuelwood gathering for on site use only.

Applicable Management Area

MA-D5 Retention
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D11 Developed Recreation

Standard and Guideline

Fuelwood cutting areas will only be provided where they will be a tool to provide a proper cover forage ratio for optimum deer winter range.

Do not allow fuelwood cutting when deer are concentrated on the winter range.

Applicable Management Area

MA-D2 Big Game Winter Range (Metolius Deer Winter Range)

Lands

Forest- and Grassland-Wide Standards and Guidelines

Special Uses

Utility Corridors

Coordinate analysis of utility corridors with other Forests and land management agencies. Determine the lead agency and develop a study plan prior to the start of any analysis. Develop environmental analysis and documentation in compliance with the Forest and Grassland Plans, and with procedures set forth in the Regional Guide. Determine the compatibility of each alternative with the management areas affected.

Designation of corridors does not imply entitlement of use and environmental review must precede occupancy on a project-specific basis. Whenever possible, utility rights-of-way will be designated to allow joint use of the right-of-way.

Electronic Sites

Manage Round Mountain Electronic site in accordance with the approved site plan (Ochoco National Forest Analysis File). In accordance with Environmental Assessment Report "Selection of Sites for Electronic Communication Facility Development," 1979, (also Forest Analysis File), the following sites are designated as electronic sites:

Drake Butte
Dry Mountain (existing site)
Mt. Pisgah
Round Mountain (existing site)
Wolf Mountain

Other Uses

Review applications for other uses through the NEPA process

Review special use fees in accordance with the special use fee review schedule (see Appendix A).

Issue special use permits though a prospectus process when a competitive interest has been identified.

Recreation Special Uses

Issue recreational special use permits only after a public need has been demonstrated that applies to a significant number of the recreating public, which may not necessarily include business opportunities.

The experience provided through the permit must be compatible with the Recreational Opportunity Spectrum classification of the management area.

Limit the number of special use permits for a specific use, to the extent possible, in order to minimize administrative costs and to create economic conditions that

provide a high quality public service.

Minimize the impact of special use permits on other users through the operating plans.

Land Ownership Adjustment

Acquire and dispose of lands in accordance with the Land Ownership Map (map packet) and Lands Management Area Standards and Guidelines in the Forest Plan.

Survey and mark property boundaries to prevent encroachments, protect present corners or references where the possibility of disturbance exists, and assist in administration of the Forest.

Public and private land adjustment opportunities have been classified and prioritized.

Management Area Standards and Guidelines

(Forest Only)

Resource - Lands

Practice

Special Use Permits

Standard and Guideline

Compatible uses, such as nondestructive research projects, may be permitted with Regional Forester approval. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise. Award outfitter guide permits only when it will meet management objectives to provide a needed wilderness opportunity.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Compatible uses, such as nondestructive research projects and simple fish habitat improvement projects, may be permitted with consent of PNW Station Director. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise

Applicable Management Area

MA-D12 Research Natural Areas

Standard and Guideline
Compatible uses, such as nondestructive research projects and simple fish habitat improvement projects, may be permitted with Line Officer approval. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Compatible uses are permitted. Terminate existing noncompatible permits as opportunities arise. Land occupancy permits are prohibited.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation

Standard and Guideline
Compatible uses are permitted.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Land Ownership and Adjustment

Standard and Guideline
Retain and acquire lands that are necessary to maintain or enhance the management emphasis of the specific areas.

Applicable Management Area
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized

MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D12 Research Natural Areas

Standard and Guideline

Consolidate land ownership to increase management efficiency by reducing administrative costs and increasing goods and services.

Applicable Management Area

MA-D1 General Forest
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice

Rights-of-Way Grants for Roads and Trails, and Cost-Share Agreements

Standard and Guideline

Grant no rights-of-way; enter into no cost-share agreements, except as prescribed by law.

Applicable Management Area

MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline

Grant rights-of-way, and enter into cost-share agreements, only when no other reasonable alternatives exist to maintain the integrity of the management area.

Applicable Management Area

MA-D4 Old Growth
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline

Grant rights-of-way, and enter into cost-share agreements, only when no other reasonable alternatives exist to maintain the integrity of the management area. Include stipulations to prohibit activities from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Grant rights-of-way, and enter into cost-share agreements, that are compatible with the management areas emphasis.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Winter Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Practice
Federal Energy Regulatory Commission Licenses and Permits

Standard and Guideline
Allow uses that are compatible with management emphasis for the specific areas.

Applicable Management Area
All Management Areas except wildernesses and RNA's

Standard and Guideline
Stipulate additional restrictions to prohibit activities from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Practice
Utility and Transport Corridors

Standard and Guideline
Exclusion Areas for utility corridors; significant barriers in which legislation exists to preclude establishment and use.

Applicable Management Area
MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline
Category 1 Avoidance Areas for utility corridors; establishment and use of corridors conflict with management objectives.

Applicable Management Area
MA-D4 Old Growth
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Establishment and use of utility corridors must be compatible with management emphasis for the specific areas. Additional stipulation to prohibit activities from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Establishment and use of utility corridors must be compatible with management emphasis of the specific areas.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Management Area Standards and Guidelines
(Grassland Only)

Resource - Lands

Practice
Land Ownership and Adjustment

Standard and Guideline
Cooperate with the State in defining optimum ownership patterns and lease terms.

Applicable Management Area
MA-D11 Developed Recreation (Cove Palisades State Park)

Standard and Guideline
Retain and acquire all lands in National Forest System ownership. Seek transfer of Bureau of Reclamation (BOR) lands to the Forest Service.

Applicable Management Area
MA-D11 Developed Recreation (Haystack)

Standard and Guideline
Retain old growth lands unless they are small isolated blocks surrounded by privately owned lands.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Retain all lands and acquire inholdings.

Applicable Management Area
MA-D12 Research Natural Areas

Practice
Special Uses

Standard and Guideline
Allow only minimal, temporary or semipermanent research facilities and installments.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Consider relocating the existing powerline outside the area when the special use permit comes up for renewal.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized (Squaw Creek)

Standard and Guideline
Allow only special use permits for activities that are consistent with the visual management objectives for the area.

Applicable Management Area
MA-D5 Retention
MA-D6 Partial Retention - Foreground

Practice
Rights-of Way

Standard and Guideline
Obtain the right-of-way for the trail to Alder Springs. Permit private landowners access only to private land during seasonal road closures.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized (Squaw Creek)

Standard and Guideline
Establish no exclusion areas on the Grassland. Avoidance areas include Squaw Creek, Haystack RNA, Island RNA, Rimrock Springs, and antelope winter range.

Corridor widths are 1000 feet for each existing corridor. Discourage development of additional facilities. Confine additional facilities to existing corridors. Require present facilities to be upgraded before allowing new facilities.

Designation of corridors does not imply entitlement of use.

Evaluate application for use on a project-by-project basis.

Where possible, encourage joint use of the rights-of-way.

Additional utility rights-of-way or corridors may be identified and approved subject to site specific environmental analysis.

Applicable Management Area
All management areas.

Minerals & Energy

Forest- and Grassland-Wide Standards and guidelines

Leasing
Include stipulations needed to protect surface resources and/or meet management objectives in leases. Refer to management area standards and guides for specific guidance.

Issue leases with a stipulation stating "no surface occupancy" on slopes greater than 40 percent.

Evaluate surface-use plans of operation through the environmental analysis and documentation process.

Common Variety Minerals

Use existing sources instead of developing new sources; exceptions include:

when existing sources are unable to economically supply the quantity and quality of material needed; and

when conflicts with other resource uses are found to be unacceptable.

Cinder, hardrock, and gravel sources which are available for use during the planning period are designated on the Material Source Map (Grassland Plan, Appendix I).

Evaluate the supply of gravel or aggregate on the Forest before selling to the private sector. Insure that the public interest is being maintained during this process.

Sell minor amounts of clay, sand, and stone to the public on a case-by-case basis.

Develop a management plan describing development and reclamation for each mineral material source to be developed or used during the planning period.

Proposals for capital investments and improvements on structures, which may occur on known material source deposits, should be analyzed within the context of management direction within this plan. Do not unnecessarily reduce options for future removal of materials, by making significant investments on sources when equally viable options exist in other areas.

Mining Claim Administration

Administer appropriate laws and regulations relating to minerals in a reasonable and consistent manner.

Assure that operating plans include reasonable and operationally feasible requirements needed for timely and effective coordination with other resources.

Require that reclamation plans describe final management objectives for specific mined areas and detail reasonable procedures and time frames which will be followed to accomplish those objectives. Formulate reclamation bond amounts on actual reclamation costs.

Under the mining laws, claimants are entitled to access to their mining claims. Analyze access for exploration and development of locateable mineral resources through the environmental analysis process, and include reasonable provisions for access in operating plans.

Notify mining claimants of impending Forest Service actions that may affect their claims. Protect claim corners and mine workings from disturbance resulting from Forest Service activities

Recommend withdrawal from mineral entry when an established or anticipated use is not compatible and cannot be mitigated as part of the mineral entry.

Rockhounding

Rockhounding (hunting and collecting rocks and minerals as a hobby) on land under Forest Service jurisdiction will be allowed without a permit, providing: the activity does not conflict with existing rights, and specimens are used for personal, noncommercial use. Activities involving other than casual removal of small amounts of material with minimal surface disturbance are provided for under the mining laws or Materials Act

Management Area Standards and Guidelines

(Forest and Grassland)

Resource - Minerals and Energy

Practice
Oil And Gas Leasing

Standard and Guideline
Issue no leases.

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Issue leases with consent of PNW Station Director only Include a "no surface occupancy" stipulation.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Issue leases with a "no surface occupancy" stipulation.

Applicable Management Area
MA-D4 Old Growth
MA-D11 Developed Recreation
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Issue leases with a seasonal use stipulation prohibiting exploration, drilling and other development activity from December 1 to May 1. This limitation does not apply to maintenance and operation of producing wells.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Issue leases with a stipulation requiring drilling and storage facilities to be set back a specified distance from the area or feature.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition (Outside of management area)
MA-D14 Riparian in Excellent Condition (Outside of management area)

Standard and Guideline
Issue leases with a stipulation requiring all permanent and semipermanent facilities to blend into the surrounding landscape or be located out of view.

Applicable Management Area
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Standard and Guideline
No special restrictions.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range

Practice
Locatable Minerals (Mining Claims)

Standard and Guideline
The following areas are withdrawn from mineral entry under the mining laws. Prospecting will be allowed if conducted in a manner compatible with the wilderness environment

Applicable Management Area
MA-D8 Wilderness

(except existing valid claims)

Standard and Guideline
The following areas are withdrawn from mineral entry under the mining laws.

Applicable Management Area
MA-D12 Research Natural Areas(Ochoco Divide only)
MA-D11 Developed Recreation (Delintment Lake and Walton Lake Campgrounds only)
MA-D5 Retention (600 ft. right-of-way corridor only)

Standard and Guideline
Recommend withdrawal from mineral entry.

Applicable Management Area
MA-D12 Research Natural Areas (Dry Mountain, Silver Creek and Stinger Creek)

Standard and Guideline
Include reasonable measures in operating plans in order to meet management emphasis for the specific areas. Include stipulation to prohibit activity from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Include reasonable measures in operating plans in order to meet management emphasis for the specific areas.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D8 Wilderness (existing claims)
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Common Variety Minerals

Standard and Guideline
Do not develop material sources.

Applicable Management Area
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D12 Research Natural Areas
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Do not remove material from sources from December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Material sources development allowed.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range

Old Growth

Forest- and Grassland-Wide Standards and Guidelines

All old growth stands meeting the definition stated in the Regional Guide, 1984 will be periodically inventoried and monitored. Juniper old growth on the Grassland does not meet this definition.

Specific allocations have been made to provide habitat for old growth dependent species, with the pileated woodpecker as the indicator species. A portion of these acres are included in wilderness, roadless areas, and Research Natural Areas due to the distributional needs of dependent species. See management area standards and guidelines for Wildlife and Fish.

Other old growth (including juniper on the Grassland), outside of that allocated for wildlife habitat, is also available throughout the Forest, but subject to less stringent standards and guidelines, depending on the management area in which it is found.

For example, old growth stands currently existing in visual management areas, or riparian areas are available for management and will decline over time.

Old growth in research natural areas, wilderness, and roadless areas, but not included in the wildlife habitat allocation, are also subject to the standards and guidelines for the respective management areas (i e. underburning in wilderness and research natural areas).

Recreation

Forest- and Grassland-Wide Standards and Guidelines

General

Recreational activities will be managed to prevent site deterioration within riparian areas.

Developed Sites

Prepare comprehensive and detailed site plans prior to rehabilitation, expansion, or construction projects.

Dispersed Recreation

Provide facilities needed to protect public health and safety (e.g portable toilets, campfire rings, and environmental protection)

Off-Road Vehicles (ORV'S)

ORV use varies by management area.

ORV use will be limited to over snow vehicles on scablands (See Soils Standards and Guidelines).

Trails

Construct and maintain the trail system to standards suitable for type and amounts of use. Maintain trails to prevent resource damage, protect the

investment in the system and provide for user safety. In areas of concentrated use, trails should be designed and maintained to minimize impacts on riparian communities.

Encourage volunteer groups or individuals to maintain or construct parts of the trail system.

Additional direction on trails is contained in specific management area prescriptions.

Management Area Standards and Guidelines

(Forest Only)

Resource - Recreation

Practice
Wilderness Recreation Spectrum (WRS)

Standard and Guideline
Primitive and Semiprimitive.

Applicable Management Area
MA-D8 Wilderness

Practice
Recreation Opportunity Spectrum

Standard and Guideline
Semiprimitive Nonmotorized.

Applicable Management Area
MA-D4 Old Growth
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Semiprimitive Motorized.

Applicable Management Area
MA-D10 Semiprimitive Motorized

Standard and Guideline
Roaded Natural.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Roaded Natural, Roaded Modified or Rural.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D11 Developed Recreation

Practice
Developed Recreation

Standard and Guideline
Develop no interpretive, demonstration, or recreational sites.

Applicable Management Area
MA-D4 Old Growth
MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline
Do not locate developed sites in floodplains unless no feasible alternative sites exist outside floodplains. (Executive Order 11988).

All activities within floodplains must meet water quality standards and goals.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Trails, trail heads and trail shelters may be built to facilitate nonmotorized recreation. Minimum site modifications are allowed. Some minor improvements at high use camp sites, such as fire pits, may be allowed.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Developed camp sites may be opened to the public from May 1 to December 1. New or additional developed campgrounds must be analyzed in a site specific plan.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Prepare environmental assessments, design narratives and site plans prior to rehabilitation, expansion, or construction projects.

Applicable Management Area
MA-D11 Developed Recreation

Practice
Dispersed Recreation

Standard and Guideline
Discourage recreational activities and use, including overnight camping, and pack and saddle stock use.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Manage to protect the naturalness of the areas. Use of the areas for nonmotorized recreation is acceptable, but should not be encouraged

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Where conflicts develop, riparian objectives will take precedence over dispersed recreational needs.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Promote driving for pleasure and mountain biking.

Applicable Management Area
MA-D5 Retention

MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Standard and Guideline
Develop a variety of ATV routes for a variety of terrain and experience levels.

Applicable Management Area
MA-D1 General Forest
MA-D10 Semiprimitive Motorized

Standard and Guideline
Promote backcountry recreational opportunities for hiking, horseback riding, and mountain biking.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Camp Sites
Discourage development of "permanent" dispersed campsites. Disguise, obliterate, or rehabilitate such campsites when found.

Allow no caching of camping supplies.

No more than two campsites will be visible or audible from any other campsite (within 500 feet).

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Encounters
Primitive Area, encounters per day 80% of the time: seven or less

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Semiprimitive Area, encounters per day 80% of the time: 12 or less

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Group Size

Maximum permissible group size: 12 people

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Camp Sites

No more than two camp sites should be visible or audible from any other camp site (within 500 feet).

Encounters

During all use periods there should be no more than 10 other groups encountered per day.

Group Size

The maximum permissible party size is 12 people with 18 head of livestock.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Close area to camping from December 1 to May 1 except within 300 feet of designated access roads.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Utilize minimum on-site controls and restrictions to protect resources and promote safe use of the area.

Applicable Management Area
MA-D10 Semiprimitive Motorized

Standard and Guideline
Provide recreational improvements where needed to protect the resources or sites.

Sites receiving recurring use should be checked periodically for safety considerations (water sources, hazard trees).

Recommend the "pack it out policy" for garbage. Promote "leave no trace" camping techniques.

Applicable Management Area
MA-D1 General Forest
MA-D3 Big Game Summer Range

Practice
Search and Rescue

Standard and Guideline
Use of motorized vehicles for search and rescue must be approved by the Forest Supervisor.

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Use of motorized vehicles for search and rescue must be approved by the District Ranger.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Practice
Signing

Standard and Guideline
Use minimum natural-appearing signing in wilderness areas identifying destinations, but not mileages.

Applicable Management Area
MA-D8 Wilderness

Practice
Trails

Standard and Guideline
Coordinate trail and trailhead planning to disperse users and offer a range of challenges. Design trails to blend with landscape, and construct with native materials

Applicable Management Area
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
No motorized or mechanized use allowed on trails.

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
No motorized use allowed on trails.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
No motorized use of trails, except snowmobiles operating on designated routes, and on an adequate snow base between December 1 and May 1.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Motorized use on designated trail routes is allowed. Restrict motorized use during the period December 1 to May 1.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
No motorized use of trails except on designated routes for research purposes.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
No motorized use of trails except on designated routes.

Applicable Management Area
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground

MA-D7 Partial Retention - Middleground
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Motorized use of trails encouraged on designated routes. Off-trail use will be discouraged.

Applicable Management Area
MA-D1 General Forest

Management Area Standards and Guidelines

(Grassland Only)

Resource - Recreation

Practice
Recreation Opportunity Spectrum

Standard and Guideline
Semiprimitive nonmotorized except for Road 6360 corridor.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Practice
Dispersed Recreation

Standard and Guideline
Protect the environment in and around dispersed camp sites.

Do not encourage dispersed recreational use during the time antelope and deer are concentrated on the winter range.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Use of the area for nonmotorized recreation is acceptable.

Applicable Management Area
MA-D4 Old Growth

Practice
Trails

Standard and Guideline
Allow existing trails to remain as long as the RNA objectives are not compromised.

Construct no new trails unless needed for research purposes.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Relocate trails to avoid wet areas.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Off-Road Vehicle Use

Standard and Guideline
Allow ORV use on designated routes where such use will not conflict with other resources. Restrict ORV use when conflicts with management area objectives will occur.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Scenic Resources

Forest- and Grassland-Wide Standards and Guidelines

Manage for the visual quality objectives (VQO's) listed for each management area. See management area standards and guidelines for SCENIC RESOURCES.

Where natural catastrophes such as large wildfires, insect epidemics, or windthrows occur, management activities may differ from stated visual quality objectives.

In areas of the Forest managed for "modification" or "maximum modification," be sensitive to the needs of the viewing public by utilizing cost-effective visual management techniques while meeting the emphasis of the management area. Examples of these techniques may include:

Leaving desirable looking seed-trees in regeneration units.

Modifying harvest boundaries to eliminate "sharp line" effects.

Construction of facilities, roads and other physical structures, with native materials, where possible.

Management Area Standards and guidelines

(Forest Only)

Resource - Scenic Resources

Practice
Visual Quality Objective (VQO)

Standard and Guideline
Preservation.

Applicable Management Area
MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline
Retention.

Applicable Management Area
MA-D4 Old Growth

MA-D5 Retention
MA-D9 Semiprimitive Nonmotorized
MA-D11 Developed Recreation

Standard and Guideline
Partial Retention.

Applicable Management Area
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D10 Semiprimitive Motorized
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Maximum Modification.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Management Area Standards and Guidelines

(Grassland Only)

Resource - Scenic Resources

Practice
Visual Quality Objectives (VQO's)

Standard and Guideline
Preservation.

Applicable Management Area
MA-D8 Wilderness
MA-D12 Research Natural Areas

Standard and Guideline
Retention.

Applicable Management Area

MA-D4 Old Growth
MA-D5 Retention
MA-D9 Semiprimitive Nonmotorized
MA-D11 Developed Recreation

Standard and Guideline
Partial Retention.

Applicable Management Area
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Maximum Modification.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Social and Economic

Forest- and Grassland-Wide Standards and Guidelines

Human Resources

Minimize social, cultural and administrative barriers to legitimate uses of the Forest, within the legal authority of the agency.

Maintain and implement an affirmative action plan.

Consider needs of the handicapped in the design of facilities and in other possible ways.

Conduct compliance reviews as required by the Title VI of the Civil Rights Action of 1964

Inform the general public, including minorities and the underprivileged, of benefits they are eligible to receive from Forest and Grassland programs. Use techniques and the media best suited to increase awareness and participation

Protect and preserve for American Indians, access to, and use of traditional sites, possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. Coordinate location and protection of these areas with representatives of the Confederated Tribes of the Warm Springs Indian Reservation and Burns Paiute tribes. Consider the plans and policies of other Federal, State, local, and American Indian tribal governments in plan implementation

Consider and provide for the ceded land rights (treaty rights) of the Warm Springs Confederated Tribes in all Forest related management activities (cf. Middle Oregon Treaty of June 25, 1855)

Coordinate resource activities with the designated representatives of the Confederated Tribes of the Warm Springs Indian Reservation.

Soil

Forest- and Grassland-Wide Standards and Guidelines

General

The standards and guidelines stated below apply to all proposed activities occurring on the Ochoco National Forest. Other standards and guidelines are specific to certain types of activities, such as timber harvesting and road building, and are listed under those sections in order to increase the ease and effectiveness of management direction.

Compaction, displacement, puddling, and severely burned soils are to be considered collectively, when assessing impacts.

Watershed Management

Even though watershed effects are the cumulative result of all activities occurring in a particular watershed (including road building, recreation, grazing, etc.), timber management has the greatest potential for detrimental impacts. Therefore, Forest-wide standards and guidelines have been established and designed in the appropriate context, towards timber harvest scheduling and dispersion (see Forest-wide Standards and Guidelines-Timber).

Soil Compaction and Displacement

The threshold level of detrimental compaction is defined as any bulk density increase of 15 percent or more, or any macro pore space reduction of 40 percent or below 15 percent. These values are critical changes over the natural state in the top 12 inches of soil.

In order to maintain site productivity, all project activities will be planned to reduce soil compaction and displacement to the lowest reasonable level. Strive

to reduce compaction and displacement to get as close to 90% of the total activity area (including permanent, rocked, and non-surface roads) remaining in a non-compacted/non-displaced condition, as realistically possible, one year after any land management activity. The minimum will be 80 percent of the total activity area. Existing areas exceeding these standards will be scheduled for rehabilitation as soon as possible.

Surface Soil Erosion

Land management activities will be planned to achieve effective ground cover as defined by the classes shown in Table D-7.

TABLE D-7
Soil Resource Inventory Minimum % Effective Ground Cover

Erosion Hazard Class	First Year	Second Year
Low	20-30	30-40
Moderate	30-40	40-50
Severe	50-60	60-75
Very Severe	60-75	75-90

Effective ground cover is defined as the basal area of perennial vegetation, plus litter and coarse fragments (greater than 2mm sizes), including tree crowns and shrubs that are in direct contact with the ground. Exceptions may occur where specific projects meet erosion control objectives without meeting the ground cover objectives stated above.

Soil Mass Wasting

When a project could result in an increased potential for mass wasting, which could cause significant soil loss or sedimentation, hazards to property, loss of fish habitat, or damage to other resource values, alternative project proposals will be evaluated and documented through the project's environmental analysis.

An activity area is the total area for which a ground-impacting activity is planned, for example, a unit for a timber sale, slash disposal project, grazing allotment. The area would also include transportation systems within and directly adjacent to the project.

Fragile Areas

Recognize the sensitivity and potential of certain areas and/or situations to be adversely affected by management activities and plan accordingly to minimize those effects. Fragile areas include scablands (shallow soil areas), elk wallows, and other isolated soil areas which exhibit sensitivities that require special care.

Scablands

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. This is a result of their having very shallow soils which are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible. For this reason, all management activities will be analyzed as to their affect on scablands, prior to implementation. Use *Plant Communities of the Blue Mountains in Eastern Oregon and Southwestern Washington,* Hall, 1973, to identify scabland plant communities.

Other standards and guidelines for scablands are specific to certain types of activities, such as timber harvesting, livestock grazing, and road building, and are listed under those sections.

Management Area Standards and Guidelines

(Forest Only)

Resource - Soil

Practice
Soil Conditions

Standard and Guideline

Limit displacement and erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment except at some campsites and in designated trail tread.

Locate, relocate, or close campsites to prevent excess soil erosion and compaction when necessary.

Correct areas of human-caused soil instability which contribute to resource degradation, utilizing measures compatible with the Wilderness objectives.

Manage for no human-caused change in rock formations.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Allow activities that do not conflict with the objectives of RNA's, such as special studies, monitoring, and research. Develop soil rehabilitation plans to implement in the event of soil disturbing activities such as fire suppression.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment except at some camp sites or on designated trails.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
No more than 10 percent of an activity area can be compacted or displaced to a degree which degrades vegetative productivity.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Management Area Standards and Guidelines

(Grassland Only)

Resource - Soil

Practice
Soil Conditions

Standard and Guideline
Develop soil rehabilitation plans. Implement in the event of soil disturbing activities such as fire suppression.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Maintain 90 percent of the area in an acceptably productive condition.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Timber

Forest-Wide Standards and Guidelines

Suitable Forest Land

Regulated timber harvest will only be allowed on lands classified as available, capable and suitable. Lands currently classified as suitable but found unsuitable in project analysis will be identified as such on planning maps and treated as unsuitable.

Where unmapped, unsuitable lands are found, project implementation will recognize these areas and plan mitigation measures to avoid adverse impacts. An example of this may be small slumps (unstable soil areas) where soil disturbing activities are avoided.

Silviculture

Prepare silvicultural prescriptions for all activities proposing the management of trees or timber stands to meet resource management objectives. Prescriptions will be recorded in analysis files and stand records.

All prescriptions will be prepared or approved by a Certified Silviculturist.

Elements required in a silvicultural prescription are documented in FSH 2470, the Silvicultural Examination and Prescription Handbook, and by Regional direction. No standardized format will be required, but all requirements must be addressed in the prescriptions or through project environmental analysis.

Plant communities of the Blue Mountains in Eastern Oregon and Southeastern Washington, Hall, 1973, or any future accepted guide, will be used as a guide to site productivity of forest communities and for other applicable management considerations.

The silvicultural prescription should consider integrated pest management. Pests refer to any biotic or abiotic influence on the Forest, including insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices, and competing vegetation.

Develop site-specific prescriptions to provide for biological diversity and ecosystem function, including consideration for long-term productivity. Vegetation management should allow for all natural species to function. None should be eliminated from the site.

Silvicultural prescriptions must provide for snags, and trees for future snags, that will meet the habitat requirements for cavity nesting species, according to management area objectives (see Management Area Standards and Guidelines for Wildlife and Fish); exceptions could be fuelbreaks or situations where snags could cause a safety hazard. During preparation of marking guides, include provisions which specify that damaged, defective, or low value trees be used for replacement snags as much as possible, especially in commercial thinnings. However, take precautions not to leave disease ridden trees that may spread infection to adjacent healthy trees.

Retain trees whose roots stabilize streambanks along Class III and IV streams, especially where fair to poor streambank stability conditions exist. Generally large mature trees provide bank stability for a distance of 5 to 10 times the diameter of the trunk, though this area of influence may be considerably larger. Understory trees and juniper play a role in bank stability in an area approximately equal to their crown diameter. Merchantable trees may be removed if sufficient trees remain to provide root strength for bank stability or if streambank stability is good or excellent and shade and large woody debris are present in sufficient amounts.

Stand examinations and/or other data gathering processes will be used to verify or develop silvicultural prescriptions.

A regeneration system providing the desired establishment conditions will be selected. Leave trees per acre and leave basal area per acre for seed tree or shelterwood systems will be silviculturally prescribed on a site specific basis.

Uneven-aged Management

The application of uneven-aged management is characterized by stands which contain at least two well defined age classes. Even-aged aggregations of trees within these uneven-aged stands should be of a size such that regeneration never loses the protection of the adjacent older age classes. Regulation of the rate of harvest within uneven-aged stands requires the control and maintenance of a desired distribution of size classes.

Uneven-aged management can be applied using either individual tree or group selection silvicultural systems. The decision to apply either system should be based on actual stand and site conditions.

Uneven-aged management is applicable to immature, mature, and overmature stands of essentially pure ponderosa pine within the ponderosa pine community types. Uneven-aged management can be most readily applied to relatively vigorous pure stands of ponderosa pine which display an uneven or mixed stand structure.

Uneven-aged management is most applicable to the mature and overmature stands within the pine/associated community types, but only where silvicultural activities will result in stands dominated by early successional species, including ponderosa pine and western larch. Dominance in these community types is established when stocking by early successional species can be maintained at or above 50 percent of the minimum stocking level basal area established in the silvicultural prescription, on 80 percent of the treated acres. As an objective, dominance by early successional species should assure long-term stand health and vigor, as well as provide for the final harvest of preferred species as planned in the silvicultural prescription.

Stands which are severely understocked, overmature and single-storied, decadent, heart-rotted, or are producing little net growth are generally poor candidates for uneven-aged management.

Uneven-aged management is not recommended in lodgepole pine community types.

Uneven-aged management is applicable where there is reasonable assurance that natural regeneration of acceptable genetic quality and diversity will occur within 10 to 15 years. Planting or interplanting is also appropriate to maintain acceptable genetic quality and/or diversity, dominance by early successional species, or to assure timely regeneration under extremely harsh site conditions.

Uneven-aged management is most applicable on slopes less than 30 percent where tractors normally operate.

Uneven-aged management is most applicable where the total area impacted by detrimental soil compaction, erosion or displacement can be restricted to less than 20 percent of the stand

Uneven-aged management is most applicable where stands are free from dwarf mistletoe. Where stands are lightly infected, uneven-aged management is applicable only where dwarf mistletoe can be confined to the lower half of the tree crowns and within a single canopy layer. The infection of lower canopy layers by upper canopy layers should be avoided. The objective is to maintain stand growth within 80 percent of its disease-free potential.

Uneven-aged management is most applicable where stands are free from root rots. Where stands are lightly infected, uneven-aged management is applicable only where root rot can be managed to maintain stand growth within 80 percent of its disease-free potential. Root rot centers should be managed using even-aged systems.

Silvicultural prescriptions should be designed to maintain or improve the existing size class diversity and uneven-aged structure. Emphasis should be given to managing the existing growing stock. The existing relationship between trees in all size classes, and the condition of those trees, should be considered first as a basis for developing marking guidelines, rather than the ultimately desired size class distribution or upper diameter limit.

Timber harvest and post sale activities should generally be planned on a 20-year entry cycle. All post sale activities should be completed within nine years following the harvest entry. Stands should not be salvage logged at other than the prescribed entry cycle except where wildfire, bark beetles, disease, or other conditions have created catastrophic mortality.

No minimum or maximum sized stand treatment units are specified where an uneven-aged structure can be maintained throughout the stand treatment unit. An average treatment unit of approximately 100 acres or larger is recommended to facilitate inventory and record keeping needs.

Timber marking guidelines should be developed which retain the most vigorous trees of best quality. First priority for leave trees are those with demonstrated good vigor. Second priority are those trees which will produce high value products in the future.

Following each commercial harvest entry, post sale activities should emphasize natural regeneration and stocking level control. Where natural regeneration is a planned objective, post sale activities should be closely coordinated to produce disturbance to the litter and vegetation as necessary for natural regeneration to occur.

Timber harvest, fuel treatment, and site preparation activities should strive to avoid damage to residual trees.

Treatment areas will be coordinated with wildlife habitat needs for cover. Silvicultural prescriptions will address the size, spacial arrangement, and opportunities presented by the existing vegetation within a treatment area.

Pruning may be done where it is economically efficient to produce clear, quality lumber.

Even-aged Management

General

Size of units for intermediate treatments, over-wood removal treatments, and precommercial thinning will be determined through the interdisciplinary process during environmental analysis. Normally these units will not exceed 100 acres. Possible exceptions are stands which have a high susceptibility to insects and disease or where they are exhibiting retarded growth due to disease.

Vegetation diversity will be considered when preparing prescriptions and schedules for large homogenous areas that are generally the same age, in order to provide a mosaic of stands at different conditions and ages.

Rotation Age

The minimum rotation age (at which stands are scheduled for harvest) will be the age at which the mean annual increment (MAI) is equal to or greater than 95 percent of culmination of mean annual increment (CMAI) Harvesting may be at older stand ages to meet specific management objectives (see management area standards and guides for Timber).

Dispersion

The maximum size of a created opening will be 40 acres, except when openings up to 60 acres will be allowed:

When larger created openings will reduce the disturbance to soil, water, fish, or riparian resources, and residual vegetation by: (1) allowing economically feasible logging systems that reduce landing and road construction, or (2) locating roads away from unstable soils, and (3) reducing soil and vegetation disturbance from dragging logs.

Where groups of dwarf mistletoe or root rot disease infected trees need to be incorporated into the created opening to avoid infection, and their inclusion cannot be achieved by centering the created opening over the area of infection.

Where the visual quality objectives require shaping and blending of openings to fit landforms.

When natural catastrophic situations such as fires, windstorms, or insect and disease attacks occur.

On an individual case basis, after a 60-day public notice and review by the Regional Forester.

A harvested area will no longer be considered a created opening when (a) trees are four and one half (4.5) feet tall, free to grow, and meet minimum stocking requirements, or (b) when the vegetation in the harvested area meets the management area objectives, emphasis and desired future condition as stated in Section 3, Management Area Prescriptions, this chapter.

Created openings will be separated by blocks of land generally not classed as created openings as described above. The blocks of land between created openings shall vary in size and contain one or more logical harvest units. These blocks of land shall be large enough and of a stand structure appropriate to meet resource requirements of the Forest Plan.

Openings to be created contiguous to natural openings should receive an exceptional level of attention during the analysis and prescription for treatment since natural openings are recognized as important or critical. The decision to create openings contiguous to natural openings shall be supported by prescriptions specific to individual natural openings or to a group of natural openings where their importance is diminished by more frequent occurrence. Created openings should generally not exceed 1/3 the size and/or be contiguous to more than 1/3 the edge of a natural opening where the natural opening exceeds 30 acres in size. Limitations for created openings contiguous to natural openings less than 30 acres in size will be subject to the interdisciplinary decision making process and its review of land management objectives.

Reforestation

Stocking

Forest stocking guides will be utilized to assess adequate stocking on all regeneration units prior to certifying them as being satisfactorily reforested (See Table D-8 below).

TABLE D-8
STOCKING STANDARDS AT 4.5 FEET

	Level	
	Recommended	Minimum
Pine Low Site Tractor 1/	50-200	2/ 50
Ponderosa Pine Tractor Cable	150-300 125-250	3/ 75 3/ 75
Mixed Conifer Tractor Cable	150-350 150-300	3/ 75 3/ 75

1/ No reforestation work planned for cable ground on low site

2/ Overstory will not be removed if stocking is below this level

3/ Replanting or additional effort will be required if stocking is below this level Area can not be certified as stocked, and will need to be reported as a failure.

Standards are established for each of the three timber types (low site pine, ponderosa pine, and mixed conifer) and by logging method (tractor or cable). They are based on 4.5 feet tall crop trees (usually between five and ten years of age). Make allowances for expected mortality and natural fill in that will occur prior to crop trees reaching 4.5 feet, based on staked tree and/or stocking surveys of similar stands. If rework is necessary, the stocking should be brought to the recommended level.

Recommended range of stocking is that which will produce the yields predicted in the Forest Plan. A variety of harvesting and cultural activities are allowed for, so recommended stocking varies to cover this range.

Tree species used in planting harvest units should be based on the potential of the site as indicated by plant communities. Consideration should be given to regenerating and maintaining a mixture of species, where appropriate for the site.

The recommended stocking for each stand will be established by the silviculturist in the prescription, based on local conditions and objectives, with consideration given to meet costs and outputs projected in the Forest Plan.

Natural regeneration opportunities will be taken advantage of if acceptable genetic quality and diversity is likely to result. If artificial regeneration is necessary, the recommended method will be to plant.

Planting should generally not be prescribed for low site pine types.

In clearcut units, site preparation should normally be completed within two years of harvest. Planting shall occur within one year of site preparation. Exceptions can occur, but only for resource objectives that have been documented through environmental analysis. These units should be suitable and certified as satisfactorily reforested three years after planting.

Planting will be done with seed from selected trees for all ponderosa pine seedlings and for other species when available.

Precommercial Thinning

Precommercial thinning is recommended when:

Existing overstocking will reduce future yields below predicted or planned levels (1973, op cit) which varies by Hall's Community Types and management emphasis.

The expected return from increased timber production and value exceeds the cost of precommercial thinning.

It is consistent with management objectives.

Stands with an average DBH over six inches should not be precommercially thinned, except when threatened by insects and disease. Sanitation cutting may be done to control mistletoe, or to remove defective or damaged trees that will not make a merchantable product.

The maximum acceptable stocking for ponderosa pine is 450 trees per acre, and for mixed conifer is 500 trees per acre. If the DBH for the stand is under three inches (excluding trees planned for overstory removal, if any) include all trees. If DBH is three inches or larger, exclude seedlings under 4.5 feet high from the trees per acre calculations.

There needs to be at least minimum stocking in trees capable of responding to release. This includes a minimum of 30 percent with live crown ratio, and sufficiently free of disease (such as mistletoe) or damage, to make a merchantable product.

Consider economics, as well as stocking, mistletoe (disease), and management objectives as criteria before arriving at decisions to precommercially thin stands. Thinning must be determined to be economically viable and to meet management prescription objectives.

Thinnings should retain a diversity of species based on site potential.

Harvest Schedule

Allowable Sale Quantity

The allowable sale quantity (ASQ) is planned to remain constant over the next five decades and beyond (See Objectives for Timber, Section 1 of this Chapter). The ASQ represents projected, potential outputs based on available inventory and assumptions, and accountability is on a decade basis. The planned harvest does not infer a commitment on the part of the Forest to supply the stated level on a regular basis, but rather states the maximum output available, subject to budgetary constraints and the broad discretion of the agency.

Salvage

Salvage volume is standard sound material from dead or dying trees, standing or down, that is calculated outside of the planned ASQ. Harvest levels will vary from decade to decade and from year to year within a decade depending on mortality, economics of harvesting, etc. but total timber sold (ASQ plus salvage) for the decade will not exceed planned level by more than five percent (10 MMCF or 62 MMBF). If a catastrophic event makes more salvage volume available, it will be substituted for ASQ volume to keep total sale volume within five percent per decade. The salvage program may be increased up to 10 percent of ASQ (12 MMBF) to harvest timber killed by a catastrophic event. Any increase above this will require an equal reduction in the ASQ sell volume. The amount of salvage available may be constrained by snag habitat requirements for the Forest, in any one year (See Cavity Nester Habitat, Wildlife and Fish Standards and Guidelines, this section of this chapter).

Harvest Levels by Forest Watershed

Based on current conditions, the following equivalent harvest acres (EHA) guidelines will be in effect and will remain in effect until updated or changed in the Forest Plan. This guideline assumes that suitable dispersion of harvest within a given watershed is achieved as well (also use for meeting water quality objectives).

Logging Methods

Ground skidding and slash piling equipment will be avoided on slopes exceeding 35 percent, and on soil conditions with high compaction, erosion or displacement hazards, or wherever soil productivity standards cannot be met.

Designated skid trails will be confined to 20 percent or less of the activity area for all timber harvest practices (including disposal of slash), unless it can be demonstrated beyond a reasonable doubt, that particular circumstances or equipment exist which will not detrimentally impact soils as stated in Soils Forest-Wide Standards and Guidelines.

Locate skid trails and roads to avoid paralleling stream channels. New landings should not be placed in riparian areas. Existing landings within streamside areas which are impacting or could impact water quality should be rehabilitated.

TABLE D-9
EQUIVALENT HARVEST ACRES (EHA) GUIDELINES

Watershed Sensitivity	EHA Threshold Harvest Level (Percent)
High	25
Moderate	30
Low	35

TABLE D-10
FOREST WATERSHEDS BY SENSITIVITY CLASS

Watershed	Sensitivity	Threshold Value
Middle Fork Crooked River	Low	35 percent
Dry/Stinger Creek (D-1)	↓	↓
Dry Stinger Creek (D-3)	↓	↓
Beaver Creek (East)	↓	↓
Beaver Creek (West)	↓	↓
Bear/Camp Creek	↓	↓
Keeton Creek	↓	↓
North Fork Crooked River	Medium	30 percent
Marks Creek	↓	↓
Emigrant Creek	↓	↓
McKay Creek	↓	↓
Howard/Porter Creek	↓	↓
Ochoco Creek	↓	↓
Mill Creek	↓	↓
Silver Creek	↓	↓
Deschutes River	↓	↓
Willow Creek	↓	↓
John Day River	High	25 percent
Rock Creek	↓	↓
Trout Creek	↓	↓
Bridge Creek	↓	↓
Deep Creek	↓	↓
Wolf Creek	↓	↓
Nicoll/Sawmill Creek	↓	↓
Badger Creek	↓	↓
Bear Creek	↓	↓

Scablands will not ordinarily be used for landings and skid trails. An exception to this would be in the case of skyline logging where a particular location would necessitate using a scab. Should this occur, the affected area will be erosion-proofed through use of rock or other appropriate methods.

Low Productivity Lands

On timbered lands where site productivity is expected to be less than 20 cu.ft./ acre/year, the regeneration method will be natural regeneration. This will be accomplished under the shelterwood method. Overstory will not be removed until regeneration is securely established.

Christmas Trees

Consistent with other resource objectives, Christmas trees will be offered for sale. Emphasis will be placed on personal use by individuals. Special restrictions are to be applied to prevent indiscriminate cutting of trees.

Management Area Standards and Guidelines

(Forest Only)

Resource - Timber

Practice
Scheduled Harvest

Standard and Guideline
No timber harvest allowed (including salvage).

Applicable Management Area
MA-D4 Old Growth
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D12 Research Natural Areas

MA-D11 Developed Recreation

Harvest Scheduling
Harvest only for the purpose of maintaining safe and attractive recreational sites. No scheduled timber harvest.

Reforestation
Rely on natural regeneration. Planting may be done to meet management area objectives.

Visual Influence Area

Silvicultural System

Both even- and uneven-aged silvicultural systems may be used. Emphasize maintenance of large, yellow bark ponderosa pine and western larch.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Cultural Treatments

Precommercial thinning and commercial thinning may be done to meet the visual quality objectives and maintain healthy stands.

Harvest

Cutting practices may be used that meet the objectives shown in Table D-11.

TABLE D-11
TIMBER HARVEST OBJECTIVES

	Ponderosa Pine	Mixed Conifer
Unit Size (Acres)		
Even-aged		
Two Story Stands	4-10	2-5
Regeneration Cuts	2-5	2-5
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No limit	No limit
Rotation Age (years)		
Even-aged	250	200
Entry Cycle (years) 1/		
Uneven-aged	20	20
Diameter 2/	30"	27"

1/ Actual harvest entry cycle will be prescribed in a site-specific silvicultural prescription

2/ The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated is a target diameter

Manage ponderosa pine to encourage large trees and open park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features, such as aspen stands and rock outcroppings.

MA-D10 Semiprimitive Motorized

Silvicultural Systems

Harvest ponderosa pine on an uneven-aged management system as follows:

1. 40 year entry cycle
2. Basal area 40 - 80 sq. ft./ac.
3. Maintain 5 - 10 trees per acre in 20"+ size class

Harvest mixed conifer stands using the patch cut system on a 200 to 220 year rotation. Harvest patch size will be 2 - 5 acres in size.

Reforestation

Rely on natural regeneration in ponderosa pine. Plant mixed conifer where necessary.

Intermediate Harvest

Two entries in mixed conifer stands.

If logging cannot be done while meeting road objectives, then delay logging until it is economical or practical to meet road objectives. Helicopter or logging to the existing road system should be considered in lieu of building high standard roads in these areas.

MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Silvicultural Systems

Even-aged and uneven-aged systems may be used. Select the system that best meets the shading and woody debris objectives.

Even-aged Systems

Reforest by natural regeneration or plant. Select the method that creates the least soil disturbance Schedule harvest on a 200 year rotation (five percent per decade). Limit the size to 180 linear feet along streams. Design harvest units (shape, size, and distribution) to meet shading objectives over time.

Uneven-aged Systems

Use a forty-year entry cycle. Maintain basal area at 50 - 90 square feet per acre. Maintain 5 - 10 trees per acre greater than 20 inches in diameter.

Reforestation

Rely on natural regeneration or plant to obtain desired stocking. Allow no mechanical site preparation, application of herbicides, or fertilization.

Precommercial Thinning

May be used to obtain desired stocking levels.

Commercial Thinning

May be used to obtain desired stocking levels.

TABLE D-12
Objectives For Modeling Stand Conditions

	Ponderosa Pine	Mixed Conifer
Unit Size (Acres)		
Even-aged		
Two Story Stands	4-10	2-5
Regeneration Cuts	2-5	2-5
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No limit	No limit
Rotation Age (years)		
Even-aged	250	200
Entry Cycle (years) 1/		
Uneven-aged	20	20
Diameter 2/	30"	27"
Lineal Feet of Road Frontage in an Open Condition per Mile 3/	600	400

1/ Actual harvest entry cycle will be prescribed in a site-specific silvicultural prescription

2/ The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated is a target diameter

3/ Does not apply to intermediate treatments such as commercial thinnings, or single tree selection

TABLE D-13
Objectives For Modeling Stand Conditions

	Ponderosa Pine	Mixed Conifer
Unit Size (Acres)		
Even-aged		
Two Story Stands	10-20	5-8
Regeneration Cuts	5-8	5-8
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No limit	No limit
Rotation Age (years)		
Even-aged	200	150
Entry Cycle (years) 1/		
Uneven-aged	20	20
Diameter 2/	27"	22"
Lineal Feet of Road Frontage in an Open Condition per Mile 3/	800	600

1/ Actual harvest entry cycle will be prescribed in a site-specific silvicultural prescription

2/ The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated is a target diameter

3/ Does not apply to intermediate treatments such as commercial thinnings, or single tree selection

MA-D5 Retention

Silvicultural Systems

Utilize both uneven-aged and even-aged systems where ecologically suitable. Manage ponderosa pine for a combination of: 1) multiple age class stands, and 2) open, park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as distant landscapes, aspen stands and rock out-crops.

Uneven-aged management systems will follow Forest-wide standards and guidelines while protecting the scenic qualities in these areas.

A silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the objectives shown in Table D-12.

MA-D6 Partial Retention - Foreground

Silvicultural Systems

Utilize both uneven-aged and even-aged systems where ecologically suitable. Manage ponderosa pine for a combination of: 1) multiple age class stands, and 2) open, park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as distant landscapes, aspen stands and rock out-crops.

Uneven-aged management systems will follow Forest-wide standards and guidelines while protecting the scenic qualities in these areas.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the objectives shown in Table D-13.

MA-D7 Partial Retention - Middleground

Silvicultural Systems

Cutting practices may be used that meet the partial retention objectives shown in Table D-14.

For Alternatives E-Departure and A
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Reforestation

Practices may vary from natural regeneration to planting at normal or increased stocking depending on target acres. Select the most productive and accessible lands for increased stocking. Utilize natural regeneration on lower productivity sites and where natural regeneration is likely to be successful.

Precommercial Thinning
Thin according to management objectives. Stocking should be within 50 trees per acre of what is shown in the appropriate yield table.

Commercial Thinning
Select areas to thin based on management objectives and economic feasibility.

Regeneration Harvest
At culmination of mean annual increment or later as scheduled.

Silvicultural Systems
Both even- and uneven-aged management systems will be practiced. Uneven-aged management is the preferred management system on low sites. Uneven-aged management systems will follow Forest-wide standards and guidelines.

For Alternative C
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Silvicultural Systems
Mixed conifer stands and stands on slopes greater than 30% will be managed using even-aged systems. Ponderosa pine stands, on slopes less than 30% and with suitable age class distributions, will be managed using uneven-aged systems.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

A silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the objectives shown in Table D-15.

Reforestation
Plant at normal or increased stocking levels. Select the most productive and accessible sites for increased stocking as shown in the model component. Utilize natural regeneration on lower productivity sites and where natural regeneration is likely to be successful.

Cultural Treatments
Precommercial and commercial thinnings will be done according to Management Objectives and economic feasibility. For precommercial thinning, stocking should be within 50 trees per acre of the number shown in the appropriate Managed Yield Table. Pruning may also be done where economically feasible in ponderosa pine stands to improve wood quality.

Uneven-aged Stands

Uneven-aged management is the preferred silvicultural system within portions of these Management Areas. This system should be prescribed within ponderosa pine stands where stand and site conditions are appropriate, and no other resource objectives which preclude the use of uneven-aged management have been identified and documented during the project planning process.

TABLE D-14
Partial Retention Objectives

	Ponderosa Pine	Mixed Conifer
Rotation Age (years)		
Even-aged	100	90
Diameter 1/	18	16
Unit Size (acres) 2/	10-20	5-8

1/ The indicated diameter is an average end point diameter at rotation age for even-aged stands

2/ Does not apply to intermediate treatments or overstory removals

TABLE D-15
Objectives for Modeling Stand Conditions

	Ponderosa Pine	Mixed Conifer
Rotation Age (years)		
Even-aged	130	90
Entry Cycle (years) 1/		
Uneven-aged	20	20
Diameter 2/		
Even-aged	18"	16"
Uneven-aged	24"	

1/ Actual harvest entry cycle will be prescribed in a sit-specific silvicultural prescription

2/ The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated is a target diameter

TABLE D-16
Objectives For Treating Timber Stands

	Ponderosa Pine	Mixed Conifer
Rotation Age (years)		
Even-aged	130	90
Diameter 1/		
Even-aged	18"	16"

1/ The indicated diameter is an average end point diameter at rotation age for even-aged stands

MA-D1 General Forest

Silvicultural Systems

In this management area, either present net value or timber production will be maximized by utilizing a number of cultural practices, including:

Planting of genetically improved trees at two stocking levels.

Natural regeneration,

Precommercial thinning;

Commercial thinning from one to three times; and

Rotation ages from 95 percent of culmination of mean annual increment (CMAI) (usually from 80 to 90 years) to 150 years.

Timber stands will be managed using even-aged systems with trees uniformly spaced and fully occupying sites except in the seedling and sapling stages. Stands will be treated to meet the objectives shown in Table D-16.

Reforestation

Plant at normal or increased stocking levels depending on target acres. Select the most productive and accessible sites for increased stocking as shown in the model component. Utilize natural regeneration on lower productivity sites and where natural regeneration is likely to be successful.

Cultural Treatments

Precommercial and commercial thinnings will be done according to Management Objectives and economic feasibility. For precommercial thinning, stocking should be within 50 trees per acre of the number shown in the appropriate Managed Yield Table.

Regeneration Harvest

At Culmination of Mean Annual Increment (CMAI), unless blowdown, insect infestation, or other such events interrupt rotation.

Transportation System

Forest- and Grassland-Wide Standards and Guidelines

Planning

Transportation systems will be planned to support resource activities in the management areas and to serve multiple resource needs rather than individual project proposals.

Roads and trails will be at the lowest density which meets long-term resource needs. Where existing roads or trails are impacting water quality steps will be taken to mitigate the problem.

The planned transportation system will be constructed to the required standards to meet the needs of the planned resource activities of the area. This standard will be such that repeated reconstruction to upgrade any given section of the system will be minimized during the planning period.

Prepare and maintain road management objectives (RMO's) for proposed and existing system roads and identify roads not needed for future maintenance.

Coordinate with the State and Counties on management of their roads to complement Forest uses.

Identify roads that require Forest Service jurisdiction to meet resource objectives.

Update the "Forest Sign Plan" annually to reflect road management objectives.

Traffic Management

General

The adequacy and safety of the transportation system will conform to the Forest Service Manuals and Handbooks. If a road does not exist at an adequate and safe standard for the traffic expected to use it, traffic can be restricted to a level where the existing road is adequate. This could eliminate the need to reconstruct the road.

Manage traffic as needed to control access due to structural limitations of the road, safety, or to meet resource objectives, such as those to meet wildlife needs or off-road vehicle (ORV) travel management needs.

Strategies for managing traffic will range from highly restrictive low impact, single user, short-term roads to unrestricted long-term roads.

Strategies for managing traffic could include prohibiting use on a seasonal or year long basis, or eliminating all standard vehicle use for more than one year.

Put sign traffic control devices (such as gates) to let users know why use is restricted and for what period of time.

No construction or logging equipment parking or turn around will be allowed on scablands except under landings.

Commercial Hauling

During commercial hauling activities, public access will generally be discouraged or prohibited on single user local access roads.

Generally, primary commercial haul routes are reconstructed, operated and maintained to permit low clearance (passenger car) traffic. However, some commercial haul routes may be maintained for high clearance vehicles, maintenance Level 2.

Recreation

Encourage ORV use only on roads where all standard vehicle use has been eliminated, or on roads which have no current or planned future use where appropriate with other resources.

Access routes to developed sites will generally be reconstructed, operated and maintained to permit low clearance (passenger car) traffic. However, public use may be seasonally discouraged, or restricted.

Local road access to historical dispersed recreation sites are generally graveled to prevent investment loss and resource damage during wet periods of the year. Road access management strategies to the dispersed sites will generally be "accept" or "encourage" use by dispersed recreationists.

Construction and Reconstruction

Design, construct, and reconstruct roads according to standards based on the following criteria: resource management objectives, environmental constraints, safety, physical environmental factors, traffic requirements, traffic service levels, vehicle characteristics, road users, and economics.

Roads will not be constructed through the length of a riparian area. Roads crossing a riparian area will not alter stream or groundwater flow characteristics to a degree which will impact the riparian characteristics.

Road drainage will be designed and maintained to eliminate any influx of sediment road runoff directly into stream channels, to the extent possible.

Road construction activities will be managed to minimize the amount of unprotected soil surfaces when heavy rain or heavy surface runoff are most likely to occur.

Ensure that erosion control measures are completed prior to times of year when heavy rain or heavy runoff are normally expected.

Whenever practical, roads should be located on areas with the lowest erosion hazard.

Provide cost effective timber haul based on the various seasons of the year.

Ensure that temporary culverts or bridges are used where stream bottoms or banks would otherwise be damaged, and that these temporary structures are removed after use.

Roads which pass through high water table areas should be constructed in a manner which does not alter the flow characteristics of the groundwater.

Stream Crossings

Design and construct the transportation system to minimize the numbers of stream crossings.

Locate stream crossings and the approach alignment to minimize stream damage.

Bridge approach fills should be riprapped or protected by wing walls.

Ensure adequate sizing of culverts or bridges to accommodate anticipated high streamflows and to allow fish passage.

Schedule stream crossing construction during low streamflow and/or outside fish spawning periods.

Stream crossings should not change floodplain or streamflow characteristics.

Maintain existing riparian communities both upstream and downstream from the crossing.

Scablands

Road construction on scablands will be limited to long-term collector, arterial and local roads. Temporary or short-term roads or trails will not be constructed across scablands unless there is no other feasible alternative. Should a specific activity necessitate the construction of temporary access, the area affected will be completely erosion proofed through use of crushed rock and other appropriate methods.

Thoroughly analyze the long term need before establishing borrow pits on scablands.

Visuals

Include parking areas and view points in road plans and designs where appropriate.

Locate material stockpiles out of site of the main travel route.

Gravel pits, barrow areas, landings, etc. should meet visual objectives for the management area.

Avoid locating roads in the visual foreground other than at junctions. Design roads to fit the topography, minimizing cuts and fills. Roads should not dominate the natural pattern of line, form or color.

Necessary road closures in visual management areas should be designed and constructed to blend with the natural characteristics of the landscape.

Road Operations and Maintenance

Operate and maintain all roads within available financing according to maintenance levels established in Road Management objectives and standards defined in Table D-17.

TABLE D-17
Definitions of Road Management Objectives and Standards

Minimum Maintenance Level	Use
Obliterated	No current or future use (36 CFR 261 5)
1 (Closed)	No current use, planned future use
2	High clearance vehicles
3, 4, 5	Low clearance vehicles

If funding is inadequate to maintain some roads at the intended maintenance level, maintain roads at a lower maintenance level, such as high clearance access (Level 2) to a closed level (Level 1).

Stabilize and re-establish vegetation on obliterated roads.

Ensure that necessary road and trail maintenance is performed on all runoff control and drainage structures (dips and culverts).

Provide for additional maintenance of road drainage and crossing structures during periods when unusual runoff is expected.

Ensure that appropriate traffic management is established to prevent the creation of pollution-generating conditions, such as deep wheel tracks in roads during wet weather.

Management Area Standards and Guidelines

(Forest Only)

Resource - Transportation System

Practice

Construction and Reconstruction

Standard and Guideline

None allowed.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

None allowed except for research purposes, and approved by PNW Station Director.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Develop no permanent roads. Develop and maintain trails and trailheads to meet semiprimitive recreational objectives.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Allow no road construction unless there are no reasonable alternatives. When essential, allow construction or reconstruction only between July 15 and January 31 to protect wildlife values, such as nesting.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Construct primitive roads and trails of varying levels of difficulty for recreation and limited timber harvest. Manage road density to maintain the semiprimitive character of the area.

Applicable Management Area
MA-D10 Semiprimitive Motorized

Standard and Guideline
Construction and reconstruction are allowed to access Forest resources, according to management area emphasis, subject to Forest-wide Standards and Guidelines.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Operations and Maintenance

Standard and Guideline
Obliterate and revegetate and revegetate all existing roads except those authorized for mining operations. Where appropriate, utilize the old road system for a nonmotorized trail.

Applicable Management Area
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Hazard tree felling is permitted. Felled trees shall remain in place unless lying across an approved road or trail.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Hazard tree felling is permitted for public safety.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - F
MA-D7 Partial Retention - Middleground
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Practice
Traffic Management

Standard and Guideline
No access permitted except for authorized mining claims.

Applicable Management Area
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Access routes will be restricted to administrative use and use by permit for research related purposes only.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Except for constant service through routes and short existing open local access, use will be restricted to approved projects designed to meet management area objectives. These will be closed to motorized use at the end of the projects.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Limit open roads to two miles per square mile following timber harvest and post-sale activities. Close roads following timber sales if post-sale activities are delayed longer than one year.

Keep roads closed unless needed in emergencies for protection of life or property.

Applicable Management Area
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Standard and Guideline
Certain local roads may be restricted to administrative use and use by permit only.

Applicable Management Area
MA-D11 Developed Recreation

Standard and Guideline
Constant service roads will remain open. Use on all other roads across the management areas will be eliminated.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Generally, access routes will be open subject to Forest-wide Standards and Guidelines.

MA-D1 General Forest
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D10 Semiprimitive Motorized

Practice
Off-Road Use

Standard and Guideline
No motorized use allowed.

Applicable Management Area
MA-D4 Old Growth
MA-D8 Wilderness
MA-D9 Semiprimitive Nonmotorized
MA-D11 Developed Recreation
MA-D12 Research Natural Areas

Standard and Guideline
Allow no off-road use from December 1 through April 15, including snowmobiles. Use a road closure system (such as the Green Dot System) to protect wildlife habitat, minimize harassment, maintain escapement opportunity, and promote quality hunting.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Restrict off-road use where needed to protect wildlife habitat, minimize harassment of wildlife and to promote quality hunting. Use a system similar to the green dot system.

Applicable Management Area
MA-D3 Big Game Summer Range

Standard and Guideline
Discourage off-road use.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Where off-road use impacts are evident, close areas to use and rehabilitate.

Applicable Management Area
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Standard and Guideline
Motorized use encouraged on designated routes.

Applicable Management Area
MA-D1 General Forest
MA-D10 Semiprimitive Motorized

Management Area Standards and Guidelines
(Grassland Only)

Resource - Transportation System

Practice
Operations and Maintenance

Standard and Guideline
Generally maintain roads for high clearance vehicles. County roads are generally maintained for low clearance vehicles.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Generally, maintain roads for low clearance vehicles. However, some roads may be maintained only for high clearance

Applicable Management Area
MA-D1 General Forest

Standard and Guideline
Maintain roads for low clearance vehicles.

Applicable Management Area
MA-D11 Developed Recreation

Standard and Guideline
Design and maintain transportation systems needed to support the installation and maintenance of the structures associated with the utility corridors. Normally, close roads to public use.

Applicable Management Area
Utility Corridors within all management areas.

Practice
Traffic Management

Standard and Guideline
Transportation within the park boundary is the responsibility of the State.

Applicable Management Area
MA-D11 Developed Recreation (Cove Palisades State Park)

Standard and Guideline
Control access to protect old growth habitat.

Applicable Management Area
MA-D4 Old Growth

Standard and Guideline
Limit open roads to one mile per square mile.

Applicable Management Area
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range

Standard and Guideline
Close Road 6360 seasonally to protect deer winter range. Close all other roads in the management area to public use year-round, allowing only administrative and permittee use.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized (Squaw Creek)

Practice
Off-Road Access

Standard and Guideline
Allow no vehicle use off designated routes, except for administrative use.

Applicable Management Area
MA-D11 Developed Recreation (Haystack)

Water

Forest- and Grassland-Wide Standards and Guidelines

Water Quality

Comply with State requirements in accordance with the Clean Water Act for protection of waters of the State of Oregon (Oregon Administrative Rules, Chapter 340-41), through planning, application, and monitoring of Best Management Practices (General Water Quality Best Management Practices, Pacific Northwest Region, November 1988) in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.

In cooperation with the State of Oregon, the Forest will use the following process:

Select and design BMP's based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for those waters potentially impacted.

Implement and enforce BMP's.

Monitor to ensure that practices are correctly applied as designed.

Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.

Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMP's do not perform as expected.

Adjust BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Consider recommending adjustment of water quality standards.

dums of Understanding between the Oregon Department of Environmental Quality and U.S. Department of Agriculture, Forest Service (2/12/79 and 12/7/82). Also use "Attachments A and B" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest, 12/78, and Best Management Practices for Range and Grazing Activities on Federal lands, respectively).

Temperature

The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this can not be attained, 100 percent of the potential for shade is the standard.

Shade requirements may be reduced in cases where management is necessary to sustain a thrifty community of shade providing species over time, e.g., in the case of local infestation or disease, or for managing for future shade in a decadent stand, but activities may not result in an increase in temperatures above the limits specified.

John Day River System, Silver and Emigrant Creeks, and Associated Tributaries.

Existing temperatures at or below 66° F. may be raised a maximum of 2° F. Where stream temperatures exceed 68° F., management activities will include objectives for reducing temperatures to levels that will improve fish habitat capability.

Deschutes River, Crooked River, and Associated Tributaries.

Existing temperatures at or below 56° F. may be raised a maximum of 2° F. Where stream temperatures exceed 58° F., management activities will include objectives for reducing temperatures to levels that will improve fish habitat capability.

Turbidity

Stream channel cutbanks should not exceed an average of 20 percent for any given stream drainage.

Allow no more than 10 percent cumulative increase in stream turbidity. Short-term deviations (50 years) from this standard to accommodate emergency or other legitimate activities will comply with state requirements for notification and approval.

Waste Disposal

Dispose of waste effluents (e.g. sanitary waste, fuels, solvents, and pesticides) in a manner that will prevent contamination of surface or subsurface water.

Project Planning

See Forest-wide Standards and Guidelines for TIMBER for direction on equivalent harvest acres (EHA) guidelines.

Plan for no management activities in and around Class III and Class IV streams that contribute to the deterioration of water quality below standards set for downstream Class I and II streams. Protection will be provided primarily through mitigation measures. Some short-term temperature and/or turbidity increases may be allowed, providing the standards for Class I and II streams

continue to be met. Consider the potential for cumulative impacts. Provide suitable amounts of woody material based on specific characteristics of individual stream courses.

Develop specific objectives for the management of streams through the NEPA process for all projects that could impact water quality.

Floodplains and Wetlands (including springs and wet meadows).

Riparian areas are a unique and biologically important system on the Forest. Special attention shall be given to land and vegetation for approximately 100 feet form the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas. Topography, vegetation type, soil, climatic conditions, management objectives, and other factors shall be considered in determining what management practices may be performed within these areas, or the constraints to be placed upon their performance. (36 CFR 219.27e.)

Give preferential consideration to riparian-dependent resources over other resources in case of unresoluble conflicts.

Consider the presence of, and potential impacts to any inventoried floodplain in project area environmental analysis.

Do not locate major structures, roads, or other facilities within floodplains unless no feasible alternative sites exist outside floodplains.

Allow projects causing short-term impacts on floodplain values only if specific mitigation measures designed to minimize the impacts are documented in the project environmental analysis. Restore natural floodplain characteristics after the activity has ceased

Discuss the presence of potential impacts to riparian areas in all project-level environmental documents.

Vegetation and ground cover requirements:

Where site potential and topographic factors permit, manage riparian areas to provide the shade necessary to meet stream temperature goals.

Maintain upper streambanks in a stable condition along at least 80 percent of the length of a stream.

Retain at least 80 percent of the potential ground cover in grass-forb riparian communities. Also, retain at least 80 percent of the potential tree or shrub cover in riparian areas dominated by trees or shrubs. In riparian areas with mixed layers, the cover requirement may be met by taking credit for the

effective cover provided by all vegetative layers of the riparian community including shrubs, tree understories, and the dominant overstory. Consider the mitigating effect of stream size and orientation, as well as surrounding topography, when determining the amount of cover that may be removed.

Management Area Standards and Guidelines

(Forest and Grassland)

Resource - Water

Practice

Water Quality Improvement Projects

Standard and Guideline

Enhancement of riparian vegetation or other water related resources, is restricted to research purposes, unless authorized by PNW Station Director.

Applicable Management Area

MA-D12 Research Natural Areas

Standard and Guideline

Use of motorized equipment for water improvement projects will be approved by the Regional Forester on a case-by-case basis.

Applicable Management Area

MA-D8 Wilderness

Standard and Guideline

Construction and maintenance for water improvement projects allowed, subject to Forest and Grassland-Wide Standards and Guidelines.

Applicable Management Area

MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground
MA-D9 Semiprimitive Nonmotorized
MA-D10 Semiprimitive Motorized
MA-D11 Developed Recreation
MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Wildlife and Fish

Forest- and Grassland-Wide Standards and Guidelines

Planning

Coordinate activities that affect fish or wildlife resources with the Oregon Department of Fish and Wildlife, Columbia River Inter-tribal Council, Bureau of Land Management, and the U.S. Fish & Wildlife Service. The level at which coordination occurs will be based on the magnitude of proposed activities, and the species involved.

Structural improvements to provide water, or otherwise concentrate wildlife (big game) use will not be planned specifically for scablands (See Forest and Grassland-wide Standards and Guidelines, Soils).

Management Indicator Species

Determine if the species' use of the area is incidental or if it is essential habitat. If it is determined to be essential habitat (roosting sites, for example) protect it from adverse modification through curtailment of conflicting activities, modification of activities, seasonal restriction of activities, or avoiding the area. For bald eagles, request an informal consultation with the Endangered Species Branch of the Fish and Wildlife Service on proposed actions which may adversely affect the species.

For newly discovered essential habitat, conduct environmental analysis under the NEPA process to determine if it is necessary to designate the area as essential habitat. If so, the Forest or Grassland Plans will be amended or supplemented where appropriate, and the essential habitat designation will supersede previous land allocations or can be substituted for other habitat allocated to threatened or sensitive species.

Pileated Woodpecker

Approximately 19,250 acres of old growth, and another 19,250 acres of supplemental feeding habitat have been allocated across the Forest (outside of wilderness and Research Natural Areas) to meet the needs of old growth dependent wildlife, with the pileated woodpecker as the major indicator species.

Another 2,100 acres of old growth within wilderness and Research Natural Areas are considered necessary to meet the distributional needs of the woodpecker, but have not been specifically allocated, due to legal precedence for these areas. Natural processes (natural fire ignitions, etc.) shall continue to occur in these stands and may circumvent management desires to maintain them for wildlife habitat. But, any planned management activities in wilderness and RNA's (planned ignitions or research) should be done in such a way as to protect the integrity of these areas. See management area standards and guidelines for specific management direction Also, see locations of old growth stands for habitat (both inside and outside wilderness and Research Natural Areas) on the Alternative I map.

Primary Cavity Excavators

Primary cavity excavators create cavities for themselves and other cavity users. In addition to the ecological diversity provided by these species, they also play an economic role in the forest environment. These species, plus the secondary cavity nesters, consume insects that are destructive to forests. While these birds may not prevent epidemic populations from building, many authors have indicated a suppressive influence on insects at endemic levels. For these reasons, more than a minimum population of the primary excavators is desirable. Effective population levels of these excavators is believed to be above 40 percent of their potential population levels, as compared to a viable population of only 20 percent. See *Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington,* Thomas, 1979, for further discussion of management of this specialized habitat.

Provide habitat to support populations of cavity nesters at various levels by management area in order to achieve a Forest-wide objective of 47% of maximum potential over the first decade (see management areas standards and guidelines, Wildlife and Fish).

Snag Distribution

Provide snags within areas that are generally no larger than normal harvest unit size (40 acres). These snags will be maintained through the full rotation on these areas by providing for green replacement trees that will become snags of adequate size when existing snags fall. It is not intended or possible that dead and defective tree habitat be uniformly distributed over every acre. But, do not (arbitrarily) combine areas with high concentrations of dead and defective tree habitat with non-adjacent areas devoid of dead and defective habitat to arrive at a prescribed average number per acre. Plan dead and defective tree habitat by units, such as project planning areas or subdrainages (3,000 to 5,000 acres maximum) where specific management levels can be monitored.

Where adequate snags are not currently available to meet the desired level (40%,etc.), created snags should be used to meet the direction as nearly and as soon as possible.

If snags are not present and cannot be created, higher snag levels can be managed in adjacent areas and averaged with the low levels in deficient areas to meet management objectives. However, averaging should be done over as small an area as possible, and replacement snags should be planned for in the deficient areas to meet the distribution requirements as soon as possible.

In a forested setting (uneven-aged management or mid to late successional stages in even-aged management), either clumped or evenly distributed snags are acceptable.

In early successional stages (grass/forb, seedlings and saplings) of even-aged management areas (i.e. clearcut and overstory removal), it is more desirable to *manage snags in patches because*

Snag patches can provide foraging as well as nesting habitat;

Snag patches are more likely to support species that won't nest in the open

than are single, uniformly distributed snags;

It is operationally safer and more efficient to provide snags in patches rather than in single, uniformly distributed patterns, and

Snag patches better provide opportunities for live trees that can become replacement snags throughout the rotation of a stand.

Golden Eagle and Prairie Falcon

Carefully evaluate activities having the potential to alter or disturb cliffs, talus, or cave habitats.

Bald Eagle

Preserve the integrity of actual and potential bald eagle winter roost sites. Utilize the findings and recommendations of a bald eagle winter roost survey, conducted by the Oregon Cooperative Wildlife Research Unit in 1986 through 1987. See Eagle Management Prescription (Management Area F12-Eagle Roosting Areas), and FEIS Chapter 2, *Alternatives Including the Proposed Action.*

Rocky Mountain Elk and Mule Deer

Big game capability models should be used in project planning to determine habitat effectiveness (HE), as affected by quality and quantity of cover and forage, and open road density. Resulting HE values will be compared with those predicted for future outputs, to determine whether or not big game objectives are being met. Specific actions should be taken when project alternatives chosen for implementation are shown to reduce HE values below those predicted over the planning period. See management area standards and guidelines for Wildlife and Fish, this chapter for predicted HE values and specific actions to take. Also see Chapter 5, Implementation of the Forest Plan, for monitoring requirements.

The model used to predict the influence of forest management on elk is a Habitat Effectiveness model. It is a biologically based model that tells us how effective an area will be in supporting elk. The model was designed to measure effectiveness on a scale of 0 to 180, with 180 representing the highest potential effectiveness and 0 representing the least desirable situation for elk. It is intended to be only a relative measure of effectiveness, and does not consider many factors that would influence the actual number of elk found in an area. These additional factors include the effects of hunting, predators, disease, yearly changes in weather and forage production, competition with other animals, and the rate at which elk populations can change from one level to another.

To make the results of the model easier to interpret, the effectiveness index was translated into a number of animals that could be supported on an area. This was done by estimating the density of animals that could be supported on an area if the habitat were maintained at optimum effectiveness. It was then assumed that a habitat effectiveness value of 180 translated to this highest possible density of elk, and that lower values would translate to proportionally lower densities. The numbers shown in Chapter 2 are those numbers of elk that could potentially be supported on the area. The numbers are not projections of actual elk populations. As noted above, many additional factors would have to be considered in

order to project actual elk populations. It is especially important to note that the current elk numbers on an area may not be the direct result of factors that are measured in the habitat effectiveness model. The current population in an area could be limited by the availability of winter range on private land, by hunting pressure, or by any of the other factors discussed above. In this case, habitat effectiveness might decline but have no real influence on the number of elk that occupy the area, or habitat effectiveness might increase but still have no net influence on the number of elk. Because the numbers shown as outputs in Chapter 2 for Wildlife only represent habitat effectiveness, it is important to read the full text in order to understand the effect of forest management on the elk population.

Protect the character of elk calving sites. Minimize disturbance from human activity during calving season (approximately May 15 to June 30). Also protect wallows during rutting season (September 1 to October 15).

Provide forage sufficient to meet management objectives for population levels of Rocky Mountain elk and mule deer.

Rainbow Trout, Brook Trout, Steelhead

Provide habitat by managing as per riparian prescriptions (Chapter 2).

Threatened, Endangered, and Sensitive Plant and Animal Species

Inventory and protect threatened and endangered species and their habitat(s).

Cooperate with State and Federal fish and wildlife agencies in developing and implementing recovery plans for threatened or endangered species.

Consult with the U.S. Fish and Wildlife Service when conflicts between project activities and habitat needs cannot be resolved, or when uncertainty exists.

Maintain inventories of essential or critical habitats including their locations and distribution.

Maintain contacts with Federal, State, and other agencies, groups, and individuals concerned with the management of threatened, endangered, and sensitive species. Consult with the Oregon Department of Fish and Wildlife, Oregon Natural Heritage Data Base and U.S. Fish and Wildlife Service for technical assistance in developing species management guides and in determining viable population levels.

During environmental analysis of each project activity, available habitat, location records, and other information should be reviewed to determine whether known or suspected locations of sensitive species or their habitat occur.

If no suitable habitat or reported locations of sensitive species are identified, these findings should be documented, and no further investigation is required.

When suitable habitats or reported locations are suspected to occur in the area of influence of the project, a field reconnaissance will be performed to more precisely verify the presence, abundance, and distribution of the sensitive

species. If the search is conducted during a season of the year when positive identification is probable and no listed species are found, this fact should be documented and no further investigation is needed.

If listed species are found in the project influence area, their actual distribution and current status will be determined. Informal consultation with the Endangered Species Branch of the Fish and Wildlife Service will be initiated if the species is Federally listed. If the proposed project would jeopardize the existence of the species it would be modified or curtailed.

Identified safeguards will be clearly spelled out in the environmental analysis and project plan and project personnel will be fully responsible for being aware of and implementing them. Supervision of the activity must assure that actions which jeopardize the listed species do not occur.

If actions which may adversely affect habitat for Federally listed endangered or threatened species cannot be avoided, the activity will be deferred until a formal consultation with the Endangered Species branch of the Fish and Wildlife Service is completed to determine a course of action.

In cases where other high values or uses would be foregone if the proposed activity were modified or deferred, a full investigation of the species involved may be conducted. Management guidelines will be developed that will make possible an assessment of the significance of the specific population involved. Based on these findings and consultation with appropriate state and federal agencies, a course of action will be determined.

Coordinate with the Native Plant Society of Oregon to exchange information on local plant distributions and status.

Other Species

Antelope

Manage antelope habitat on the Forest in accordance with Oregon Department of Fish and Wildlife population objectives. Population control necessitated by conflicts will also be dealt with by that agency.

Raptor Habitat

Protect active bird of prey nests from human disturbance until nesting, feeding, and fledging are completed. Provide protection of nest sites and nesting habitat sufficient for the species involved.

Bald and Golden Eagles

Nesting sites, and roosting sites used in conjunction with nesting sites, will be protected under the "Act for Protection of Bald and Golden Eagles" ref. title 50 CFR, USC 668-668d.

Nesting

Eagle nesting territories are divided into primary and secondary management zones.

Primary

The boundary of the primary zone shall not be less than 20 chains from the nest.

Human activities should be controlled during the critical period. The critical period is the time between arrival of adults at the nest site and three weeks after the fledging of any young. The critical period will usually fall between March 1 and August 15.

Secondary

The purpose of this zone is to further minimize disturbance.

The size of the secondary zone will be determined by local topography and resulting visibility from the nest. It shall lie outside the primary zone and be approximately circular with a minimum boundary of 40 chains from the nest.

Human activities into the secondary zone should be restricted during the critical period.

Roosting

Within 1/2 mile (40 chains) of existing nests, save three to five old growth trees for potential roost and perch trees during the breeding season.

Hawks and Owls, Except Prairie Falcons

Nesting

Nesting areas are divided into primary and secondary zones.

Primary

The boundary of the primary zone should not be less than five chains. The management objective for this zone will be to maintain the present habitat characteristics.

The critical period, during which human activities should be restricted, will usually fall between March 1 and August 1.

Secondary

The boundary of the secondary zone should be an additional five chains radius beyond the primary zone (total 10 chain radius). In this secondary zone, modified treatments will be required. "Modified" means intermediate between that required in the primary zone, and that normally prescribed outside of the whole protection zone.

The critical period is the same as for primary zone 'Hawks' above.

Prairie Falcons

Nesting

Nesting areas are divided into primary and secondary zones.

Primary

Size: same as for primary zone Hawks.
Critical period: same as for primary zone Hawks.

Secondary

The boundary of this zone should be an additional 15 chains beyond the primary zone. The management direction for this zone will be a modified treatment between the primary zone, and full treatment beyond the secondary zone.

Critical period: same as for primary zone Hawks.

Species Associated with Dead and Downed Logs

Down dead log requirements for wildlife are expected to be met through attrition of standing snags as they fall. Removal of these logs will not be allowed for other purposes. Wherever possible, two uncharred logs per acre should be left for wildlife habitat. These logs should be at least 12 inches in diameter or greater, and at least 20 feet in length.

Species Associated with Various Plant Communities and Successional Stages

Diversity is to be provided for by maintaining representative portions of all plant associations and having various successional stages represented in an area through time.

Species Associated with Springs, Bogs, and Other Unique Habitat

Seeps, springs, bogs, wet areas, and any other unique habitats, often or generally less than 10 acres in size, will be identified and evaluated on a project level basis and given appropriate protection.

Introduced Species

Evaluate proposals for introducing wildlife (case-by-case) through the National Environmental Policy Act (NEPA) process.

Management Area Standards and Guidelines

(Forest Only)

Resource - Wildlife and Fish

Practice

Habitat Management

General

Standard and Guideline

Manipulation of habitat to sustain the value of wilderness or to perpetuate a Threatened or Endangered wildlife species may be allowed with approval of the Chief of the Forest Service.

Applicable Management Area
MA-D8 Wilderness

Standard and Guideline
Manipulation of habitat will be allowed only for research purposes, with consent of the PNW Station Director.

Applicable Management Area
MA-D12 Research Natural Areas

Standard and Guideline
Habitat improvement projects are acceptable providing they meet the visual objective.

Applicable Management Area
MA-D9 Semiprimitive Nonmotorized

Standard and Guideline
Habitat improvements that do not dominate the landscape may be implemented.

Applicable Management Area
MA-D5 Retention
MA-D6 Partial Retention - Foreground
MA-D7 Partial Retention - Middleground

Standard and Guideline
Habitat improvements that meet the partial retention visual quality objective are acceptable.

Applicable Management Area
MA-D10 Semiprimitive Motorized

Standard and Guideline
Allow activities that meet the visual quality objectives and do not detract from the recreational value of the area.

Applicable Management Area
MA-D11 Developed Recreation

Standard and Guideline
Construct needed fish and wildlife habitat improvements.

Applicable Management Area
MA-D13 Riparian in Acceptable Condition

Standard and Guideline
Manage habitat for maximum populations of brook, rainbow trout, and steelhead.

Applicable Management Area
MA-D14 Riparian in Excellent Condition

Standard and Guideline
Permit habitat improvements compatible with the primary objectives of the management area.

Applicable Management Area
MA-D1 General Forest
MA-D2 Big Game Winter Range
MA-D3 Big Game Summer Range
MA-D4 Old Growth

Pileated Woodpecker Habitat

Standard and Guideline
300 acres or more is the optimum size stand, but clusters and smaller blocks (50 acre minimum) that are no more than 1/4 mile apart and total 300 acres are acceptable. Within a 1000 acre unit, which includes and surrounds each old growth habitat allocation, maintain a minimum average of two hard snags per acre greater than 10 inches DBH, on an additional 300 acres for feeding.

Standards by forest types are as follows:

Ponderosa Pine

Stands will contain at least 10 mature to overmature trees per acre with ponderosa pine representing 75 percent of the overstory.

Stem size will be 21 inches or greater in the overstory tree layer. Broken topped trees may be present. Overstory canopy closures will seldom exceed 50 percent on poor sites A minimum of one standing snag per acre with at least 1.5 tons of down material, including three logs per acre will be present.

Mixed Conifer

Stands include both intolerant and tolerant species. The stands should contain at least 15 trees per acre, 21 inches or more in diameter; and two snags with at least three tons of down material, including three logs per acre. Broken-topped trees may be present. Overstory canopy closure will be 70%.

Applicable Management Area
MA-D4 Old Growth

Big Game Habitat

Standard and Guideline
Manage to provide high capability for elk and deer use on winter range.

Manage 50 percent of the total area in thermal cover. Cover types may include mountain mahogany for deer and elk, and juniper for deer but not for elk.

Maximum distance from cover to any point in a forage area should not exceed 400 feet.

Treat isolated cover producing lands to produce the best balance of cover over time when the general area inherently has a low cover production potential.

Limit open roads to two miles per square mile following timber harvest and post-sale activities.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Manage 40 percent of the area in thermal cover. Thermal cover patches should be 30 to 60 acres each.

Maximum distance from cover to any point in a forage area should not exceed 600 feet.

The spacing of thermal patches will be controlled when these patches are isolated by noncover producing lands. Thermal cover patches, when adjacent to each other will not be treated simultaneously if the treatment results in thermal cover spacing greater than 1800 feet.

When an island of thermal cover is partially treated, the remaining portion will not be scheduled for treatment until the first portion is again in a thermal cover producing condition.

Forested stands, that have been previously treated in a manner that precludes development of thermal cover will be scheduled for treatment at the earliest possible time to meet cover management objectives.

Limit motorized access to two miles per square mile following completion of timber harvesting and post-sale activities

Applicable Management Area
MA-D3 Big Game Summer Range

Standard and Guideline

Maintain hiding cover in big game travel corridors.

Applicable Management Area

MA-D5 Retention
MA-D6 Partial Retention - Foreground

Cavity Nester Habitat

Strive to provide snag habitat at the levels shown in Table D-18, while meeting the primary management emphasis for the specific area. The 40 percent level is the lowest level for any management area, except where safety is involved.

TABLE D-18
SNAG HABITAT LEVELS

Snag Level (Percent)	Management Area
* 40	MA-D1 General Forest
* 60	MA-D2 Big Game Winter Range
* 60	MA-D3 Big Game Summer Range
100	MA-D4 Old Growth
100	MA-D5 Retention
80	MA-D6 Partial Retention-Foreground
40	MA-D7 Partial Retention-Middleground
100	MA-D8 Wilderness
100	MA-D9 Semiprimitive Nonmotorized
100	MA-D10 Semiprimitive Motorized
0	MA-D11 Developed Recreation
100	MA-D12 Research Natural Areas
40	MA-D13 Riparian in Acceptable Condition
80	MA-D14 Riparian in Excellent Condition

* These levels are hard target objectives, even though not specifically required as minimum. Others are anticipated and predicted results of implementation of the primary prescription.

Snag habitat may be provided through either identifiable snag patches, or even distribution. Snag patches (clumping) is the preferred method in most cases.

Snag Patch Method (Clumping)

When using the snag patch method, the acreage and number of the untreated clumps or units will vary according to timber type and acres treated. These areas may be managed on a double rotation, and made available for harvest in the future when adjacent and previously harvested areas are suitable for snag habitat production.

Snag patches should be distributed as evenly as possible, and located (on the average) one per 10 acres. This is necessary to meet the smallest territory size needs of a pair of excavator species.

Permanence of snag patches is more effectively achieved when size of snag patches exceeds one acre. But, it may be necessary to designate patches less than one acre in size in order to meet the territory need stated above, which is the more important habitat need.

Table D-19 shows the size of areas needed to be left for a double rotation based on major species groups and snag level. Areas selected for double rotation should be fully stocked and have a variety of size and tree conditions In two-story pine types, full stocking may very often not occur. When this is encountered, use the Individual Snag Distribution Method instead.

TABLE D-19
ACRES MANAGED FOR SNAGS PER ACRES TREATED ON EXISTING STANDS

	Ponderosa Pine		Mixed Conifer	
Snag Level (percent)	Size of snag patch at 1 per 10 acres (Acres)	% YT Reduction	Size of snag patch at 1 per 10 acres (Acres)	% YT Reduction
20	0 3	3	0 2	2
40	0 6	6	0 4	4
60	0 9	9	0 6	6
80	1 2	13	0 8	8
100	1 4	17	1 1	10

Individual Snag Distribution Method

Table D-20 shows the number of large green trees to leave per acre when using the individual snag distribution method. This will ensure a supply of large snags and part of the smaller snags (10-20").

TABLE D-20
GREEN TREES LEFT PER ACRE TO MEET DIFFERENT SNAG LEVELS
(20" DBH +)

	Understory Managed 1/		Understory Not Managed 2/	
Snag Level	Trees/Acre	% Volume	Trees/Acre	% Volume
20	2	3	3	4
40	.4	6	5	7
60	.6	9	7	10
80	.8	11	9	12
100	1.0	13	11	14

1/ Assumes 100 years before large snags will be produced

2/ Assumes 120 years before large snags will be produced

For Both Clump and Individual Tree Method

The size of residual stocking and adjacent stand conditions need to be considered to ensure a supply of small snags. If there is a predicted shortage of small snags, then additional trees in the 10 inch plus size class should be left within the managed stand to meet this need.

Species Management

Native animal species will be maintained. Allow no intentional introduction of non-native wildlife species

Applicable Management Area

MA-D8 Wilderness
MA-D12 Research Natural Areas

Management Area Standards and Guidelines
(Grassland Only)

Resource - Wildlife and Fish

Practice
Habitat Management

Big Game

Standard and Guideline
Maintain 75 percent of the area in a natural ecological condition.

Provide 20 to 40 percent cover.

Cover units may vary in size from 10 to 20 acres.

Encourage shrub components within different plant communities and successional stages.

Applicable Management Area
MA-D2 Big Game Winter Range

Standard and Guideline
Maintain a good ecological condition while managing for 15 to 20 percent deer cover.

Cover units may vary from 5 to 20 acres.

Encourage the shrub component within communities and successional stages.

Manage antelope fawning areas to protect their value and character.

Restrict vehicle use in antelope fawning areas from May 15 through June 15.

Applicable Management Area
MA-D3 Big Game Summer Range

Common Flicker

Standard and Guideline
Old Growth Juniper: 40 acres minimum; may be composed of scattered stands as small as five acres in size located no more than 1/8 mile apart. Spacing of old growth units (totaling 40 acres) should be a minimum of two miles and a maximum of five miles apart.

Juniper stands should contain 50 to 150 trees per acre with an average age greater than 150 years. Decadence within the stand is common, at least one juniper snag greater than 12 inch DBH present per acre. Percent crown closure will be low, 10 to 25 percent. The majority of the trees are large with hollow centers.

Applicable Management Area

MA-D4 Old Growth

Standard and Guideline

Manage riparian vegetation to provide cover for upland game birds.

Applicable Management Area

MA-D13 Riparian in Acceptable Condition
MA-D14 Riparian in Excellent Condition

Appendix E

Selection of Harvest Cutting Methods

Appendix E

Selection of Harvest Cutting Method

Harvest Cutting Methods

Harvest cutting methods include both even-aged and uneven-aged silvicultural systems (see Figure F-1). Even-aged harvest cutting methods generally include clearcutting, shelterwood cutting and seedtree cutting. Uneven-aged harvest cutting methods generally include individual tree selection and group selection cutting. The intent here is to document the rationale for selection of harvest cutting methods (even-aged or uneven-aged) to be applied on the Forest. The specific harvest treatment methods (such as clearcutting, seedtree cutting or group selection) will be selected on a site specific basis as identified in project level environmental analyses, or in silvicultural prescriptions written or approved by a certified silviculturist. Although even-aged management will generally be favored for reasons given below, this does not preclude the use of some tree or group selection cutting methods where they may be applicable.

Discussion of Even-Aged vs. Uneven-Aged Criteria

The criteria used for determining harvest cutting methods were developed using those identified in the Regional Guide for the Pacific Northwest Region (1984), as well as direction provided in 36 CFR 219.27(b) for management prescriptions that involve manipulation of tree cover. A brief description of the criteria follows. More detailed discussion can be found in the above cited documents.

Regional Guide Criteria

1. The method must permit the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest.

2. The method must permit use of a logging system which can remove designated trees without excessive damage to the residual stand and while meeting other established land management objectives. Table 3-1 in the Regional Guide displays the compatibility of logging systems with common harvest cutting methods. Generally, ground based logging methods, helicopters, and cable methods using slack pulling carriages are appropriate for all harvest methods, while cable methods without slack pulling carriages and balloons are appropriate only for clearcuts.

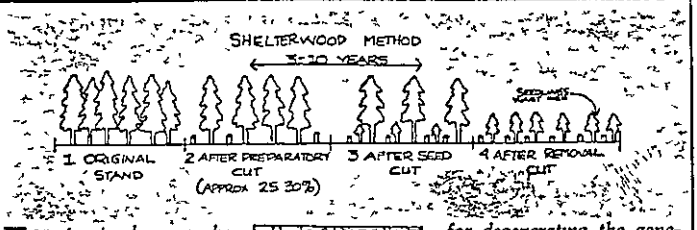
3. The harvest method must be capable of providing special conditions that are required to meet resource management objectives. Table 3-2 in the Regional Guide displays commonly used harvest methods which achieve desired forest character. Generally, both even-aged and uneven-aged methods can meet desired forest character with the exception of a mosaic of forest and opening, and maximum wildlife species diversity. Here, uneven-aged methods are not applicable.

4. The method must permit control of vegetation to establish desired numbers and rates of growth of trees as well as other vegetation needed to achieve special management objectives. Tables 3-3 and 3-4 in the Regional Guide outline these harvest cutting methods. Generally, both even-aged and uneven-aged methods can be used in vegetation zones occurring on the Forest, however uneven-aged methods are not applicable for maximum forage production or optimum tree seedling and sapling growth.

5. The method must promote a stand structure and species composition which minimizes serious risk from insects, disease, animal damage and wildfire, and will allow treatment of exist-

Figure E-1
Four Ways to Grow A Forest

FOUR WAYS TO GROW A FOREST



Forest stands can be harvested to produce a subsequent stand that is either even-aged or uneven-aged. Even-aged stands are ones in which all the trees are relatively close in age uneven-aged stands are comprised of trees that are in two or more age classes To achieve either type of stand certain harvesting methods are generally employed One of three methods can be used to ensure reproduction of an even-aged stand—clearcutting, seed-tree, or shelterwood For an uneven-aged stand, only the selection method can be used Let's examine the advantages and disadvantages of each of these four methods

A selection harvest is the removal of mature timber, usually the oldest or largest trees, as single scattered individuals or in small groups Cutting is done fairly often and is repeated indefinitely to maintain the uneven-aged structure of the stand Advantages of using a selection cut are that the stand is less susceptible to disease insects and fungi that would attack one species or age-class a continuous forest cover helps protect steep slopes from erosion, and such timber cutting is aesthetically most favorable On the other hand the method requires greater skill and more time in marking trees rather than boundaries of a sale area or trees to be left It is also more costly to return to a stand time and time again for a partial harvest and in doing so it is difficult to prevent logging damage to immature trees Perhaps the biggest drawback of the selection method is that of the four methods, it has the greatest potential for degenerating the genetic quality of the stand by eliminating the best trees

With clearcutting, an entire stand is harvested in one cutting and reproduction is obtained either artificially (by planting) or by natural seeding from adjacent stands or trees felled as part of the harvest Clearcutting is less expensive than the selection method, does no damage to the subsequent stand, and takes less time to mark However, there is a greater risk of disease and insect attack to the even-aged stand, a clearcut reduces protection from erosion and flooding, and it results in the least attractive appearance of the forest Most importantly, if reproduction on a clearcut fails, the resource manager may have to resort to planting, which is costly and time consuming



From top, shelterwood, selection, and seed-tree methods are three ways of managing forests

The seed-tree method is similar to the clearcut except that a few of the best trees on each acre are left singly or in groups to provide a seed source for getting the next stand started. Thus it has the benefits of clearcutting along with a better chance for natural seeding A disadvantage is that harvesting the seed trees after they have done their job can damage part of the forest they have helped create And many times the seed trees do not last that long, because they are more subject to the forces of nature when standing alone or nearly so

In a shelterwood cutting there is even greater insurance for reproduction as more trees are left to encourage even-aged regeneration in partial shade of the trees that are left

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From: Boerner, D. 1986, Monongahela Revisited. American Forests, Vol. 92(2) pp. 19, 51.

FOUR WAYS TO GROW A FOREST

Continued from page 19

Since there is always vegetation on the site this method approaches a selection cut in appearance and protection against erosion However harvest operations must occur at least twice as often as on a clearcut, and the harvest of overstory trees once the new stand is established can damage the reproduction

The four harvest methods should not be viewed as totally separate techniques The line between a group seed-tree and a shelterwood cut, for example is not distinct Neither is the difference between some shelterwood and selection harvests To stretch the example a bit farther but not out of proportion a clearcut can approximate a shelterwood cutting if it is small enough and/or located so that the adjacent stand encourages certain species to grow in its shade Likewise a large group selection cut in an uneven-aged stand might be considered by some as a clearcut The important thing to note is that these harvest methods are in reality reproduction methods and should be chosen singly or in combination to reproduce a stand with a particular species and age composition according to objectives and environmental/economic circumstances

—DEBORAH A BOERNER

ing insect, disease and fuel conditions. Table 3-5 in the Regional Guide displays harvest cutting methods favorable to the reduction and treatment of these agents. Generally, uneven-aged methods are not applicable where dwarf mistletoe and root disease present serious risks.

6. The method must meet multiple use management objectives identified in the Regional Guide and Forest Plan.

36 CFR 219.27(b) Criteria

The seven criteria identified in 36 CFR 219.27(b) which direct management prescriptions for the manipulation of tree cover are summarized as follows:

1. Be best suited to multiple use goals, considering biological, environmental, engineering, economics, and other impacts.
2. Assure that lands can be adequately restocked.
3. Not be chosen primarily because of the greatest dollar return or timber output, although these factors should be considered.
4. Consider the potential impacts on residual trees and adjacent stands.
5. Avoid permanent reduction of site productivity and ensure conservation of water and soil.
6. Provide the desired effects to meet special management objectives.
7. Be practical in terms of transportation and harvesting requirements, and total costs of timber sale preparation, logging, and administration.

Combined Criteria for Harvest Cutting Method

The criteria identified in the Regional Guide and in 36 CFR 219.27(b) were subsequently combined to eliminate duplication of intent and simplify the rationale for selecting the harvest cutting methods used to implement the Forest Plan. The seven criteria combined are summarized as follows:

1. The method must produce a volume of marketable trees that meet utilization standards and are designated for harvest. (Regional Guide: criteria 1.)
2. It must use available and acceptable logging systems. (Regional Guide: criteria 2, 36 CFR 219.27(b): criteria 4.)
3. It must be capable of meeting special management and multiple use objectives. (Regional Guide: criteria 3 and 6; 36 CFR: criteria 1 and 6.)
4. The method must permit control of vegetation to establish desired species composition, density, and rates of growth (Regional Guide: criteria 4; 36 CFR: criteria 4 and 6.)
5. It must promote a stand structure and species composition which minimizes risks from insects, disease and wildfire. (Regional Guide: criteria 5.)
6. The method must assure that lands can be adequately restocked (36 CFR: criteria 2.)
7. It must be practical and economical in terms of transportation, harvesting, preparation and administration of timber sales. (36 CFR: criteria 7.)

Forest Types and Management Areas

Both even-aged and uneven-aged harvest cutting methods are acceptable and were evaluated for selection within the two major Forest types and management areas where timber harvesting is scheduled. Management areas were grouped based on rationale for selecting the harvest system. Groups with similar rationale are summarized as follows:

Management Group		Management Area
General Forest	9	Rock Creek/Cottonwood Creek Unroaded-Helicopter Area
	21	General Forest Winter Range
	22	General Forest
Big Game	20	Big Game Winter Range

Riparian	15	Riparian
Recreation & Others	7	Summit National Historic Trail
	11	Lookout Mountain Recreation Area
	12	Eagle Roosting Areas
	13	Developed Recreation
	14	Dispersed Recreation
	16	Bandit Springs Recreation Area
	17	Stein's Piller Recreation Area
	18	Hammer Creek Wildlife Area
	19	Deep Creek Recreation Area
	23	North Fork Crooked River Recreation Corridor
	24	North Fork Crooked River Scenic Corridor
	27	Round Mountain National Recreation Trail
Visual Corridor	25	Highway 26 Visual Corridor
	26	Visual Management Corridors

Rational for Determining Harvest Cutting Method

The following analysis documents rationale for determining the harvest cutting method within each forest type (ponderosa pine and mixed conifer) and management group[1] based on those combined criteria which have a significant effect on the method selected.

Ponderosa Pine Forest Types

Ponderosa Pine/General Forest

Lands within this management area will be managed for both timber and forage production. Thermal and/or hiding cover for big game will be provided on at least ten percent of the area that is in winter range. Satisfactory tree growth rates should be maintained and stands should be protected from insects, disease and damaging agents. Both even-aged and uneven-aged methods are biologically acceptable (Barrett, 1979, Burns, 1983). Even-aged methods generally provide enhanced forage production and maximize wildlife species diversity (combined criteria 3). Even-aged methods generally provide for enhanced seedling and sapling growth rates because of the significant effect of mature or larger trees on height and diameter growth of the understory (Barrett, 1979) (combined criteria 4). Clearcutting or shelterwood cutting with planting allows the introduction of genetically improved stock. Where dwarf mistletoe and root disease are present, uneven-aged methods are not applicable (combined criteria 5). Even-aged methods are more economical and practical in terms of transportation, harvesting, preparation and administration (Barrett, 1979; Burns, 1983) (combined criteria 7). Uneven-aged stands are generally more aesthetic and are best suited for the production of high quality trees and provide better distribution of snags (combined criteria 3). With uneven-aged systems thrifty (fast growing) black-bark pines and more thrifty old growth can be retained to supply a more continuous supply of large pine. Within this working group, periodic use of prescribed fire reduces fuel accumulations and eliminates undesirable competitive vegetation (Burns, 1983). Even-aged methods are more compatible with this treatment, but with care and proper timing prescribed burning can be done in uneven-aged stands.

It is clear that neither system is universally superior, so the decision needs to be made based on site specific analysis. Generally, an uneven-aged system is the preferred method where: the existing stand is multi-age, tractor logging is planned, and diseases are not a problem. Even-aged systems will be used in most cases where these conditions are not met.

Ponderosa Pine/Big Game

Vegetation will be managed to provide optimum habitat for deer and elk. Special conditions required to meet the resource management objectives include providing thermal cover over 20 percent of the area as well as a vigorous forage base. Prescribed burning is recommended for site preparation and

[1]The management prescriptions contained in Appendix D provide more specific direction

forage enhancement. Although both even-aged and uneven-aged harvest cutting methods are biologically acceptable, even-aged methods can best provide for the special conditions (cover) within this management area (combined criteria 3). Uneven-aged methods are generally not applicable where the desired character is a mosaic of dense forest, 30 to 60 acres in size, and openings of similar size. In addition, the transportation system and entry frequency necessary for management of uneven-aged stands results in more big game harassment.

Ponderosa Pine/Riparian

Vegetation will be managed to provide streambank stability, stream shading, and a supply of large woody debris. Timber production and economic returns is a secondary consideration. Both even-aged and uneven-aged methods can provide these conditions (combined criteria 3). Either harvesting method may be used based on specific site and stand characteristics, as documented in the project level environmental analysis.

Ponderosa Pine/Recreation and Other

Ponderosa pine managed in these areas will maintain visual diversity through variations of stand densities and size classes. Large, old growth trees will provide an important stand component. Both even-aged and uneven-aged methods are biologically appropriate and can provide for the visual variety and maintenance of a large tree component. Here, the special conditions required to meet management objectives take precedence over economic considerations or timber volume production (combined criteria 3). Tree growth rates should be sufficient to produce the characteristic large tree component within the rotation age and maintain trees in a healthy condition (combined criteria 4). In addition, trees should be managed to minimize risks from insects, disease and wildfire (combined criteria 5). Either even-aged or uneven-aged harvest cutting methods may be selected here. The ultimate selection should be based on specific site and stand characteristics as documented in project level environmental analyses.

Ponderosa Pine/Visual Corridors

Management requirements are similar to Developed Recreation but with more emphasis on open park-like stands of ponderosa pine. Either even-aged or uneven-aged management could be used but even-aged management with extended rotations can best meet the size requirements (combined criteria 4) and the park-like condition (combined criteria 3).

Mixed Conifer Forest Types

Mixed Conifer/General Forest

Lands within this management area will be managed for both timber and forage production. Thermal cover for big game will be provided on at least ten percent of the area that is in winter range. Satisfactory growth rates should be maintained and stands should be protected from insects, disease and damaging agents. Species composition in this working group should be controlled to produce trees which can maintain satisfactory growth rates and resistance to insects, disease and damage (Schmitt, 1984). Both even-aged and uneven-aged methods are biologically acceptable here. The selection decision is weighted heavily by successional trends and upon the relative shade tolerance of species present within the mixed conifer working group (Burns, 1983; Minore, 1979). Here, shade intolerant species, including ponderosa pine and western larch, are more desirable and better meet management objectives for growth and resistance to insects, disease, and damage. Even-aged management is most desirable to convert over-mature, old growth stands to vigorous stands of shade intolerant species (Burns, 1983) (combined criteria 4 and 5). Also, on the Ochoco National Forest, mixed conifer stands frequently occur on slopes greater than 30 percent where acceptable logging systems and fuels treatment favor even-aged methods (combined criteria 2). These methods are generally more practical and economical in terms of transportation, harvesting, preparation and administration of timber sales (combined criteria 7). Even-aged methods will generally be selected for mixed conifer/timber, but uneven-aged may be used where thrifty, disease free, multi-age stands occur with acceptable species mix.

Mixed Conifer/Big Game

The objective in this management area is to maintain 40 percent cover in stands 30 to 60 acres in size. This can be met with minor modifications to the Timber-Range prescription (see the Forest Plan, Management Prescriptions). Even-aged management is the only system that will provide the cover requirements in the size of area needed to meet the management objectives. Even-aged is selected for this reason (combined criteria 3). Other reasons as discussed in Timber-Range above also apply.

Mixed Conifer/Riparian

Vegetation here will be managed to provide streambank stability, stream shading, and a supply of large woody debris. Timber production and economic returns are secondary considerations. Both even-aged and uneven-aged methods can provide these conditions (combined criteria 3). Either harvesting method may be used based on specific site and stand characteristics as documented in project level environmental analyses. When uneven-aged is selected, it will be by group selection method rather individual selection.

Mixed Conifer/Recreation and Other, and Visual Corridors

Mixed conifer stands managed in this area will provide a variety of species, snags and size classes. Large, old-growth trees will provide an important stand component. Both even-aged and uneven-aged harvest cutting methods are biologically applicable and can provide for the visual variety and maintenance of the large tree component. Here, the special conditions required to meet visual management objectives are the primary consideration (combined criteria 3). While economic returns and timber volume production are also important, they play a secondary role in this management area. Tree growth rates should be sufficient to produce the characteristic large tree component and maintain trees in a healthy condition (combined criteria 4). In addition, trees should be managed to minimize risks from insects, disease and wildfire (combined criteria 5). Either even-aged or uneven-aged methods may be selected here. Uneven-aged methods may require artificial regeneration to maintain the appropriate species composition and may be restricted to sites where acceptable logging methods can be applied (combined criteria 2). Uneven-aged methods are not applicable where insect or disease conditions cannot maintain stands relatively free of risk (combined criteria 5). Where even-aged management is used it will use small patch cuts, and where uneven-aged management is used it will be group selection. The ultimate selection should be based on specific stand and site characteristics as documented in project level environmental analyses.

Literature Cited or Reviewed

The evaluation of harvest cutting methods is based on operational experience and research findings published in the following documents:

Barrett, J.W. 1979. Silviculture of Ponderosa Pine in the Pacific Northwest: the State of Our Knowledge. USDA For. Serv. Gen. Tech. Rpt. PNW-92, PNW For. and Range Exp. Stn., Portland, Or. 106 p.

Burns, R.M, tech. comp. 1983. Silvicultural Systems for the Major Forest Types of the United States. Ag. Handb. 445, USDA, Washington, D.C. 191 p.

Fowells, H.A., tech. comp. 1965. Silvics of Forest Trees of the United States. Ag. Handb. 271, USDA, Washington, D.C 762 p.

Minore, D. 1979. Comparative Autecological Characteristics of Northwestern Tree Species: A Literature Review. USDA For. Serv. Gen. Tech. Rpt. PNW-87, PNW For. and Range Exp. Stn., Portland, Or. 72 p.

Schmidt, C.L, et al 1984. Effects of Management Activities, and Dominant Species on Pest-Caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests. USDA Pacific Northwest Region, Forest Service. Portland, Or.

Smith, D. 1962. The Practice of Silviculture. John Wiley & Sons, Inc. New York. 578 p.

Appendix F

Management Requirements

Appendix F

Analysis of Management Requirements

This appendix presents information responding to decisions of the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding Appeal Number 1770, brought by the Northwest Forest Resource Council on September 18, 1986. The appeal centered on direction from the Regional Forester to incorporate management requirements (MR's) into Forest Plan alternatives.

The appellant requested that the appropriateness of the management requirements be examined through the environmental impact statement process. This analysis is intended to address the issue raised by the appellant In the analysis, alternate ways of meeting the management requirements are examined and certain opportunity costs (losses in economic efficiency and timber available for harvest) are considered

Background

What are Management Requirements?

Many laws and regulations guide Forest Service activities. One law in particular, the National Forest Management Act of 1976 (NFMA), and its implementing regulations, provides direction for the forest planning process. The regulations for National Forest System Land and Resource Management Planning, in Section 36 of the Code of Federal Regulations, Part 219 (36 CFR 219) specify: 1) the minimum specific management requirements to be met in accomplishing the goals and objectives of the National Forest System (36 CFR 219 27) and 2) the minimum requirements for integrating individual forest resource planning into the forest plan (36 CFR 219.14 through 219.26). The term "management requirement" will be used in this appendix to refer to these NFMA regulations. Previously, the term "minimum management requirements" or "MMR's" was applied. The regulations do not use either of these terms and their use is discontinued hereafter.

Some requirements are procedural and need not be dealt with here Some were analyzed and available for public review during the Regional Guide Environmental Impact Statement process and are also not dealt with here The primary management requirements applying to the Ochoco National Forest are summarized in Table F-1. The management requirements treated in this supplement that required additional analysis are: size and dispersion of created openings, providing adequate habitat to maintain viable populations of existing native vertebrate species and water quality. Each of these is discussed in more detail later in this appendix. Additional information on management requirements and process may be found in Appendix B.

Legal Requirements vs. Implementing Methods (Ends vs. Means)

The management requirements from the planning regulations (36 CFR 219.27) are legal requirements, and as such are ends that must be achieved on-the-ground when the forest plan is implemented. For example, NFMA implementing regulations require that fish and wildlife habitat be managed to maintain viable populations of existing native vertebrate species and desired non-native vertebrate species in the planning area. Whatever implementation methods are chosen, this--and all other management requirements--must, by law, be met

TABLE F-1.
SUMMARY OF MAJOR OCHOCO NATIONAL FOREST MANAGEMENT REQUIREMENTS AND APPLICATION METHODOLOGY 1\

MODELING REQUIREMENT	METHOD EMPLOYED
TIMBER	
Nondeclining yield at or below range sustained yield capacity	- FORPLAN constraints - Impacts assessed in Analysis of Management Situation (AMS) and DEIS -Departures formulated and evaluated
Management intensities and utilization standards consistent with Renewable Resources Planning Act (RPA)	- Full range of intensities examined and used in FORPLAN - Utilization standards incorporated in yield tables
Rotations no earlier than culmination of mean annual increment (CMAI)	- Entry ages assigned in FORPLAN - Impacts assessed in AMS and DEIS
Perpetual harvest meeting principle of sustained yield	- FORPLAN "ending inventory" constraint
Assure that restocking can occur within 5 years	- Acre limits set for natural regeneration in FORPLAN - Suitability classification and typing
No timber harvesting on unsuitable lands	- No timber yield tables available for unsuitable analysis areas
Provide for dispersion of openings and maximum unit sizes 2/	- R-6 harvest dispersion constraints in FORPLAN - Impacts assessed in AMS and DEIS
FISH AND WILDLIFE	
Provide habitat to maintain viable populations	- Use of selected species for representative habitats (pileated *woodpeckers, primary cavity excavators)* - Substantive requirements incorporated as FORPLAN constraints - Impacts assessed in AMS
Provide habitat for threatened and endangered species 2/	- Standards and guidelines in the Forest Plan
SOIL AND WATER	
Do not allow permanent impairment of the productivity of the land No more than 10% of an activity area may be impacted by *soil compaction* Meet riparian and equivalent clearcut area (ECA) requirements No timber harvest on unsuitable lands	- *Costs reflect practices necessary to meet requirements* - See Below - See Below
Meet requirements of Clean Water Act by application of Best Management Practices (BMP's), ECA's and riparian requirements 2/	- Scheduling constraints incorporated into FORPLAN - Impacts assessed in AMS and DEIS - See below
No detrimental changes to temperature, chemical composition, ordeposits of sediment which seriously or adversely affect water conditions or fish habitat	- *Standards, guidelines and management prescriptions incorporat*ing practices, and associated costs to meet the requirements assigned to riparian areas in FORPLAN - Impacts assessed in AMS and DEIS

RANGE	
Protect, manage, and control wild horses	- Wild Horses Management Plan standards and guidelines in Forest Plan Appendix C1 provide for maintenance of existing herd

1/ Management requirements listed here are those that may be directly attributable to NFMA requirements

2/ MR's that have an effect of two percent or more allowable sale quality, or PNV in the context of the maximum Benchmark (without MR's), are the requirements which will be analyzed further in this appendix supplement

Specifications or standards for achievement for each management requirement are established at the national level or through analysis at the regional level for most of the management requirements. These are listed in the regulations or as standards and guidelines in the Regional Guide. Additional specifications identified on the Forest are listed as standards and guidelines in the Final Environmental Impact Statement (FEIS) Appendix D The specifications must be based on knowledge of the resources involved. For example, in meeting the management requirements for viable populations of vertebrate species, it is necessary to define the type of habitat required by the species, the maximum distance between habitats which will still provide reasonable assurance of genetic interaction, and the size of habitat area needed to support a breeding pair.

Often, the pool of scientific knowledge is insufficient to provide the entire basis for defining the specific conditions or standards that will satisfy or meet a management requirement. When this happens it is necessary to rely on field experience and the professional judgement of knowledgeable professionals, and to establish monitoring and research that will provide better information for future planning efforts

Implementation methods are the means or ways of meeting the ends (management requirements). Using the pileated woodpecker as an example, the end is to provide adequate habitat to maintain a viable population of pileated woodpeckers into the foreseeable future. The means of providing this habitat involves designing and implementing a set of practices that will assure that nesting and feeding areas meeting the needs of pileated woodpeckers are available in the future, and that these habitats are located closely enough together to allow woodpeckers occupying adjacent habitat areas the opportunity to interact, thus assuring continued genetic diversity and continued viability of the species.

Unfortunately, the distinction between ends and means is not always clear. For example, the requirement regarding viable populations of vertebrate species, stated above, is well defined In contrast, the size and dispersion of created openings management requirement (end) is rather general: NFMA specifies that maximum size limits for areas to be cut in one harvest operation be established for areas to be clearcut (Sec. 6[g][3][F][iv]), but does not specifically state the objective (end) to be accomplished by doing so. Nonetheless, the implementing regulations and the Regional Guide have specified maximum unit sizes and dispersion requirements.

How Implementation Methods for Management Requirements are Developed

Often there is more than one way of achieving a management requirement. Considering and analyzing different means (or ways) of meeting a specific management requirement are particularly important if there are potentially large opportunity costs involved.

A six-step process was used for identifying alternative ways and means of meeting management requirements. The steps used are as follows:

1. Identify the desired "end" for each management requirement.
2 Assemble information about the resources affected by each management requirement.
3. Analyze the existing information to determine what conditions or specifications need to exist on-the-ground (specifications) to assure that the management requirement would be met.
4. Develop the ways, means, or methods to achieve the desired conditions. Usually, conditions were simulated using the FORPLAN model.
5 Evaluate the effectiveness of the alternative ways, means, or methods in meeting the management requirement. The opportunity costs, that is, the effect on both economic efficiency as measured by present net value (PNV) and timber availability as measured by allowable sale quantity (ASQ), were analyzed for each alternative way or means.
6. If the opportunity costs of meeting a management requirement with the most efficient means were found to affect the PNV or ASQ of a maximum present net value benchmark by two percent or more, the process used to determine the optimum means was analyzed further and is presented in this appendix Two percent was used because differences less than two percent would not be significant in terms of the opportunity costs of the alternatives.

Table F-2 displays the management requirements

TABLE F-2
MANAGEMENT REQUIREMENTS ANALYZED FOR OPPORTUNITY COST

Ends	Summary of Specifications
Openings created by timber harvest activities are dispersed and limited in size	- Maximum created opening size of 40 acres (with some exceptions) - Limit to 1/3 the size and 1/3 the perimeter of adjacent natural openings. - Corners of two or more created openings may touch, but are considered a single opening and cannot exceed 40 acres (with some exceptions) if they are not stocked with trees 4 1/2 feet tall - Protect vegetation along edge of natural openings at all times - Site must be adequately stocked with trees 4 1/2 feet tall before a harvest area is considered a closed stand and not an opening
Habitat provided that maintains viable populations *of existing native and desired non-native* vertebrate species	- Maintain old growth and mature forest stands (nesting habitat) and feeding areas of adequate size and distribution to permit interaction among breeding pairs of dependent species (Table I-5)
Protect riparian habitat	- Land approximately 100 feet from edges of all perennial streams, lakes, and other bodies of water require special attention 1 to maintain streambank stability 2 to maintain stream channel stability 3 to avoid unacceptable erosion and sedimentation that would exceed State standards, and 4 to meet Clean Water Act standards
Protect water quality	- Limit the amount of a watershed in cutover state at any point in time - Meet Clean Water Act Standards

and the alternative means analyzed for opportunity costs on the Ochoco National Forest. Table F-2 also displays the management requirements analyzed for opportunity costs and a summary of the specifications or standards used to measure the achievement of those ends. Complete specifications are noted in the FEIS.

In analyzing the effects that alternative ways of meeting the management requirements had on PNV and ASQ, FORPLAN runs were made with and without constraints designed to simulate meeting the management requirement. A run that portrays the mix of management activities that would result in the highest level of economic efficiency (PNV) in managing the Ochoco National Forest resources (run #3 of the benchmark run sequence, 1920, 5/17/83) was used for this analysis. This benchmark contains no management requirements, therefore, inserting one management requirement at a time would likely result in higher opportunity costs than if the same analysis was conducted in a fully developed benchmark or alternative. It also identifies the ASQ associated with the most economically-efficient mix of management activities and the maximum opportunity costs. A benchmark rather than an issue-based Forest Plan alternative was used for the comparison because management practices used to meet other objectives of an issue-based alternative might have partially or fully met the management requirement, thus clouding any analysis of opportunity costs induced by the management requirement. The true effect when measured against a fully developed alternative is significantly less because the objectives of that alternative may satisfy the management requirements to a large extent

Results of this analysis are displayed in Table F-3,

TABLE F-3

APPROXIMATE CHANGE (OPPORTUNITY COST)
ASSOCIATED WITH MEETING THE MANAGEMENT REQUIREMENTS
WITH SELECTED OPTIMUM IMPLEMNTATION METHOD 1\

	First-Decade ASQ MMCF/Yr	Estimated Percent Change in ASQ	PNV 2\ MM$	Percent Change in PNV
Maximum PNV benchmark without MR as displayed in the DEIS	23 4	--	494 0	--
Estimated Opportunity Cost of Meeting All Selected Management Requirements	1	4	16 4	3 3
Opportunity Cost of Providing Adequate Habitat to Maintain Viable Populations MR (Old Growth)	6	2 6	15 9	3 2
Opportunity Cost of Meeting Water Quality MR	1 0	4 3	44 4	9 0
Opportunity Cost of Meeting Riparian MR	3	1 3	7	.2

MMCF/Yr = Millions of cubic feet per year
MM$ = Millions of dollars

1\These effects represeent the maximum potential impact since the efficiency of methods meeting more than one MR, or other resource objectives for an alternative were not considered The potential effects of MR's are displayed as if they were additive, although there may be overlap

2\PNV figures taken directly from FORPLAN reports and are not fully comparable to PNV's displayed elsewhere in DEIS For comparison purposes here, however, the figures are applicable

including the PNV and the first-decade ASQ for a maximum PNV benchmark as shown in the FEIS (Appendix B, Table B-6-1, pg. B-92), the reduction in PNV and ASQ resulting from application of the selected means of meeting the management requirements, and the percent change in ASQ and PNV.

Where the opportunity costs exceeded two percent, the analysis of the alternative means for meeting management requirements is presented in subsequent discussion. The following sections present an analysis of the management requirements where alternative ways of meeting that requirement were considered.

Significant Management Requirements

Management Requirements for the Size and Dispersion of Created Openings

Source of the Management Requirement

Direction for the size and dispersion of created openings comes from the National Forest Management Act (NFMA)(Section 6 (g)(3)(F)), the planning regulations (36 CFR 219.27(d), and the Regional Guide (pp. 3-7 and 3-8).

Specifications for the Management Requirement

The specifications or standards for achievement of the size and dispersion of created openings management requirement have been published in the 1984 "Regional Guide for the Pacific Northwest Region" and are as follows:

1 A harvested area will no longer be considered a created opening for silvicultural purposes when stocking surveys carried out in accordance with Regional instructions indicate that prescribed tree stocking is at least 4 1/2 feet high and free to grow.

2. The maximum size limit of harvest openings on the Ochoco National Forest is 40 acres. Some exceptions may be permitted in specific situations.

3. Harvested openings will be separated by blocks of land that are adequately stocked with trees that are at least 4 1/2 feet high and that contain one or more logical harvest units of similar size.

4. Harvested openings that touch each other are not precluded, but will be considered a single opening in determining harvest area maximum size limits

5. Harvested openings contiguous to 30-acre or larger natural openings are subject to the 40 acre maximum size limit, but normally should not exceed one-third the size of the natural opening and not occupy more than one-third of the natural opening perimeter.

6. Harvest openings should not be created adjacent to any natural openings (regardless of size) unless adequate vegetation along the edge of the natural opening can be developed or retained in sufficient density to protect wildlife and meet visual management objectives.

Alternative Ways of Meeting the Management Requirement For the Size and Dispersion of Created Openings.

As required in the planning regulations (36 CFR 219), standards were developed in the Regional Guide for controlling the size and dispersion of created openings. The Regional Guide allows some flexibility in applying these standards by permitting exceptions to the maximum opening sizes These however are exceptions and not relief from the standards themselves. That is, these exceptions may be considered when deciding how the standards should be reflected in the planning process, not if the standards should be reflected.

Original Regional direction relating to the size and dispersion of created openings did not focus on how the various Forests should interpret the requirements, but instead repeated the dispersion requirements of the Regional Guide, recommended computer modeling techniques, and established documentation and review procedures. The responsibility for determining how to meet the dispersion requirements was deferred to the Forests.

The Region's initial effort in addressing this management requirement focused on how to develop a dispersion factor to be applied in FORPLAN to represent the limitation on harvest location that the dispersion requirement imposes. This factor was intended to represent the percentage of lands that could be assigned to a regeneration timber harvest prescription creating an opening in a single FORPLAN period. A recommended process was developed for Forests to use if they chose, or for Forests to use as a check on any other process they thought would serve the same purpose. The recommended process consisted of developing a theoretical dispersion factor based on specific Forest conditions, and then testing this factor on sample areas of the Forest to verify or adjust it.

This testing was designed to recognize the limitations of the theoretical factor. First, the theoretical factor assumed that the area to be harvested was homogeneous, when in fact most acres outside roadless areas already have existing harvest patterns that affect the flexibility to lay out harvest units. Second, the theoretical factor assumed that all harvest units were the same size, when in fact the size of logical harvest units necessary to separate created openings does not have to be the same size. Therefore, Forests were advised to examine their own situations to determine if the theoretical results could be applied to a sample area for the first harvest period. If harvesting up to the theoretical percentage was difficult, they were to look for possible reasons why, and adjust the dispersion factor accordingly.

Once an appropriate factor was determined to ensure compliance with the requirements for the size and dispersion of created openings, a corresponding constraint in FORPLAN was applied as a maximum percentage of the acres allocated to a timber harvest prescription that could be final harvested by period in an analysis area.

The requirement specifications were incorporated into the Ochoco FORPLAN model. The theoretical dispersion factor was developed and validated by extensive mapping (1920 5/31/84) and the factor was evaluated by the Forest interdisciplinary team. This analysis indicated that a 33 percent limit on regeneration harvest by analysis area was appropriate.

An assumption was made in the model that it takes twice as long for an area left to natural regeneration to grow out of the opening stage than it does for an area that is planted. This was portrayed by modeling created opening regeneration rates and allowing the linear program to select from various management intensities using either planting or natural regeneration to most efficiently meet the minimum requirement.

Because many of the Forest's issues and concerns, as well as costs and values, revolve around harvest scheduling, another option was considered. It used a different modeling approach where alternative harvest schedules would be determined prior to running the model and averaged over time to reflect harvest dispersion, and input to the model. This scheme for modeling dispersion was eventually dropped because only a few of the hundreds of potential schedules available for an analysis area could be represented with this approach, thus unnecessarily limiting PNV.

Evaluation of Implementing Methods to Meet the Size and Dispersion of Created Openings Management Requirement

Opportunity Costs and Consequences of Methods (Ways and Means)

The opportunity costs associated with achieving the requirement of limiting the size and dispersion of created openings has only a minor effects on the

allowable sale quantity (Table F-3, Pg. F-7), but does affect the PNV by 3.3 percent. Alternative practices for implementation such as regeneration methods, which can affect the rate or time it takes to recover, were analyzed and employed in the modeling. An assumption was made that natural regeneration takes approximately twice as long to establish a 4 1/2 foot tall stand of trees in created openings as would planting. This assumption is reflected in the opportunity cost in the PNV. The potential alternative means of a priority harvest schedule development, and adjustment of dispersion factors, were determined to be impractical solutions to satisfy the requirement. In reality, the costs of this management requirement are masked by the method employed to meet the water quality minimum requirement which is similar in application, but more stringent. The opportunity costs reflect the regeneration methods chosen.

Rationale for Selected Method

The means to achieve the requirement were selected through processes developed by specialists at the regional and forest level, and reviewed by the interdisciplinary teams. The 33 percent factor developed was determined to have the least effect on efficiency and harvest scheduling while still meeting the intent of the management requirement. To assist rapid recovery of created openings, artificial regeneration is chosen as the primary means. The model does have the potential to select natural regeneration where it is more efficient. Artificial regeneration adds to the cost of stand establishment, thus decreasing the PNV. It does, however, provide more flexibility in scheduling and a potential positive effect on the ASQ.

The Wallowa-Whitman National Forest assessed the option of a longer time period for trees to attain the 4 1/2 foot height requirement for a stand to convert from an opening to a forested area. This option was not analyzed on the Ochoco National Forest because it was felt that the 4 1/2 foot standard is still the real means to the end. The longer time frame option did not present a real alternative means. A true alternative would have been to alter the height requirement. This was not done because of the Regional direction to use the 4 1/2 foot standard.

Implications for Forest Plan Alternatives

The alternatives and benchmarks considered in the FEIS have no direct opportunity costs associated with meeting the size and dispersion of created openings management requirement. This is because the means used to meet the water quality management requirement are more restrictive than those for the size and dispersion of created openings. In the context of an alternative, if the requirement for water quality was abolished, the opportunity cost for the size and dispersion of created openings would be less than displayed in Table F-3. The opportunity costs displayed, as discussed above, reflect regeneration methods. All alternative means incorporate the management requirement for the size and dispersion of created openings.

Role of Monitoring and Research

The size and dispersion of created openings requirement will be monitored to determine whether actual outputs are consistent with those projected by the FORPLAN model. The actual time required for new stands to reach 4 1/2 feet in height will be monitored for both natural and artificially regenerated stands. This is important in testing the appropriateness of the selected modeling assumptions.

Management Requirements for Providing Adequate Habitat to Maintain Viable Populations of Existing Native Vertebrate Species

Source of the Management Requirement

The planning regulations state:

"Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure continued existence in the planning area. In order to insure that viable populations will be main-

tained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area" (36 CFR 219.19).

Description of the Management Requirement

In assessing those wildlife species that could be put at risk as a result of future management activities, the types of habitat existing today and how they would change in the future were examined. Through this review, it was determined that most types of habitat existing on the Forest today would continue to exist in similar quantities in the future. The significant exception to this was the old growth/mature forest habitat type. Unless management activities were specifically designed to retain a component of old growth and mature forest, it was apparent that wildlife species dependent on this habitat could experience significant reductions in their population sizes and distribution.

Management requirements also exist for primary cavity excavators, bald eagles, and peregrine falcons, but there are no measurable opportunity costs associated with providing adequate habitat to maintain viable populations on the Ochoco National Forest Consequently, they were not analyzed here.

There are approximately 100 wildlife species on the Ochoco National Forest that use old growth or mature forests to some extent. In this analysis, pileated woodpecker requirements were used because they

TABLE F-4
Species Matrix for Addressing Management Requirements
For Wildlife 1/ and Threatened and Endangered Species

Habitat	Zone 1 North Coastal	Zone 2 Westside Cascades	Zone 3 Eastside Cascades	Zone 4 Blue Mountains
Mature and Old Growth (Seral stages V and VI)	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker Northern 3-toed Woodpecker	Marten 2/ Pileated Woodpecker Northern 3-toed Woodpecker
Dead and Defective	Primary Cavity Nesters	Primary Cavity Nesters	Primary Cavity Nesters	Primary Cavity Nesters
Riparian				Native Trout
Big Game		Mountain Goat	Mountain Goat (Wenatchee)	
Threatened and Endangered Species	Bald Eagle Peregrine Falcon Brown Pelican Aleutian Canada Goose	Bald Eagle Peregrin Falcon	Bald Eagle Peregrin Falcon Grizzly Bear Woodland Caribou (Colville)	Bald Eagle Peregrin Falcon

1/ The species listed were selected as management indicators because they are representative of all species requiring the identified habitats

2/ The Ochoco National Forest has little habitat for Marten or Northern 3-toed Woodpeckers (or the species they represent) Consequently, the Regional Forester in September 1984, agreed that the pileated woodpecker would serve as the sole indicator species for old growth species on the Ochoco

best represent other species dependent on old growth or mature forest habitats occurring on the Ochoco. That is, by managing and monitoring in a way that will ensure the woodpeckers viability, it is believed that the other species with similar habitat requirements will be protected. Habitats descriptions were based on broad seral stages of groups of plant communities from Kuchler's vegetation classification system. For example, the pileated woodpecker habitat represents mature and old growth timber across 12 different plant communities.

Identification of management requirement species was made on a Regional (all the National Forests in Oregon and Washington) and a subregional basis. The results, by subregion, are shown in Table F-4. The Ochoco National Forest is a part of the Blue Mountain subregion. The Regional Forester made an exception to management requirement species for the Ochoco National Forest in September 1984. In Table F-4, Pileated Woodpecker, marten and the Northern Three-toed Woodpecker would all be indicator species for the Blue Mountain subregion forests. The Ochoco however has very little habitat for marten and the Northern Three-toed Woodpecker Because of the insignificant amount of habitat for these two species, and hence associated species, and the impracticability of managing this small area forest wide, the pileated woodpecker was selected to represent the old growth dependent species across the Forest.

Once the management requirement species were identified, the Region defined habitat requirements and biological characteristics for the species. These are the basis for providing for species habitat, and also for deciding how best to represent the species' needs in the planning process and in the FORPLAN model Habitat needs were defined using information from *Wildlife Habitats in Managed Forests· The Blue Mountains of Oregon and Washington,* Thomas, J. W., 1979 and other resources (see bibliography for this appendix). This information was used to define the habitat conditions, habitat dispersal, and habitat sizes necessary to meet the management requirement When information was available, but did not exactly fit the management requirement context, professional judgment was used to apply the information in estimating habitat needs. When information was not available, habitat needs were developed from the professional judgment of a number of the more knowledgeable biologists on the subject. Information from existing research was used whenever possible.

This information for each species was provided for three habitat factors described below and presented specifically thereafter for each indicator species.

(1) Principal Habitats Used

Information about the seral stages and Kuchler vegetation types used by the various species is documented in many research papers for individual species. Information as to which Kuchler type and/or seral stage are primary or secondary habitat, and the amount of dependency upon each habitat, is based mostly on professional judgment. (Guenther and Kucera, 1978, Phillips, et al, 1981.)

(2) Dispersal Distance Between Habitats

Research information is generally not available for optimum dispersal distance between habitats As a result, dispersal distance is based on observations, experience, and professional judgment. Dispersal distance is determined by the ability of an individual species to travel to the next habitat with a frequency to prevent isolation of subpopulations. Distances are adjusted to consider the network and overlap of habitat formed by the species (e g , pileated woodpecker and marten).

(3) Size of Habitat Areas

The size of individual habitat areas provided for each wildlife species is based on the habitat acreage needed to support the basic social or reproductive unit of the species, in this case breeding pairs. Both home range and species density information are used to estimate the needed size of habitat area Again, professional judgement is used where data is not available for the specific habitat types being managed.

The specific Regional direction for the identified indicator species and the scientific source of that direction are discussed in the following section. This direction is summarized from "A Report on Mini-

mum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service" (USDA Forest Service, June 1986) In developing the report, various habitat sizes and dispersal distances were considered. Based on that analysis, minimum habitat sizes and maximum dispersal distances were identified for each species Since those minimums are based on the best available data, and there are no data specific to the Blue Mountains or the Ochoco National Forest area that would indicate different habitat needs, alternate minimums were not considered in developing the Forest Plan.

Irwin (1987) points out that the key item may involve maintaining a minimum amount of habitat components that are more or less continuously distributed through time and space. The following discussion and analysis outlines how this is being accomplished and the alternatives considered.

Pileated Woodpecker

Principal Habitats Used

Pileated woodpeckers represent species that need mature or old growth stands of timber for nesting and feeding. Habitats were identified in Bull and Meslow (1977), Guenther, et al. (1978), and Thomas (1979).

Dispersal Distance Between Habitats

The initial five-mile maximum dispersal distance between habitats was the result of professional judgment as documented in Phillips and Roberts (1985). In June 1986, the distance between habitats was changed to one habitat for every 12,000 to 13,000 acres to allow greater flexibility in application.

Irwin (1987) has pointed out the distance could probably be greater, but given the uncertainty of information on the subject, the Forest Service has chosen (in the judgement of professional biologists)

TABLE F-5
Pileated Woodpecker Habitat Requirements

	Zone 1	Zone II	Zone III	Zone IV
Principal Habitats Used Reproducing (Seral Types V & VI)	Kuchler Types K1, K2, K3, K5, K12 and riparian	Kuchler Types. K1, K2, K3, K5, K29 K29 and riparian	Kuchler Types· K1, K2, K3, K5, K7, K10, K11, K12, K13, K14 and riparian	Kuchler Types K11, K12, K14, K15 and riparian
Feeding	All seral stages of Kuchler Types listed for reproducing habitat, provided snags are present			
Dispersal Distance Between Habitats	One habitat area for every 12,000 to 13,000 acres			
Size of Area to Which Wildlife Prescriptions Apply	600 acres per pair			
Habitat Requirements To Be Used in Analyses (Within a 1,000 acre unit)	- Maintain 300 acres of conifers in seral stages VI and/or V, per pair for reproducing - Maintain a minimum average of 2 hard snags per acre greater than or equal tp 12 inches DBH, within the 300 acre reproductive area Forty-two of these 600 snags should be greater than or equal to 20 inches DBH - When possible, maintain reproductive area in 300 contiguous acres If not possible, habitat may be arranged in blocks no less tha 50 acres and no more that 1/4 mile apart - Maintain a minimum average pf 2 hard snags per acre greater than or equal to 10 inches DBH, or an additional 300 acres for feeding			

to maintain the June 1986 spacing. The original alternative of five-mile maximum distance was not used in the Final.

Size of Habitat Areas

The size of nesting areas in Region 6 for the pileated woodpecker has been identified as falling in the range of 100 to 540 acres. The Region defined 300 acres of old growth or mature timber as nesting area, plus 300 acres of feeding area as a Region-wide requirement to meet the needs of pileated woodpeckers both east and west of the Cascades. Three hundred acres of nesting area appears to be an average for different habitats. As more data, specific to westside and eastside habitats (eastside may be further subdivided), becomes available, the size of the nesting area may be adjusted (Bull and Meslow, 1977, Bull, 1975; Mannan, 1982). A 1,000-acre unit was established as the size of territory that a pair of woodpeckers would defend as determined from research data Snag size and density were taken from Thomas (1979), and acreage figures from Bull (1975), and Bull and Meslow (1977). Habitat specifications for the pileated woodpecker are summarized in Table F-5.

Alternative Ways of Meeting the Management Requirement for Providing Adequate Habitat to Maintain Viable Populations of Existing Native Vertebrate Species

The Region provided the following direction (filing designation 1920, November 10, 1983) for determining requirements for old growth: (1) distribute habitat in a way that minimizes impacts on the commercial forest land base while still achieving the necessary distributional needs of the species, and (2) conduct analysis to determine whether set asides ("dedicated" approach) or long rotations ("managed" approach) would minimize effects for the species

The Ochoco National Forest constructed maps of alternative levels of old growth habitat needed to provide habitat following recent revision of Regional direction (filing designation 1920, April 16, 1984). The distributional needs of the pileated woodpecker limit the flexibility in applying the requirements in a manner that minimizes the impact on the timber land base. However, by considering habitat provided in wilderness, research natural areas, and in other allocations with less intensive timber management and reduced yields, impacts to the timber base may be reduced.

Application of the Regional direction for size and dispersal of habitats to the Ochoco National Forest requires that a minimum of 18,000 acres of old growth forest, outside of wilderness or other lands not suitable for timber production, be retained as wildlife habitat for the pileated woodpecker and other species occupying the same habitat.

Another aspect related to dedicated areas is introduced here, the relationship of other non-dedicated areas such as riparian corridors and others that provide "connective habitat" or travel lanes likely to be utilized by species traveling between existing areas of old growth.

In the FEIS the Ochoco National Forest elected to provide old growth habitat by dedicating areas through the allocation of lands to a management area for old growth. Two other ways of meeting the management requirement were considered prior to selecting this strategy· (1) managed old growth on a 240-year rotation, and (2) managed old growth on a 320 years rotation.

Under a dedicated old growth strategy, each acre of old growth is withdrawn from timber production. Dedication of existing old growth stands assures that desired structural characteristics will be available for wildlife, but risks the loss of individual stands through catastrophe or decay. However, more recent research suggests that such risk is much less than once thought. Management of old growth on a long rotation may not provide all the characteristics important to old growth and may hasten the decline of the residual stand (Franklin, 1981). In managed old growth strategies it is assumed that existing old growth stands will be harvested and that other stands will grow into an old growth condition to replace them. Failure of the replacement stands to develop desired structural characteristics on schedule would

mean that old growth would be lost for a period of time or that harvesting of existing old growth stands would be delayed.

Under a managed old growth approach, harvest would be delayed on existing old growth stands reserved for wildlife habitat, and harvest would be prohibited on additional replacement stands. Depending on the rotation age (240 or 320 years), harvest would be restricted on an additional two to three stands. If a long-term replacement stand was also provided, harvest would be restricted on two additional stands.

Evaluation of Implementing Methods to Meet the Management Requirements for Providing Adequate Habitat to Maintain Viable Populations of Existing Native Vertebrate Species

Opportunity Costs

Table F-6 displays the opportunity costs associated with the three ways of meeting the management requirement. The cost of the feeding area requirement has been determined to be insignificant (0.2 percent), and is not discussed further. Present net value for the managed old growth methods is not displayed since opportunity costs were calculated by means other than the FORPLAN model.

TABLE F-6
Estimated Opportunity Cost Associated
With the Vertebrate Species Management Requirement

	First Decade ASQ MMCF/Yr	Percent Change in ASQ 1/	PNV MM$	Percent Change in PNV
Maximum PNV benchmark as displayed in the DEIS	23 4	--	494	--
Opportunity cost of the selected way of providing adequate habitat to maintain viable populations (dedicated old growth/mature timber)	6	2 6	15 9	3 2
Opportunity cost using managed old growth/ mature timber with 320-year rotation	7	2 8	NE	NE
Opportunity cost using managed old growth/ mature timber with 240-year rotation	7	3 1	NE	NE

NE = Not estimated ASQ opportunity costs were estimated outside of FORPLAN, and no PNV estimate was produced Since a larger number of acres are affected when "managing" for old growth, PNV opportunity costs would likely be larger, particularly when managing for immediate and long-term replacement

MMCF/Yr = Millions of cubic feet per year
MM$ = Millions of dollars

1/ Percent change calculated on cubic foot basis

Consequences of Methods (Ways and Means)

Populations of pileated woodpeckers and other old growth forest-dependent species would not be expected to differ significantly under any of the different ways considered to meet the management requirement. There are, however, differences in the opportunity costs, as previously stated

Rationale for the Selected Method

Based on the preceding analysis, it was determined that the dedicated old growth approach would best ensure achieving desired old growth/mature forest habitat, while having the least effect on outputs of other resources. The technology of managing stands on long-term rotations to provide old growth conditions is theoretically possible but has not been demonstrated through actual management. The dedicated approach to old growth carries a lower risk into the future, and because its opportunity costs are not significantly different, it is the logical means to apply at this point in time.

Implications for Forest Plan Alternatives

Alternatives were designed to address public issues. As a result, most alternatives, including the preferred alternative, incorporate objectives for the retention of old growth and mature timber, for wildlife, for visual purposes, and for recreational purposes at levels higher than needed to meet the basic management requirement. Consequently, there are no significant differences in opportunity costs between the various alternatives.

The range of alternatives also shows the range and variation in harvest levels within the available decision space as needed to respond to public issues. If these alternatives had been formulated without adding the constraints necessary to meet the management requirement, there would have been some increase in ASQ and PNV. The gains, however, would be less than the costs calculated in Table F-6.

Role of Monitoring and Research

The monitoring plan (Forest Plan, Chapter 5) calls for monitoring populations and habitats of pileated woodpeckers. In future planning efforts, this data will be used to help determine the suitability and effectiveness of the selected means of meeting the management requirement. In this manner, the appropriateness of the selected means will be tested over time.

Management Requirements for Water Quality

Source of the Management Requirement

The management requirements for water quality are based on the planning regulations which direct forests to:

Comply with requirements of the Clean Water Act, the Safe Drinking Water Act, and all substantive and procedural requirements of Federal, State, and local governmental bodies with respect to the provisions of public water systems and the disposal of waste water [36 CFR 219.23(d)].

Evaluate existing or potential watershed conditions that will influence soil productivity, water yield, water pollution, or hazardous events [36 CFR 219.23(e)].

Conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land [36 CFR 219 27(a)(1)].

The Clean Water Act seeks to control non-point sources of water pollution To comply with Section 208 of the Act, Region 6 of the Forest Service, the states of Oregon and Washington (which manage implementation of the Act in the respective states) and the Environmental Protection Agency (EPA) agreed on what constitutes compliance with the Act This agreement, contained in memoranda of understanding between the Forest Service and the respective states, established a process whereby each state certified the best management practices (BMP's) needed to meet or exceed state water quality standards (FSM 1561.5, R-6 Supplement 67, 4/88).

Specifications for the Water Quality Management Requirements

State of Oregon water quality standards (Oregon Administrative Rules 340-41-205 through 325) provide specifications to be met by implementation methods selected by the forest. They are summarized as follows:

Dissolved oxygen concentration shall not be less than 90 percent of saturation at the seasonal low, or less than 95 percent of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes.

On the Deschutes and Crooked Rivers and associated tributaries, no measurable increases shall be allowed when stream temperatures are 58 degrees Fahrenheit or greater, and no more than two degrees increase due to all sources combined when stream temperatures are 56 degrees or less shall be allowed On the John Day River, Silver and Emigrant Creeks, and associated tributaries, no measurable increases shall be allowed when stream temperatures are 68 degrees Fahrenheit or greater, and no more than two degrees increase due to all sources combined when stream temperatures are 66 degrees or less shall be allowed.

No more than a 10 percent cumulative increase in natural stream turbidity shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity.

pH values shall not fall outside a range of 6.5 to 8.5.

Analysis of Methods Designed to Meet Water Quality Management Requirements

Two non-point source pollution parameters, namely water temperature and suspended sediment, are the major determinants of water quality on the Forest. Higher water temperatures encourage the growth of certain nuisance organisms such as bacteria, algae and fungi, that in turn affect the levels of dissolved oxygen, pH, and turbidity, and the production of undesirable tastes and odors. The amount of shading in riparian areas determines the extent streams are warmed by solar radiation. The riparian prescription (Land and Resource Management Plan, Chapter 4, pp 4-74) contains the water temperature standards and the amount of shade necessary to meet those standards. Special riparian area alternatives for shade were not examined individually because of their effect on PNV would be less than one percent.

Sediment yield is largely determined by the amount and erodibility of exposed soil in a watershed. Timber harvest activities, including road construction, slash treatment and site preparation, not only affect the amount of exposed soil, but also alter the timing and quantity of water leaving a watershed. Following harvest activities, watersheds become more hydrologically sensitive for a period of time with storm events exhibiting more rapid and extreme responses. This greater sensitivity level to storm events results in more energy being available to transport sediment to stream channels. Thus the primary effort in maintaining water quality is directed at the timber harvest program and related rate of vegetation removal in a watershed over time.

There is potential to misinterpret findings on timber harvest/watershed interactions. It is possible to refer to literature elsewhere which reports results contrary to those found locally (Megahan, Umatilla N.F., et al) However, upon close inspection these vagrancies are generally related to local geoclimatic, geomorphic, or vegetation differences between study areas, and not to methods. Or methods may be applied with different assumptions. For example, watershed studies on the Umatilla National Forest were conducted on dry soils and <20 percent slopes with two times greater precipitation than the Ochoco receives. The findings there are generally not directly applicable to the Ochoco N.F. Likewise, Megahan's work was done in the Idaho batholith.

Preliminary analysis of FORPLAN runs indicated that if unconstrained, over 90 percent of the timber harvest in the first decade of the Plan would be scheduled on the high value, extensively roaded ponderosa pine stands located in drainages with predominantly south and southwest aspects.

Further analysis showed that up to 70 percent of the acres in some drainages would be treated in the first

decade. This would result in over 40 percent of a drainage being in an equivalent harvest (EHA) condition, a situation judged to have potentially unacceptable impacts on water quality. In addition, in the second decade the harvest would shift to the steeper, mixed conifer drainages characterized by more erosive soils and high value anadromous fishery streams, further exacerbating potential watershed damage (see FEIS Chapter 4, pg. 4-83).

The Forest Service Manual directs that where prescribed cutting methods may be detrimental to watershed conditions, including water quality, limits be set on the timing of operations and the percent of watershed coverage per entry (FSM 2405.13, 3b).

Research indicates that measurable changes in runoff occur when 20 to 30 percent of a drainage is in a cut over condition (Brown, et al, 1974; Rich and Thompson, 1984; Troendle and Leaf, 1980). Water quality and quantity and timing of runoff may all be affected. These changes may be negative and often are cumulative. The rate timber is harvested or vegetation removed is a major contributor to this effect To assess the effect of the rate of harvest, a Forest-wide threshold value (EHA) of 30.1 percent was established This assumes up to 30.1 percent of the Forest can be in a harvested condition at any one time without exceeding watershed capabilities to absorb the impacts of management activities. The 30.1 percent is an average for the 22 major watersheds on the Forest. The actual EHA values ranged from 25 to 35 percent. This is further discussed in Chapter 3 of the FEIS, pp. ?? and Appendix ?? of the Land and Resource Management Plan.

The principle behind managing a watershed at or below a threshold value is to utilize the natural ability of a watershed to withstand management induced impacts or changes (such as changes in runoff patterns, soil moisture, site disturbance, or sediment yield) while protecting other resource values (such as water quality, fisheries, and soil productivity).

Exceeding the threshold value over time involves risk and the need to apply additional and often costly specific mitigation measures. Mitigation might be, for example, installation of devices to trap and store sediment.

Alternative Ways of Meeting the Management Requirements for Water Quality

Other methods of achieving water quality requirements were considered (see also FEIS Appendix G):

1) Changing the threshold level: the amount of disturbance allowed in a particular watershed may be changed based on the results of monitoring and evaluation.

2) Dedicated riparian areas (no timber harvesting).

3) The amount and kind of silvicultural activity allowed, e.g. selective harvesting under uneven-aged management, within the streamside buffer as well as the width of the buffer itself, are ways that were considered to assist in protecting riparian areas.

4) Use of in-stream structures to mitigate the effects of harvesting timber (see FEIS Chapter 4, pg. 4-88). Structures and devices to mitigate effects are employed by most alternatives. Exclusive reliance on this method alone is expensive and seldom totally effective.

The role riparian areas play in helping to meet the management requirement for water quality is separate and distinct from the management requirement for riparian areas per se The management requirement for protection of riparian areas [36 CFR 219.27(e)] does not in itself significantly affect ASQ or PNV.

Evaluation of the Implementing Methods to Meet the Water Quality Management Requirements

Consequences of Methods (Ways and Means)

The threshold level of 30.1 percent across the Forest was developed by an interdisciplinary team and represents the best estimate attainable with present information A higher or lower level of threshold could be used A lower threshold level would appear to unnecessarily constrain development activities while a higher level would exceed research recom-

mendations that a 25 to 30 percent EHA be set to avoid unacceptable changes in watershed characteristics (water quality and quantity, and timing of flows)

The riparian area means alone, such as dedicated areas and in-stream structure methods, deal with sediments as they are leaving a watershed and as a consequence do not address the loss of productivity and the need to protect the soil resource. Furthermore, approximately half (412 miles) of the riparian areas on the Forest are in less than acceptable condition and consequently not fully effective in maintaining water quality. Many of these areas have suffered the cumulative effects of past practices, and the loss of riparian vegetation following decades of grazing.

Additional methods for shade management along riparian areas have not been analyzed for the Forest. The condition of many of the riparian areas would not provide the opportunity for additional alternatives as they presently are below the desired shade conditions. The recovery and, or rehabilitation of riparian area vegetation is slow on the Ochoco and shade development may take up to 25 years in some areas to attain the desired 80 percent shade level.

In-stream structures (e.g., log weirs, loose rock, check dams) are expensive to construct and maintain, and benefits from them may not be realized for many years. While fairly effective at trapping and holding sediments, they do so at the expense of fish habitat as silt and sediment trapped by these structures cement spawning gravels, thus reducing rearing habitat.

Maintaining water quality at the expense of fish habitat is not a desired practice and the rehabilitation of spawning areas is expensive.

In view of the above, constraining the rates of disturbance and vegetation removal over time, within watersheds, is presently believed to be the most reasonable and effective way to protect soil, water, and riparian resources. The wisdom that an ounce of prevention is worth a pound of cure is particularly appropriate in dealing with watersheds

Opportunity Costs

The opportunity costs of meeting the water quality minimum requirement are displayed in Table F-3. They are a 4.3 percent change in the ASQ and 9 percent in PNV.

Rationale for Selected Method (see also Consequences)

Harvest scheduling constraints provide the best means for controlling the rate and amount of change in vegetation and soil disturbance across the Forest. The method relates to the ability of a watershed to absorb disturbance, both natural and human-caused, and recover in a reasonable period of time. It is assumed that recovery mechanisms (vegetation, bank stability, large woody debris, etc) are functioning or can be improved (e.g. revegetation or use of in-stream structures) to an effective level. The FEIS, Chapter 4, (pp. 88) describes the methodology and amount of disturbance allowed by watershed by decade. The harvest constraints (threshold values) for the various watersheds were established through professional judgement, local experience, and watershed research.

Managing above a threshold level requires that the decision maker consider both the magnitude and duration of the expected impact. Magnitude is the intensity of the effect or impact. Duration is that period of time (window of vulnerability or period above the threshold) during which the hydrologic sensitivity of a drainage, following activities, is such that the occurrence of a major natural event (e.g., 10 to 25 year storm runoff) could combine to produce undesirable effects within the drainage or on downstream resources. The probability of this occurrence is part of determining the risk in making management decisions.

To aid the decision maker in evaluating risk, the Ochoco Harvest Effect Model accesses a standard probability table with the number of years harvest effects are above the assigned threshold value (window of vulnerability). From this we predict the probability of experiencing a 10, 25, or 50 year storm event on the watershed in question. For example, if the threshold were exceeded for six years, the chances

of experiencing a 10-year storm would be 40 percent, and a 25-year storm 26 percent. The longer a watershed exceeds the threshold, the greater the chance it will experience a damaging storm event.

Implications for Forest Plan Alternatives

All the alternatives incorporate and meet the basic management requirement.

Role of Monitoring and Research

The probability of experiencing or not experiencing a 10 or 25 year storm event during a fixed period of time may help explain the wide variability of effects recorded in monitored watershed experiments. In other words, a small test watershed may not experience a major climatic event while it is hydrologically sensitive regardless of whether it is harvested at 20, 50 or even 70 percent. Research studies simply have not treated large enough areas nor monitored them long enough to have witnessed a full range of possible climatic events. In this regard, managing a Forest through a rotation is strikingly different than a research study, for what is a statistically probable event on an individual test unit will occur with a high degree of certainty over time on a Forest. Only by monitoring a Forest, watershed by watershed, are we likely to develop a true understanding of the role chance events and natural variability play in determining actual threshold values for a drainage. The threshold value proposed compared against calculations of harvest effect will provide for the first time a baseline against which the Forest can monitor and evaluate the effects of harvest management activities. Monitoring and evaluation will provide the information to base any changes in future watershed threshold values. Threshold values and conversion factors can be modified in the future to reflect information obtained.

Bibliography

Brown, H.E , et al, 1974 *Opportunities for Increasing Water Yield and Other Multiple Use Values on Ponderosa Pine Forest Lands.* Rocky Mountain Forest and Range Experiment Station. USDA Forest Service, Research Paper RM-129. 36 pp.

Bull, Evelyn L and E. Charles Meslow. 1977. *Habitat Requirements of the Pileated Woodpecker in Northeastern Oregon* Journal of Forestry 1975 (6). p. 334-337.

Bull, Evelyn L. 1975 *Habitat Utilization of the Pileated Woodpecker, Blue Mountains, Or.* M.S. Thesis. OSU, Corvallis. 58 pp.

Burke, T.E 1982. *Marten* (unpublished). Colville National Forest, Washington.

Campbell, T.M. 1979 *Short-term Effects of Timber Harvest on Pine Marten Ecology.* M S. Thesis Colorado State University. Ft Collins, Colorado. 71 pp.

Franklin, Benj. 1754 *Poor Richard's Almanac.* Benj. Franklin Publishing. Philadelphia, PA. 74 pp.

Franklin, Jerry F., et al, 1981. *Ecological Characteristics of Old-Growth Douglas-fir Forests.* Gen. Tech. Rep. PNW-118. USDA Forest Service. Pacific Northwest Forest and Range Experiment Station.

Guenther, K. and T Kucera. October 1978 *Wildlife of the Pacific Northwest.* USDA Forest Service, Pacific Northwest Region.

Irwin, Larry L. 1987. *Review of Minimum Management Requirements for Indicator Species Pine Marten and Pileated Woodpecker.* National Council of the Paper Industry for Air and Stream Improvement. Technical Bulletin No. 522

Jackman, Siri M. and Dr. J. Michael Scott. 1975. *Literature Review of Twenty-three Selected Forest Birds of the Pacific Northwest.* USDA Forest Service, Pacific Northwest Region. 382 pp.

Johnson, K. September 21, 1983. Westside Coordination Meeting Notes. USDA Forest Service Memo

Mannan, R. W 1982. *Territory Size and Habitat Preferences of Pileated Woodpeckers in Western Oregon.* OSU Corvallis Ag. Exp Stat. Tech. Paper 000.

Megahan, Walter F. 1976. *Effects of Forest Cultural Treatment Upon Streamflow.* Reprint from the Forest Acts Dilemma Symposium Proceedings, Montana Forest and Conservation Experiment Station, University of Montana.

Phillips, C. A and R. Roberts. June 4, 1985. *Documentation of Wildlife Management Requirements.* USDA Forest Service Memo.

Phillips, et al. January 1981. *Wildlife Habitats and Species ManagementRelationship Program.*

Rich, L.R and J.R. Thompson. 1974. *Watershed Management in Arizona's Mixed Conifer Forests· The Status of Our Knowledge* Rocky Mountain Forest and Range Experiment Station. USDA Forest Service. Research Paper RM-130. 15 pp.

Thomas, J.W. Edited 1979. *Wildlife Habitats in Managed Forests. The Blue Mountains of Oregon and Washington.* USDA Agric. Handbook No. 553. Washington, D C.

Troendle, C A. and C F. Leaf. 1980. *Hydrology, Chapter 3. In An Approach to Water Resources Evaluation of Non-point Silvicultural Sources.* EPA 60018-80-012. 173 pp. Env. Research Lab. Athens, GA.

USDA Forest Service. June 1986. A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service.

USDA Forest Service. 1988. *Umatilla National Forest Draft Environmental Impact Statement for the Proposed Land and Resource Management Plan,* Page IV-13.

Appendix G

Best Management Practices

Appendix G

Best Management Practices

Definitions

Nonpoint sources refers to diffuse or unconfined sources of pollution where wastes can either enter into, or be conveyed by the movement of water to, public waters (Oregon Water Quality Standards, 340-41-007(17)). Silvicultural sources, such as erosion from a harvest unit or surface erosion from a road are considered nonpoint sources.

Best Management Practices are defined as "methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMP's include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures BMP's can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters." (40 CFR 130 2, EPA Water Quality Standards Regulation.)

Usually BMP's are applied as a system of practices rather than a single practice BMP's are selected on the basis of site specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility (EPA Interagency Nonpoint Task Force, 1985)

BMP's are basically a preventative rather than an enforcement system. BMP's are a whole management and planning system in relation to sound water quality goals, including both broad policy and site-specific prescriptions.

Introduction

Best Management Practices are the primary mechanism to enable the achievement of water quality standards (Environmental Protection Agency 1987) BMP's will be selected and tailored for site specific conditions to arrive at the project level BMP's for the protection of water quality. The process for determining appropriate BMP's and for ensuring their implementation at both the Forest Plan and Project level is described. Following is a description of the methods and procedures that will be used to control or prevent nonpoint sources of pollution from resource management activities and to ensure compliance with the·

Clean Water Act of 1972, as amended (1977 and 1987). Section 319 of the Clean Water Act Amendments of 1987 requires that the States determine those waters that will not meet the goals of the Act, to determine those nonpoint source activities that are contributing pollution, and to develop a process of determining BMP's to reduce such pollution to the "maximum extent practicable." This Appendix is designed to fulfill the intent of the requirements of Section 319.

Oregon Administrative Rules (Chapter 340-41-001-975). Department of Environmental Quality (DEQ). Oregon's Administrative Rules contain water requirements for the protection of identified beneficial uses of water.

Memorandum of Understandings· The Oregon Department of Environmental Quality and U.S Department of Agriculture, Forest Service (2/12/79 and 12/7/82), and "Attachments A and B" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest 12/78 and Best Management Practices for Range and Grazing Activities on Federal lands, respectively)

Washington Administrative Code (Chapter 173-201). Department of Ecology (DOE). Washington's Administrative code contains water requirements for protection of various classes of surface waters.

Memorandum of Understanding: The Washington Department of Ecology and U S. Department of Agriculture, Forest Service (7/79), and attachment A referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest, 12/78).

California's Porter-Cologne Water Quality Control Act (California Water Code, Division 7). The Water Quality Control Plan for the North Coast Region was approved by the North Coast Regional Water Quality Control Board on April 28, 1988. It is pending approval by the State Water Resources Control Board and the Environmental Protection Agency.

The Draft North Coast Regional Water Quality Control Plan contains water quality objectives that are considered necessary to protect those present and probable future beneficial uses of water.

Memorandum of Understanding: The State Water Resources Control Board, State of California, and U.S. Department of Agriculture Forest Service, Pacific Southwest Region, 1981.

The EPA has certified the Oregon Forest Practices Act and Washington Forest Practices Rules and regulations as BMP's. The State of Oregon compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed State requirements. As state practices change, comparisons are made to ascertain that Forest Service practices meet or exceed these changes. Monitoring and evaluation will determine the need for changes in BMP's and/or state standards.

Forest Services management practices will meet, as a *minimum*, the substantive State BMP requirements, and other considerations required by the National Forest Management Act (NFMA), and other authorities, for the protection of the soil and water resource.

The general BMP's described herein are action initiating mechanisms which call for the development of detailed, site-specific BMP prescriptions to protect beneficial uses and meet water quality objectives. They are developed as part of the NEPA process, with interdisciplinary involvement by a team of individuals that represent several areas of professional knowledge, learning, and/or skill appropriate for the issues and concerns identified. BMP's also include such requirements as Forest Service manual direction, contract provisions, environmental documents, and Forest Plan Standards and Guidelines. Inherent in prescribing project-level management requirements is recognition of specific water quality objectives which BMP's are designed to achieve.

BMP Implementation Process

In cooperation with the State, the primary strategy for the prevention and control of nonpoint sources is based on the implementation of BMP's determined necessary for the protection of the identified beneficial uses.

The objective is to identify the most practical means of attaining water quality objectives. Water quality objectives include water quality measures that adequately reflect the needs of identified beneficial uses

The Forest Service Nonpoint Source Management System consists of:

1. Selection and design BMP's based on site-specific conditions, technical, economic and institutional feasibility, and the water quality standards of those waters potentially impacted.
2. Implementation and enforcement of BMP's.
3. Monitoring to ensure that practices are correctly applied as designed.
4. Monitoring to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards Evaluation of the appropriateness of water quality criteria to reasonably assure protection of beneficial uses.
5. Evaluation of monitoring results and mitigation where necessary to minimize impacts from activities where BMP's do not perform as expected.
6. Adjustment of BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate possible adjustment of water quality standards.

BMP Selection and Design - Step 1

Scoping: Potential concerns are identified, e.g., mass wasting, water quality, etc. as part of the NEPA process for environmental analysis. Public notices are dispersed inviting comment and participation in the process. Alternatives are developed to address potential problems and to accomplish project objectives.

Environmental Analysis: Each alternative is evaluated for its potential effect on different resources, including water From this analysis, a preferred alternative is identified, along with the measures (BMP's) needed to reduce risk and increase the potential for success.

Documentation: An Environmental Assessment (EA) or Environmental Impact Statement (EIS) is developed with a decision notice and includes required measures (BMP's).

Water quality standards are used as objectives towards which practices are designed to protect beneficial uses.

Appropriate BMP's are selected for each project by an interdisciplinary team. BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, climate, economics, institutions, constraints, etc. Environmental effects and water quality protection options are evaluated and a range of practices is considered. A final set of practices are selected that not only protect beneficial uses, but meet other resource needs. These final selected practices constitute the BMP's.

The selected BMP's, an estimate of their effectiveness, and a plan for monitoring them is included in the project EA or EIS. The site-specific BMP prescriptions are normally included in project implementation plans, but may also be included in the body or appendix of a project environmental document.

BMP Implementation and Enforcement - Steps 2 and 3

The site-specific BMP prescriptions are taken from plan-to-ground by a combination of project layout and resource specialists (hydrology, fisheries, soil, geology, etc.). Final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

When the resource activity (e.g., timber harvest or road construction) begins, timber sale administrators, engineering representatives, resource specialists, and others ensure that the BMP's are implemented according to plan. A similar implementation process is used for other resource activities (range management, mining, etc.) on national forests.

BMP implementation monitoring is done before, during, and after resource activity implementation. This monitoring answers the question: Did we do what we said we were going to do? Some examples of implementation monitoring for a streamside management unit BMP prescription may be:

1. Before project: checking Stream Management Units (SMU's) along streams to see if layout meets the objectives of the BMP prescription, or if the road crossing of a stream is properly located and designed per estimates made during the environmental analysis.
2. During project: during timber felling, the timber sale administrator checks to see if the timber fallers understand marking prescription for timber to be felled in the SMU. The timber sale administrator also observes ongoing harvest operations to see if the activity meets the objectives defined in the project plan.
3. After project: measuring canopy stream shading to see if the amount specified in the BMP prescription was retained, or monitoring a beneficial use of the water to determine a change or trend in use.

Enforcement is carried out primarily through internal project reviews and contractual enforcement, e.g., timber sale contract, grazing or special use permit, etc.

Contract enforcement is a more formal method used to achieve desired results. Normally, each project is assigned a person as a contracting officer. For timber sales, that person is called a timber sale administrator. The project is routinely monitored to ensure that practices are being carried out in the manner and method prescribed in the contract, permit, etc. When a contractor or permittee is not in compliance, they can be held in breech with penalties (e.g., bond forfeiture) until remedies are implemented.

Often during the course of an activity, adjustments are made if it is determined that unsatisfactory results are currently resulting or may occur. This can often mean that a contract modification may be necessary (as in the case of a timber sale).

BMP Monitoring - Step 4

Once BMP's have been implemented, further monitoring is done to evaluate their effectiveness. BMP "effectiveness monitoring" answers the question: Are BMP's effectively meeting management objectives and protecting water quality?

Water quality standards are the "yardstick" against which the effectiveness is tested If, through objective monitoring, BMP's do not meet prescribed objectives, then information is available to modify either the BMP's for future management, or the objectives, or both.

The natural variability of water quality under unmanaged conditions is an important factor that will be considered during the monitoring and evaluation. Additionally, effectiveness monitoring will include measurement against land management objectives, as well as water quality objectives

Some examples of the types of BMP effectiveness monitoring to be conducted are:

1. Measuring stream temperatures to see if the riparian prescriptions in a watershed are maintaining water temperature.
2. Storm period surveillance monitoring of a road system to see if road rocking is effectively preventing road surface erosion.

Another type of more costly and time consuming monitoring is "validation." The purpose of validation monitoring is to answer the question of whether standards, coefficients, requirements, and guidelines are appropriate to meet objectives, e.g., protect beneficial uses.

Examples:

(1) Did the change in water temperature impact the fish population?

(2) Did the soil compaction effect tree growth?

Validation Monitoring will need to be closely coordinated with, or in some cases, conducted by research. It may require the establishment of permanent plots or administrative studies. This kind of monitoring will be very limited and will require coordination to select projects with broad application and to prevent duplication. Only those coefficients and standards that are not reasonably validated by existing research or documentation should be candidates for this monitoring.

The monitoring and evaluation section of the Forest Plan, Chapter 5, contains more detailed monitoring descriptions. Once a specific project is designed, a site-specific monitoring plan may be developed.

Results of monitoring should be shared with State and local agencies as well as available to the public. Monitoring design, sampling, and laboratory analyses will be coordinated.

BMP Evaluation and Adjustment - Steps 5 and 6

The technical evaluation and monitoring described above will determine how effectively BMP's protect and/or improve water quality. If the evaluation indicates that water quality objectives are not being met and/or beneficial uses are not being protected, corrective action will consider the following three components:

1. The BMP : Is it technically sound? Is it really best, or is there a better practice which is technically sound and feasible to implement?
2. The implementation program or processes: Was the BMP applied entirely as designed? Was it only partially implemented? Were personnel, equipment, funds, or training lacking which resulted in inadequate or incomplete implementation?
3. The water quality standards: The water quality standards are established to protect the beneficial uses of water. They include numeric and narrative criteria that, when exceeded, are assumed to indicate detrimental impacts on beneficial uses. They are intended to provide a benchmark for evaluating harm to beneficial uses.

Assessing the applicability of the standards is a responsibility of the State. The Forest Service will provide information to the State to address the following types of questions:

Do the standards describe the conditions necessary for protecting beneficial uses?

Are standards higher or lower than that necessary for protecting beneficial uses?

Do the standards reflect the natural variability occurring within the natural and human-affected ecosystem?

Do the parameters and criteria that constitute water quality standards adequately reflect (are they sensitive enough) human-induced changes to water quality and beneficial uses?

Corrective action may be initiated once the reason for failing to achieve the management objectives is understood. The management practice may have to be changed, the water quality objectives modified, or both.

Training

National Forest personnel involved with project location, design, layout, administration, and maintenance activities will receive BMP training. The training will consist of BMP awareness, as well as the more technical aspects such as planning, implementation, monitoring, and evaluation.

General Best Management Practices and Examples

Individual general Best Management Practices are described in General Water Quality Best Management Practices, Pacific Northwest Region, 11/88. Also included in this document is a description of the process, and limitations and use of these BMP's. Each BMP listed includes the Title, the Objectives, the Explanation, Implementation and Responsibility, and Monitoring. Evaluations of ability to implement and estimated effectiveness are made at the project level.

Not all of the general BMP's listed will normally apply to a given project, and there may be specific BMP's which are not represented by a general BMP in this document.

The sensitivity of the project determines whether the site-specific BMP prescriptions are included in the EA/EIS or in the sale/project plan, or the analysis files.

Following is an example of a general BMP, as described in this document, along with an example of a site-specific BMP which is developed at the project level.

General BMP

T-5. Title: Limiting the Operating Period of Timber Sale Activities

Objective: To ensure that the Purchaser conducts operations in a timely manner, within the time period specified in the Timber Sale Contract (TSC).

Explanation: The TSC specifies a Normal Operating Season, during which, operations may generally proceed without resource damage. Operations are permitted outside the Normal Operating Season only when they can be conducted without damage to soil, water, and other resources. Where determined to be necessary through the environmental analysis, the TSC will limit operations to specific periods or weather conditions. Operations are not permitted to continue if damage will occur.

Implementation & Responsibility: Limited operating periods are identified and recommended during the Timber Sale Planning Process by the interdisciplinary team and followed through the life of the timber sale primarily by the Sale Administrator.

Ability to implement: Add at project level.

Effectiveness: Add at project level.

Monitoring. Done during implementation of timber sale activities by the Sale Administrator, Forest Service Representative (FSR), engineers, and watershed specialists. Also see Appendix D monitoring plan item: Water Resource Monitoring.

Specific BMP

PT-5. Title. Limiting the Operating Period of Timber Sale Activities

Objective: To ensure that the Purchaser conducts operations in a timely manner, within the time period specified in the Timber Sale Contract (TSC).

Explanation: The Ship Mountain Timber sale contains sensitive soils that are subject to soil compaction during tractor skidding, and a non-surfaced road that is not suitable for wet weather haul.

The normal operating season for the Forest will be enforced for the Ship Mountain Timber sale. All operations off Forest Road 10 (non-surfaced) will be halted at the onset of wet weather to prevent erosion and damage to the road. Tractor skidding on units 1-5 will be restricted if soil moisture is above the level established by the soil scientist. Other operations can continue outside the normal operating season if they can be conducted without damage to soil, water, and other resources

Implementation and responsibility: For the Ship Mountain Timber sale the normal operating season for the Forest will be enforced. All operations off of Forest Road 10 (non-surfaced) will be halted at the onset of wet weather to prevent

erosion and damage to the road. Other operations can continue outside of the normal operating season if they can be conducted without damage to soil, water, and other resources. The forest watershed specialists will work with the timber sale administrators to evaluate the potential for resource damage if operating outside of the normal operating season.

Ability to implement: High

Effectiveness: High

Monitoring: Monitoring identified for this BMP in the Forest Plan BMP Appendix applies.

References

1988, USDA Forest Service, Pacific Northwest Region, General Water Quality Best Management Practices, November, 1988

1987. US Environmental Protection Agency. Nonpoint Source Controls and Water Quality Standards. Water Quality Standards Handbook, Chapter 2, General Program Guidance, Page 2-25, August 19,1987.

1985, US Environmental Protection Agency. Final Report on the Federal/State/Local Nonpoint Source Task Force and Recommended National Nonpoint Source Policy. Office of Water, Washington, D.C. Page 17.

Appendix H

Squaw Creek
Wild and Scenic Evaluation

Appendix H

Summary of Wild and Scenic River Study Report for Squaw Creek[1]

The report evaluated and determined the eligibility of the portion of the Squaw Creek that flows through lands administered by the National Grassland for possible classification under the Wild and Scenic Rivers Act of 1968

Squaw Creek was presented at a public hearing for inclusion in the Oregon Wild and Scenic Rivers Bill by several citizens.

The study does not officially designate Squaw Creek as a scenic or recreational river. That determination can only be accomplished by legislation by Congress. The report does find that Squaw Creek, on the National Grassland, meets the criteria for classification as either "recreational" or "scenic," but does not meet the criteria for "wild." This report recommends that the 7 5 mile segment at Lower Squaw Creek be recommended for designation as a "scenic river" in the Wild and Scenic River System.

The following chart outlines the status of the river miles inventoried:

SQUAW CREEK - RIVER MILES AND OWNERSHIP
WITHIN THE CROOKED RIVER NATIONAL GRASSLAND

River Mile	Geographic Point	Scenic River Study Miles	Length of Segment in Miles	Status/Ownership Within Segment
0	Creek empties into Deschutes River	0	7.5	0.1 miles BLM 6.1 miles C.R.N.G. 1 3 miles Pvt.
7.5	Grassland boundary	7.5		

Segment of the Squaw Creek Studied in this Report

The segment studied in this report is:

River Mile	Location
0.0	Confluence with the Deschutes River
to	
7.5	National Grassland Boundary

1\ complete report on file at the Forest Headquarters in Prineville, Oregon This report covers the elgibility and suitability of Lower Squaw Creek for designation as a "scenic river "

General Location and National Significance

The study segment begins at the confluence with the Deschutes River in Section 7 of T 13 S., R. 12 E. and ends at the Grassland boundary in Section 34 of T. 13 S., R. 11 E. Squaw Creek, in the Crooked River National Grassland, flows through a canyon that is both outstanding and remarkable. The canyon has regional significance. The canyon is in an Intermountain Sagebrush/sagebrush steppe ecosystem, according to Kuchler Vegetation Classification system. A portion of the creek corridor was included in the Deschutes Canyon - Steelhead Falls Wilderness Study Area. All of the creek corridor is included in the Squaw Creek Management Area, designated for semiprimitive nonmotorized recreation and big game winter range in the Grassland Plan.

Outstanding Remarkable Values

Squaw Creek has several outstanding remarkable values: an excellent fishery, spectacular canyon scenery, scenic geologic formations, large natural springs, exemplary natural riparian vegetation, important deer winter range and unique canyon semiprimitive recreational opportunities.

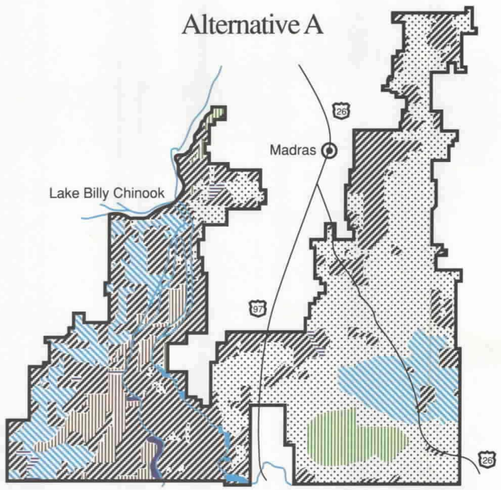
Potential Classification for Squaw Creek, Confluence with the Deschutes River and the Crooked River National Grassland Boundary

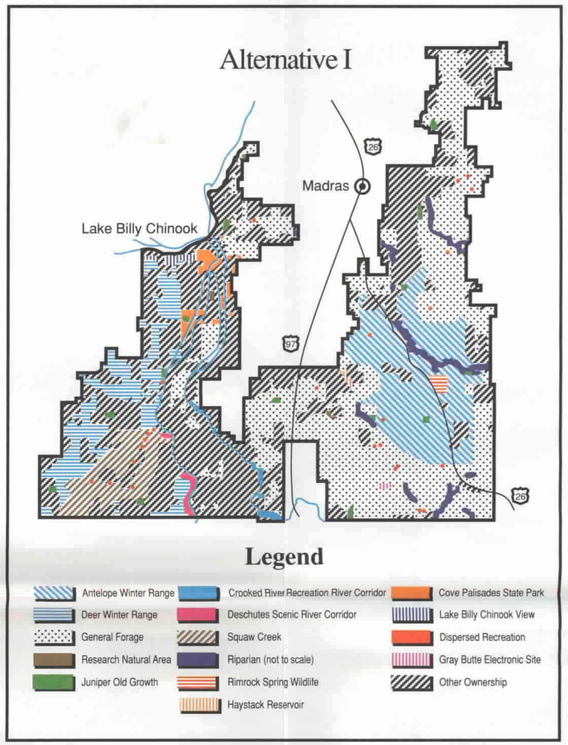
Attribute	Wild	Scenic	Recreational
Water Resources Development	Q	Q	Q
Shore Development:			
Presence of Structures	Q	Q	Q
Grazing Evidence	Q	Q	Q
Timber Harvesting Evidence	Q	Q	Q
Accessibility	X	Q	Q
Water Quality	Q	Q	Q

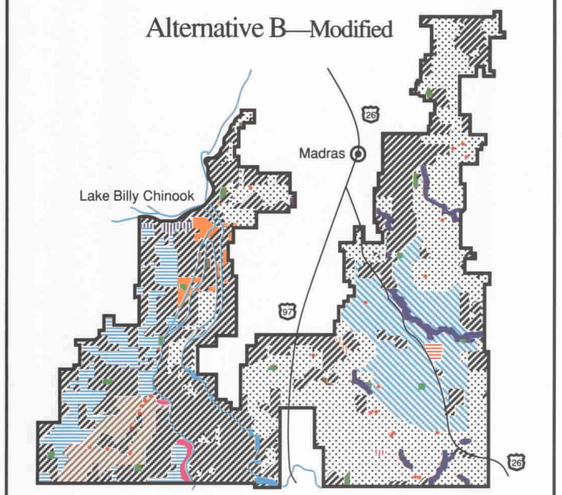
Q - Qualifies
X - Does not Qualify

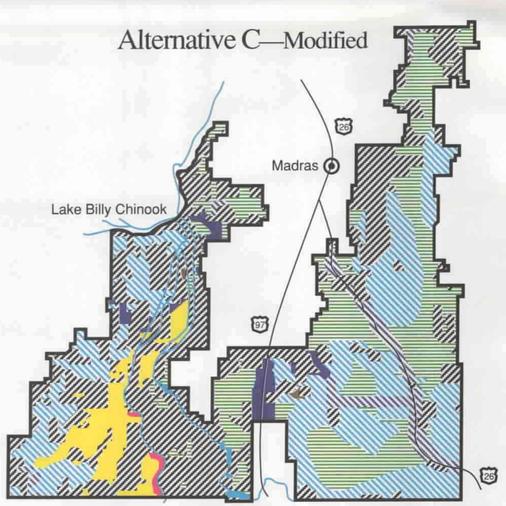
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Crooked River National Grassland
Alternatives







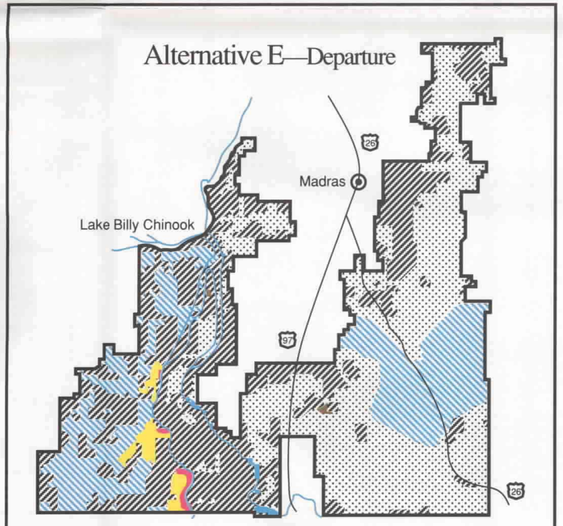


Alternatives I and B—Modified

MA-G1 Antelope Winter Range - Manage for optimum Winter Range conditions for Antelope in conjunction with the Oregon Department of Fish and Wildlife.
MA-G2 Metolius Deer Winter Range - Manage for Big Game Winter Range habitat.
MA-G3 General Forage - Manage for forage production and utilization in a manner consistent with Forest-wide Standards and Guides for other resources.
MA-G4 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.
MA-G5 Juniper Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.
MA-G6 Crooked River Recreation River - Management will maintain the appearance of a natural landscape to enhance and protect recreational values.
MA-G7 Deschutes River Scenic Corridor - Manage for scenic quality and natural appearance of the landscape.
MA-G8 Squaw Creek - Provide opportunities for Semiprimitive Nonmotorized recreation in a pristine canyon setting while protecting and enhancing the Deer Winter Range habitat and fisheries.
MA-G9 Riparian - Manage streamside vegetation and habitat in order to maintain or improve water quality, meeting temperature and turbidity levels as required by state standards under the Clean Water Act.
MA-G10 Rimrock Springs Wildlife - Provide unique habitat (wetlands, ponds, springs) within the juniper-sagebrush steppe, characteristic of Central Oregon's high desert. Provide for nonconsumptive (viewing, photography) wildlife uses in a natural setting.
MA-G11 Haystack Reservoir - Provide users with a system of quality Facilities that are safe and environmentally sound. Continue to emphasize camping, picnicking, boating, fishing, and swimming.
MA-G12 Cove Palisades State Park - Manage for developed campgrounds and water related recreational activities.
MA-G13 Lake Billy Chinook View - Maintain the natural appearing character of the viewshed from Lake Billy Chinook, where management activities are not evident or are visually subordinated to the surrounding landscape.
MA-G14 Dispersed Recreation - Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.
MA-G15 Gray Butte Electronic Site - Accommodate electronic transmission Facilities. The site is limited to low power output electronic equipment.

Alternatives A, C—Modified, and E—Departure

MA-G6 Crooked River Recreation River - Management will maintain the appearance of a natural landscape to enhance and protect recreational values.
MA-G7 Deschutes River Scenic Corridor - Manage for scenic quality and natural appearance of the landscape.
MA-D1 General Forage - Production of forage while meeting Standards and Guides for all resources.
MA-D2 Big Game Winter Range - Manage for Big Game Winter Range habitat.
MA-D3 Big Game Summer Range - Manage for Big Game Summer Range habitat.
MA-D5 Retention Foreground - Provide a scenic, natural view so that management activities are not evident in the foreground.
MA-D6 Partial Retention Foreground - Provide a scenic, near natural view where management activities remain visually subordinate to the natural landscape in the foreground.
MA-D8 Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.
MA-D9 Semiprimitive Nonmotorized - Provide roadless nonmotorized recreation opportunities in a natural or natural appearing setting with minimum sights and sounds of human activity.
MA-D12 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.



N
0 2 4 6 8 10
1/4" = 1 Mile

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Ochoco National Forest
Alternative A

MA-F1 Black Canyon Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F2 Bridge Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F3 Mill Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F4 North Fork Crooked River Wilderness Study Area - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F12 Eagle Roosting Areas - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.*1*

MA-F23 North Fork Crooked River Recreation Corridor - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment.

MA-F24 North Fork Crooked River Scenic Corridor - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

MA-D1 General Forest - Production of timber and forage, while meeting the Forest-wide Standards and Guides for all resources.

MA-D2 Big Game Winter Range - Manage for Big Game Winter Range habitat.

MA-D3 Big Game Summer Range - Manage for Big Game Summer Range habitat.

MA-D4 Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.

MA-D5 Retention Foreground - Provide a scenic, natural view so that management activities are not evident in the foreground.

MA-D6 Partial Retention Foreground - Provide a scenic, near natural view where management activities remain visually subordinate to the natural landscape in the foreground.

MA-D9 Semiprimitive Nonmotorized - Provide roadless nonmotorized recreation opportunities in a natural or natural appearing setting with minimum sights and sounds of human activity.

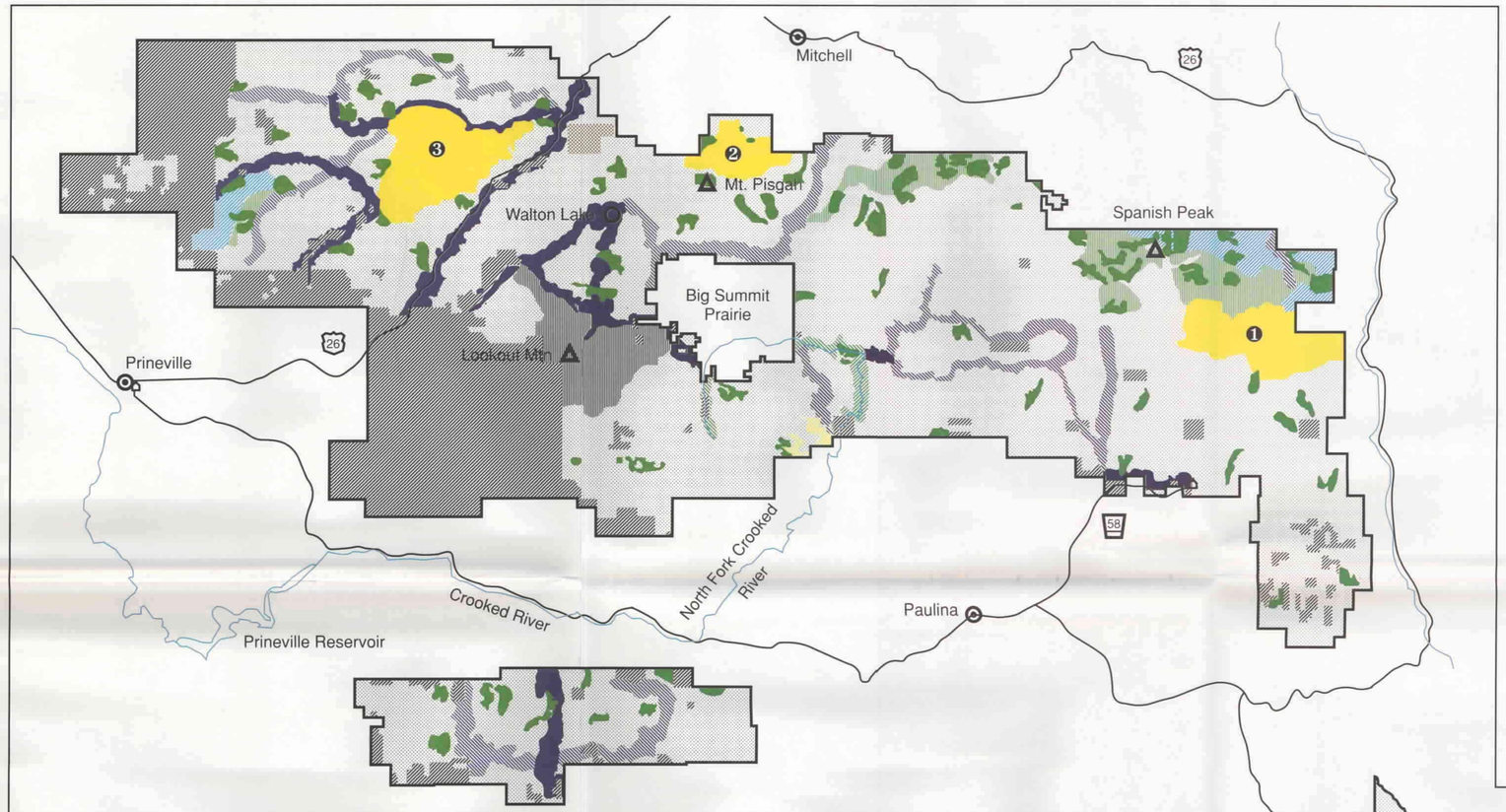
MA-D11 Developed Recreation - Provide and maintain safe, healthful, and esthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.*2*

MA-D12 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.

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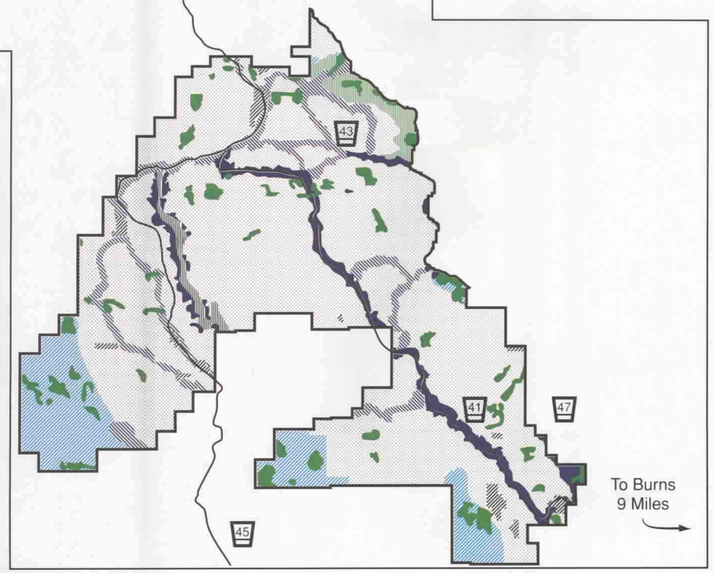
1) The positions of the six Eagle Roosting Areas are not shown on this map. They are shown on the maps for Alternative I and Alternative B-Modified.

2) The positions of the thirty Developed Recreation areas are not shown on this map.



Legend

- **Wilderness**
  - ❶ Black Canyon
  - ❷ Bridge Creek
  - ❸ Mill Creek
- **North Fork Crooked River** Wilderness Study Area
- **Research Natural Area**
- **Old Growth**
- **Semiprimitive Nonmotorized**
- **North Fork Crooked River**
  - Scenic Corridor
  - Recreation Corridor
- **Retention**
- **Partial Retention**
- **Winter Range**
- **Summer Range**
- **General Forest**
- **Other Ownership**



N 0 2 4 6 8 10 1/4" = 1 Mile

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Ochoco National Forest
Alternative B—Modified

MA-F1 Black Canyon Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F2 Bridge Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F3 Mill Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F4 North Fork Crooked River Wilderness Study Area - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F5 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.

MA-F6 Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.

MA-F10 Silver Creek Roadless Area - Protect and enhance the roadless qualities and provide nonmotorized recreational use.

MA-F11 Lookout Mountain Recreation Area - Maintain a natural setting, providing continued opportunities for high quality, semiprimitive recreational activities, and wildlife habitat, while maintaining healthy forests.

MA-F12 Eagle Roosting Areas - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.

MA-F13 Developed Recreation - Provide safe, healthful, and esthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.

MA-F14 Dispersed Recreation - Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.

MA-F16 Bandit Springs Recreation Area - Dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. The recreational activities and opportunities will be expanded beyond winter recreation to year round activities.

MA-F17 Steins Pillar Recreation Area - Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Steins Pillar. Provide roadless nonmotorized recreation, with various opportunities to enjoy nature.

MA-F19 Deep Creek Recreation Area - Provide a near natural setting, where management activities are not visually evident, for recreational pursuits within the area.

MA-F21 General Forest Winter Range - Manage for timber production with measures taken to maintain habitat effectiveness for big game. Management activities will be designed and implemented to recognize big game habitat needs.

MA-F22 General Forest - Production of timber and forage while meeting the Forest-wide Standards and Guides for all resources.

MA-F23 North Fork Crooked River Recreation Corridor - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment.

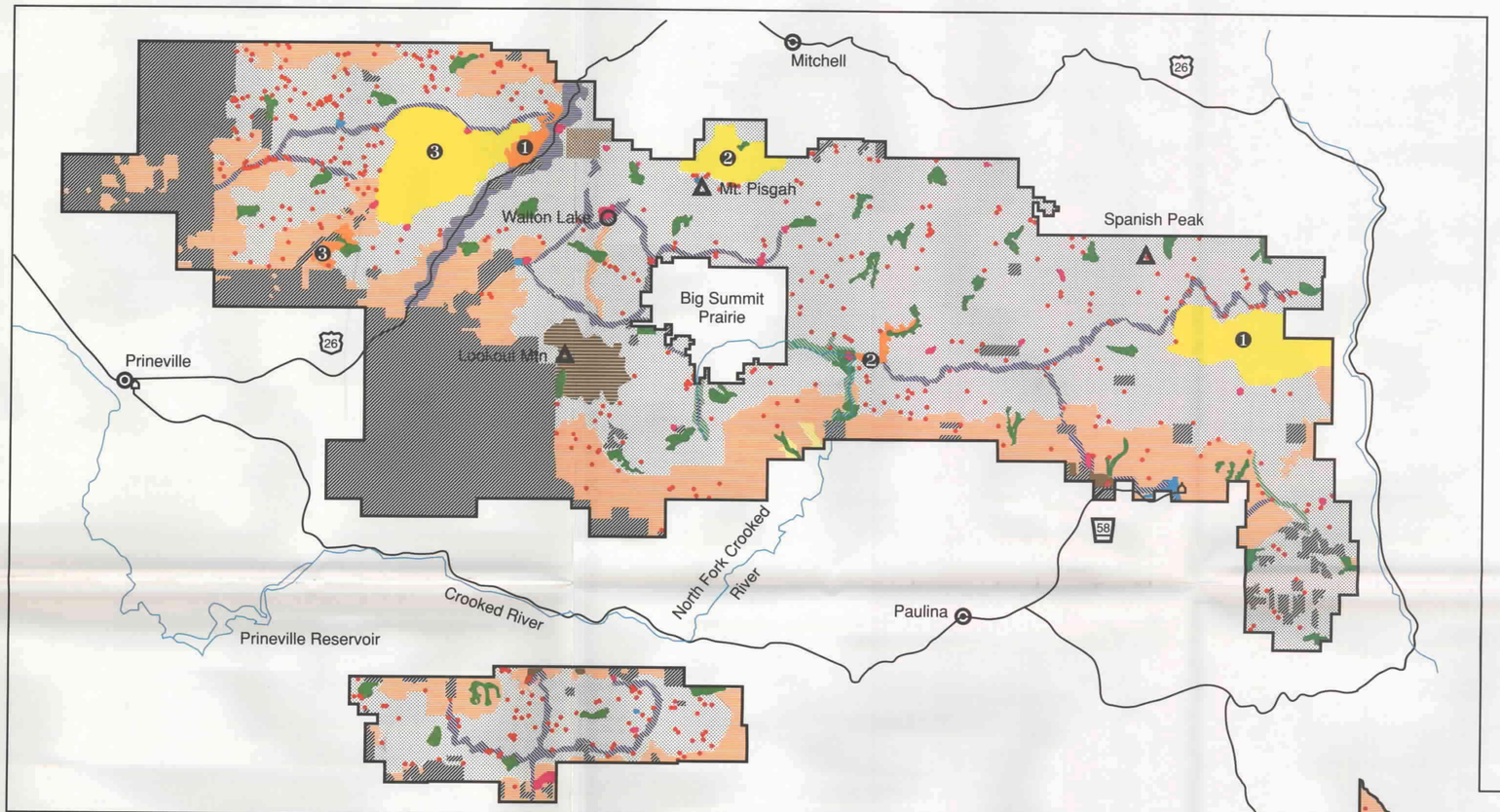
MA-F24 North Fork Crooked River Scenic Corridor - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

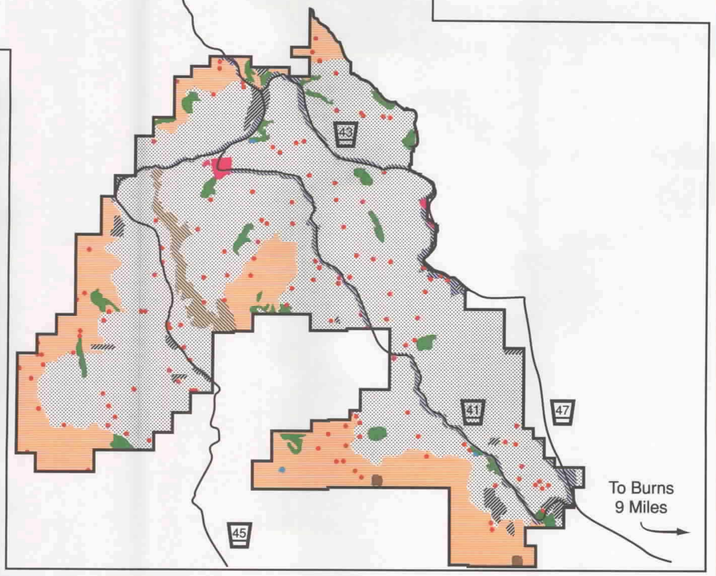
MA-F25 U.S. Highway 26 Visual Corridor - Maintain and enhance the scenery for travelers along U.S. Highway 26.

MA-F26 Visual Management Corridors - Maintain the natural appearing character of the Forest along major travel routes, where management activities are not evident, or are visually subordinated to the surrounding landscape.

MA-F27 Round Mountain National Recreation Trail - Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting.

MA-F28 Facilities - Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surroundings.





Legend

Wilderness
- ❶ Black Canyon
- ❷ Bridge Creek
- ❸ Mill Creek

North Fork Crooked River Wilderness Study Area

Research Natural Area

Old Growth

Eagle Roosting Area

Silver Creek Unroaded

Lookout Mountain Recreation Area Top (unroaded)

Round Mountain National Recreational Trail

Developed Recreation Area

Dispersed Recreation Area

North Fork Crooked River
- Scenic Corridor
- Recreation Corridor

Recreation Areas
- ❶ Bandit Springs
- ❷ Deep Creek ❸ Steins Pillar

Visual Corridors
- Highway 26
- Partial Retention

Facilities

General Forest Winter Range

General Forest

Other Ownership

N 0 2 4 6 8 10 1/4" = 1 Mile

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Ochoco National Forest
Alternative C—Modified

MA-F1 Black Canyon Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F2 Bridge Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F3 Mill Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F4 North Fork Crooked River Wilderness Study Area - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F12 Eagle Roosting Areas - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.*1*

MA-F16 Bandit Springs Recreation Area - Dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. The recreational activities and opportunities will be expanded beyond winter recreation to year round activities.*2*

MA-F23 North Fork Crooked River Recreation Corridor - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment.

MA-F24 North Fork Crooked River Scenic Corridor - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

MA-D2 Big Game Winter Range - Manage for Big Game Winter Range habitat.

MA-D3 Big Game Summer Range - Manage for Big Game Summer Range habitat.

MA-D4 Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.

MA-D5 Retention Foreground - Provide a scenic, natural view so that management activities are not evident in the foreground.

MA-D6 Partial Retention Foreground - Provide a scenic, near natural view where management activities remain visually subordinate to the natural landscape in the foreground.

MA-D7 Partial Retention Middleground - Provide a scenic, near natural view where management activities remain visually subordinate to the landscape in the middleground.

MA-D9 Semiprimitive Nonmotorized - Provide roadless nonmotorized recreation opportunities in a natural or natural appearing setting with minimum sights and sounds of human activity.

MA-D10 Semiprimitive Motorized - Provide motorized recreation opportunities, without developed roads, highway vehicles, or concentrations of people in a relatively natural appearing environment.

MA-D11 Developed Recreation - Provide and maintain safe, healthful, and aesthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.*3*

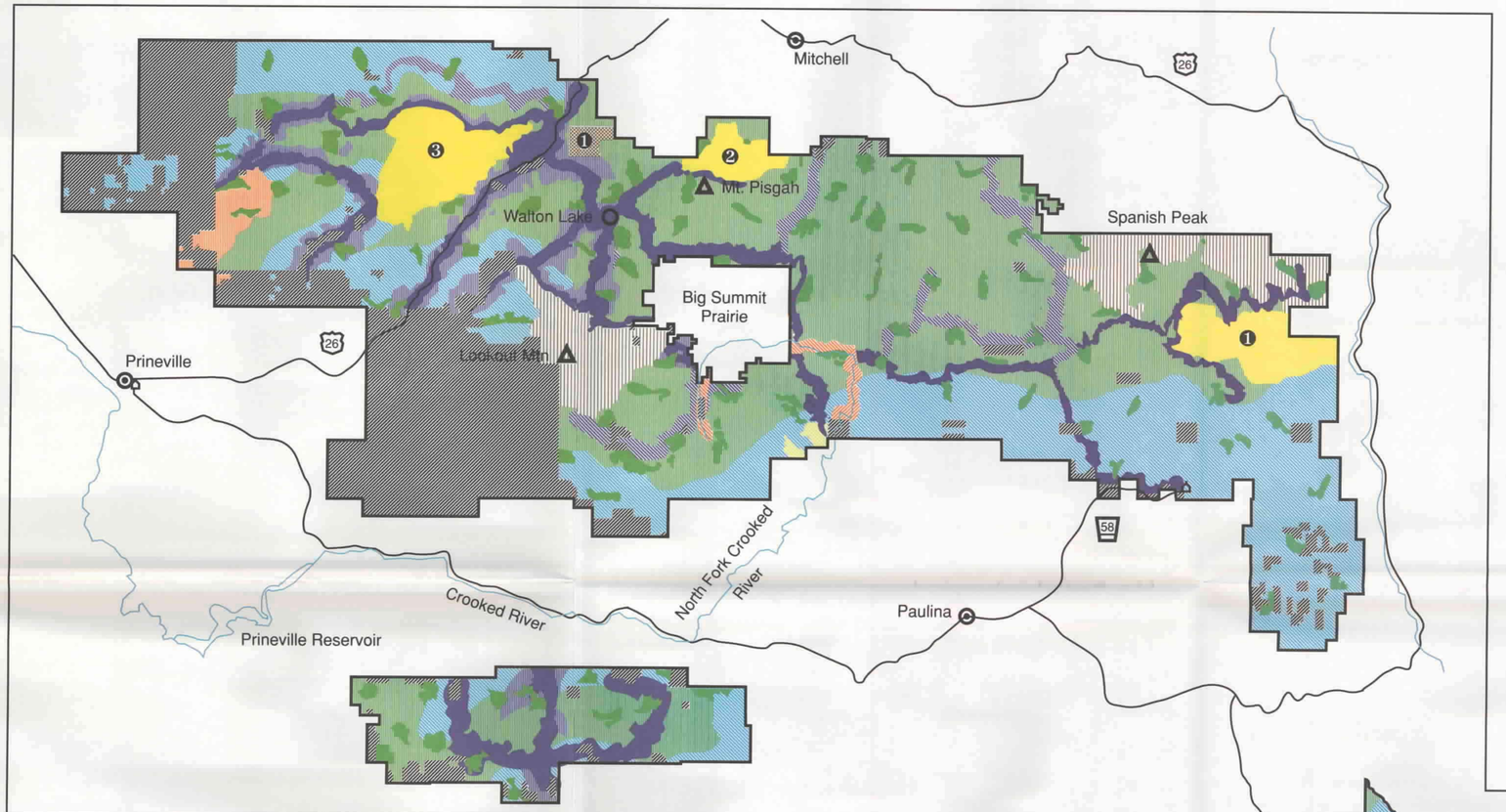
MA-D12 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.

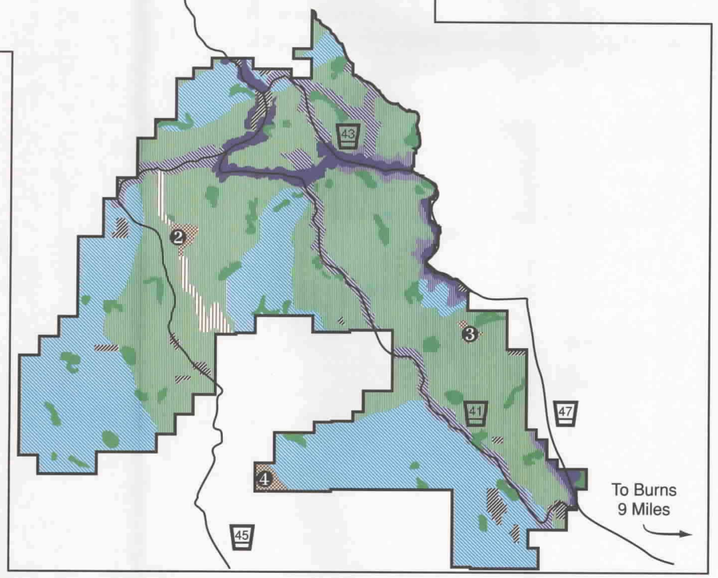
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1) The positions of the six Eagle Roosting Areas are not shown on this map. They are shown on the maps for Alternative I and Alternative B-Modified.

2) The Bandit Springs area is shown as visual retention on this map. It is shown separately on the maps for Alternative I and Alternative B-Modified.

3) The positions of the thirty Developed Recreation areas are not shown on this map.





Legend

- **Wilderness**
  - ❶ Black Canyon
  - ❷ Bridge Creek
  - ❸ Mill Creek
- **North Fork Crooked River** Wilderness Study Area
- **Research Natural Area**
  - ❶ Ochoco Divide
  - ❷ Silver Creek
  - ❸ Stinger Creek
  - ❹ Dry Creek
- **Old Growth**
- **Semiprimitive Nonmotorized**
- **Semiprimitive Motorized**
- **North Fork Crooked River**
  - Scenic Corridor
  - Recreation Corridor
- **Visual Corridors**
  - Retention
  - Partial Retention
  - Middleground
- **Winter Range**
- **Summer Range**
- **Other Ownership**

N 0 2 4 6 8 10 1/4" = 1 Mile

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Ochoco National Forest
Alternative E—Departure

MA-F1 Black Canyon Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F2 Bridge Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F3 Mill Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F4 North Fork Crooked River Wilderness Study Area - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F12 Eagle Roosting Areas - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.*1*

MA-F16 Bandit Springs Recreation Area - Dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. The recreational activities and opportunities will be expanded beyond winter recreation to year round activities.*2*

MA-F23 North Fork Crooked River Recreation Corridor - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment.

MA-F24 North Fork Crooked River Scenic Corridor - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

MA-D1 General Forest - Production of timber and forage, while meeting the Forest-wide Standards and Guides for all resources.

MA-D2 Big Game Winter Range - Manage for Big Game Winter Range habitat.

MA-D3 Big Game Summer Range - Manage for Big Game Summer Range habitat.

MA-D4 Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.

MA-D5 Retention Foreground - Provide a scenic, natural view so that management activities are not evident in the foreground.

MA-D6 Partial Retention Foreground - Provide a scenic, near natural view where management activities remain visually subordinate to the natural landscape in the foreground.

MA-D7 Partial Retention Middleground - Provide a scenic, near natural view where management activities remain visually subordinate to the landscape in the middleground.

MA-D9 Semiprimitive Nonmotorized - Provide roadless nonmotorized recreation opportunities in a natural or natural appearing setting with minimum sights and sounds of human activity.

MA-D10 Semiprimitive Motorized - Provide motorized recreation opportunities, without developed roads, highway vehicles, or concentrations of people in a relatively natural appearing environment.

MA-D11 Developed Recreation - Provide and maintain safe, healthful, and aesthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.*3*

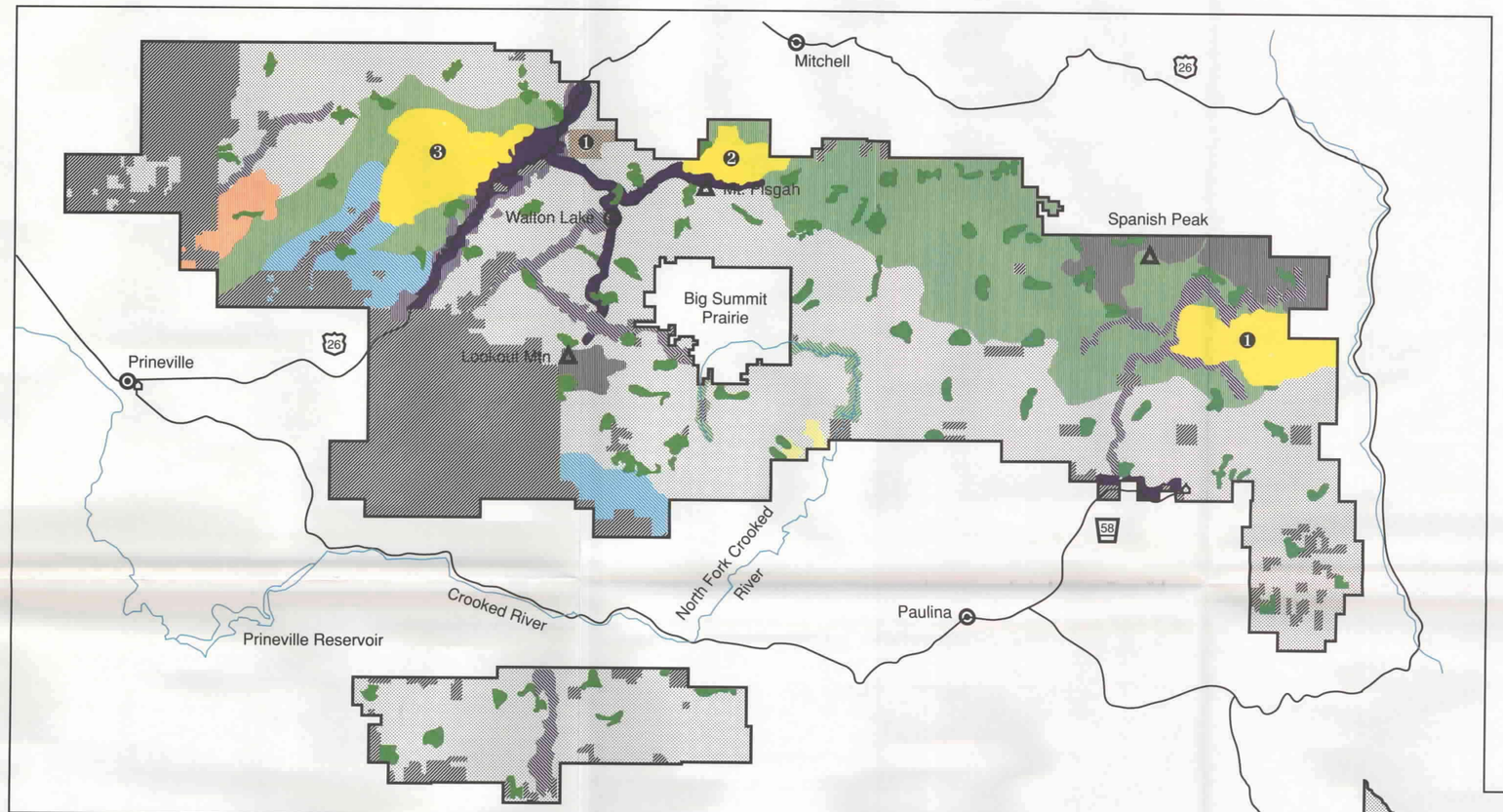
MA-D12 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.

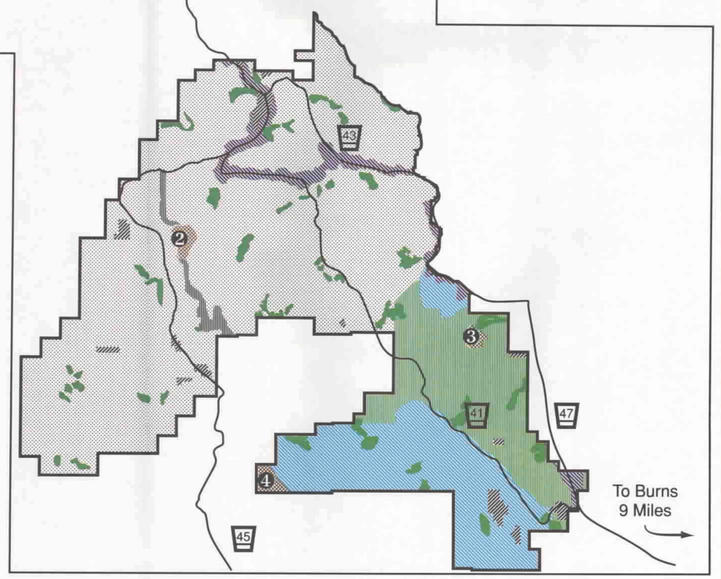
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1) The positions of the six Eagle Roosting Areas are not shown on this map. They are shown on the maps for Alternative I and Alternative B-Modified.

2) The Bandit Springs area is shown as visual retention on this map. It is shown separately on the maps for Alternative I and Alternative B-Modified.

3) The positions of the thirty Developed Recreation areas are not shown on this map.





Legend

- **Wilderness**
  - 1 Black Canyon
  - 2 Bridge Creek
  - 3 Mill Creek
- **North Fork Crooked River** Wilderness Study Area
- **Research Natural Area**
  - 1 Ochoco Divide
  - 2 Silver Creek
  - 3 Stinger Creek
  - 4 Dry Creek
- **Old Growth**
- **Semiprimitive Nonmotorized**
- **Semiprimitive Motorized**
- **North Fork Crooked River**
  - Scenic Corridor
  - Recreation Corridor
- **Visual Corridors**
  - Retention
  - Partial Retention
  - Middleground
- **Winter Range**
- **Summer Range**
- **General Forest**
- **Other Ownership**

N

0 2 4 6 8 10

1/4" = 1 Mile

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Ochoco National Forest
Alternative I

MA-F1 Black Canyon Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F2 Bridge Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F3 Mill Creek Wilderness - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

MA-F4 North Fork Crooked River Wilderness Study Area - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F5 Research Natural Areas - Provide opportunities for research, education, and ecological benchmarks in naturally occurring ecosystems where natural processes are maintained.

MA-F6 Old Growth - Provide habitat for wildlife species dependent on Old Growth stands.

MA-F7 - Summit National Historic Trail - Protect the existing integrity of the Summit Trail. Enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities.

MA-F8 Rock Creek/Cottonwood Creek Roadless Area - Provide for protection of soil, water, and fisheries, and for opportunities for nonmotorized recreational use and enjoyment. Maintain vegetation on steep slopes to prevent erosion, and to protect water quality and the anadromous fishery.

MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area-Allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes, and big game habitat.

MA-F10 Silver Creek Roadless Area - Protect and enhance the roadless qualities and provide nonmotorized recreational use.

MA-F11 Lookout Mountain Recreation Area - Maintain a natural setting, providing continued opportunities for high quality, semiprimitive recreational activities, and wildlife habitat, while maintaining healthy forests.

MA-F12 Eagle Roosting Areas - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.

MA-F13 Developed Recreation - Provide safe, healthful, and esthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.

MA-F14 Dispersed Recreation - Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.

MA-F16 Bandit Springs Recreation Area - Dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. The recreational activities and opportunities will be expanded beyond winter recreation to year round activities.

MA-F17 Steins Pillar Recreation Area - Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Steins Pillar. Provide roadless nonmotorized recreation, with various opportunities to enjoy nature.

MA-F18 Hammer Creek Wildlife/Recreation Area - Provide and maintain habitat diversity for a variety of wildlife species where open road density is minimal, and a scenic, semi-natural or natural-appearing setting for nonmotorized recreational opportunities exists.

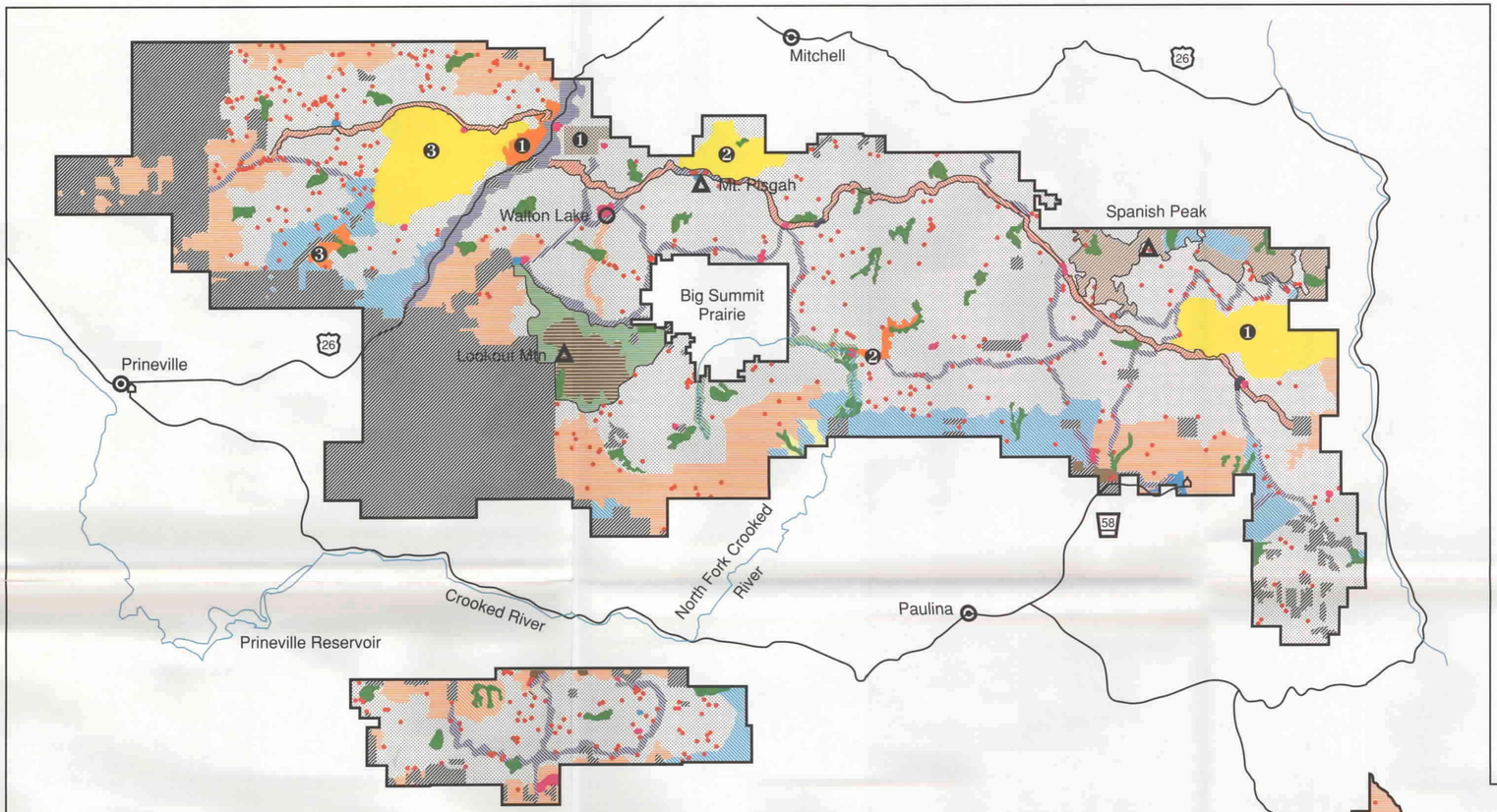
MA-F19 Deep Creek Recreation Area - Provide a near natural setting, where management activities are not visually evident, for recreational pursuits within the area.

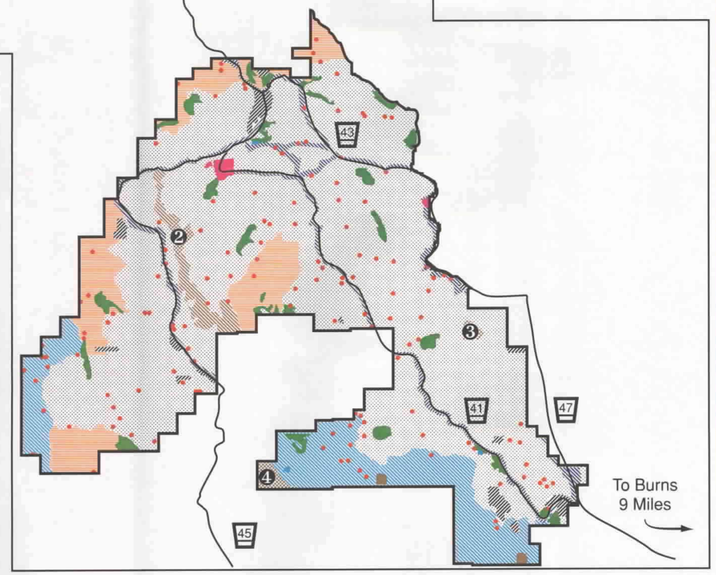
MA-F20 Winter Range - Manage for Big Game Winter Range habitat.

MA-F21 General Forest Winter Range - Manage for timber production with measures taken to maintain habitat effectiveness for big game. Management activities will be designed and implemented to recognize big game habitat needs.

MA-F22 General Forest - Production of timber and forage while meeting the Forest-wide Standards and Guides for all resources.

(continued at right edge of map)





Legend

- **Wilderness**
  - ❶ Black Canyon
  - ❷ Bridge Creek ❸ Mill Creek
- **North Fork Crooked River** Wilderness Study Area
- **Research Natural Area**
  - ❶ Ochoco Divide ❷ Silver Creek
  - ❸ Stinger Creek ❹ Dry Creek
- **Old Growth**
- **Summit National Historic Trail**
  - Preservation
  - Retention
  - Partial Retention
- **Lookout Mountain Recreation Area**
  - Bottom
  - Top (unroaded)
- **Silver Creek**
- **Rock Creek/Cottonwood Creek**
  - Unroaded
  - Unroaded Helicopter
- **Developed Recreation Area**
- **Dispersed Recreation Area**
- **North Fork Crooked River**
  - Scenic Corridor
  - Recreation Corridor
- **Facilities**
- **General Forest**
- **Round Mountain National Recreation Trail**
- **Recreation Areas**
  - ❶ Bandit Springs
  - ❷ Deep Creek ❸ Steins Pillar
- **Hammer Creek Wildlife/ Recreation Area**
- **Winter Range**
- **General Forest Winter Range**
- **Eagle Roosting Area**
- **Visual Corridors**
  - Highway 26
  - Retention
  - Partial Retention
- **Other Ownership**

N

0 2 4 6 8 10

1/4" = 1 Mile

MA-F23 North Fork Crooked River Recreation Corridor - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment.

MA-F24 North Fork Crooked River Scenic Corridor - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

MA-F25 U.S. Highway 26 Visual Corridor - Maintain and enhance the scenery for travelers along U.S. Highway 26.

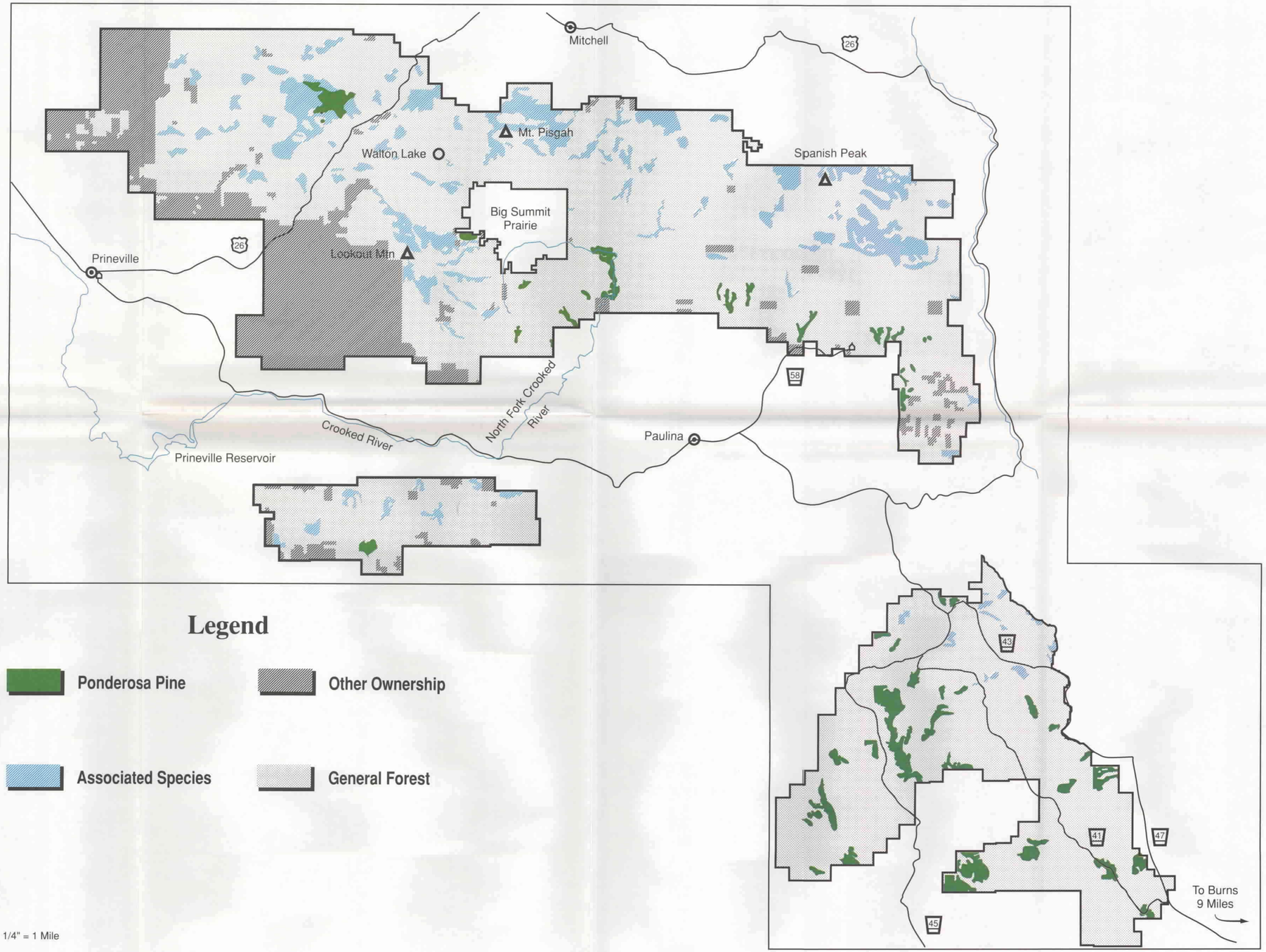
MA-F26 Visual Management Corridors - Maintain the natural appearing character of the Forest along major travel routes, where management activities are not evident, or are visually subordinated to the surrounding landscape.

MA-F27 Round Mountain National Recreation Trail - Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting.

MA-F28 Facilities - Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surroundings.

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Ochoco National Forest
Existing Old Growth



Legend

- Ponderosa Pine
- Other Ownership
- Associated Species
- General Forest

N

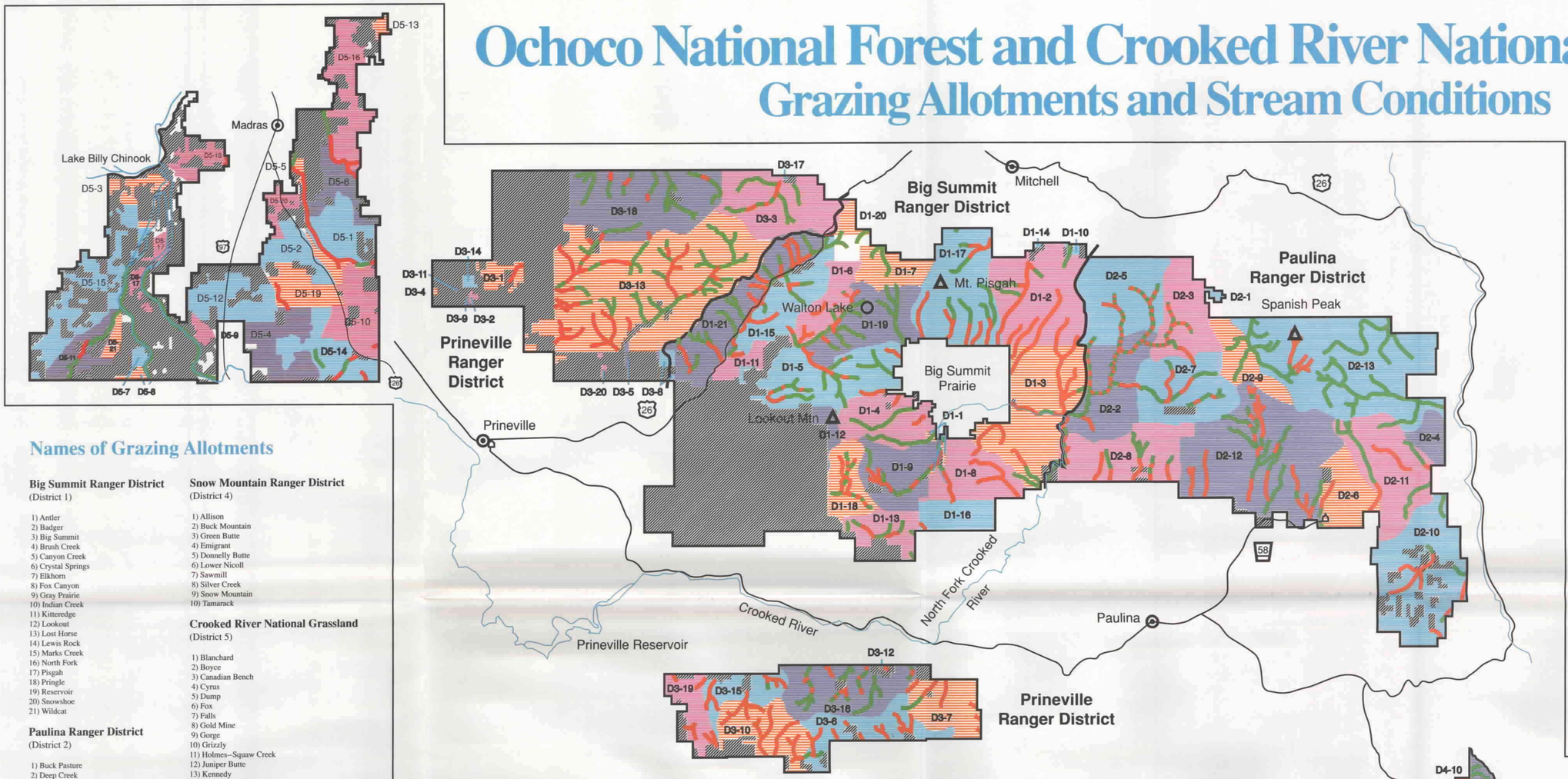
0 2 4 6 8 10

1/4" = 1 Mile

U.S. GOVERNMENT PRINTING OFFICE: 1989—691-059/91,200 REGION NO. 10

Ochoco National Forest and Crooked River National Grassland

Grazing Allotments and Stream Conditions



Names of Grazing Allotments

Big Summit Ranger District
(District 1)

1) Antler
2) Badger
3) Big Summit
4) Brush Creek
5) Canyon Creek
6) Crystal Springs
7) Elkhorn
8) Fox Canyon
9) Gray Prairie
10) Indian Creek
11) Kitteredge
12) Lookout
13) Lost Horse
14) Lewis Rock
15) Marks Creek
16) North Fork
17) Pisgah
18) Pringle
19) Reservoir
20) Snowshoe
21) Wildcat

Paulina Ranger District
(District 2)

1) Buck Pasture
2) Deep Creek
3) Derr
4) Dry Corner
5) Happy
6) Heisler
7) Little Summit
8) Roba
9) Rock Creek
10) Sunflower
11) Wind Creek
12) Wolf Creek
13) Bearskull--Cottonwood

Prineville Ranger District
(District 3)

1) Allen Creek
2) Andrade
3) Bear Creek
4) Cox
5) Craig
6) Double Cabin
7) East Maury
8) East Ortman
9) Jones
10) Klootchman
11) Lytle Creek
12) McCullough
13) Mill Creek
14) Reynolds
15) Sherwood
16) Shotgun
17) Stephenson
18) Trout Creek
19) West Maury
20) West Ortman

Snow Mountain Ranger District
(District 4)

1) Allison
2) Buck Mountain
3) Green Butte
4) Emigrant
5) Donnelly Butte
6) Lower Nicoll
7) Sawmill
8) Silver Creek
9) Snow Mountain
10) Tamarack

Crooked River National Grassland
(District 5)

1) Blanchard
2) Boyce
3) Canadian Bench
4) Cyrus
5) Dump
6) Fox
7) Falls
8) Gold Mine
9) Gorge
10) Grizzly
11) Holmes--Squaw Creek
12) Juniper Butte
13) Kennedy
14) Lone Pine
15) Lower Desert
16) North
17) Peninsula
18) Round Butte
19) Rush
20) Steer
21) Williams

N 0 2 4 6 8 10 1/4" = 1 Mile

Legend

- Streams in Acceptable Condition
- Streams in Unacceptable Condition
- Ranger District Boundary
- No Grazing Allotment

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Ochoco National Forest

Land Adjustment Plan Map

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
F. DALE ROBERTSON, CHIEF

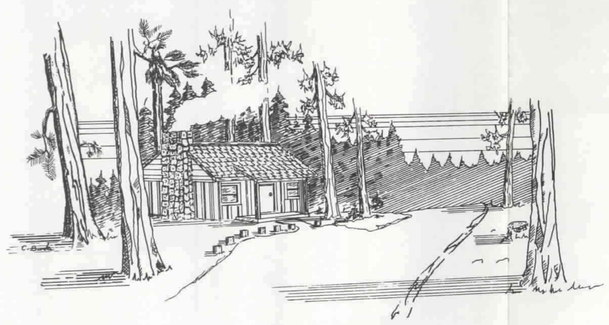
OCHOCO NATIONAL FOREST
and
CROOKED RIVER NATIONAL
GRASSLAND
OREGON
WILLAMETTE MERIDIAN

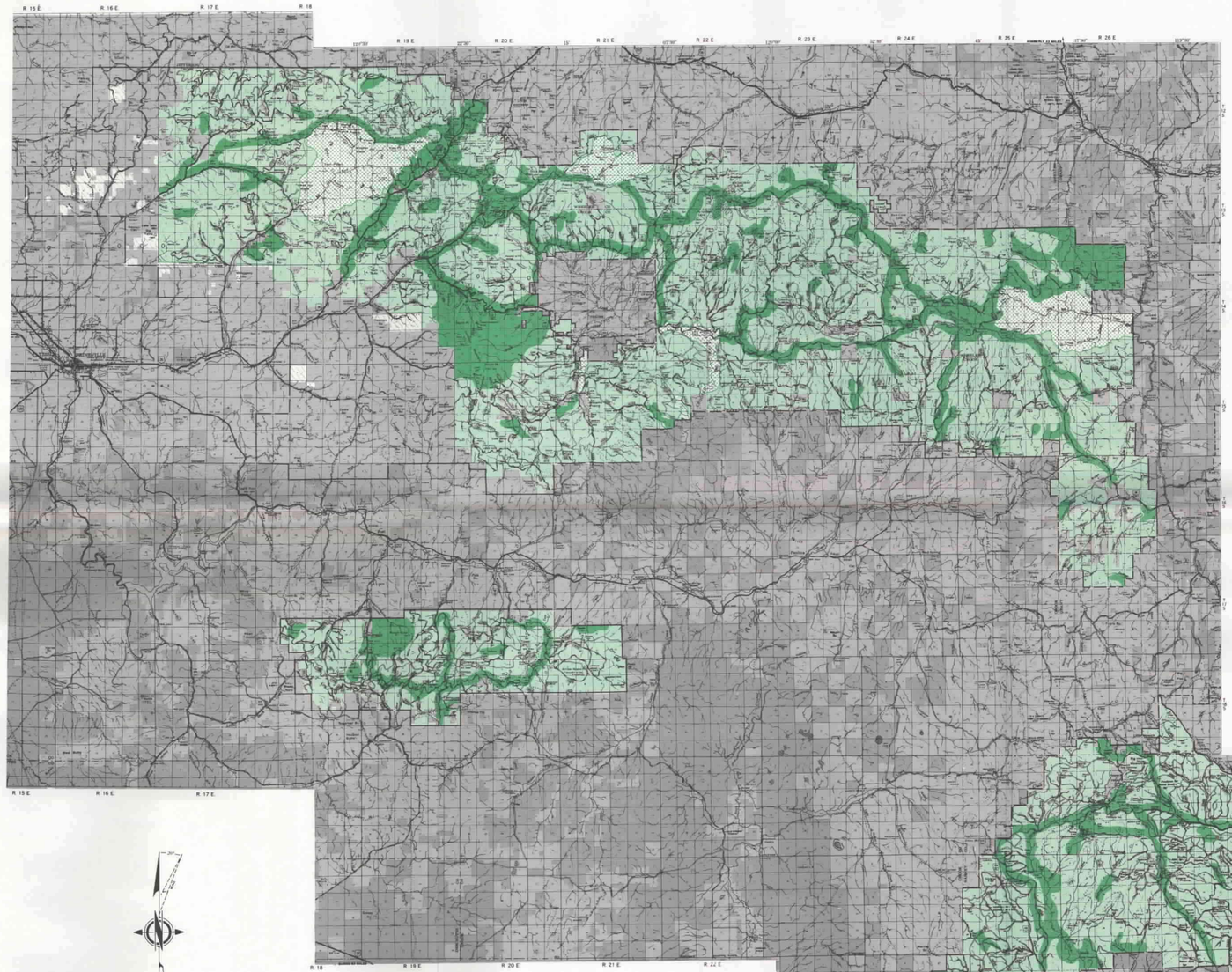
1989

Scale ¼" = 1 Mile

LEGEND

- Ochoco National Forest and Crooked River National Grassland Boundaries
- Adjacent National Forest Boundary
- Wilderness Boundary
- County Boundary
- Ranger District Boundary
- U.S. Route
- Oregon State Route
- National Forest Primary Route
- National Forest Secondary Route
- Other National Forest Routes (Not maintained for automobile)
- Paved Road
- Gravel Road
- Improved Road
- Primitive Road
- Gate
- Trail
- Railroad
- Power Transmission Line
- Forest Supervisors Office
- District Ranger Office
- Other Forest Service Facility
- Located or Landmark Object
- House, Cabin or Other Building
- School
- Church
- Gaging Station
- Sawmill
- Horizontal Control Station
- Horizontal Control Station and Permanent Lookout
- Permanent Lookout Station
- Mine, Quarry or Gravel Pit
- Recreation Site, Forest Service





KEY MAP

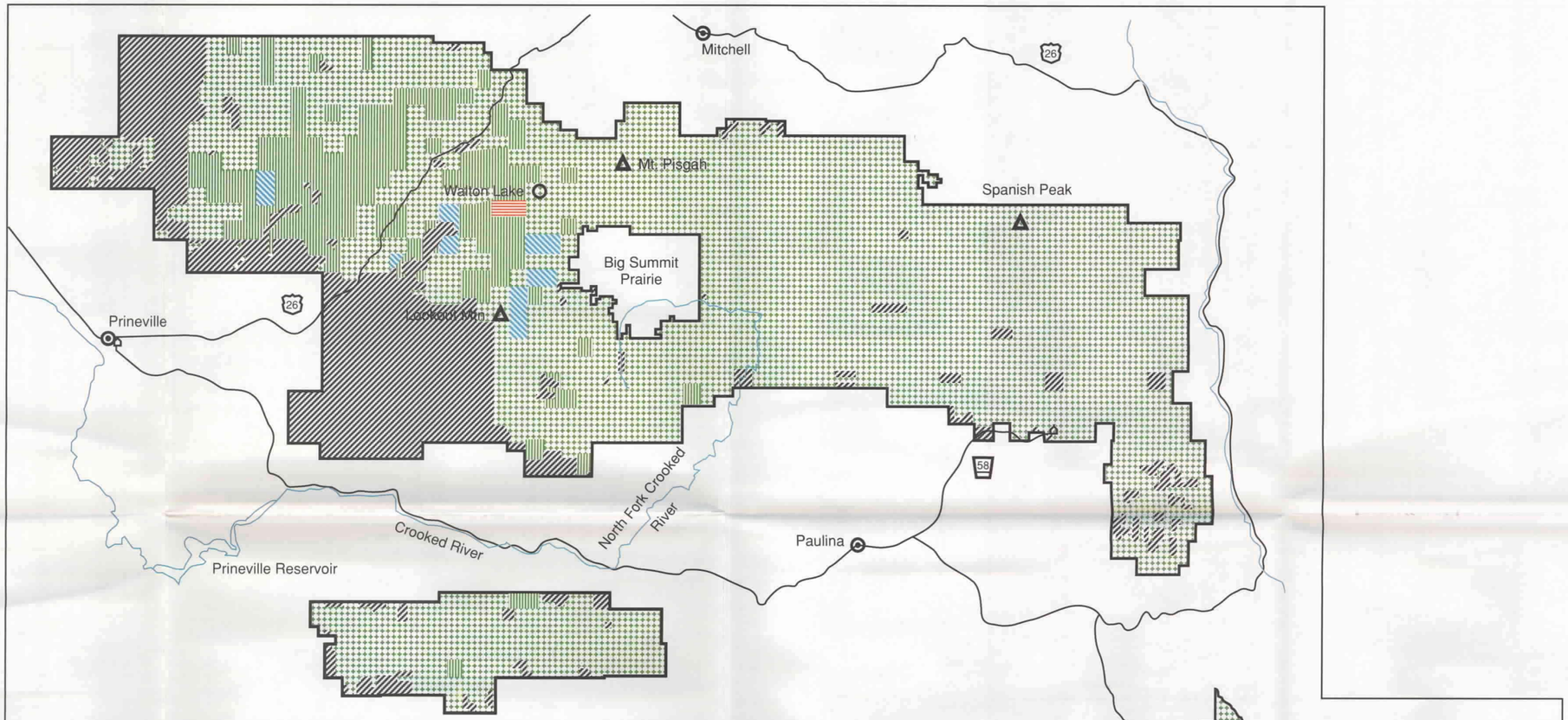


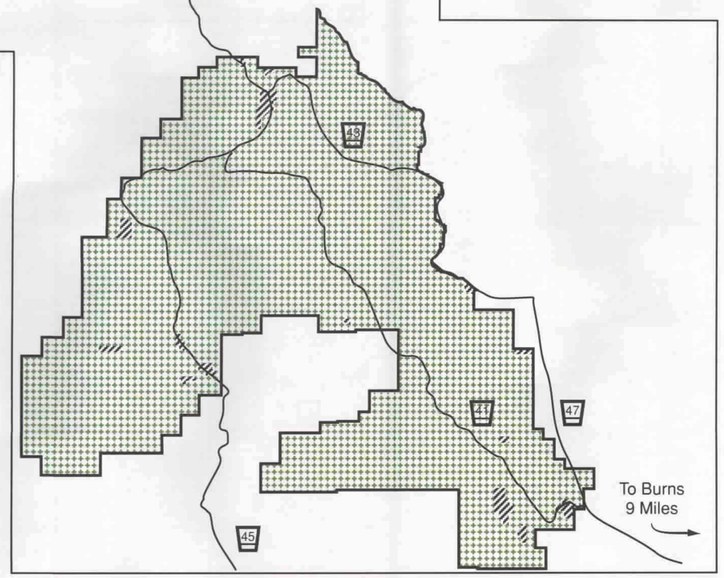
Legend

- Category 1 - Congressional Direction to Retain/Acquire
- Category 2 - Retain/Acquire
- Category 3 - Disposal Acceptable
- Category 4 - Disposal Preferable
- Category 5 - Further Study

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Ochoco National Forest
Locatable Mineral Potential





Legend

- High Potential for Gold
- Moderate Potential for Mercury/Gold
- High Potential for Mercury (Moderate Potential for Gold)
- Low or Unknown Potential for Mercury/Gold
- Other Ownership

N

0 2 4 6 8 10

1/4" = 1 Mile

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Ochoco National Forest
Old Growth Management Areas

Big Summit Ranger District (D1)

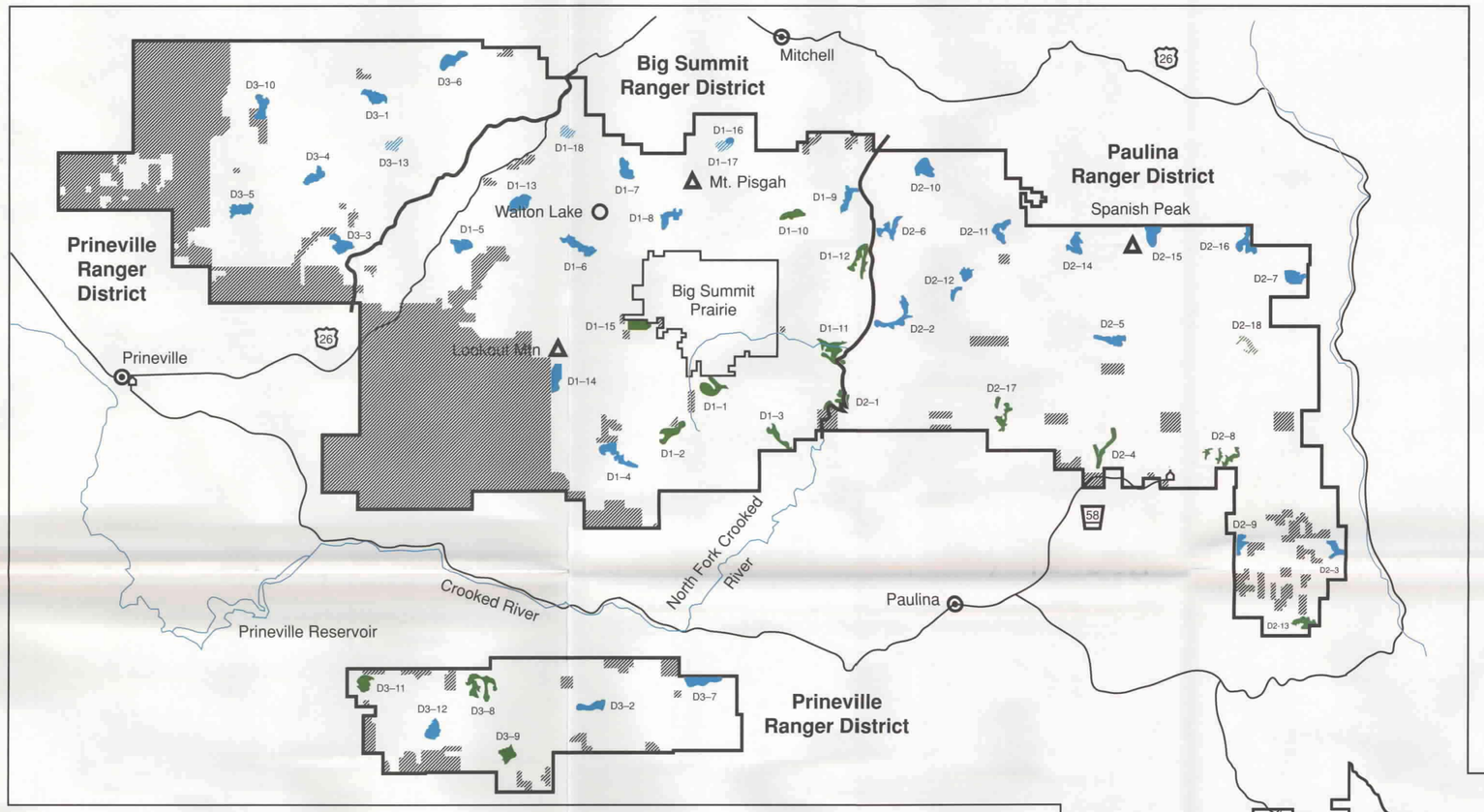
Stand #	Number of Acres
D1-1	250
D1-2	380
D1-3	300
D1-4	300
D1-5	360
D1-6	320
D1-7	300
D1-8	300
D1-9	300
D1-10	240
D1-11	400
D1-12	290
D1-13	300
D1-14	300
D1-15	300
D1-16	50
D1-17	300
D1-18	300

Paulina Ranger District (D2)

Stand #	Number of Acres
D2-1	380
D2-2	310
D2-3	310
D2-4	300
D2-5	300
D2-6	300
D2-7	310
D2-8	300
D2-9	320
D2-10	340
D2-11	320
D2-12	320
D2-13	300
D2-14	300
D2-15	330
D2-16	320
D2-17	330
D2-18	300

Prineville Ranger District (D3)

Stand #	Number of Acres
D3-1	300
D3-2	290
D3-3	300
D3-4	280
D3-5	300
D3-6	260
D3-7	290
D3-8	440
D3-9	300
D3-10	300
D3-11	300
D3-12	300
D3-13	300



Snow Mountain Ranger District (D4)

Stand #	Number of Acres
D4-1	300
D4-2	300
D4-3	300
D4-4	300
D4-5	160
D4-6	300
D4-7	310
D4-8	300
D4-9	300
D4-10	300
D4-11	300
D4-12	300
D4-13	300
D4-14	300
D4-15	300
D4-16	300
D4-17	260
D4-18	300
D4-19	300
D4-20	280
D4-21	300
D4-22	300
D4-23	300

Legend

- Ponderosa Pine
- Associated Species
- Ponderosa Pine In Other Management Areas
- Other Ochoco National Forest Land
- Other Ownership
- Associated Species In Other Management Areas
- District Boundary

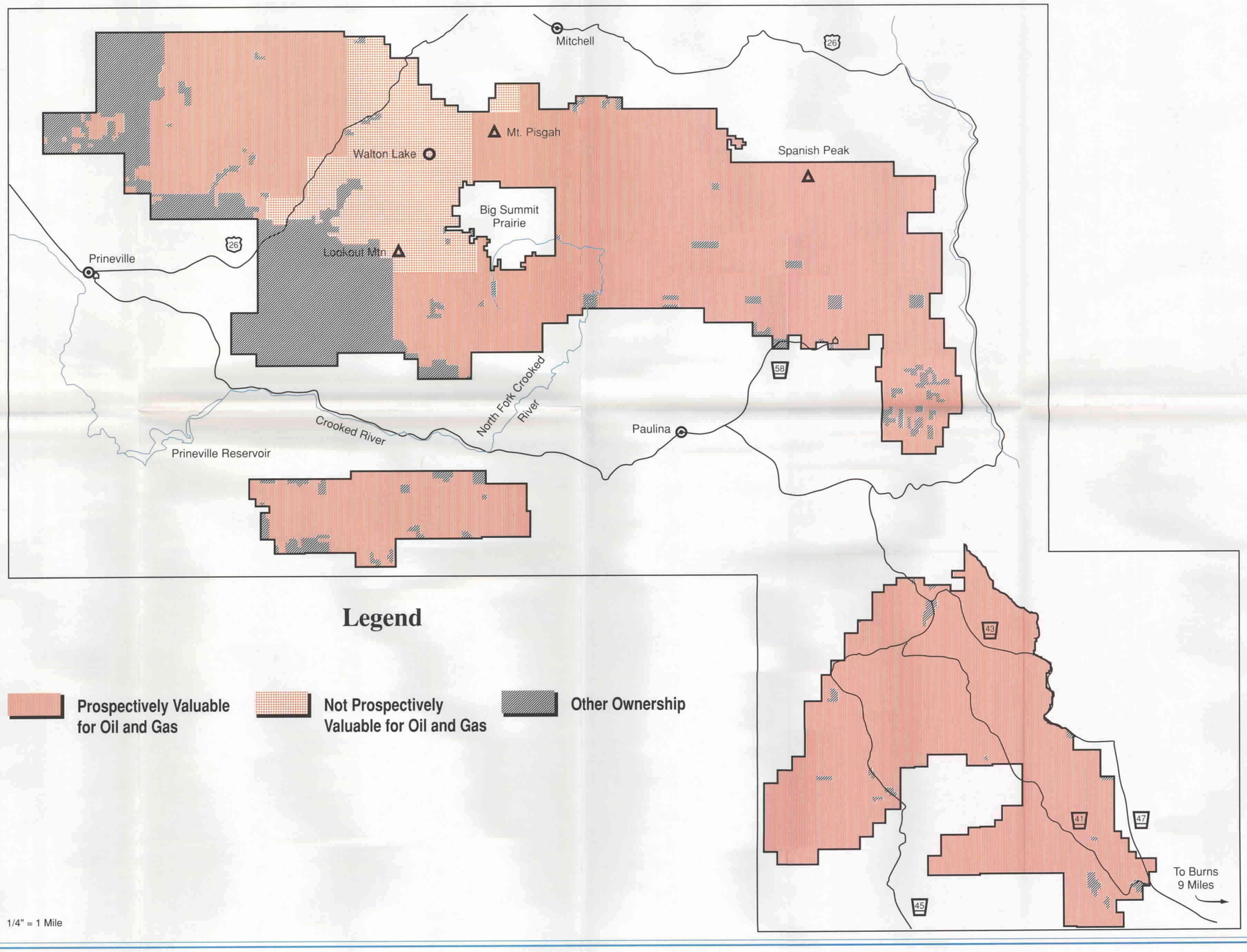
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0 2 4 6 8 10

1/4" = 1 Mile

U.S. GOVERNMENT PRINTING OFFICE: 1989—691-059/01,200 REGION NO. 10

Ochoco National Forest
Oil and Gas Potential



Legend

- Prospectively Valuable for Oil and Gas
- Not Prospectively Valuable for Oil and Gas
- Other Ownership

N

0 2 4 6 8 10

1/4" = 1 Mile

U.S. GOVERNMENT PRINTING OFFICE: 1989—691-059/01,200 REGION NO. 10

OCHOCO NATIONAL FOREST
CROOKED RIVER NATIONAL GRASSLAND
TRAVEL PLAN
1989

Effective October 1, 1989, or until rescinded.

Welcome to the Ochoco National Forest and Crooked River National Grassland, yours to enjoy and use for a variety of purposes. However, in order to protect resources, safeguard users and minimize conflicts of use, it is necessary to establish controls on the use of areas, roads and trails in the Ochoco National Forest and Crooked River National Grassland. This map displays where travel is allowed and where it is restricted on National Grassland and Forest land.

Study this map and the travel restrictions. Your understanding and observance of these travel restrictions will minimize the need for enforcement action.

The travel plan will be reviewed annually and public comment will be sought during the review period. You are, of course, encouraged to comment at any time. Please feel free to visit the Forest or District Offices to discuss the reasons for any closure with us.

Enjoy your visit to the Ochoco. We look forward to serving you.

October 1, 1989 — Terry E. Goltberg
Date — Forest Supervisor



TREAD LIGHTLY!

Travel only where motorized vehicles are permitted.

Respect the rights of hikers, horseback riders, skiers, campers and others so they can enjoy their activities undisturbed.

Educate yourself. Obtain Visitor Maps and regulations from public agencies, comply with signs and barriers, and ask owners permission to cross private property.

Avoid streams, lakeshores, meadows, muddy roads and trails, steep hillsides, wildlife and livestock.

Drive responsibly to protect the environment and preserve opportunities to enjoy your vehicle on

WHY IS THIS AREA OR ROAD CLOSED?

There are a number of reasons why some modes of travel are restricted on public lands. These are not always well understood, particularly if encountered unexpectedly. Here are the reasons for them.

WILDLIFE HABITAT PROTECTION- Many closures are put into effect to protect critical areas where big game animals live. These areas are sensitive and often include winter ranges, calving grounds, or security areas. Many areas are closed seasonally and often open to vehicle use during other times of the year when big game are less likely to be disturbed.

RESOURCE PROTECTION - Some areas, roads, and trails are closed during wet weather to prevent rutting and other roadbed damage. This reduces erosion and the amount of sediment transported to streams. Also road maintenance cost are substantially reduced when roads and trails are closed during wet conditions.

PUBLIC SAFETY- In some specific instances, certain types of travel are prohibited to insure user safety. Even so caution should be used on every route because many receive heavy traffic, others are located on steep hillsides or are slippery when wet, and some have logging truck and other heavy equipment use. Backcountry travelers may encounter a variety of dangerous conditions. It is your responsibility to inform yourself about these risks and take appropriate precautions.

CONFLICT OF USE- In a few cases, it has become necessary to give preference to one use over another to resolve problems that exist between competing user groups. Insuring, of course that adequate opportunity exists elsewhere for the use prohibited. This is common between non-motorized and motorized forms of recreation use where, for example, a popular hiking or horseback trail might also be frequented by motorized riders.

LEGAL MANDATES- Some areas such as wildernesses are afforded special protection by Federal law. For example, it is unlawful to have possession of motorized equipment, bicycles and hang gliders within a classified wilderness area.

SENSITIVE LAND RESOURCES- Off-road use must not occur on meadows and should also be avoided on their fringes. Avoid use along streamsides and lakeshores.

KEY MAP



TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Unsurveyed, (BLM Protraction)



SPECIAL CONDITIONS

TEMPORARY EXCEPTIONS

Where off-route travel is prohibited, direct access to temporary campsites within 300 feet of designated routes is permitted. Please select your routes carefully, trying to avoid damage to the land and streams. Do not cut live timber.

Temporary exceptions are authorized to the travel plan closures for a Federal, State, or local officer or member of and organized rescue or firefighting force in the performance of an official duty and any vehicle use which is expressly authorized by the Forest Service under a permit, license or contract.

TEMPORARY CLOSURES

Use may be temporarily limited in some areas and on some roads or trails during periods when use would damage resources or would be hazardous. Such temporarily restricted areas, roads or trails are not shown on this map.

OTHER ROUTES NOT SHOWN ON MAP

Some roads on National Forest lands may not be shown on this map. If they have locked gates, barriers or route closure devices on them, they are closed to all motor vehicles.

GAME RETRIEVAL

Persons may not travel in violation of designated travel restrictions to retrieve downed game.

SNOWMOBILES

Snowmobiles should not be operated on plowed roads. If necessary to cross one with a snowmobile, do so at a right angle at a place with good sight distance.

Please avoid driving on or across a set cross-country ski track.

APPLICABLE PENALTIES

Regulations governing motor vehicles on all National Grassland and Forest System Lands are set forth in Title 36 Code of Federal Regulations, Part 261. These regulations supplement those in 36 CFR 261, Subpart A, and are issued under authority of Title 16 United States Code 551 and CFR261.50.

As required by the Code of Federal regulations a copy of each closure notice for and area is posted in the Forest Supervisor's office, and the appropriate Ranger District Office.

Violators of these regulations are subject to fines or imprisonment. Your cooperation is solicited.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
F. DALE ROBERTSON, CHIEF

OCHOCO NATIONAL FOREST
and
CROOKED RIVER NATIONAL GRASSLAND
OREGON
WILLAMETTE MERIDIAN

1989

Scale 1/2"=1 Mile

LEGEND

- Ochoco National Forest and Crooked River National Grassland Boundaries
- Adjacent National Forest Boundary
- Wilderness Boundary
- County Boundary
- Ranger District Boundary
- U.S. Route
- Oregon State Route
- National Forest Primary Route
- National Forest Secondary Route
- Other National Forest Routes (Not maintained for automobile)
- Paved Road
- Gravel Road
- Improved Road
- Primitive Road
- Gate
- Trail
- Railroad
- Power Transmission Line
- Forest Supervisors Office
- District Ranger Office
- Other Forest Service Facility
- Located or Landmark Object
- House, Cabin or Other Building
- School
- Church
- Gaging Station
- Sawmill
- Horizontal Control Station
- Horizontal Control Station and Permanent Lookout
- Permanent Lookout Station
- Mine, Quarry or Gravel Pit
- Recreation Site, Forest Service

HOW TO USE THIS MAP

Refer to the coding shown in the the Travel Guide Legend, and the Designations and Restrictions.

The Travel Guide Legend indicates by color, areas designated open, limited, or closed to motorized travel. The Designations and Restrictions indicate by symbol the type of restrictions and seasons.

The Travel Guide Legend also indicates which routes are restricted. Roads open yearlong in areas otherwise closed are shown as ——— Trails open yearlong in areas otherwise closed are shown as — — — — Designated trails are limited to vehicles under 50 inches total width. Roads closed seasonally or yearlong are shown as ——— Trails closed seasonally or yearlong are — — — —.

DESIGNATIONS AND RESTRICTIONS

Some routes and areas are closed to vehicle travel during the time periods shown. The route restrictions are expressed on the map as solid or dashed lines. Routes within restricted areas that are open for travel are shown in green or red on the map. Vehicles may not travel off green routes during the time periods shown below. Designated routes, shown in red, are restricted during the dates shown.

MAP CODE			ROAD VEHICLE	MOTORCYCLE	ATV	SNOWMOBILE
ROAD	TRAIL	AREA				
1	1	①	Yearlong (Wilderness, Natural Areas, Resource Protection)	Yearlong	Yearlong	Yearlong
		②	Yearlong (Semiprimitive Nonmotorized Recreation, Resource Protection)	Yearlong	Yearlong	May 1-Dec 1
		③	Sept 28-Nov 23 (Hunting Recreation Opportunity)	Sept 28-Nov 23	Sept 28-Nov 23	Sept 28-Nov 23
4		④	Dec 1-May 1 (Big Game Winter Range, Resource Protection)	Dec 1-May 1	Dec 1-May 1	Dec 1-May 1
		⑤	Nov 1-May 1 (Conflicts of use, Resource Protection)	Nov 1-May 1	Nov 1-May 1	Nov 1-May 1
		⑥	Sept 28-May 1 (Hunting Recreation Opportunity, Big Game Winter Range)	Sept 28-May 1	Sept 28-May 1	Sept 28- May 1
7		⑦	Nov 15-Mar 31 (Resource Protection)	Nov 15-Mar 31	Nov 15-Mar 31	Nov 15-Mar 31
		⑧	Sept 28-Mar 31 (Hunting Recreation Opportunity, Resource Protection)	Sept 28-Mar 31	Sept 28-Mar 31	Sept 28-Mar 31
9			Nov 25-Apr 15 (Resource Protection)	Nov 25-Apr 15	Nov 25-Apr 15	No Restrictions
10			May 1-June 30 & Sept 28-Nov 23 (Big Game Security, Resource Protection)	May 1-June 30 & Sept 28-Nov 23	May 1-June 30 & Sept 28-Nov 23	May 1-June 30 & Sept 28-Nov 23
11			May 5-July 15 (Big Game Security, Resource Protection)	May 5-July 15	May 5-July 15	May 5-July 15
12			Aug 15-Nov 1 (Big Game Security, Resource Protection)	Aug 15-Nov 1	Aug 15-Nov 1	Aug 15-Nov 1

The above restrictions are invoked on National Grassland and Forest lands pursuant to authority in 36 CFR261.50. Copies of the orders are on file at the District Ranger and Supervisor's offices of the Ochoco National Forest.

TRAVEL GUIDE LEGEND

- National Forest land closed to all motorized vehicles yearlong.
- National Forest land with less travel restrictions.
- National Forest land with greater travel restrictions.
- Crooked River Recreation River and Deschutes River Scenic Corridor closed to all motorized vehicles yearlong! Areas jointly administered with the Bureau of Land Management.
- National Forest lands open to all motorized vehicles.
- Private and other lands not covered by this travel guide.
- Designated road open yearlong. Road open yearlong to all motorized vehicles in an otherwise restricted area.
- Designated trail open yearlong. Trail open yearlong to vehicles 50 inches or less in total width in an otherwise restricted area.
- Designated road with restrictions. Road closed seasonally or yearlong. May also be a designated road closed seasonally in an otherwise restricted area.
- Designated trail with restrictions. Trail closed seasonally or yearlong.
- ① Restricted area reference.
- 1 Road restriction reference.
- 1 Trail restriction reference.
- Barrier or locked gate.

Longitude west from Greenwich

United States
Department of
Agriculture

Forest Service

**Pacific
Northwest
Region**

1989

Land and Resource Management Plan

Part 1

Ochoco National Forest

Caring for the Land...

Land and Resource Management Plan

Preface

Ochoco National Forest

August1989

The Ochoco National Forest Land and Resource Management Plan (Forest Plan) was prepared in compliance with 36 CFR 219, based on the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act of 1976, and in compliance with 40 CFR 1500 based on the National Environmental Policy Act of 1969.

Because the Plan is a major Federal action significantly affecting the quality of the human environment, an environmental impact statement (EIS) was prepared. The Plan provides direction for implementing the preferred alternative selected in the EIS.

If any particular provision of this Forest Plan, or the application of the action to any person or circumstance, is found to be invalid, the remainder of the Forest Plan and the application of that provision to other persons or circumstances shall not be affected.

Additional information about the Plan is available from:

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OCHOCO NATIONAL FOREST PLAN

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Chapter 1

Forest Plan Introduction

Chapter 1

Forest Plan Introduction

Purpose

The Forest Land and Resource Management Plan guides all natural resource management activities and establishes management standards and guidelines for the Ochoco National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

Although Crooked River National Grassland is an administrative unit of the Ochoco National Forest, it is addressed in a separate plan. The Grassland has land and resource characteristics, management activities, and parent laws and regulations which are



generally distinct from those of the Ochoco National Forest. This, coupled with public response, led to a separate land and resource management plan for the Grassland.

The decisions of the Regional Forester in approving a Forest Plan may generally be categorized as:

establishment of Forest-wide multiple-use goals and objectives [36 CFR 219.11(b)];

establishment of Forest-wide standards and guidelines to fulfill requirements of the National Forest Management Act (NFMA) applying to future activities [resource integration requirements of 36 CFR 219.13 to 219.26, and the requirements of 36 CFR 219 27];

establishment of management area direction including management area prescriptions and standards and guidelines applying to future management activities in that management area [36 CFR 219.11(c)];

establishment of allowable timber sale quantity and designation of land suitable for timber management [36 CFR 219.16 and 219 14],

nonwilderness multiple-use allocations for those roadless areas that were reviewed under 36 CFR 219.17 and not recommended for wilderness designation and,

monitoring and evaluation requirements [36 CFR 219.11(d)].

The Forest Plan embodies the provisions of NFMA, the implementing regulations, and other guiding documents. Land use determinations, prescriptions, and standards and guidelines are statements of the Plan's management direction. However, the projected outputs, services, and rates of implementation are dependent on the annual budgeting process

This plan will guide Forest Service programs on the Ochoco National Forest beginning in fiscal year 1990 (Oct. 1, 1989). It will ordinarily be revised on a ten-year cycle, but at least every 15 years. The Plan may be amended or revised at any time if the Forest Supervisor determines that conditions in the area covered by the Plan have changed significantly, or if project level environmental analysis demonstrates the need to make a change.

Relationship of the Forest Plan to Other Documents

Relationship to the Environmental Impact Statement and the Record of Decision

This Forest Plan sets forth the preferred alternative for managing the land and resources of the Ochoco National Forest. The Plan results from extensive analysis and considerations addressed in the Environmental Impact Statement (EIS) and the Record of Decision (ROD). The planning process and the analysis procedures used to develop this Plan are described or referred to in the EIS. The EIS also describes other alternatives considered in the planning process.

Specific activities and projects will be planned and implemented to carry out the direction in this Plan. The Forest will perform environmental analysis on these projects and activities. This subsequent environmental analysis will be tiered to the EIS and Plan.

Relationship to the Regional Guide

The Regional Guide for the Pacific Northwest Region, as amended December 8, 1988, provides direction for National Forest Plans. It includes standards and guidelines addressing the major issues and management concerns considered at the Regional level to facilitate Forest planning.

1. National	Resource Planning Act Assessment and Program.
2. Regional	Regional Guide.
3. Forest	National Forest Land and Resource Management Plans (Forest Plans) for National Forest System lands. Tiered to Regional Guide.
4. Project	Site or project specific plans, generally at Ranger District level. Tiered to Forest Plan.

Relationship to Other Plans

This Forest Plan serves as the single land management plan for the Ochoco National Forest. All other land management plans are replaced or superseded by the direction in this plan, or will be made consistent with it; see Chapter 5 for a listing of existing plans that this Forest Plan supersedes.

Management alternatives for the Ochoco National Forest and the Crooked River National Grassland Land and Resource Management Plans are described in the EIS. The Ochoco National Forest retains administrative and management responsibility for both the Forest and Grassland. Required planning, programming, and management activities for both plans will be integrated at the Supervisor's Office level for efficiency in implementation.

PLAN STRUCTURE

The Forest Plan is composed of five chapters, a glossary, and appendices. Chapter 1 provides planning background and a summary of the types of management decisions made. Chapter 2 summarizes the current situation, and the supply and demand of significant market and nonmarket goods and services on the Forest. Chapter 3 shows the Plan's response to the major public issues, management concerns, and resource opportunities identified during the planning process.

Chapter 4 is the heart of the Forest Plan. It sets the management direction for the Forest for the next 10 to 15 years. It presents goals, objectives, and desired future conditions directing resource management on the Forest. Desired future condition sections describe what the Forest should look like after the implementation of the management direction. Chapter 4 also presents prescriptions for each of the 28 management areas, Forest-wide standards and guidelines, and management area standards and guidelines. Forest-wide standards and guidelines state the constraints within which all practices are to be carried out in implementing the Forest Plan.

Chapter 5 explains how management direction will be implemented, how activities will be monitored, and how the plan will be kept current with changing conditions or other findings. The appendices provide detailed, supplemental information needed to explain portions of the Plan. The Glossary, contained in the FEIS, lists and defines technical terms used in the Plan. An index is provided to assist readers in locating subjects of interest.

FOREST DESCRIPTION

Located near the geographic center of Oregon, the Ochoco National Forest consists of 845,498 acres of land. The Forest is subdivided into four Ranger Districts: Big Summit, Paulina, Prineville, and Snow Mountain. The Forest is headquartered in Prineville.

The Forest administers lands in the Maury and Ochoco mountains, southward extensions of the Blue Mountain physiographic province. Most of the Forest is drained by the Crooked and Deschutes Rivers. Part of the north slope of the Ochoco Mountains drains into the John Day River. The Snow Mountain District drains into three systems: the Crooked River, the John Day River, and Malheur and Harney Lakes.

Vegetative types found on the Forest are diverse.

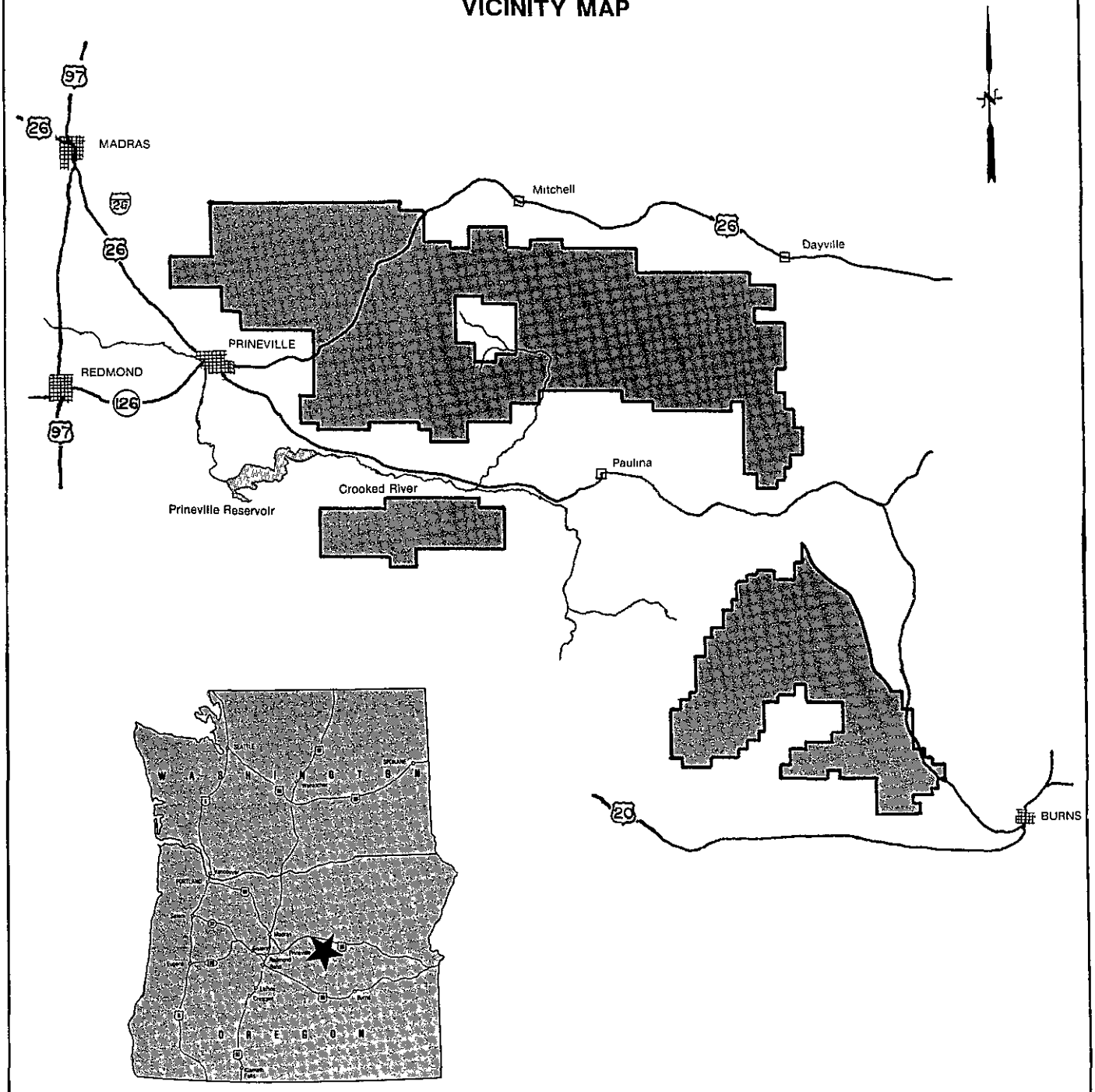
Lower elevations of the Forest where annual precipitation is less than 10 inches per year are vegetated with juniper, sagebrush, and grasses. Higher up, stands of ponderosa pine dominate southern and western aspects and compose the largest single forest type found on the Forest. Mixed conifer stands, made up of Douglas-fir, ponderosa pine, white fir, and western larch, grow at higher elevations on the cooler northern and eastern aspects. Scattered stands of lodgepole pine cover less than one percent of the Forest.

The Forest is managed to produce both commodity and noncommodity resources. Timber produced on the Forest is a major component of the local economy. Summer forage for livestock available on the Forest is important to local ranchers. These commodity resources are managed with consideration for recreation, wildlife, soil, and water. Major recreational pursuits include big game hunting and rockhounding. Both of these attractions draw visitors from well beyond the local area.

Figure 1-1

OCHOCO NATIONAL FOREST

VICINITY MAP



Chapter 2

Summary of the Analysis of the Management Situation

Chapter 2

Summary of the Analysis of the Management Situation

Introduction

This chapter summarizes the supply and demand situation for the key market and nonmarket goods and services associated with the Forest. Included is a summary containing:

resource supply and demand conditions for the Resources Planning Act (RPA) periods,

production levels attainable under both the current management direction (Alternative A) and Forest Plan direction (Alternative I),

and a list of information that would be desirable to have prior to the preparation of the next Ochoco National Forest Land and Resource Management Plan.

Resource and Economic Potentials

Benchmarks were developed to help define the resource and economic potentials of the Forest, and the range of outputs from which alternatives could be developed.

Most of the benchmarks were developed to explore the potential of the Forest to produce the maximum of a particular issue-related resource; e.g. timber, range, recreation, or big game. Two benchmarks were developed to determine the mix of resources that produced the maximum present net value (PNV) of the Forest: one using market values only and the other using market and assigned values. Market priced outputs include timber, minerals, livestock, grazing, and developed recreation. Outputs with assigned values are dispersed recreation, including wilderness, and fish and wildlife use. (See Appendix B of the FEIS for dollar values.)

One benchmark estimates the minimum costs to retain the Forest in Federal ownership with no outputs of goods and services other than those that would occur incidentally, such as dispersed recreation.

While benchmarks must be realistic, they could not serve as alternatives because they do not address the issues, concerns, or opportunities (ICO's). Rather, they were used to define the minimum and maximum parameters within which alternatives might be developed.

All benchmarks and alternatives were required to meet management requirements (Regional Direction 1920, 11/10/83). The major management requirements (MR's) addressed are:

size and dispersion of timber harvest units,

soil and water conservation;

riparian areas; and

minimum habitat requirements for old growth dependent species and primary cavity nesters. A more detailed discussion of benchmarks and opportunity costs for MR's is in the FEIS Appendix B and Appendix F.

Resource Description and Supply/Demand Projections For Selected Resources

Introduction

Following is a brief discussion of the current situation of each of the major Forest resources (see FEIS Chapter 3 for more detailed discussions), and the anticipated supply and demand for goods and services associated with these resources. The supply figures were developed from benchmarks and independent estimates. Demand figures were estimated independently and the source is included in Table 2-1. Economists consider "demand" to be a schedule of quantities of an output that users are willing to consume within a price range, at a given time, and under certain conditions of sale. The term "demand," as used in this section, identifies a certain level of consumption at a particular point in time. Although demand estimates are projected over several decades, long-term projections are expected to be less accurate than those for the near future.

Forage

Current Situation:

The Forest provides summer forage for approximately 11,300 cattle and 2,500 sheep annually (58,000 AUM's), involving 55 permittees in 4 counties. These numbers have been relatively stable in the recent past, and adjustments in the numbers of livestock or season of use have not been common.

Supply:

While there appears to be adequate forage to increase the number of AUM's on the Forest, the main limiting factor is distribution of forage use in order to keep some places (primarily riparian areas) from being over-grazed before other areas receive use. Water developments can draw livestock to other areas thereby making forage available that otherwise may not get used. Increasing the grazing to the maximum potential shown in Table 2-1 would require a substantial number of water developments. The construction of 290 water developments could increase the grazing capacity of the Forest by an estimated 9,900 AUM's. Due to potential conflicts with riparian management and other resources, it is not expected that this increase will be realized in the near future.

Demand:

Ranchers regard the Forest as desirable summer range because of the high quality of forage and availability of water. As a result, allotments are usually fully occupied. When an allotment becomes available, it is usually filled, indicating a constant demand for available forage. In addition, there is interest in increasing livestock numbers and the season of use.

The demand figures in Table 2-1 are from the Forest Service 1980 RPA Program, and reflect the Forest's apportioned share of the national demand for forage.

Fuelwood

Current Situation:

Local residents point out that the quality of firewood continues to lower, and travel distances increase. The Forest has sold an average of 10,000 cords of personal use fuelwood in the past 5 years.

Supply:

Availability of firewood on the Forest is proportional to the volume of the timber harvest: increased timber harvests increases residues available for firewood. As shown in Table 2-1, the maximum supply of firewood that could be produced in the first decade is 15,000 cords annually. Wind-thrown trees and juniper make up a small portion of the total supply.

Firewood is also available from other sources, including other nearby National Forests, BLM lands, private lands, and sawmills.

Demand:

Numerous factors influence demand for firewood from the Forest, including accessibility, size and species, availability from other sources, and the price of other forms of energy. These factors make demand difficult to estimate. The total demand for firewood used in homes in Burns, Hines, Redmond, Prineville, Madras, Mitchell, Dayville, and adjacent unincorporated areas is estimated to be 37,000 cords per year.

The proportion of the 37,000 cords that would come from the Forest is estimated to be approximately 18,000 cords annually. The total demand cannot be met by the Forest alone.

Minerals and Energy

Current Situation:

Approximately 140,000 acres of Forest land are under lease for oil and gas. There are no geothermal leases on the Forest. About 8,000 acres of the Forest have been staked as mining claims. There are 350 mineral material sources (quarries or pits) in operation.

Supply:

On the Forest, 807,521 acres are available for oil, gas or geothermal leasing. All of this area is classified as being favorable for the discovery of thermal water of sufficient temperature for direct heat application. Of the acres available, 718,370 acres are classified as being tentatively valuable for the discovery of oil and gas and 804,510 acres are available for the location of mining claims. Of this amount, 81,460 acres are classified as having moderate or high potential for mercury or gold. Reserves of common variety materials (sand, gravel, etc.) are estimated at over 5 million cubic yards.

Demand:

The demand for oil, gas, gold and mercury is directly related to international production and price. An increase in the price of any of these commodities will result in increased exploration on the Forest, and the discovery of a valuable deposit may result in the production of that commodity. The largest number of acres ever leased for oil and gas on the Forest was 670,000 acres in the early 1980's. There is no known demand for direct heat applications of geothermal energy on the Forest. The demand for mineral materials is generated by the construction, reconstruction and maintenance of roads on and near the Forest. Approximately 850,000 cubic yards of mineral material will be produced on the Forest each decade if historic trends continue.

Old Growth

Current Situation:

Timber harvesting has significantly reduced the amount of old growth on the Forest; about 94,000 acres remain. What remains has a less than optimum distribution for wildlife that rely on old growth habitat. The Forest managed 32,000 acres of old growth for wildlife habitat under the 1979 Forest Plan. Approximately 20,000 acres are dedicated under this Plan. However, only about one third of these acres will exist in old growth at any given time.

Old growth areas are a valuable component of the Forest, providing habitat for over 100 wildlife species. They also provide cover for big game, provide attractive scenery, help provide diversity, and are a tree gene pool source. Twenty-one thousand acres are identified as the minimum amount of old growth needed to maintain viable populations of dependent wildlife species.

Supply:

The Forest Plan would resuce the available old growth to about 55,000 acres in fifty years. This is about ten percent of the total forested lands. See Table 2-8 in the FEIS for more details. This acreage of old growth would continue at this level until the

Plan was changed or a catastrophic event destroyed some of the existing old growth. The planned management strategy of uneven-aged managed and rotation ages that would provide 18-inch DBH trees will provide for stands that could be allowed to grow into an old growth condition in 20 to 50 years. These stands are identified as successional Stage V in Table 2-8 in the FEIS, and it is estimated that there would be about 230,000 acres in this condition in fifty years. The acres in this class would fluctuate from year to year but should never be less 100,000 acres. These stands would also provide additional habitat for some of the species normally found in old growth areas.

Recreation

Current Situation:

The Ochoco National Forest provides a wide range of outdoor recreation opportunities. Gentle terrain, high value timber, and good livestock forage encouraged early commercial use of the Forest and development of an extensive road system. As a result, 89 percent of the lands have been roaded for various management activities. Approximately 11 percent, located mostly on the north slope of the Ochoco Mountains or in isolated tracts of rough terrain elsewhere, currently offer opportunities for semiprimitive recreation use.

The Forest estimates use of 350,000 recreation visitor days (RVD's) annually. Much of the recreation use is tied to the road system. Camping, motorized travel, picnicking, and hunting are estimated to comprise 77 percent of the use. Activities associated with certain streams and the few available lakes are popular.

Current direction emphasizes dispersed rather than developed recreation. There are 767 inventoried dispersed sites. There may be over 400 additional dispersed sites which have not been inventoried. Most have no facilities. There are 38 developed (having facilities) recreation sites with a total capacity of 1902 people at one time (PAOT).

The existing trail system is a remnant of a formerly extensive system which has largely been replaced by roads. The Forest currently maintains 96 miles of nonmotorized summer trails. There are 9 miles of cross-country ski trails and 75 miles of snowmobile trails. Twin Pillars and Round Mountain trails are National Recreation Trails.

Supply:

Developed recreation capacity could be increased to support an additional 925 PAOT. This increase in PAOT's would be accomplished by increasing site capacity of existing sites and the construction of several new sites. As much of the Forest is currently roaded, the dispersed roaded recreation opportunities far exceed the demand

The current inventory of roadless areas on the Forest (not including wilderness) totals 45,893 acres: Lookout Mountain, 16,594 acres; Rock Creek, 9,336 acres; Cottonwood, 9,737 acres; Silver Creek, 3,226 acres, and Green Mountain, 7,000 acres.

Demand:

Overall recreation demand is correlated with the population increase of approximately 1% per year. Demand for recreational vehicle camping, hiking, and interpretation is increasing at a higher rate than many other recreational activities. Hiking demand is highest in the semiprimitive natural setting. The latest information in the State-wide Comprehensive Outdoor Recreation Plan (SCORP) indicates that although more use actually occurs in roaded modified settings, the predominant preference is for primitive and semiprimitive nonmotorized settings.

The demand for roadless recreation expressed in RVD's is shown in Table 2-1. If all of the inventoried roadless areas were managed as semiprimitive nonmotorized (SPNM), the Forest could meet the demand for roadless recreation for 50 years and beyond.

The demand for future management of roadless is summarized as follows:

> Lookout Mountain was the most controversial area. The majority of people who commented

on the Draft Plan favored continued management of the area for nonmotorized recreation, while others wanted a motorized access route to the top.

There was general support for managing Silver Creek, Rock Creek, and Cottonwood as roadless areas.

There was little support for managing Green Mountain for nonmotorized recreation.

Social and Economic

Current Situation:

In Crook and Harney Counties, over 80% of the forested land is in public ownership, most of which is administered by the Forest Service. The surrounding communities are significantly affected both socially and economically by resource management on the Forest. County revenues from the Forest exceed 30 percent of some local counties' total annual receipts. Timber industry and government agency employment accounts for approximately half of the economic base. Livestock grazing on the Forest is vital to some local ranchers and important to the communities' social character. The Forest also provides numerous recreational opportunities.

Supply:

The Forest has the ability to supply more outputs which influence jobs and payment to counties than current levels Higher levels of these outputs (timber and domestic livestock) generally mean less opportunities for leisure activities such as hunting and roadless recreation.

Demand:

The Forest will continue to be relied upon for outputs that affect the social and economic character of the local communities. As the demand for all outputs and opportunities continue to grow, it is unlikely that the Forest will be able to provide for all aspects that influence the social and economic character of the local communities.

Timber

Current Situation:

Timber production from the Forest contributes significantly to the local economy and to the regional timber supply. The level of harvest directly affects income, employment, and county revenues in the Forest's six-county general zone of influence, and particularly in Crook and Harney counties, the Forest's primary zone of influence.

The average annual sale volume between 1979 and 1988 was 137 MMBF for all species, including 109 MMBF of ponderosa pine. The average annual cut, during this period, was 111 MMBF for all species, which included 87 MMBF of ponderosa pine.

Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring within a locale, region or the nation as a whole. Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology. Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement; attempting to do so would underestimate the biological potential of timber producing lands and make future growth projections impossible. It is Forest Service Policy (FSM 1922.15) to use cubic foot volume as a measurement of long-term sustained yield, as well as regulate the amount of timber to be offered and sold as specified by the allowable timber sale quantity (ASQ), in order to respond to changing technology and product requirements projected for the future (RPA, '85).

Supply:

The maximum volume of timber that could be harvested annually on a sustained yield from the Forest, subject to legal requirements, is 23.3 MMCF - 10 percent higher than the current harvest. The maximum long-run sustained yield is 22.8 MMCF.

Measured in board feet, the maximum potential yield declines to two percent below the present harvest by the fifth decade (2026-2035). This is because

the smaller diameter trees produced in the future will saw into fewer board feet relative to cubic feet than the large diameter trees being harvested now. Due to past rates of harvest, the supply of large diameter ponderosa pine has been declining, resulting in smaller diameter trees and less ponderosa pine being produced in the future.

In the short term, the harvest could be increased by departing from nondeclining even flow. This would result in more timber available in the near future, but less thereafter.

The species mix will likely change in the future. While there is still a substantial volume of ponderosa pine standing on the Forest, future harvests will likely include greater percentages of Douglas-fir, western larch, and white fir than in the past.

Demand:

The Forest does not have the capability to meet local demand for timber as indicated by the installed mill capacity. The installed mill capacity in Crook and Harney counties is 400 MMBF annually. In 1987, the mills processed 280 MMBF - 70% of capacity. In 1982, they processed 87 MMBF, which was 25% of capacity at that time.

The mills are set up primarily to process large diameter ponderosa pine logs, and the greatest demand is for ponderosa pine. The change in tree size and species in the future will require the mills to continue retooling to process this change of materials. Industry is demanding not just that an adequate volume of timber be offered for sale in the future, but that a good share of it be large diameter ponderosa pine.

Quantified demand estimates for timber are available from two sources: the 1980 Resource Planning Act (RPA) Program and State of Oregon 1980 Timber Supply Assessment.

The Forest Service Pacific Northwest Region apportioned the RPA targets to the 19 Forests in the Region. The Ochoco National Forest was assigned a goal of 25 MMCF (150 MMBF) annually, for the years 1986 through 1995. This level of harvest would be maintained into the future. The demand figures are shown in Table 2-1.

In 1980, the Oregon State Forestry Department issued its "Forestry Program for Oregon." Within this report, output levels were assigned to various land owners: state, federal, private, and industrial. The outputs assigned to the Ochoco National Forest are shown in Table 2-1. In summary, the State calls for increasing the harvest on the Forest by over 20 percent in the 1980 to 1990 period.

The maximum supply could meet the state demand for the next 50 years, but could meet the RPA demand for only 20 years.

Wildlife

Current Situation:

There are over 375 different species of reptiles, amphibians, birds, and mammals known or expected to inhabit the Forest; 15 species of game fish, and numerous nongame fish species are in the area's reservoirs, lakes, and streams. Deer, elk and antelope are big game animals hunted on the Forest. Anadromous (steelhead) fish spawning occurs in some streams.

Habitat is known or expected to exist for the following species classified by state or federal wildlife agencies as endangered, threatened, or sensitive: peregrine falcon, bald eagle, Swainson's hawk, western sage grouse, greater sandhill crane, long-billed curlew, common loon, Malheur spotted sculpin, wolverine, and redband trout.

Supply:

The Forest has potential habitat to support 4,040 elk by the year 2030. The current elk population is estimated at 2,300. The primary factors influencing big game habitat are: the amount of timber harvest, selection of silvicultural systems, and the extent and use of the road system.

The Oregon Department of Fish and Wildlife (ODFW) has a current planning benchmark of 2600 elk.

The deer population is estimated at 18,300, which is the ODFW management objective. The habitat could support a larger population.

TABLE 2-1
SUMMARY OF PROJECTED SUPPLY AND DEMAND FOR SELECTED RESOURCES FOR THE FOREST

	Average Annual for Decade					
Resources	1	2	3	4	5	Source of Information
ECONOMIC AND SOCIAL CHANGE IN JOBS FROM CURRENT SITUATION						
Supply						
Current Direction	48	N/A	N/A	N/A	N/A	Alternative A
Maximum Potential	224	N/A	N/A	N/A	N/A	Independent Estimates
Forest Plan	109		N/A	N/A	N/A	Alternative I
PAYMENT TO COUNTIES (MM $)						
Supply						
Current Direction	4 3	5 3	N/A	N/A	5 1	Alternative A
Maximum Potential	6 0	N/A	N/A	N/A	N/A	Maximum PNV Benchmark
Forest Plan	4 9	5 6	N/A	N/A	5 4	Alternative I
FIREWOOD (M CORDS)						
Supply						
Current Direction	14 0	12 4	12 0	12 0	11 6	Alternative A
Maximum Potential	15 0	14 0	13 0	13 0	13 0	Timber Benchmark
Forest Plan	13 0	12 0	11 0	11 0	11 0	Alternative I
Demand	18 0	18 0	18 0	18 0	18 0	Independent Estimate 1/
RANGE (MAUM)						
Supply						
Current Direction	57 8	57 6	63 7	64 9	65 2	Alternative A
Maximum Potential	68 0	65 7	75 6	75 9	76 3	Range Benchmark
Forest Plan	58 0	62 5	66 6	63 9	65 6	Alternative I
Demand	83 0	83 0	83 0	83 0	86 0	RPA 2/
RECREATION (MRVD)						
Developed Recreation						
Supply						
Current Direction	224 5	224 5	224 5	224 5	224 5	Alternative A
Maximum Potential	261 3	261 3	261 3	261 3	261 3	Recreation Benchmark
Forest Plan	261 3	261 3	261 3	261 3	261 3	Alternative I
Demand	116 1	130 5	145 0	156 6	172 0	Independent Estimate 3/
Roaded Natural and Rural Supply						
Supply						
Current Direction	1099 3	1099 3	1099 3	1099 3	1099 3	Alternative A
Maximum Potential	1139 4	1139 4	1139 4	1139 4	1139 4	Maximum PNV Benchmark
Forest Plan	1067 9	1067 9	1067 9	1067 9	1067 9	Alternative I
Demand	262 4	288 8	312 2	337 8	365 0	Independent Estimate 3/
SEMIPRIMITIVE MOTORIZED SUPPLY						
Supply						
Current Direction	0	0	0	0	0	Alternative A
Maximum Potential	25 9	25 9	25 9	25 9	25 9	Recreation Benchmark
Forest Plan	0	0	0	0	0	Alternative I
Demand	16 8	18 3	20 0	21 7	23 5	Independent Estimate 3/
SEMIPRIMITIVE NONMOTORIZED SUPPLY						
Supply						
Current Direction	22 5	22 5	22 5	22 5	22 5	Alternative A
Maximum Potential	65 1	65 1	65 1	65 1	65 1	Recreation Benchmark
Forest Plan	44 0	44 0	44 0	44 0	44 0	Alternative I
Demand	32 2	35 3	38 5	42 0	45 7	Independent Estimate 3/
FISHING						
Supply						
Current Direction	28 7	31 9	34 1	36 5	39 2	Alternative A
Maximum Potential	28 7	33 1	35 3	37 7	40 5	Wildlife Benchmark
Forest Plan	28 7	33 1	35 3	37 7	40 5	Alternative I
Demand	47 8	57 3	61 4	66 0	71 0	Maximum PNV Benchmark
HUNTING						
Supply						
Current Direction	82 5	80 6	75 1	77 0	76 2	Alternative A
Maximum Potential	79 8	79 8	89 1	87 3	88 8	Wildlife Benchmark
Forest Plan	79 1	77 9	78 4	77 7	75 5	Alternative I
Demand	89 9	98 1	108 8	108 8	108 8	ODFW

Resources	1	2	3	4	5	Source of Information
BIG GAME DEER (1000 DEER)						
Supply						
Current Direction	18 3	18 3	18 3	18 3	18 3	ODFW 4/
Maximum Potential	18 3	18 3	18 3	18 3	18 3	ODFW
Forest Plan	18 3	18 3	18 3	18 3	18 3	ODFW
ELK						
Supply						
Current Direction	3370	3160	2570	2775	2690	Alternative A
Maximum Potential	3075	3075	4070	3880	4040	Wildlife Benchmark
Forest Plan	3000	2900	2900	2800	2600	Alternative I
Demand	2560	2560	2560	2560	2560	ODFW 5/
TIMBER (MMCF)(ASQ + SALVAGE)						
Supply (All Species)						
Current Direction	19 3	20 6	20 6	20 5	20 5	Alternative A
Maximum Potential	23 4	23 4	23 4	23 4	23 4	Timber Benchmark
Forest Plan	19 8	19 5	19 2	19 2	19 2	Alternative I
Supply (Ponderosa Pine)						
Forest Plan						Alternative I
Demand						Maximum PNV Benchmark
State of Oregon	19 0	19 6	19 7	20 6	21 6	State of Oregon 6/
Forest Service	25 0	25 0	25 0	25 0	25 0	RPA 2/
WILDERNESS USE (MRVD)						
Supply						
Current Direction	25 7	25 7	25 7	25 7	25 7	Alternative A
Maximum Potential	25 7	25 7	25 7	25 7	25 7	Oregon Wilderness Bill
Forest Plan	25 7	25 7	25 7	25 7	25 7	Alternative I
Demand	16 3	17 8	19 2	21 0	22 9	Independant Estimate 3/
OLD GROWTH (M ACRES)						
Supply						
Current Direction	93 8	83 0	73 0	63 0	53 0	Alternative A
Maximum Potential	93 8	93 8	93 8	93 8	93 8	Benchmark
Forest Plan	93 8	83 9	74 2	64 5	55 1	Alternative I
Demand	N/A	N/A	N/A	N/A	N/A	
SNAGS (% OF POTENTIAL)						
Supply						
Current Direction	46 0	52 0	52 0	52 0	52 0	Alternative A
Maximum Potential	51 0	59 0	67 0	68 0	69 0	Benchmark
Forest Plan	47 0	49 0	51 0	55 0	54 0	Alternative I
Demand	N/A	N/A	N/A	N/A	N/A	
MINERALS - OIL (M ACRES LEASED)						
Supply						
Current Direction	808	808	808	808	808	Alternative A
Maximum Potential	808	808	808	808	808	
Forest Plan	808	808	808	808	808	Alternative I
Demand	140	670	400	270	140	

1/ Firewood estimate, based on past sales of permits
2/ Forest Service 1980 Resource Planning Act Program
3/ Estimate based on population growth See text
4/ Management objective for deer established by Oregon Department of Fish and Wildlife
5/ The Forest Program for Oregon, 1980

NOTE Current Direction is the No Action alternative which is Alternative A

MM$ - Million Dollars
M Cords Thousand Cords
MAUM - Thousand Animal Unit Months
MRVD - Thousand Recreation Visitor Days
MMCF Million Cubic Feet
ASQ Allowable Sale Quantity

The Forest has the potential habitat to support larger populations of deer and elk than is required by the ODFW's management objectives.

Demand:

The primary demand for wildlife on the Forest is for populations of deer and elk large enough to be hunted. Hunting license sales are expected to grow two percent annually between 1986 and 1995, and one percent annually thereafter.

Although the demand for hunting opportunities is expected to increase in the future, big game population levels are ultimately limited by the capacity of the environment to support them. Control through hunting is a means of regulating big game populations at levels compatible with their habitat capacity. The authority for establishing hunting seasons and regulating populations rests with the State.

Habitat for Wildlife Species Dependent upon Snags

Current Situation:

The number of snags (standing dead trees) across the Forest is quite variable. In the mixed conifer stands on the north slopes, snags are fairly abundant. On the southern slopes, where ponderosa pine stands predominate, snags are relatively scarce because of timber harvesting and firewood cutting.

Snags provide habitat for many species of wildlife. Snags and down logs are used for nesting and/or shelter by at least 39 species of birds and 23 species of mammals. The number of snags is usually the limiting factor controlling the population of birds that nest in snags.

Supply:

The Forest is presently providing about 47 percent of the potential population level of cavity nesting species. A 40 percent level is dictated in General Forest, General Forest Winter Range, and Winter Range management areas Other management areas do not have any level dictated but predominantly end up with higher than the 40 percent level due to other resource management constraints. Forest-wide, we will be managing for 49 percent of the potential population level of cavity nesting species by the end of the second decade, and 54 percent by the fifth decade.

Demand:

Demand for snag habitat is difficult to determine. The management requirement level (MR) is 20 percent of the potential population level. This is the level needed to maintain viable populations of cavity nesting species. Regional guidance is to provide for 40 percent of potential population on General Forest, General Forest Winter Range, and Winter Range management areas. Most of the other management areas have a higher than 40 percent level because of other resource constraints. Overall, the Forest will be averaging between 47-54 percent of potential population over the five decade planning horizon.

Information Needs

This section lists possible information, inventory and research needs for the Ochoco National Forest. Gaps in data or scientific knowledge that would be desirable to fill prior to preparation of the next Forest land and resource management plan are recognized. Organization and development of these needs is based on the biological, physical and social ecosystems which are the foundation for the planning process.

This ecosystem perspective has been used to develop a comprehensive framework for identifying and organizing information, inventory, and research needs. This framework is intended to encourage integrated research approaches that address interdisciplinary needs rather than traditional functional approaches.

The ecosystem approach should meet planning needs, as well as help the public understand information needs.

Several situations were identified as having particular current importance in forest planning. Old growth, riparian/aquatic, upper slope ecosystems, and human interactions within the forest environment, are examples of areas where more information would be desirable in order to test present planning assumptions as plans are implemented.

Information needed to address potential concerns fall into the five general categories: interactions/processes, long-term productivity, cumulative effects, social and economic analysis, and wildland/community relations.

Interactions/Processes

This category includes information leading to a better understanding of the interactions of ecosystems, and the physical, biological, social, and political processes that influence these ecosystems.

Refine recreation carrying capacity estimates by development of predictive model figures for dispersed recreation.

Determine the relationships between recreational settings, use, and opportunities and other resource uses.

Survey streams for native fish. Determine occurrence, distribution, and status.

Improve knowledge of the distribution and habitat requirements of wildlife associated with old growth forests.

Understand the relationships between old growth characteristics and ecological and visual diversity, associated plant and wildlife species, and the maintenance of natural gene pools.

Assess the effects of landscape patterns of timber harvest and road construction on biological diversity (including management indicator species) and stability of special habitat areas such as Research Natural Areas.

Determine the effects of vertebrate species on other ecosystem components (e.g., effects of big game on plantations, and effects of insectivorous birds on forest insect populations).

Assess effects of stream segmentation by barriers caused by road crossings, debris, etc., on fish production potential.

Assess fish productivity of various stream and lake habitats, and the effects of management activities on fisheries potential. Determine sediment types and levels that affect fish habitat components.

Assess the results of stream rehabilitation projects on fish population dynamics.

Develop effective methods of uneven-aged management to produce maximized resource benefits.

Evaluate the relationship of uneven-aged management with fuels treatment, long-term site productivity, designated skid trails, and reforestation needs.

Develop strategies (rotation length, stocking levels) for producing higher quality wood.

Develop strategies that minimize soil disturbance and compaction during harvesting, and post harvest activities.

Identify specific sites and situations where natural regeneration can be a successful management option.

Evaluate the costs and benefits (both monetary and nonmonetary) of alternative logging residue treatments.

Develop data base (inventory) and analysis techniques to identify sites that are uneconomical to manage for timber production given the anticipated variation in production costs and price.

Increase knowledge of site/moisture relationships in harvested areas (micro-watersheds).

Develop a predictive methodology for sediment production and soil productivity for use in project-level planning.

Identify key soil chemical or physical factors which might be monitored to determine significant impairment of long-term productivity.

Improve total tree biomass information that is needed to evaluate whole-tree harvesting practices.

Evaluate the effects of stand treatment combinations on understory composition in managed stands.

Evaluate the effects of fire (presence or absence) on the nutrient cycle in local stand types.

Develop a drainage-specific predictive model for fisheries and the effects of habitat modification.

Identify the effects of prescribed fire on old growth habitat components.

Determine the necessary size of an old growth habitat area to support a pair of pileated woodpeckers.

Develop an effective technique to regenerate mountain mahogany, bitterbrush and aspen.

Discover how seasonal vegetation changes affect pocket gopher utilization of their habitat.

Discover how elk use different timber stand conditions. Identify whether we are treating ponderosa pine in a way that precludes future elk use.

Determine the abundance and distribution of redband trout and Malheur mottled sculpin (sensitive species) in the Silver Creek Basin on Snow Mountain Ranger District.

Determine what good avian indicator species for monitoring riparian habitat are. Determine which monitoring techniques are relatively low cost, but provide a reasonable level of reliability.

Discover how big game, both deer and elk, are responding to prescribed fire that has been applied to Pine Spring Basin in order to improve their habitat.

Determine elk use relative to Habitat Effectiveness Index values.

Determine if elk use patterns change on summer and winter range after timber management activities.

Determine fidelity of elk to winter concentration areas in the Horse Heaven drainage relative to varying winter severity. Determine if use patterns vary relative to severity of winter.

Locate calving areas in the Horse Heaven/Lookout Mountain area south of Big Summit Prairie.

Improve knowledge of requirements necessary to support viable populations of indicator species.

Long-Term Productivity

This section includes studies leading to better understanding of ecosystem needs in order to maintain various aspects of long-term productivity.

Determine user (visitor) needs and expectations for recreational opportunities.

Inventory wildlife habitats: riparian, wetlands, old growth forests, snags, and lodgepole pine by biological, chemical, and physical characteristics.

Assess the importance of seral vegetation in maintaining long-term site productivity for dependant species.

Determine the amount and distribution of in-stream woody debris necessary to maintain the productivity of fish habitat.

Determine the effects of forest fragmentation on ecosystem integrity and function, including viability of vertebrate species.

Determine the effects of management practices on the incidence and severity of pathogens and insects as they affect the condition of the Forest over time.

Develop local yield studies for principal timber species growing in managed conditions.

Evaluate the effects of soil compaction on long-term productivity.

Assess the effects of harvest practices and residue treatments on long-term productivity.

Understand the role of fire in the nutrient cycles that maintain long-term productivity.

Identify which nutrients, if any, are limiting production on the Forest.

Identify the current productivity levels of resources such as timber, wildlife forage, and fish habitat to establish baseline levels of productivity.

Identify the mineral potential of the Forest.

Cumulative Effects

This section includes studies to examine the cumulative effects of naturally occurring and human-induced activities on various aspects of selected ecosystems and resources.

Develop indicators or criteria to predict when recreational user patterns may change as a result of intensive forestry practices.

Determine wildlife and fish species reactions to patterns of habitat created or altered by management and natural succession.

Develop a drainage-specific predictive model for fisheries and the effects of habitat modification.

Determine the effects of human disturbance and livestock competition on wildlife species.

Assess the potential effects of predation of management indicator species on each other in small fragmented habitat units.

Evaluate the effects of planting genetically-selected stock on stand growth and yield, pathogen and insect population dynamics, forage nutritional quality for wildlife, etc.

Determine the cumulative effects of timber management activities (timber harvest, road construction, and site preparation) on water quality and stream stability and fish habitat.

Develop threshold of sediment production for cumulative effects on the soil and water resource considering the value of the water and the uses associated with the water.

Evaluate the cumulative effects on soil productivity by ground-based timber harvest equipment under uneven-aged management strategies.

Evaluate the effects of fire exclusion on the structure and function of ecosystems.

Social and Economic Analyses

Additional studies are needed to increase our understanding of the economic and social effects of many planned wildland activities.

Measure and predict the effects of changes to wildland landscapes on recreational values, both in economic and social terms.

Understand the effects of long-term changes in site productivity for a range of resources on local and regional economies.

Evaluate the relative costs of strategies aimed at managing the effects of pathogens and insects on stand growth and yield, recreation values, water quality, etc.

Evaluate decision processes that can compare market and nonmarket benefits.

Identify Forest Service contributions to the local economy and the dependency of local communities on the Forest.

Determine the economics of pruning ponderosa pine.

Evaluate the quality (grade, species, size) of wood that will be needed by local industry in the future.

Wildland-Community Relations

The relations and interactions between wildlands and the human communities within and around them need to be better understood.

Evaluate the patterns of resource theft and develop techniques for reducing losses.

Develop vegetative strategies that reduce risk of wildfire and recognize adjacent community values and concerns.

Chapter 3

Response to Issues, Concerns, and Opportunities

Chapter 3

Response to Issues, Concerns, and Opportunities

Overview

The Ochoco National Forest initiated its public involvement process in 1980 to prepare for the Draft Plan and Environmental Impact Statement (EIS). There has been a major effort throughout the process to capture and incorporate public and agency ideas so that the Final Ochoco National Forest Plan can be responsive to concerns and new information. This has been a continuing effort. The Plan is intended to be dynamic in its ability to respond to new ideas, issues or information as circumstances may require

Issues Display and Discussion in the Final EIS

A in the FEIS details how the issues were originally developed and how they evolved. The public comments on the DEIS, and the Forest responses to those comments are discussed in Appendix I of the FEIS. Substantive comment received on the Draft Plan and EIS did result in changes in the final documents. A number of the issues were modified and new issues added.

A discussion of the changes in issues from the Draft to the Final and how the Plan will address the issues follows.

Issue #1, Timber Supply and Forest Management, continued to be a major concern. Subissues relating to timber supply and forest management have been identified and are treated separately.

Timber Supply and Sustained Even-Flow Yield: Timber industry and dependent publics continued to offer support for sustained yield of 137 MMBF annually. Local economic stability and jobs were strongly related to high harvest levels by timber industry and dependent publics. At the other end of the spectrum, conservationists favored a much more conservative harvest level of 75 to 90 MMBF annually.

Between 1990 and 2000, the average annual harvest will be 19.0 MMCF (ASQ) (115 MMBF), slightly below the current harvest level. The volume of ponderosa pine offered annually will average 85 MMBF. This represents a considerable decrease from pine volume sold between 1980 and 1988, which averaged 109 MMBF annually.

The long-term sustained yield for this Plan is 19.0 MMCF. This is 82 percent of the potential estimated in the Maximum Timber Benchmark (23.5 MMCF).

The timber harvest will be modified in some areas to protect other resources. In old growth and roadless areas, harvest will be prohibited. In riparian areas and scenic corridors, rotation time will be lengthened. In big game areas, thinning practices will be altered.

Ponderosa Pine Management: There was significant support for the production of large diameter pine (at least 20 inches in DBH) and a timber supply scenario to sustain large diameter pine production over time to maintain the present industry base in Prineville and surrounding communities. The importance of large diameter pine to wildlife and as a visual resource was noted by other interest groups.

The strong interest in maintaining large diameter ponderosa pine over time has been incorporated into the Final Plan with even-aged silvicultural systems designed to provide an average tree of 18 inches DBH, and uneven-aged silvicultural systems designed to provide ponderosa pine greater than or equal to 20 inches DBH. Special management areas in the Final Plan will also provide large ponderosa pine greater than 20 inches DBH with some, such as Old Growth, providing old growth pine of diameters up to their biological potential in some cases.

Uneven-aged vs. Even-aged Silviculture: The timber industry and other groups noted some advantages and expressed general interest in the Forest exploring uneven-age management strategies on all or portions of the Ponderosa pine stands available for timber management. Industry sees this as a means to allow the continuation of high harvest levels in pine while providing a quality log. Conservation groups and other publics sensitive to even-age management systems see this as a means to limit clearcutting, reduce harvest levels and preserve a forested appearance over time.

In the first decade, 62,200 acres of forest land will be managed through uneven-aged timber harvest prescriptions. Even-aged timber harvest prescriptions (clearcuts, shelterwoods, and overstory removals) will be applied to 82,900 acres.

Departure: The preferred alternative in the Draft Plan proposed a departure from sustained yield to maintain high timber supplies for the first decade. There was essentially no support for this departure. Industry predicted that the departure option would result in an unstable timber supply which would negatively affect business and community stability. Conservationists suggested that the departure option was merely an euphemism for the rapid liquidation of old growth forest.

The timber harvest is scheduled to maintain a non-declining yield. The objective will be to maximize timber production within the constraints of the Plan, and maintain a sustained timber supply over time.

Clearcutting: There was almost unanimous opposition to clearcutting. Many opposed it as a waste of younger stock and potential crop trees. Others cited the adverse effects of clearcutting on other resources Industry expressed some acceptance of clearcutting in mixed conifer stands, but regarded the clearcutting of Ponderosa Pine as unacceptable.

In the first decade, there will be 8,700 acres of clearcuts in mixed conifer stands. Root rot and other insect and disease problems, plus slash disposal needs, make any type of partial removal impractical for most of the mixed conifer stands. Ponderosa pine will be harvested with overstory removals, as appropriate. Clearcuts are used to harvest ponderosa pine only rarely when insects or disease preclude other harvest methods.

Issue #2, Social and Economic Wants and Needs of Local Communities, continued to receive the attention of the timber industry and dependent publics. These groups were adamant in demanding a high timber supply to maintain the local economy and jobs. Others called this viewpoint short-sighted and suggested that the rapid conversion to second growth/ fiber management might not be positive in the long run. These respondents reasoned that old growth contributes more to the local economy even if harvest levels are significantly reduced, because old growth ponderosa pine has a much higher commercial value than second growth. This issue is interrelated with the departure, uneven-age, and ponderosa pine issues discussed in Issue #1.

Some comments noted the importance of grazing on local economies. These respondents expressed concern over the negative effect that reductions in grazing would have on Crook and Harney Counties. This issue is discussed in Issue #3, livestock grazing.

Local communities are dependent on forest-related jobs and income, and payments to counties in lieu of taxes. As a result, economics is the major factor in measuring the social and economic effect the Plan will have on these communities.

[1]These figures include the Crooked River National Grassland

Using computer models (described in FEIS Appendix B), the economic effects of the Plans[1] for the first decade were estimated.

Income	Increase $1.737 million
Employment	Increase 124 jobs
Payments to counties, average annual	$4.9 million

Payments to counties will increase to $5.6 million in the second decade and then decrease to $5.4 million by the end of the fifth decade.

Issue #3, Livestock Grazing or Grazing Allotments, remained a major issue for the management of the Forest. In the public comments to the Draft, concern was expressed over the impact of grazing on riparian areas and big game habitat Many felt livestock grazing numbers could not be increased while simultaneously improving riparian conditions. Others stated that the economies of Crook and Harney Counties are dependent on ranching, and that significant reductions in livestock numbers would have adverse effects on those economies.

Grazing will remain level or slightly decrease in the first decade and then slowly increase over time with improved management, improved riparian conditions and the installation of range improvements.

The use of riparian areas by livestock will decrease in the first decade. This will be offset by increasing forage production on transitory range, improved forage production resulting from nonstructural range improvements, and construction of water developments to distribute livestock into areas where forage is available, but natural water sources are not.

Issue #4, Riparian Area Management, received additional interest during the public comment period to the Draft. Generally, comments addressed the impacts of grazing, timber harvest and road building. As noted in the discussion for Issue #3, concern was expressed over the proposed increases in grazing numbers and how this might prevent the Forest and Grassland from improving riparian conditions.

All riparian areas on the Forest will be managed to achieve "excellent" condition. Fencing, log weir construction, rock structures, shrub plantings, and woody debris additions will be used to improve riparian conditions. These improvements will be completed in the first decade. However, it will be 20 to 60 years before all riparian areas have attained their full biological potential.

Issue #5, Transportation System, brought 1000 comments on the FEIS. Some commented that too many roads are constructed and that road standards are too high. These respondents expressed concern over the cost of road construction and maintenance.

Support was voiced for the physical closure of roads to protect water quality and sensitive areas. Both temporary and permanent road closures were recommended to protect wildlife habitat. This is different from the comments made at the first public meetings, which opposed the closure of areas to access by motorized equipment. This view was expressed in comments stressing the need for roads to provide recreation access for the elderly and handicapped.

A travel plan for the Forest will address road management concerns and will complement the objectives of the various management areas on the Forest and Grassland. Wildlife habitat effectiveness objectives will be partially met through road restrictions and closures. The number of miles of roads maintained open for public travel on the Forest will decrease nominally in the future as a result of these road restrictions and closures for big game habitat protection and erosion control and public safety.

In the first decade 840 miles of road will be maintained for passenger car travel, and 2,330 miles will be maintained for high clearance vehicles. By the fifth decade 850 miles will be maintained for passenger cars, and 2,270 miles for high clearance vehicles.

Roads will be closed to protect soil and water, prevent disturbance of big game, and limit investment loss. In the first decade, 1,160 miles of roads will be closed. In the fifth decade, 2,190 miles will be closed. Closures may be seasonal or year long.

Issue #6, Big Game Habitat, was second only to timber in the number of public comments on the Draft. The public continues to be very interested in the number of elk and deer on the Forest and Grassland. In particular, there was support voiced for population levels of elk higher than those proposed by the Draft Plan and the Oregon Department of Fish and Wildlife (ODFW). The public supported the management of big game winter range and the management of road systems to attain habitat effectiveness.

The Forest Plan will designate important areas of big game winter range in two management area classifications: Winter Range (64,130 acres) and General Forest Winter Range (107,360 acres). Management for big game habitat will be the primary emphasis in winter range. In addition, wildernesses, roadless areas, old growth areas, and Hammer Creek Wildlife/Recreation Area will provide important big game habitat.

The Final Plan will provide standards and guidelines for the management of cover and road management that will support elk numbers that meet the population objectives of ODFW. In these areas, road use and thermal cover will be managed to provide high quality big game habitat. Habitat will support 3,000 elk in the first decade, decreasing to 2,870 in the second decade, and to 2,620 by the fifth decade due to the effects of timber management. The ODFW's current planning benchmark for elk on management units within the Forest is 2,600.

Issue #7, Roadless Areas and Wilderness Study Areas, generated the third highest number of comments on the DEIS. Public comments focused on Lookout Mountain and the Ochoco Canyons area of the Forest.

Lookout Mountain has received a lot of public interest from the beginning and continues to concern public groups and the Forest Service. Because of competing interests over available resources, the area has received special attention during the planning process.

Comments about Lookout Mountain involved access, recreation and multiple use. Commentors disagreed as to whether or not Lookout Mountain should be managed as a roadless area. Many supported a roadless designation, while others felt that the existing roads should be reopened to allow senior citizen, handicap or recreation access. There was also significant disagreement over the appropriate size of the area to be left roadless.

Other comments addressed timber management in this area. Some commentors felt that timber should be harvested, while others felt that management should stress recreation and wildlife.

Ochoco Canyons, Green Mountain, Silver Creek and the North Fork of the Crooked River also received comments. There was strong sentiment for the retention of existing roadless areas by some, while others objected to the single-use designation as precluding other uses. Some respondents recommended that roadless area management reflect a compromise between natural values and commodity production.

In the Final Plan, 15,660 acres at Lookout Mountain are allocated to remain unroaded. Cottonwood, most of Rock Creek, and a portion of Silver Creek, totaling 14,300 acres, will be retained as roadless areas and managed for semiprimitive nonmotorized recreation. Green Mountain will be managed as general forest. The Draft proposed semiprimitive motorized recreation which was determined not to be appropriate for the area and not supported by public comment

The total wilderness, proposed wilderness, and unroaded acreage is 83,800 - about 10 percent of the Forest. Combined, unroaded areas and wilderness will meet the expected demand for semiprimitive recreation until the year 2025. A number of other special management areas which will also provide nonmotorized recreational opportunities have been designated. These are Summit National Historic Trail, Stein's Pillar, Hammer Creek, Deep Creek and Round Mountain National Recreation Trail.

Issue #8, Scenic or Visual Resources, continued to receive public interest. Generally public comments to the DEIS concerned the retention of the scenic corridor along Highway 26.

Some comments supported increased emphasis on visual resources, while others supported less emphasis. Those favoring less emphasis expressed concern that an emphasis on visual resources would result in reduced harvest levels.

The Plan will provide for a number of scenic corridors where the primary emphasis will be to meet visual quality objectives in order to maintain and enhance key scenery. Travel corridors, including major roads, access roads to roadless areas, and a winter sports corridor on the Big Summit District, will be managed for scenic qualities. Scenic corridors will total 40,110 acres, 38 percent of the maximum potential of 106,700 acres. These scenic corridors will provide the public with views of large ponderosa pines in park-like settings.

Parts of the Summit National Historic Trail, roadless areas, dispersed and developed recreation areas, Bandit Springs, Stein's Pillar, Hammer Creek, Deep Creek, and the North Fork Crooked River Scenic and Recreation Corridors will be managed to maintain a natural or near-natural appearance.

Issue #9, Old Growth Forest, generated over 1000 comments on the DEIS. A majority of the comments supported a larger allocation for old growth. In addition, there was interest in increasing the old growth management area size over that in the Draft Plan.

Approximately 47,890 acres will be managed for old growth: 19,990 acres specifically allocated to old growth management, and another 27,900 acres in wilderness and other special management areas (Wilderness Study Areas, Research Natural Areas, Summit National Historic Trail, roadless areas and facilities). This allocation includes 1,270 acres of timber stands which are mature, but not far enough along in succession to meet the definition of old growth. This represents 228 percent of the minimum level required by old growth dependent species (21,000 acres), and 51 percent of the maximum old growth available on the Forest (93,800 acres). Refer to Table II-8 for acres of old growth by species.

The size and distribution of areas managed for old growth were designed to meet habitat requirements for the pileated woodpecker, a management indicator species. These areas will also provide habitat for other species dependent upon old growth.

The existing mature stands and designated old growth outside Old Growth, Wilderness, and other special management areas will be subject to timber harvest. By the year 2030, it is expected that only the following areas will contain stands of timber with trees up to 27 inch DBH: wildernesses, Research Natural Areas, old growth areas, Summit National Historic Trail, Rock Creek/Cottonwood Creek Roadless Area, Silver Creek Roadless Area, Lookout Mountain Recreation Area, eagle roosting areas, facilities, developed recreation areas, dispersed recreation areas, Bandit Springs, Highway 26 Visual Corridor, visual management corridors, Round Mountain National Recreation Trail, and Hammer Creek.

Issue #10, Fuelwood Supply, also generated over 1000 comments to the DEIS. The comments supported the continuation of fuelwood supplies into the future. This plan will continue to make firewood available to the public at levels commensurate with project activitity and available access. A moderate amount of firewood will be available, approximately 13,000 cords annually, between 1990 and 2000.

Between 1984 and 1989, the annual demand for firewood on the Forest and Grassland has been less than 10,000 cords. Thus, it appears that demand will exceed supply.

Issue #11, Snag Dependent Wildlife - Cavity Nesters, continued to receive some interest. Although the number of comments was limited, they voiced support for the retention of snag habitat and concern that the Draft Plan did not adequately protect snag habitat.

Moderate (74 percent of potential) and fairly well distributed levels of habitat will be provided for cavity-dependent species. Snag levels will vary by management areas, ranging from 40 percent in intensively managed areas to 100 percent in wilderness

and unroaded areas. Snags will not be allowed to remain in minor areas, such as developed recreation areas and facilities, for safety reasons.

Issue #12, Winter Sports, also received continued attention by segments of the public. The development of additional winter sports trails and snow park areas was widely supported. Some skiers supported the creation of separate use areas for skiers and snowmobilers.

Comments regarding conflicts between snowmobiles and cross-country skiers in the Lookout Mountain area were received. Opinions included eliminating snowmobile use, constructing separate cross-country and snowmobile trails, and allowing unrestricted snowmobile use.

Most of the Forest, except for Bandit Springs and Wilderness Areas, will be open to snowmobiling. Bandit Springs (1580 acres) will be limited to non-motorized winter sports, such as snowshoeing, cross country skiing and sledding. Lookout Mountain Recreation Area will be open to snowmobiling.

New Issues

Public involvement, including comments on the DEIS, has resulted in the Forest adding four new issues to the twelve developed for the DEIS. Two of the issues are extensions of previous issues where it became evident that special attention would be appropriate in the FEIS to capture public concerns and allow full assessment of the issue in the development, analysis and selection of a final alternative for the Forest and Grassland Plans.

Anadromous Fish: Anadromous fish were not identified as an issue in the development of the DEIS and proposed Forest Plan. In the responses to the DEIS, anadromous fish were identified as a concern by several individuals and groups, including the Columbia River Inter-Tribal Fish Commission. Primary concerns included protection and enhancement of spawning habitat and the adequacy of the monitoring plan. Native American groups noted that treaties guarantee protection for anadromous fish habitat.

All riparian areas, including streams which support anadromous fish, will be managed for "excellent" condition. There will be 26 smolts per 100 square meters of streamed in the first decade, increasing to 126 smolts per 100 square meters in the fifth decade.

Historic Trail Preservation: It is Forest Service policy to identify and preserve cultural resources. The Ochoco National Forest has an old trail that was the major east-west travel route through the Forest for many years. The Summit Trail was originally constructed in the early 1900's as a pack trail, and continued to provide access as a trail system until the late 1930's. The significance of this trail was recognized by the Forest Service in January 1987, when it was nominated to the National Register of Historic Places. This action was subsequently followed by a Forest decision to protect and manage the trail corridor for its historical significance. Comments overwhelmingly favored the re-establishment and protection of this trail.

The Summit National Historic Trail is allocated to a management area in the Final Plan. This management area includes 170 acres of preservation, 5,600 acres of retention, and 3,790 acres of partial retention visual quality objectives. The outer boundary of the management area will generally not exceed 600 feet on either side of the trail.

Off-Road Vehicle (ORV) Use: This issue emerged during the issue/Final Plan validation phase. Most respondents desired a reduction in ORV use on the Forest and Grassland. Some favored a total ban on ORV's, while others felt use should be prohibited in sensitive areas. Damage to the environment and noise levels were the reasons given for restriction or prohibition.

In contrast, some respondents requested additional areas for ORV use. They felt that the Forest and Grassland have enough nonmotorized opportunities and that motorized recreation opportunities are lacking.

Only trails historically established for exclusive ORV use are being designated at this time. Any others will be accomplished in the Plan implementation phase through site-specific analysis and further planning.

Round Mountain: In its response to the Draft Plan, the Oregon Hunters Association (along with a number of other sponsors, such as the Oregon Natural Resources Council) asked that a recreation unit be established for the Round Mountain area. This was brought up again by one individual in the validation process. The indivual suggested that the Round Mountain area could provide the opportunity, through a specific allocation, to demonstrate some management emphasis for a working forest with special provisions for recreation, scenic, and wildlife resources.

The Plan does not create a special management area for Round Mountain. A portion of the Round Mountain area is allocated to old growth, and the Round Mountain National Recreation Trail is treated as a separate management area. The rest of the area is allocated to General Forest.

Chapter 4

Forest Management Direction

Section 1

Forest Management Goals, Objectives, and Desired Future Condition

Chapter 4

Forest Management Direction

Section 1

Forest Management Goals, Objectives, and Desired Future Condition

Goals are generalized statements that provide broad direction for future management of the Forest. The primary goal of the Ochoco National Forest is to manage under the principles of "Caring for the Land and Serving People." Multiple use and sustained-yield management of all forest resources are an integral part of these principles. Specific resource goals are in support of these principles and are presented in this chapter.

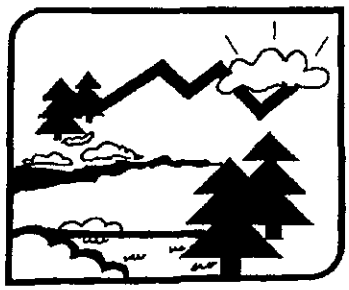
Objectives represent projected, potential outputs in support of overall goals. They are based on available inventory data and assumptions, subject to annual budgets. Objectives for key forest resources are displayed as average annual outputs, or totals per decade for the next five decades. They do not infer a commitment on the part of the agency to supply the appropriate resource on a regular basis, but do state the maximum output available, subject to the broad discretion of the Forest Service.

Desired future conditions summarize the anticipated physical changes that are likely to occur as a result of carrying out planned management practices over time. These descriptions are provided at ten years, and fifty years and beyond, for the Forest.

The information presented in this section provides goals, objectives, and desired future conditions for each of the key Forest resources. Resources are presented in alphabetical order. They are:

AIR QUALITY
BIOLOGICAL DIVERSITY
CULTURAL RESOURCES
FACILITIES
FIRE
FORAGE AND LIVESTOCK USE
FOREST HEALTH
FOREST RESIDUES
FUELWOOD
LANDS
MINERALS AND ENERGY
OLD GROWTH
RECREATION
SCENIC RESOURCES
SOCIAL AND ECONOMIC
SOIL
TIMBER
TRANSPORTATION SYSTEM
WATER
WILDLIFE AND FISH

Air Quality



Goal(s)

Maintain air quality at a level adequate for the protection and use of the Ochoco National Forest resources, and which meets or exceeds applicable Federal and State standards and regulations (Clean Air Act, as amended, and Oregon State Implementation Plan for Protection of Visibility in Class I Areas).

Objectives

Use the best available technology and management techniques to minimize smoke production from prescribed burning activities. Table 4-1 shows the estimate of total suspended particulates (TSP) generated in smoke from both natural and activity residue treatments.

Table 4-1

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
TSP Generation by Prescribed Fire	M Tons/Yr.	13.2	12.7	11.5	7.4	9.9

Desired Future Condition

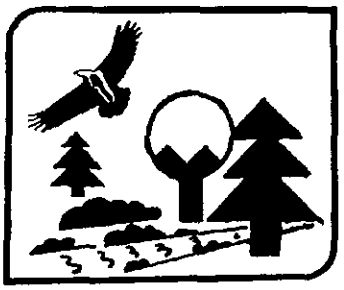
In Ten Years

Smoke emissions are projected to decrease over time, as shown in Table 4-1. This will result in a similar percentage decrease in visibility impairment (see Fire, Prescribed Burning Objectives, this section).

Fifty Years and Beyond

Emissions will decline to stable levels by the fifth decade: about 7 to 10 thousand tons per year. Improvement in visibility over the long run is primarily the result of the timber harvest schedule and an anticipated 20-40 percent reduction in the amount of excess residues in the managed stand condition.

Biological Diversity



Goal(s)

Maintain native, historic, and desirable introduced plant and animal species and communities, including those that may be threatened, endangered, or sensitive.

Maintain or enhance ecosystem functions to provide long-term productivity of forest resources and biological communities.

Objectives

Provide for all seral stages of terrestrial and aquatic plant associations existing and/or desirable for the Forest, with a distribution that is ecologically sound and ensures continued reproduction of the specie(s). For the Ochoco National Forest, the following diversity elements (Table 4-2) serve as objectives for defining biological diversity for both plants and animals. Values are displayed as totals, rather than average annual outputs.

Table 4-2

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Riparian Areas in Excellent Condition [1/]	M Acres	10.0	11.2	12.7	15.1	17.5
Riparian Areas Designated For Connective Habitat	M Acres	1.0	1.0	1.0	1.0	1.0
Snag Habitat for Cavity Nesters (Average Across the Forest)	Percent of Potential	47	49	51	55	54
Old Growth (Allocated plus Unallocated)	M Acres	93.8	83 9	74.2	64.5	55.1
Acres of forested land by Successional Stage [2/]						
Stage I and II	M Acres	9	30	26	37	34
Stage III	M Acres	151	151	30	56	63
Stage IV	M Acres	184	192	333	160	190
Stage V	M Acres	134	115	109	255	230
Stage VI	M Acres	94	84	74	64	55
Acres of nonforest land by Plant Community Type						
Timberline Meadows	M Acres	3	3	3	3	3
Meadows	M Acres	9	9	9	9	9
Juniper Dominant	M Acres	57	57	57	57	57
Grass Dominant	M Acres	5	5	5	5	5
Sagebrush Dominant	M Acres	38	38	38	38	38
Biscuit Root-Scabland	M Acres	7	7	7	7	7

[1/] See WATER Objectives, this section
[2/] Stage I=Grass-forb
Stage II=Shrub-seedling (0-10 years)
Stage III=Pole-sapling (11-39 years)
Stage IV=Young (40-79 years)
Stage V=Mature (80-159 years)
Stage VI=Old Growth (160 + years)

Desired Future Condition

In Ten Years

Forest-wide, biological diversity of plant and animal communities and species will be different in ten years.

Riparian areas, which serve as critical habitat for more than 75 percent of the Forest's wildlife species, will be improved over today's conditions, as a result of specific management actions. Connective habitat, of which riparian areas are a major factor, will be available in varying degrees across the Forest to provide linkage or extensions between forested habitats for wildlife species. Some riparian areas have been purposely widened in identified areas to accommodate movement of old growth dependent species (pileated woodpecker) between primary reproductive habitats (see Section 3, Management Area Standards and Guidelines for Wildlife and Fish).

Snag habitat for cavity nesters will be at about 47 percent of potential, but will be more evenly distributed as areas currently deficient in snags are improved due to natural mortality, or created through management action.

About 94 thousand acres of old growth will exist across the Forest, with large contiguous acreages concentrated mostly in wilderness, roadless areas and Research Natural Areas. Old growth specifically allocated for dependent wildlife species (along with equal acreages of supplemental feeding habitat) will exist in a somewhat evenly distributed pattern across the remainder of the Forest in order to ensure viable populations. In addition, other old growth will exist in areas allocated for various levels of vegetative manipulation (i.e. General Forest and other management areas), but will be declining over time.

Out of a total of 572 thousand acres of forested vegetation, all successional stages are expected to be present, though they will not necessarily be evenly distributed geographically. Pole/sapling, young stands, and mature stands (Stages III-V, respectively) will comprise the largest acreage, especially across intensively managed areas of the Forest. These will be represented both vertically (uneven-aged stands) and horizontally (even-aged stands). Grass/forb and shrub/seedling stages will be increasing, primarily in mixed conifer stands, as even-aged management is implemented. Old growth (Stage VI) will be decreased, both in total acreage as well as overall distribution.

In non-forest plant communities, species dominance may change as a result of forage enhancement for wildlife and livestock, and juniper thinning or removal for watershed improvement. No planned management practices are intensive to the point that they will actually result in a change from one plant community to another for non-forest vegetation types.

Even though not specifically stated as an objective above, habitat for existing threatened, endangered, and sensitive species of plants and animals will be available as needs are identified over time. Current conditions include habitat for bald eagles, as stated in specific management area prescriptions (see Section 2,

Management Area Prescriptions for Eagle Roosting Areas; also see Threatened, Endangered, and Sensitive Plants and Animals List, Appendix C).

Fifty Years and Beyond

Forest-wide, biological diversity of plant and animal communities and species will be substantially different.

Most of the riparian areas on the Forest will be in "excellent condition" as a result of specific management actions. Connective habitat will be available in varying degrees across the Forest in order to provide linkage or extensions between forested habitats for wildlife species, but may not be as effective as today, because most timber stands in these areas will have been placed under some level of management.

Snag habitat for cavity nesters will be at about 54 percent of potential, and as evenly distributed as possible. No areas of the Forest (other than those managed for safety concerns, i.e. administrative areas) will be below 40 percent of potential.

About 55 thousand acres of old growth will exist across the Forest, but will be concentrated mostly in wilderness, roadless areas and Research Natural Areas. In order to ensure viable populations, old growth specifically allocated for dependent wildlife species (along with equal acreages of supplemental feeding habitat) will still exist in a somewhat evenly distributed pattern across the remainder of the Forest . Very little old growth will exist in areas allocated for various levels of vegetation manipulation (i.e. General Forest and other management areas), as most of these areas will have been treated.

On forested land, all successional stages should be present, though they will not necessarily be evenly distributed geographically. Young and mature stands (Stages IV & V) will comprise the largest acreage, especially across intensively managed areas of the Forest. These will be represented both vertically (uneven-aged stands) and horizontally (even-aged stands). Grass/forb and shrub/seedling stages (Stages I & II) will be approaching an acreage indicative of a fully managed forest condition, meaning that similar acreages will be represented indefinitely. Old growth (Stage VI) will be about 55 thousand acres, and most will be concentrated in wilderness, roadless areas and Research Natural Areas. The remaining acreages will be in somewhat isolated stands reserved for dependent wildlife species across the Forest, with a small acreage still available in General Forest and other management areas.

No significant change in acre distribution of non-forest plant communities is projected at this time.

Habitat for threatened, endangered, and sensitive plant and animal species will be available as needs are identified in accordance with Federal Law.

Cultural Resources



Goal(s)

Locate, evaluate, protect, and mitigate if necessary, significant historic and archaeological sites. Enhance and interpret selected sites for public enjoyment, education and interpretation after public involvement with American Indian Tribes, historical societies, and local interest and professional groups. Promote opportunities for research, and traditional Native American cultural practices, writing, and photography.

Objectives

Complete "broad-area" cultural resource inventories and documentation prior to ground-disturbing activities on the Forest (see standards and guidelines, Section 3, this chapter). Identify Native American traditional food and religious use areas, in compliance with Public Law 95-341 (American Indian Religious Freedom Act) and the Treaty of 1855, with the assistance of the Warm Springs Confederated Tribes and the Burns Paiute Tribe.

Numbers shown in Table 4-3 represent estimates of site documentation, site enhancement or interpretation, and nominations to the National Historic Register for future decades, based on past experience.

Table 4-3

Resource/Activity	Unit of Measure (Average)	Decade				
		1st	2nd	3rd	4th	5th
Sites Documented	Number/Yr.	120	100	80	70	60
Sites Enhanced/Interp.	Number/Yr.	3	3	3	2	2
Nat'l Register Nomination	Num/Decade	2	2	2	2	2

Desired Future Condition

In Ten Years

In ten years, 60-70 percent of the Forest will have been surveyed for cultural resources. As the demand for timber harvest and other resources in previously avoided areas increases, many significant cultural resource sites will be mitigated. This will benefit the public as well as the academic community by increasing the body of knowledge about the prehistory and history of the Forest. Accurate, meaningful interpretation of a greater number of sites will result. Similarly, greater knowledge will enable the Forest to more efficiently manage the resource.

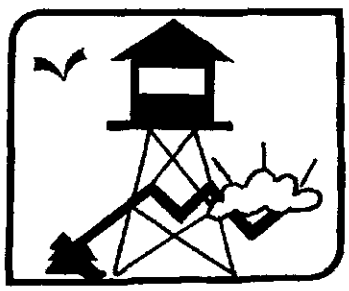
Management plans and allocations for site and thematic site classes may have been recognized, through amendment of the Forest Plan and involvement with appropriate individuals, groups and public agencies. Traditional Native American use of sites and areas will be recognized and considered during land and resource management activities Site enhancement and interpretation will have been performed on specific sites and thematic classes. Stabilization of threatened cultural resource sites will have been performed within or adjacent to existing public recreation and use areas.

Fifty Years and Beyond

The accumulated knowledge of historic, cultural and prehistoric site types and implementation of management plans and allocation strategies for cultural resources will reduce the need to inventory certain portions of the Forest. Information on the prehistoric, historic, and Native American cultural use of the Forest will have increased to a level that management of the resource will be efficient and precise. Advances in archaeological methods, historic research, sampling site stabilization and thematic evaluation will affect changes in management and result in more accurate interpretation of the resource. A large body of protected sites and data from mitigation projects will provide the basis for ongoing interpretive programs and facilities.

Enhancement and interpretation will begin to dominate the cultural resource program. Local citizens, groups and professional organizations will be involved in site preservation and interpretation. Native Americans will make greater use of the Forest for traditional food gathering and religious practices; they will be involved in the management and treatment of prehistoric sites and burials, and the Forest in general.

Facilities



Goal(s)

Plan, construct, maintain, and manage Forest facilities to provide maximum economy, investment protection, user safety, and resource protection.

Objectives

Facilities relate to administrative sites located across the Forest These include ranger stations, campground facilities, work centers, lookouts and electronic sites. Future facilities construction or improvements are provided as totals (first decade only), instead of average annual outputs. See Table 4-4.

Table 4-4

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Construction and Improvements (Reconstruct)	Number	27	N/A	N/A	N/A	N/A

Desired Future Condition

In Ten Years

Forest facilities will be attractive to users and reflect favorably on the Forest Service. Marginal facilities will have been removed or upgraded based on need and planned life expectancy.

Fifty Years and Beyond

No drastic changes in location or design of Forest facilities are predicted, even though some changes may occur as a result of an aging population.

Fire



Goal(s)

Control wildfire aggressively (particularly in urban-Forest interface areas), and in a cost-effective manner (minimize suppression cost plus loss).

Provide for the ecologically sound use of prescribed fire as a cost-effective management tool for achieving resource management objectives.

Objectives

Wildfire Management

Provide a cost-efficient fire management organization as determined by the National Fire management Analysis System. The Wildfire Effectiveness Index figures shown in Table 4-5 represent average annual program cost plus wildfire loss per thousand acres protected.

Table 4-5

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Wildfire Effectiveness Index	$/1000 ac protected	715	715	715	715	715

Prescribed Burning

Reduce wildfire intensities to support a cost-efficient fire protection organization.

Emulate the natural role of fire in maintaining environmental diversity and site productivity. Maintain or improve wildlife and range habitat.

Table 4-6 provides estimates of average prescribed fire acres. It is anticipated that there may be large variations above and below these averages in any one year due to variations in available burning conditions, funding, personnel, and timber harvest schedule.

Table 4-6

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Prescribed Burning Natural & Activity Fuels	M Acres/Yr	24.6	25.2	24.9	19.7	25.6

Desired Future Condition

In Ten Years

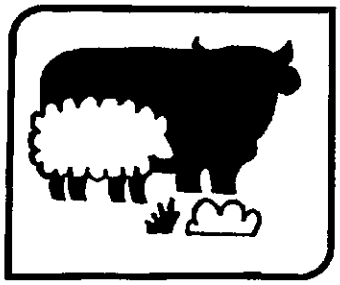
It is expected that about 750 acres per year will burn as wildfires, based on planned suppression organization. The Wildfire Effectiveness Index will be about $715 per 1000 acres protected.

About 25,000 acres will have been prescribed burned per year, resulting in 246,000 acres burned at the end of the first decade.

In Fifty Years

No dramatic changes in the number of acres burned by wildfire are expected. Much of the Forest will have reached a near stable mosaic of residue levels, as a direct result of managed timber stands and appropriate use of prescribed fire.

Forage and Livestock Use



Goal(s)

Provide forage for wildlife and domestic livestock in a manner consistent with other resource objectives and environmental constraints, while maintaining or improving ecological condition and plant community stability.

Objectives

Present permitted use by domestic livestock is 58,000 Animal Unit Months (AUM's). The Forest objective is to improve all range conditions to good or excellent by intensifying management. In the long run, present AUM's can probably be maintained or increased; but short-term (within this planning period) reductions in AUM's are predicted, particularly for improving riparian conditions. Average annual production for the first decade will not be substantially different from today, due to increases in upland forage production, resulting primarily from timber harvest.

Structural and nonstructural improvements play a large role in achieving overall forage management objectives. As shown in Table 4-7, improvements are planned to increase over the next decade, and then decrease to a maintenance level thereafter.

Wild horses are found on particular areas of the Big Summit Ranger District. The number of wild horses is currently estimated at 60 and is expected to be maintained at that level indefinitely (see Appendix I, Management of Wild Horses).

Table 4-7

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Forage Production [1/]	M AUM's/Yr	57	62.5	66.6	63.9	65.6
Structural Improvements						
Fencing	Miles/Yr.	35.7	0	0	0	0
Fencing Removal	Miles/Yr.	3.0	0	0	0	0
Water Developments	Number/Yr	14.0	0	0	0	0
Nonstructural Improvements						
Juniper Treatment For Riparian Improvement	Acres/Yr.	796	0	0	0	0
Range Burning For Forage Enhancement	Acres/Yr.	4,072	4,072	4,072	4,072	4,072
Wild Horses	Number	60	60	60	60	60

[1/] AUM fluctuations are due primarily to acres of transitory range made available by timber harvest type, amount and location.

Desired Future Condition

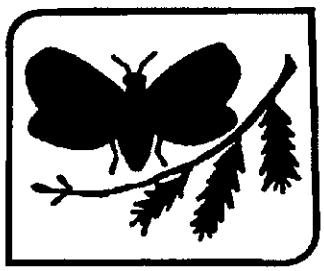
In Ten Years

Most allotments will be managed under more intensive grazing systems than present. Management changes and the resulting structural improvements necessary to improve riparian conditions to excellent will have been installed. Predicted reductions in available AUM's due to riparian exclosures and other riparian improvement practices, completed during the first decade, will generally have been offset by increases in transitory range made available through timber harvest and additional water developments installed in the uplands.

Fifty Years and Beyond

Range conditions will be good and forage production will be higher than at present due to improved range conditions. All necessary range improvements (structural and non-structural) will be completed, and the range improvement program will consist primarily of reconstruction and maintenance. Most riparian areas will be in excellent condition.

Forest Health



Goal(s)

Maintain the health of the Forest for present and future uses, within management's ability to do so. Forest health is defined as "a condition where biotic and abiotic influences on the Forest (i e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives either now or in the future."

Objectives

Utilize Integrated Pest management (IPM) strategies to maintain forest health.

Prevention and control of damage to forest resources, caused by insects, diseases, and noxious weeds will be accomplished through a number of practices.

Resource activities to control pests will depend on site specific analysis and may vary greatly from year to year. Emphasis will be on prevention rather than control When control is necessary, the method with the least impact on the environment will be used. Best estimates of activities for the next five decades are shown in Table 4-8. These do not represent target acres of accomplishment.

Table 4-8

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Integrated Pest management Strategies						
Manual [1/]	Acres/Yr.	100	100	100	100	100
Mechanical [1/]	Acres/Yr.	200	200	200	200	200
Biological [2/]	M Acres/Yr	100	100	100	100	100
Chemical	Acres/Yr.	200	200	200	200	200

Note: These acres do not include scheduled activities for resource management, such as precommercial thinning.

[1/] Includes 25 acres of noxious weed control

[2/] Primarily related to control of spruce budworm and other defoliators, using Bacillus thuringiesis (b t), or other suitable biological agents

Desired Future Condition

In Ten Years

Integration of pest management strategies in all activities will be practiced. Some of the most important activities are:

Accelerated precommercial and commercial thinning in overstocked ponderosa pine and lodgepole pine where this can be done within management area and economic limitations.

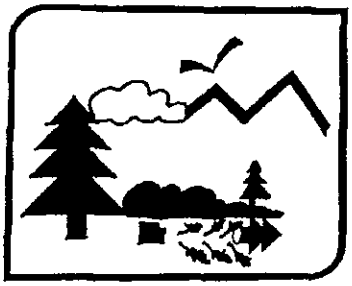
Attempts to identify severe root rot pockets and to treat these stands as soon as practical.

Stands being regenerated, including selection cutting, emphasizing treatments that will favor early seral species. This will be done by a combination of prescribed fire, planting, site preparation for naturals, and seed tree selection.

Fifty Years and Beyond

Continued practice of standards and guidelines for Forest Health should provide stands with manageable levels of most root rots, dwarf mistletoe, and bark beetles. Care will be needed when planning projects around the boundaries of old growth or wilderness areas to prevent encroachment of diseases. Forest managers will need to be on the alert for insects and diseases in the younger stands as these become more common.

Forest Residues



Goal(s)

Manage forest residues (woody biomass), resulting from either natural or man-caused processes, as a separate resource. Provide this resource for the benefit of resources such as soil, water, wildlife, and timber, as well as for the social and economic benefits associated with firewood gathering and other family oriented endeavors centered around residues.

Objectives

Provide for natural levels of forest residues consistent with the access, vegetation community, stage of stand development, on-site nutrient cycling, diversity, and forest protection needs. Desired residue profiles for common vegetation types around the Forest are shown in Forest-wide Standards and Guidelines under Forest Residues. More specific profiles by management area are shown in Section 3, Management Area Standards and Guidelines. Approximately 12 tons per acre represents a weighted average residue condition across the Forest. This equates to about 10.4 million tons of minimum residue requirements for the whole Forest (See Minimum Site Requirements, Table 4-9.)

Remove residues that exceed minimum site requirements. Attempt to use excess residues to reduce the impacts of alternate disposal methods (machinery operations and/or emissions from prescribed fire).

Table 4-9 shows how the amount of forest residues change over time. Units represent total amount of residues available on the Forest at any one time, and not an average annual output.

Table 4-9

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Pretreatment Residues	MM Tons	20.0	18.9	18.2	16 6	17.1
Minimum Site Requirements	MM Tons	10.4	10.4	10.4	10.4	10.4
Excess Residues	MM Tons	9.6	8.5	7.7	6.2	6.7
Activity	MM Tons	4.3	4.2	3.8	2.2	3.3
Natural	MM Tons	5.3	4.3	3.9	4.0	3.4
Excess Residues Removed	MM Tons	5.3	5.1	4.6	2.9	3.9
Activity	MM Tons	4.2	4.2	3.8	2.2	3.3
Natural	MM Tons	1.1	0.9	0.8	0.7	0.6
Excess Residues Remaining	MM Tons	4.3	3.4	3.2	3.3	2.7
Total Residues Remaining	MM Tons	14.7	13.8	13.6	13.7	13.1

Desired Future Condition

In Ten Years

The Forest will continue to develop and implement its residue management program to assure the proper retention, use, and disposal of forest residues.

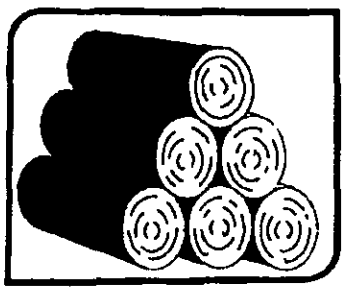
Compared to today, residues (activity slash, etc.) remaining after projects will gradually increase as implementation progresses. A more natural mosaic of residues will provide for greater habitat variety, increased nutrient capital on-site, improved visual variety, and cost-efficient wildfire protection opportunities.

Fifty Years and Beyond

The Forest will have a fully operational residue management program integrated into the project planning and implementation process.

Much of the Forest will have a natural appearing mosaic of residues managed to provide for biological diversity, appropriate nutrient cycling regimes, aesthetics, and a reasonable of level wildfire protection.

Fuelwood



Goal(s)

Provide fuelwood for personal and commercial use, consistent with other resource objectives and environmental constraints.

Objectives

The output of fuelwood shown in Table 4-10 declines over time, primarily as a result of the declining timber harvest. Other fuelwood sources will be increasing (thinning removals, etc.), but will not make up for the difference in lost timber sale slash.

Table 4-10

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Fuelwood	M Cords/Yr	13	12	11	11	11

Desired Future Condition

In Ten years

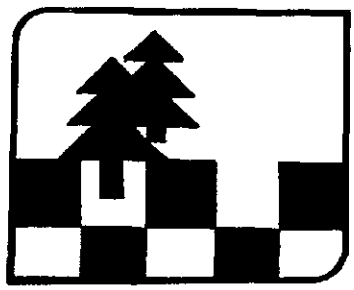
The availability of dead lodgepole will be much less than today. Greater distances will need to be driven to find quality large material.

The supply of firewood in general will be about 13 thousand cords per year until 1995, and then will decline to about 11 thousand cords per year. If present demand continues, it will not be met with the quality and accessibility currently available.

Fifty Years and Beyond

Cull sawlogs that are commonly available for wood cutting today will be very scarce. There will still be tops and limb wood, and thinning size trees four to seven inches DBH. Many people will find gathering this size of wood too time consuming and will elect to buy firewood from commercial cutters. Demand and value of smaller logs for firewood will likely exceed the value for sawlogs, therefore much of firewood needs will be supplied by commercial sales. Opportunities to allow individuals to thin younger stands and use the resulting material for firewood will be available.

Lands



Goal(s)

Permit special land uses that have been evaluated in relationship to land management objectives, that are compatible with other resource objectives and environmental considerations, and that are in the public interest.

Achieve a pattern of land ownership that best supports resource goals, improves the efficiency of resource management, and demonstrates effective forest management.

Objectives

Table 4-11 shows the number of special uses that are projected to increase in the first two decades and then level off.

Table 4-11

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Special Use Permits	Number [1/]	48	54	60	60	60

[1/] At any one time.

Desired Future Condition

In Ten Years

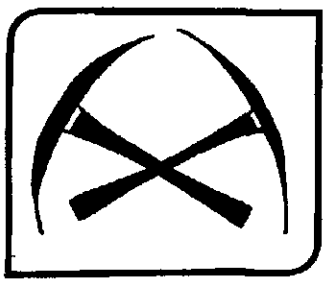
Permits for special recreational events will increase. The National Recreation Strategy will result in additional permits for recreational facilities and activities. The number of permits for electrical and telephone permits will also increase as parcels of private land scattered throughout the Forest are developed for recreational purposes.

Fifty Years and Beyond

The land exchange program will have achieved a more efficient land ownership pattern. Isolated blocks of Forest Service land will have been exchanged for private inholdings; however, inholdings with high recreation and/or real estate values will remain in private ownership.

The number of acres of land in National Forest ownership will remain approximately the same. Land exchanges will result in the acquisition of some private inholdings and the disposal of some isolated parcels of National Forest land.

Minerals and Energy



Goal(s)

Provide for and facilitate the exploration, development, and production of mineral and energy resources in coordination with other resource objectives, environmental considerations, and mining and leasing laws.

Objectives

Oil and Gas

The Forest will respond to industry demand for oil and gas leasing. On the Forest, 807,521 acres (96 percent of the Forest) are available for leasing. Of these acres, 718,370 (85 percent of the Forest) are classified as prospectively valuable for oil and gas. This is assumed to be the maximum acreage that would be leased. Presently, approximately 140,000 acres of Forest land are under lease. Approximately 670,000 acres have been under lease historically.

Domestic demand for oil and gas leasing is directly related to International production and prices. Increases in the cost of imported oil trigger increased domestic exploration and production, and probably an increase in leasing on the Forest. However, a competitive bidding system for the sale of leases could result

in higher lease costs, and thus, fewer acres of land leased. Changes in the International situation, changes in technology, failure to discover a valuable deposit, or depletion of deposits would then result in a decline in the acres listed. Table 4-12 shows projected estimates of future leased acres.

Table 4-12

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Oil and Gas	M Acres Leased [1/]	140	670	40	400	400

[1/] At any one time.

Geothermal

The Oregon Department of Geology and Mineral Industries (DOGAMI) has classified the entire Forest as "favorable for the discovery at shallow depth (less than 1,000 meters) of thermal water of sufficient temperature for direct heat applications." However, approximately three-quarters of the state is given this classification, and DOGAMI states "it is probable that only small areas of this region are truly underlain by such thermal water." For the purposes of this Plan, it is assumed that geothermal exploration in Oregon during the next five decades will be concentrated in those areas where it is now occurring, and the Forest will not issue any geothermal leases, as illustrated in Table 4-13.

Table 4-13

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Geothermal	Acres Leased	0	0	0	0	0

Locateable Minerals

The Forest will encourage and facilitate responsible mining exploration and development in a manner consistent with other resource objectives. On the Forest 804,510 acres (95 percent of the Forest) are open to mineral entry. Of this amount, 81,460 acres are classified as having either high or moderate potential for gold or mercury. Gold exploration activity has increased during this decade. The discovery of a valuable gold deposit would result in increased development and exploration activities. Conversely, the failure to make a valuable discovery could result in a decrease in mining interest (and therefore mining claims) on the Forest. Table 4-14 shows projected estimates of future claims.

Table 4-14

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Locatable (Gold, Mercury, Silver, etc.)						
Lode Claims	Number [1/]	981	1,000	1,000	1,000	1,000
Placer Claims	Number	31	30	30	30	30
Tunnel Site Claims	Number	10	0	0	0	0

[1/] At any one time.

Common Variety Minerals

The aggregate mined on Forest land is mostly used to surface Forest Service, State, and County roads. The demand for this material is expected to remain constant over the next five decades. Table 4-15 shows projected estimates.

Table 4-15

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Common Variety (Gravel, Cinders, etc.)	M Cubic Yards/Yr	85	85	85	85	85

Desired Future Condition

In Ten Years

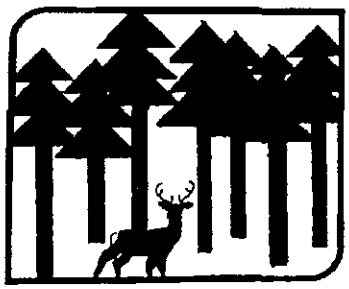
Exploration and development of locatable (hard rock) and leaseable (oil and gas) minerals will be allowed on the Forest, except in locations specifically withdrawn from mineral entry (see Standards and Guildelines, Section 3). The actual amount of exploration and development is expected to remain at existing levels throughout the first decade, then rise rapidly for oil and gas exploration due to an expected increase in the nation's demand. Up to 80 percent of the Forest may be leased for oil and gas exploration, if this occurs. If a large, valuable deposit is discovered, mining activity could result in a significant increase in both exploration and development (but is not predicted at this time). Extraction of saleable (common variety) minerals will be limited to existing pits or new locations that have approved operating plans, and is not expected to increase significantly during the first decade.

Fifty Years and Beyond

Oil and gas exploration is expected to rise nearly four-fold after the first decade due to an increase in the nation's demand. It is predicted that this will level off to a somewhat lower level thereafter, and remain constant past fifty years. Geothermal exploration is zero now, and no increases are expected for the next five decades. No substantial increase in mining activity is projected, and it will

remain at about constant levels throughout the next fifty years, barring the discovery of a large, valuable deposit. Extraction of common variety minerals is expected to remain relatively constant for the next five decades and beyond.

Old Growth



Goal(s)

Provide stands of old growth throughout the Forest for wildlife habitat, ecosystem diversity, and aesthetic diversity.

Objectives

Old growth stands will be present in various areas of the Forest, even though total acres will be declining over time Table 4-16 displays how total acres of existing old growth will slowly decline over the next five decades. Units are expressed as totals, rather than as an average annual output.

Table 4-16

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Allocated Old Growth For Dependent Species	M Acres [1/]	18 0	18.0	18 0	18.0	18.0
Unallocated Old Growth in Wilderness, Roadless & Research Natural Areas	M Acres	30.3	30.3	30.3	30.3	30.3
Limited Harvest Areas [2/]	M Acres	6.8	6.3	5.8	5.3	4.8
Full Harvest Areas [3/]	M Acres	38.7	29 3	20.1	10.9	2.0
Total Old Growth	M Acres	93.8	83 9	74.2	64.5	55.1

M = Thousand

[1/] This does not include an additional 1,270 acres that have been allocated for old growth dependent wildlife species. These acres currently are not "suitable" old growth, they are currently "capable" and are expected to become suitable in the future

[2/] This includes visual and other unique areas like Deep Creek management Area, where management will include extended rotations (150 years plus)

[3/] This includes General Forest, Big Game Winter Range, and the portion of Rock Creek/Cottonwood Creek Unroaded Helicopter Area

Desired Future Condition

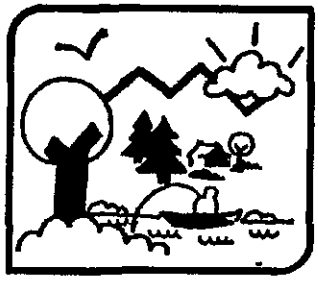
In Ten Years

Approximately 15 percent of the total forested acres on the Forest will be in an old growth condition. The majority will still exist in the General Forest areas, which are available for intensive timber management. Old growth stands allocated for old growth dependent wildlife species (18 thousand acres) will become more isolated as adjacent stands are harvested and placed in a managed condition. Barring a natural catastrophe, old growth found in wilderness, roadless and Research Natural Areas, will be maintained at current levels (about 30 thousand acres), and may even increase as younger stands develop old growth conditions. Stands with old growth characteristics will continue to be found at relatively high levels in visual corridors and other management areas which will be converted to managed stands at a relatively slow rate.

Fifty Years and Beyond

Approximately nine percent of the total forested acres on the Forest will be in an old growth condition. The majority will be found in wilderness, roadless areas and Research Natural Areas (approximately 30 thousand acres). Only two thousand acres of old growth will exist in areas available for intensive timber management, but another 18 thousand acres allocated for old growth dependent wildlife species will be distributed throughout these areas and the Forest as a whole. Stands with old growth characteristics will still be found at relatively high levels in visual corridors and special management areas (about five thousand acres).

Recreation



Goal(s)

Emphasize the National Recreation Strategy.

Provide for a variety of recreational experiences across all areas of the Ochoco National Forest, in a manner consistent with other resource objectives and environmental constraints.

Protect unique natural and recreational features.

Objectives

Developed Recreation

Manage, improve, modernize, and expand the developed recreation sites based on use and needs.

The total supply of developed sites, as well as the projected use expressed in MRVD's (Thousand Recreation Visitor Days), are shown in Table 4-17.

Table 4-17

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Developed Area Supply	M/RVD's	159.4	159 4	159.4	159.4	159.4
Projected Use	M/RVD's	116.1	130.5	143.0	156.6	159.4

Dispersed Recreation

Provide for a wide variety of recreational opportunities.

Table 4-18 shows the estimated supply, plus actual projected use for dispersed recreation, expressed in MRVD's.

Table 4-18

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Dispersed Supply						
Roaded	M/RVD's	1204.1	1220.2	1220.2	1220.2	1220.2
Unroaded	M/RVD's	44.0	44.0	44.0	44.0	44.0
Wilderness	M/RVD's	25.7	25.7	25.7	25.7	25.7
Dispersed Use Projected						
Roaded	M/RVD's	262.4	288.8	312.2	337.6	365.0
Unroaded	M/RVD's	32 2	35.3	38.5	42.0	44.0
Wilderness	M/RVD's	16 3	17.8	19.2	21.0	22.9

Hunting and Fishing Use

Hunting and fishing use occurs across all areas of the Forest, including wilderness areas and developed recreation sites. The use figures, shown in Tables 4-17 and 4-18 for Dispersed and Developed Recreation include projections for hunting and fishing. For informational purposes, they have been extracted and converted to WFUD's (Wildlife Fish User Days), and are shown in Table 4-19.

Table 4-19

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Hunting Use	WFUD's	158.2	155.8	156.8	155.4	151.0
Fishing Use	WFUD's	61.7	71.8	74.0	76.4	79.2

Off-Road Vehicles (ORV's)

ORV use, and trail construction and reconstruction, will be allowed where they are not in conflict with other resource objectives. Routes will be identified on the Forest to encourage use in specific areas by offering a variety of challenges and terrain. No numerical estimates are presently available.

Trails

A managed trail system will be provided for a variety of uses, including hiking, horseback riding, mountain biking, all terrain vehicles (ATV's), cross-country skiing, and snowmobiles.

There are currently 96.8 miles of summer use trails. About 186.9 miles of new construction and 13.0 miles of reconstruction are planned for nonmotorized use in the first decade, along with 95 miles of ATV trail construction, providing a

total of 378.7 miles of summer trails. In the second decade, a similar amount of construction and reconstruction is planned, providing a total of 563.6 miles of summer use trails.

There are currently 84 miles of winter use trails. Of that, 75 miles are designated snowmobile trails and nine miles are cross-country. In the first decade, 100 miles of construction and reconstruction of cross-country trails are planned, providing a total cross-country system of 109 miles. About 210 miles of construction are planned for snowmobile trails in the first decade, providing a total of 285 miles in the snowmobile trail system. Total winter trails will be 394 miles at that time. Construction and reconstruction of winter use trails in the second decade will be less than half of that for the first decade, providing a total winter system of 474 miles. See Table 4-20.

Table 4-20

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Summer Use Trails						
Non-Motorized	Miles	283.7	468.6	468.6	468.6	468.6
Construct/ Reconstruct	Mi./Year	18.7	18.5	0	0	0
ATV (Motorized)	Miles	95.0	190.0	190.0	190.0	190.0
Construct/ Reconstruct	Mi./Year	9.5	9.5	0	0	0
Total Summer Trails	Miles	378.7	563.6	563.6	563.6	563.6
Winter Use Trails						
Cross-Country Skiing	Miles	109.0	149.0	149.0	149.0	149.0
Construct/ Reconstruct	Mi./Year	10.0	4.0	0	0	0
Snowmobile	Miles	285.0	325.0	325.0	325.0	325.0
Construct/ Reconstruct	Mi./Year	21.0	4.0	0	0	0
Total Winter Trails	Miles	394.0	474.0	474.0	474.0	474.0

Desired Future Condition

In Ten Years

A variety of recreational opportunities will be available, focusing on dispersed recreation, backcountry recreation, and developed recreation across the Forest.

The existing campgrounds, picnic areas, and boat ramps will be maintained in the future; in the next 10 years additional camping facilities will be added at Falls, Delintment Lake, and Antelope Reservoir, Ochoco Forest Camp, Ochoco Divide, Sugar Creek, and several horse camps at various locations across the Forest.

Opportunities for nonmotorized recreation will continue to be provided in three wildernesses (Black Canyon, Mill Creek, and Bridge Creek), and three roadless areas (Lookout Mountain, Rock Creek/Cottonwood Creek, and Silver Creek).

Most of the Forest will continue to be open to off-road vehicle (ORV) use, but use will be directed to and encouraged on designated routes that will be developed. Some areas or routes will be closed and are designated on the travel plan map (map packet). ORV use will be managed and monitored to provide for resource protection.

A complex trail system will be available, providing extensive opportunities for both summer and winter use. Some trails will connect to the East-West Intertie, a trail joining the Pacific Crest Trail with the Desert Trail. Thirty-eight miles of existing trails in wilderness will be maintained. Some relocation and reconstruction of trails in Black Canyon will be necessary to reduce sedimentation caused by existing locations in creek crossings and boggy areas.

ATV and mountain bike routes will be available, offering a wide variety of terrain and experience levels. An extensive, marked snowmobile route system and cross-country ski trail system will also be available for winter time use.

Even though the majority of the Forest will be open to snowmobiles in the winter, some areas will be closed in order to emphasize other resource amenities (See Management Area Standards and Guidelines, Recreation, Section 3, this chapter).

Fifty Years and Beyond

Opportunities for dispersed recreation will have increased substantially over today's conditions. A much larger trail system will be in place and most trails will show substantial use. New trailheads, functional for more user types, will be in place. Loop trails, designated for day hikes (in such areas as Stein's Pillar Recreation Area) will include interpretive features.

Most developed recreation sites will have completed construction and reconstruction, and will be under a fee structure with maintenance costs being recovered.

Semiprimitive nonmotorized and semiprimitive motorized areas will be maintained to retain their recreational opportunities as planned today. No permanent road intrusions will have occurred in the three major roadless areas on the Forest, i.e. Rock Creek/Cottonwood Creek, Lookout Mountain (Prescription Area A), and Silver Creek.

Scenic Resources



Goal(s)

Integrate visual quality management into all resource activities which have potential negative impacts on scenery.

Provide natural appearing scenery along major travel ways, at developed and dispersed recreation sites, and in management areas where recreation is emphasized.

Participate in the "National Forest Scenic Byways" program, through nomination of other forest roads that exhibit exceptional qualities and meet national selection criteria.

Objectives

Table 4-21 lists the acres projected for scenic resources by Visual Quality Objective (VQO). In addition to specific road corridors, this includes a number of other management areas, e.g. Bandit Springs Recreation Area, that will be managed with scenic resources as either a primary or secondary objective. See Standards and Guidelines, Section 3, this chapter, for listing of VQO's by Management Area.

Table 4-21

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Preservation	M Acres	42	42	42	42	42
Retention	M Acres	85	85	85	85	85
Partial Retention	M Acres	50	50	50	50	50
Modification and Maximum Modification	M Acres	668	668	668	668	668

Desired Future Condition

In Ten Years

The figures shown in Table 4-21 represent a management allocation, but they do not accurately reflect what the Forest will look like in ten years. In reality, a large percentage of the Forest acres will continue to appear natural, as management prescriptions will not have been completely implemented. Timber management schedules for the General Forest areas will still maintain some degree of higher scenic values than Modification or Maximum Modification, even though activities will have occurred on many of the acres, and will continue to do so at a relatively high rate.

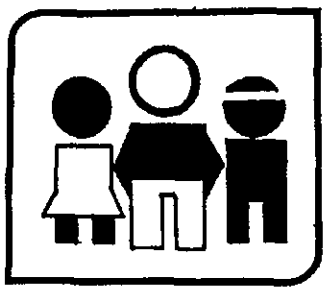
Along major travel routes, the Forest will appear as natural as possible, providing a variety of landscapes, and emphasizing natural features. The major recreation sites will be as natural as possible and facilities will be designed and placed to fit into the natural surroundings. A number of management areas emphasizing recreation will exhibit similar visual qualities in order to meet resource objectives.

In timber stands existing in areas with both partial retention and retention visual quality objectives, the Forest visitor will be able to view large, open park-like stands of ponderosa pine, as well as uneven-aged stands with a variety of age classes. Mixed conifer stands will exhibit a variety of size and age classes, with a focus on species such as larch and aspen, to give seasonal variety.

Fifty Years and Beyond

In fifty years, the figures shown by VQO in Table 4-21 should be reflected on the ground, as the majority of the management area prescriptions have been implemented. Primary scenery will be concentrated along travel routes and in management areas. But, General Forest areas will still appear somewhat natural due to use of uneven-aged management and other management techniques designed to reduce the negative viewing intensity of project activities. Size and color variety will be less in General Forest areas than in management areas allocated for higher Visual Quality Objectives.

Social and Economic



Goal(s)

Manage the Forest to lend support to the social and economic viability of local communities, as well as to the nation as a whole.

Provide equal opportunities to people regardless of race, color, creed, sex, marital status, age, handicap, religion, or national origin.

Maximize net public benefits (36 CFR 219.3).

Objectives

Maximize the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not, in a manner consistent with the principles of multiple-use and sustained yield.

Table 4-22

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Social						
Changes in Jobs	Number	109	NOT AVAILABLE			
Changes in Income	Million $	1.6	NOT AVAILABLE			
Economic						
Total National Forest Planned Budget	Million $	10.2	9.3	9.4	9.8	9.7
Returns to Government	Million $	19.4	22.3	20.8	19.5	21.5
Present Net Value	Million $	475.0	NOT APPLICABLE			
Payments to Counties	Million $	4.9	NOT AVAILABLE			

Desired Future Condition

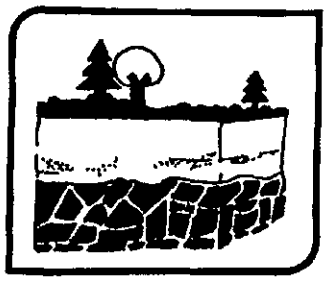
In Ten Years

The management of forest resources will be accomplished in an economically efficient manner. Investments in timber management or timber culture will take in to account site productivity, product value and marginal rates of return. Resources with market value - special uses, minerals, grazing and timber - which contribute to country receipts and the local economy, nonmarket-unroaded recreation, wildlife habitat, and unspoiled scenery - will experience increasing competition. Urban population values and demands for the latter values from the National Forest will increasingly conflict with local utilitarian views and lifestyles. The Forest Service caught in this conflicting dichotomy will continue to seek to balance use, retain options, and to form public partnerships

Fifty Years and Beyond

The dichotomy and competition for resources, and the purposes of the National Forests, will be politically and legislatively addressed and the questions of today resolved, although new issues will arise. Greater uniformity and clarity will exist in how publics view the National Forest, their purpose, and management. The present method of payment to counties,which encourages conflict, will be changed to something other than that requiring local governments to emphasize resource extraction from the National Forests in order to maximize county receipts.

Soil



Goal(s)

Manage soil to maintain, restore, or improve its natural productive potential.

Strive to reduce soil compaction and displacement to get as close to 90 percent of any activity area (including permanent, rocked, and nonsurface roads) in a noncompacted or nondisplaced condition (as is realistically possible) within one year of the projects completion.

Objectives

Land disturbing management activities, such as logging, road building, grazing, and certain recreational uses have potential for dramatic decreases in soil productivity if not managed or mitigated correctly. Soil erosion and compaction are conditions most seriously affected by activities on the Forest. It is the objective of the Ochoco National Forest to prevent or correct long-term soil damage in all activity areas that result in productivity loss on lands dedicated to plant and water production. The following parameters have been established and serve as objectives to measure the affects of activities on the soil resource.

Soil loss (erosion) results primarily from road building and timber harvesting, but also reflects the overall condition of watersheds on the Forest which may be the combined effect of all activities, including recreation and grazing. Watershed condition objectives have been established for the Forest, and are found under "Water," this section, this chapter. The tons of soil loss shown in Table 4-23 assume that watershed condition objectives will be met, and reflect what will be lost over time, despite proper management and mitigation, over the entire Forest.

Soil compaction results primarily from timber harvest and related activities (such as slash disposal). There is an estimated 102 thousand acres of forested soils in a compacted condition today, as a result of past and ongoing activities. In order to meet management requirements for soil, the acres of tillage shown in Table 4-23 (to relieve compaction at the 20 percent level) are planned over the next five decades. There are currently about 1,500 acres of tillage completed annually. Depending on annual management objectives and budgetary constraints, additional acres of tillage (at the 10 percent level) should also be considered.

Table 4-23

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
Soil Loss (erosion)	M Tons/Yr.	1.7	1.5	2.1	.9	1.9
Tillage For Compaction at 20 Percent Level (Maximum Allowed)	M Acres/Yr	1.7	1.3	2.0	.8	1.8
Tillage at 10 Percent Level (Forest Goal)	M Acres/Yr	3.0	2.3	3.6	1.4	3.2

Desired Future Condition

In Ten Years

As more of the Forest acres are affected by vegetation management activities, soil erosion will increase. These activities are mitigated in part by adherence to standards and guidelines. Soil loss is estimated to be limited to 1.7 thousand tons per year Forest-wide.

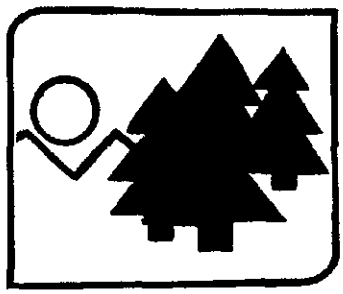
As areas with compacted soils are re-entered with timber sales or other projects, significant achievements in prevention and rehabilitation of compacted soils will be observed. The Forest will be moving closer to achieving a long-term goal of having no more than 10 percent of the managed acres in an unproductive condition.

Fifty Years and Beyond

Most available acres will be under some type of vegetative management, particularly for timber production. Fluctuations in soil loss will vary from year to year, and decade to decade, as a direct result of fluctuations in these activities. With adherence to standards and guidelines, soil loss should be limited to 1.9 thousand tons per year, based on current modeling.

During or near the end of the fifth decade, the Forest will have re-entered most acres of ground previously compacted, and rehabilitated these soils through tillage or other appropriate means, at least 80 percent of the total acres will be in a fully productive condition.

Timber



Goal(s)

Provide for the production of quality wood products, in a manner consistent with other resource objectives, environmental constraints, and economic efficiency.

Objectives

Table 4-24 provides a summary of major timber-related data for five decades in terms of average annual outputs. More detailed data concerning land suitability, comparisons with previous plans, and harvest schedules by management area are contained in Appendix A. These figures are projections of potential timber outputs based on available inventory data and assumptions, subject to annual budgets. All units are based on an average annual output. (MM=Million, M=Thousand.)

Table 4-24

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Long-Term Sustained Capacity	MMCF/Yr.	19.0	19.0	19.0	19.0	19.0
Allowable Sale Quantity						
All Species	MMCF/Yr.	19.0	19.0	19.0	19.0	19.0
	MMBF/Yr.	115.0				
Ponderosa Pine Only	MMCF/Yr.	13.7	13.1	13.5	9.9	11.2
	MMBF/Yr.	82.0				
Estimated Salvage	MMCF/Yr.	0.8	0.5	0.2	0.2	0.2
	MMBF/Yr.	4.0				
Harvest Prescriptions						
Uneven-aged						
Selection	M Acres/Yr	6.2	5.4	5.9	5.5	6.0
Even-aged						
Clearcut	M Acres/Yr	.9	2.0	2.0	2.8	2.7
Shelterwood	M Acres/Yr	2.1	3.5	1.6	.4	.3
Overstory removal on existing stands	M Acres/Yr	5.3	3.2	0	0	0
Commercial Thin	M Acres/Yr	1.3	2.4	6.7	1.6	7.9
Reforestation	M Acres/Yr	3.0	2.5	3.6	3.3	3.0
Timber Stand Improvement	M Acres/Yr	5.4	5.4	8.3	7.2	8.9

Desired Future Condition

In Ten Years

Forest stands will provide the raw material for industry as well as the setting for a variety of recreational experiences, and habitat for native wildlife species. Most of the harvest will still be coming from mature stands, but second growth stands will be providing small amounts, mainly from ponderosa pine. Many of the existing two-story stands (predominately ponderosa pine) will have had selection cutting. Clearcuts will be more common on mixed conifer (predominately fir species), and more young plantations will be visible. Sufficient acres of habitat for defoliators will be existing and will maintain the risk of an epidemic of spruce budworm or tussock moth. Commercial thinning in immature pine stands will be increasing, with an emphasis on prevention of bark beetle damage, but the risk of damage from mountain pine beetle will be reaching a peak in overstocked stands across the Forest. Ripping or cultivation may be needed to reduce soil compaction in existing stands.

Fifty Years and Beyond

Nearly all existing mature or two-story pine stands in the MA-F22 General Forest area will have had selection cuts or an overstory removal, and possibly a commercial thinning. Timber harvest will be coming from remaining mature stands and early commercial thinnings; the only overmature stands will be in wilderness and roadless areas, research natural areas, designated old growth habitat stands, portions of riparian areas, and portions of visual corridors. Most stands in General Forest will be under 130 years old and will be in a managed even-aged or uneven-aged condition. Ponderosa pine will be the major species, followed by western larch, lodgepole pine, Douglas-fir, white fir, and Engleman spruce. Except for pine climax types, nearly all stands will have a mixture of species. Hardwoods such as cottonwood, aspen, alder and willow will be more common than today along streams, meadows and wet areas. Most stands that are presently sapling or pole size will have had one or more commercial thinning, and some will be approaching a final harvest. Two-thirds of the mixed conifer stands will be in a managed even-aged condition from 0 to 60 years of age. All managed stands will be near optimum stocking level for the given management area; risk of damage from most insects and diseases will be reduced below today's level. Cultural activities, such as planting, thinning, and possibly pruning and fertilization, may be seen throughout much of the Forest. The Forest tree improvement program will have identified families best adapted to specific sites and conditions, seedlings from these families will be used in most plantations. A designated skid trail and landing system will be in place and used for most logging operations. Desired levels of snags and down woody material will exist on all timber stands. Soil compaction and disturbance will be within established guidelines.

Transportation System



Goal(s)

Plan, design, operate and maintain a safe and economical transportation system that provides efficient access for the movement of people and materials involved in the use and protection of the National Forest lands.

Objectives

Improve, expand, and maintain the road system to support other resource objectives in accordance with road management objectives, available funding to achieve economy, user safety, and resource protection.

New roads will be constructed to support timber management; some existing roads will be closed on a seasonal or yearlong basis due to structural limitations of the road, safety, or other resource considerations (such as those to meet wildlife needs or off-road vehicle (ORV) travel management needs). Ultimately, the road system will total 5478 miles, an increase of 20 percent over present mileage. By the year 2015, 63 percent of the new mileage will be completed; 81 percent will be completed by the year 2035. Roads will be constructed in roadless areas released from roadless management. Others will replace present low standard roads that are unsafe, causing resource damage, or that do not meet resource management needs. Unneeded roads will be obliterated and revegetated. The majority of the arterial and collector system is established; however, dollars will be allocated annually to maintain, restore to original design capacity, or increase the design capacity of the existing system. See Appendix A11 for proposed road construction and reconstruction schedule.

The miles of road open to passenger vehicles (Maintenance Level 3-5) and high clearance vehicles (Maintenance Level 2), and the miles closed seasonally or yearlong are shown in Table 4-25 and in Appendix D. At the end of the first decade, 67 percent of the Forest development road system will be open and unrestricted for passenger car or high clearance vehicle use, decreasing to 59 percent by the end of the fifth decade as additional road miles are closed on a seasonal or yearlong basis.

Table 4-25

Resource/Activity	Unit of Measure	Decade				
		1st	2nd	3rd	4th	5th
F.S. Roads, Open and Maintained, Total	Miles	4734	4935	5132	5231	5304
Passenger Car Use, Open and Maintained	Miles	844	850	850	850	850
High Clearance Use, Open and Maintained	Miles	2332	2210	2217	2221	2269
Closed, Seasonally or Yearlong	Miles	1558	1875	2065	2160	2185

Desired Future Condition

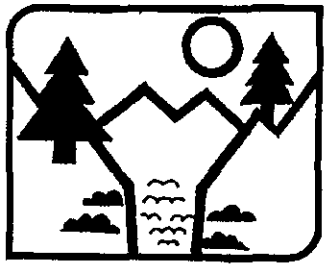
In Ten Years

The principal access roads will be readily identifiable; they will have paved or gravel surfaces and will be suitable for passenger car use. Signs will assist the traveler in finding their destination. The other roads will appear rough or primitive, but most will be available for use by the more experienced traveler. Some will be closed with gates or signs.

Fifty Years and Beyond

Most of the principal road systems will be completed and have paved or improved surfaces. A few may have State Highway designations. Most other roads will be either closed, restricted, or visually inviting to only the high ground clearance type vehicles used by the more seasoned forest traveler.

Water



Goal(s)

Maintain or improve water quality, quantity, and timing of run-off.

Comply with the objectives of the "Clean Water Act" and Oregon State water quality standards.

Provide water of consistently high quality to users and dependent resources.

Objectives

Maintenance or improvement of water quality can best be achieved through proper management of entire watersheds at all times, with special attention given to riparian areas.

Threshold values have been established to disperse harvest activities optimally over the Forest land base (see Soil and Water Standards and Guidelines, Section 3, this chapter). They also serve as benchmarks against which to measure the risk of experiencing a major climatic event in conjunction with a watershed condition or sensitivity that has the potential to result in long-term impacts to stream channels and therefore, to water quality. In Table 4-26, threshold values for individual watersheds have been combined into one average value for the Forest, which is 30.1 percent. No increases in the amount of disturbance above this threshold value have been predicted over the next five decades. More detailed analysis at the individual watershed level has indicated that threshold values may be exceeded on some watersheds, a situation that can be corrected by rescheduling or relocating harvest activities within other watersheds.

A long-term Forest objective is to maintain or improve all riparian areas to "excellent condition." Currently, 9,100 acres (roughly half) of the Forest riparian areas are in excellent condition. The remaining areas are scheduled for improvement over time. As can be seen in Table 4-26, a large portion of the needed improvement work will be completed in the first decade, even though recovery to full biological potential may require 20 to 60 years. See Section 2, Management Area Prescriptions, this chapter, for desired future condition of Management Area F15, Riparian Areas, and Appendices A12 and A15 for schedules of activities to achieve riparian area objectives.

Water quantity outputs shown in Table 4-26 are not the result of any specific proposals to increase run-off, but reflect instead the surface water leaving the Forest as a result of natural run-off, and any increased run-off expected to result from the manipulation of vegetation (mainly timber harvesting). Year to year variations in precipitation are likely to obscure any increase or decrease in run-off resulting from management activities.

Table 4-26

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Water Quality Watershed Condition	Percent Above Threshold	0	0	0	0	0
Watershed/Riparian Improvement	Acres/Yr.	319	50	50	50	50
Total in Excellent Condition	M Acres	10.0	11.2	12.7	15.1	17.5
Water Yield	M Acre Feet/Yr.	57.5	56.3	56.4	55.7	56.7

Desired Future Condition

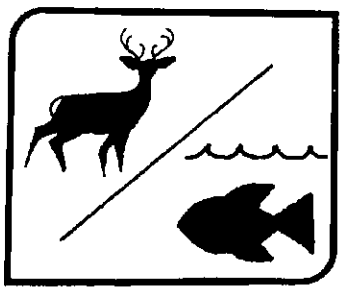
In Ten Years

Individual watersheds on the Forest that are currently in excellent condition are expected to remain so. Activities will be monitored and those watersheds not presently in good condition are scheduled for first priority improvements, but it may take decades before the entire watershed and riparian areas are fully functional again (as intended). The chances of a major storm event causing severe impacts will be even less than today. No significant increases in run-off for the Forest are expected.

Fifty Years and Beyond

It is expected that 90 to 95 percent of the riparian areas on the Forest will be in "excellent condition" by the end of the fifth decade. Additional research and monitoring of watersheds will have resulted in a situation where outputs of Forest resources (mainly timber) may be produced at levels explicitly tied to watershed condition, accounting for yearly and decadal variations in weather patterns and major storm events. Run-off of water is limited by total Forest acres and no significant increases are anticipated.

Wildlife and Fish



Goal(s)

Identify existing populations of any threatened, endangered, or sensitive species and maintain or improve their habitats.

Provide, manage and improve fish and wildlife habitats to maintain viable populations of existing native and desired non-native vertebrate species, including threatened, endangered, and sensitive species.

Objectives

Population management objectives as established by the Oregon Department of Fish and Wildlife (ODFW) are 18,300 for deer and 2,600 for elk on the Forest. The Ochoco National Forest objective is to manage the habitat to meet these population objectives to the extent practical. Populations of deer and elk are limited by habitat capability, which changes over time in response to vegetation manipulation and open road density (see Wildlife and Fish, Forest-wide Standards and Guidelines, for discussion on Habitat Models).

Wildlife habitat improvement will include items such as: prescribed burning, road closures, snag replacement, seeding, planting, mechanical treatment of woody browse species, grasses to improve summer and winter ranges for big game, and protection and improvement of special habitats such as springs, wet meadows, riparian, and aspen communities.

Fish habitat improvements will include rock and log weir installation, large woody debris and boulder placement, juniper rip-rap, riparian fencing, and planting shrubs and trees to restore shade and provide bank protection and stabilization.

Projections for anadromous fish production are derived from smolt habitat production estimates. Fish habitat is a function of both instream condition, and overall condition of the particular watershed.

Habitat for old growth dependent wildlife species is provided in mostly contiguous, allocated stands of old growth ponderosa pine and mixed conifer across the Forest, as well as that provided in wilderness, roadless areas and research natural areas. Other old growth which exists across General Forest and other special management areas, is not generally considered suitable habitat for major indicator species (pileated woodpecker), mainly because of stand size requirements. Even though the total acres of existing old growth will decline over the five decade planning horizon, a long-term allocation of 19,250 acres, as well as 30,300 unallocated acres in wilderness, research natural areas and unroaded areas will ensure maintenance of suitable habitat for the species. In addition, 19,250 acres of supplemental feeding areas surrounding each old growth block will be provided. See Table 4-27 and Table 4-16, with footnote 1/.

Table 4-27

Resource/Activity	Unit of Measure	Decade 1st	2nd	3rd	4th	5th
Deer Population	M Numbers	18.3	18.3	18.3	18.3	18 3
Elk Population	M Number	3.0	2.9	2.9	2.8	2 6
Wildlife Habitat Improvement [1/]	M Acres/Yr	.5	.4	.3	.2	.1
Fish Production (Yearly)						
Anadromous	Smolt Habitat Capability Index (M Smolt)	121.00	136.0	164.0	192.0	220.0
Resident	M Numbers	783.9	1105.0	1639.0	2707.0	2707.0
Fish Habitat Improvement [1/]	Acres/Yr.	639	50	50	50	50
Snag Habitat for Cavity Nesters (Average Across the Forest)	Percent of Potential	47	49	51	55	54
Habitat for Old Growth Dependent Species						
Allocated Old Growth	M Acres	19.3	19.3	19.3	19.3	19.3
Supplemental Feeding Areas	M Acres	19.3	19.3	19.3	19.3	19.3
Unallocated Old Growth [2/]	M Acres	30.3	30.3	30.3	30.3	30.3
Total Habitat [3/]	M Acres	68.9	68.9	68.9	68.9	68.9

[1/] Shown as acres, but is actually a combination of acres and numbers of structural improvements.
[2/] These occur in wilderness, roadless and research natural areas
[3/] Assumes 60 percent occupancy by dependent species, which may or may not occur at any one time

Desired Future Condition

In Ten Years

In ten years, habitat capability on the Forest will continue to exceed that needed to meet Oregon Department of Fish and Wildlife objectives for both deer and elk, based on current modeling procedures and assumptions. Cover is expected to become the limiting habitat factor for big game, especially elk, and will be

declining over time, but decreased open road density and increases in habitat enhancement in winter range and general forest areas are expected to compensate for the cover loss.

As a result of fish habitat improvement and watershed/riparian restoration (see objectives for Water), relatively high populations of both anadromous and resident fish are expected to be available after ten years (as shown in Table 4-27).

The amount of snag habitat across the Forest will remain at current levels Forest-wide. The amount will vary by management area, ranging between 40 and 100 percent of the number needed to support the potential populations of primary cavity excavators. Forest-wide, snag habitat will average about 47 percent in ten years.

In ten years, approximately 68,900 acres of habitat will be available for old growth dependent wildlife species (pileated woodpecker). This includes 19,250 acres of old growth allocated across the Forest, plus 30,300 acres unallocated but available in wilderness, roadless areas, and research natural areas. Supplemental feeding areas (also 19,250 acres), not specifically meeting old growth definitions, will also be available in close proximity to actual, allocated old growth stands.

Fifty Years and Beyond

It is less certain that current ODFW objectives for both deer and elk can be met, due to expected decreases in overall cover across the Forest. It must be noted however, that ongoing research on habitat needs will provide management with better data than is currently available to project population estimates and to balance overall resource objectives. The estimates shown in Table 4-27 for fifty years and beyond are based on current models which are considered insufficient to predict accurate numbers of big game. These models are the best available at the present time.

As a result of fish habitat capability improvement (including watershed/riparian restoration), both anadromous and resident fish numbers are expected to increase in fifty years (as shown in Table 4-27).

The number of snags will actually increase Forest-wide, to an average of about 54 percent of potential. The estimated large acreage of ponderosa pine stands that are currently snag deficient, will be managed to provide levels of 40 percent or greater, along with other management areas at even higher rates.

Barring a major natural catastrophe, habitat for old growth dependent wildlife species will remain about the same as is available today (68,900 acres). Species using these areas will be more limited in terms of movement and selection; a large portion of the habitat will be in isolated stands scattered across the Forest.

TABLE 4-28
SUMMARY TABLE OF
AVERAGE ANNUAL OUTPUTS BY DECADE

	DECADE							
Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th	NAS CODE	REMARKS
AIR QUALITY								
TSP Generation by Prescribed Fire	M Tons/Yr	7.4	7 0	6 4	4 2	5 4	FA1	TSP-Total Suspended Sediments
BIOLOGICAL DIVERSITY								
Riparian Areas in Excellent Condition	M Acres	10 0	11 2	12 7	15 1	17 5	CF2	
Riparian Areas Designated For Connective Habitat	M Acres	1 0	1 0	1 0	1 0	1 0	CW112	
Snag Habitat for Cavity Nesters (Average Across the Forest)	Percent of Potential	47	49	51	55	54	CW112	
Old Growth (Allocated plus Unallocated)	M Acres	93 8	83 9	74 2	64 5	55 1	CW112	
Acres of forested land by Successional Stage 1/								
Stage I and II	M Acres	9	30	26	37	34	NA	Stagel-/Grass Forb
Stage III	M Acres	151	151	30	56	63	NA	Stage II-Shrub
Stage IV	M Acres	184	192	333	160	190	NA	Seedling Stage
Stage V	M Acres	134	115	109	255	230	NA	Stage III-Pole
Stage VI	M Acres	94	84	74	64	55	NA	Sapling Stage IV-Young Stage V-Mature Stage VI-Old Growth
Acres of non-forest land by Plant Community Type								
Timberline Meadows	M Acres	3	3	3	3	3	NA	
Meadows	M Acres	9	9	9	9	9	NA	
Juniper Dominant	M Acres	57	57	57	57	57	NA	
Grass Dominant	M Acres	5	5	5	5	5	NA	
Sagebrush Dominant	M Acres	38	38	38	38	38	NA	
Biscuit Root-Scabland	M Acres	7	7	7	7	7	NA	
CULTURAL RESOURCES								
Sites Documented	Number/Yr	120	100	80	70	60	AC111	
Sites Enhanced/Interpreted	Number/Yr	3	3	3	2	2	AC111-1	
Nat'l Register Nomination	Num/ Decade	2	2	2	2	2	AC122	
FACILITIES								
Construction and Improvements (Reconstruction)	Number	27	N/A	N/A	N/A	N/A	HJ231	

Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th	NAS CODE	REMARKS
FIRE								
Wildfire Effectiveness Index	$/1000 Ac protected	715	715	715	715	715	PF114	
Prescribed Burning								
Natural & Activity Fuels	M Acres/Yr	24 6	25 2	24 9	19 7	25 6	PF24 & PF25	
FORAGE								
Forage Production	M AUM's/Yr	58	62 5	66 6	63 9	65 6	DN2	AUM Fluctuations Due to Transitory Range
Structural Improvements								
Fencing	Miles/Yr	35 7	0	0	0	0	DN221	
Fencing Removal	Miles/Yr	3 0	0	0	0	0	DN221	
Water Developments	Number/Yr	14 0	0	0	0	0	DN221	
Nonstructural Improvements								
Juniper Removal	Acres/Yr	796	0	0	0	0	DN222	
Range Burning for Forage Enhancement	Acres/Yr	4072	4072	4072	4072	4072	DN222	
Wild Horses	Number	60	60	60	60	60	DW	
FOREST HEALTH								
Integrated Pest Mangement Strategies								
Manual	Acres/Yr	100	100	100	100	100	QC	
Mechanical	Acres/Yr	200	200	200	200	200	QC	
Biological	M Acres/Yr	100	100	100	100	100	QC	
Chemical	Acres/Yr	200	200	200	200	200	QC	
FOREST RESIDUES								
Pretreatment Residues	MM Tons	20 0	18 9	18 2	16 6	17.1	FW111-1	
Minimum Site Requirements	MM Tons	10 4	10 4	10 4	10 4	10 4	FW111-1	
Excess Residues	MM Tons	9 6	8 5	7 7	6 2	6 7	FW111-1	
Activity		4 3	4 2	3 8	2 2	3 3	FW111-1	
Natural		5 3	4 3	3 9	4 0	3 4	FW111-1	
Excess Residues Removed	MM Tons	5 3	5 1	4 6	2 9	3 9	FW111-1	
Activity		4 2	4 2	3 8	2 2	3 3	FW111-1	
Natural		1 1	0 9	0 8	0 7	0 6	FW111-1	
Excess Residues Remaining	MM Tons	4 3	3 4	3 2	3 3	2 7	FW111-1	
Total Residues Remaining	MM Tons	14 7	13 8	13 6	13 7	13 1	FW111-1	
FUELWOOD								
Fuelwood	M Cords/Yr	13	12	11	11	11	ET124	
LANDS								
Special Use Permits	Number	48	54	60	60	60	JL122-1	

Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th	NAS CODE	REMARKS
MINERALS AND ENERGY Oil and Gas	M Ac Leased	140	670	400	270	140	GM1	
Geothermal	Acres Leased	0	0	0	0	0	GM1	
Locatable (Gold, Mercury, Silver, etc) Lode Claims Placer Claims Tunnel Site Claims	 Number Number Number	 981 31 10	 1,000 30 0	 1,000 30 0	 1,000 30 0	 1,000 30 0	 GM1 GM1 GM1	
Common Variety (Gravel, Cinders, etc)	M Cubic Yards/Yr	85	85	85	85	85	GM1	
OLD GROWTH Allocated Old Growth For Dependent Species	M Acres	18 0	18 0	18 0	18 0	18 0	CW11	Does not include 1,270 acres capable
Unallocated Old Growth in Wilderness, Roadless & Research Natural Areas Limited Harvest Areas Full Harvest Areas	 M Acres M Acres M Acres	 30 3 6 8 38 7	 30 3 6 3 29 3	 30 3 5 8 20 1	 30 3 5 3 10 9	 30 3 4 8 2 0	 CW11 CW11 CW11	
Total Old Growth	M Acres	93 8	83 9	74 2	64 5	55 1	CW11	
RECREATION Developed Area Supply	M/RVD's	159 4	159 4	159 4	159 4	159 4	AN111	
Projected Use	M/RVD's	116 1	130 5	143 0	156 6	159 4	AN111	
Dispersed Supply Roaded Unroaded Wilderness	M/RVD's 1220 2 44 0 25 7	 1220 2 44 0 25 7	 1220 2 44 0 25 7	 1220 2 44 0 25 7	 1220 2 44 0 25 7	 AN111 AN111 AN111		
Dispersed Use Projected Roaded Unroaded Wilderness	M/RVD's 262 4 32 2 16 3	 288 8 35 3 17 8	 312 2 38 5 19 2	 337 6 42 0 21 0	 365 0 44 0 22 9	 AN111 AN111 AN111		
Hunting Use	M/RVD's	158 2	155 8	156 8	155 4	151 0	AN111	Included in Recreation MRVD's above
Fishing Use	M/RVD's	61 7	71 8	74 0	76 4	79 2	AN111	
Summer Use Trails Nonmotorized Construct/Reconstruct	 Miles Mi /Yr	 283 7 18 7	 468 6 18 5	 468 6 0	 468 6 0	 468 6 0	 AT2 AT2	
ATV (Motorized) Construct/Reconstruct	Miles Mi /Yr	95.0 9 5	190 0 9 5	190 0 0	190 0 0	190 0 0	AT2 AT2	

Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th	NAS CODE	REMARKS
Total Summer Trails	Miles	378 7	563 6	563 6	563 6	563 6	AT2	
Winter Use Trails								
Cross-Country Skiing	Miles	109 0	149 0	149 0	149 0	149 0	AT2	
Construct/Reconstruct	Mi /Yr	10 0	4 0	0	0	0	AT2	
Snowmobile	Miles	285 0	325 0	325 0	325 0	325 0	AT2	
Construct/Reconstruct	Mi /Yr	21 0	4 0	0	0	0	AT2	
Total Winter Trails	Miles	394 0	474 0	474 0	474 0	474 0	AT2	
SCENIC								
Preservation	M Acres	42	42	42	42	42	AV1	
Retention	M Acres	85	85	85	85	85	AV1	
Partial Retention	M Acres	50	50	50	50	50	AV1	
Modification and Maximum Modification	M Acres	668	668	668	668	668	AV1	
SOCIAL AND ECONOMIC								
Social							N/A	
Changes in Jobs	Number	109	N/A	N/A	N/A	N/A		
Changes in Income	Million$	1 6	N/A	N/A	N/A	N/A		
Economic								
Total National Forest Planned Budget	Million $	10 2	9 3	9.4	9 8	9 7		
Returns to Government	Million $	19 4	22 3	20 8	19 5	21 5		
Present Net Value		475 0	N/A	N/A	N/A	N/A		
Payments to Counties		4 9	N/A	N/A	N/A	N/A		
SOILS								
Soil Loss (erosion)	M Tons/Yr	1 7	1 5	2 0	9	1 9	F111-1	
Tillage for Compaction at 20 Percent Level (Maximum Allowed)	M Acres/Yr	1 7	1 3	2 0	8	1 8		
Tillage at 10 Percent Level (Forest Goal)	M Acres/Yr	3 0	2 3	3 6	1 4	3 2		
TIMBER								
Long-term Sustained Capacity	MMCF/Yr	19 0	19 0	19 0	19 0	19 0	ET114	
Allowable Sale Quantity								
All Species	MMCF/Yr	19 0	19 0	19 0	19 0	19 0	ET114	
	MMBF/Yr	115 0					ET114	
Ponderosa Pine Only	MMCF/Yr	13 7	13 1	13 5	9 9	11 2	ET114	
	MMBF/Yr	82 0					ET114	
Estimated Salvage	MMCF/Yr	0 8	0 5	0 2	0 2	0 2	ET114	
	MMBF/Yr	4 0						
Harvest Prescriptions								
Uneven-aged Selection	M Acres/Yr	6 2	5 4	5 9	5 5	6 0	ET114	

Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th	NAS CODE	REMARKS
Even-aged								
Clearcut	M Acres/Yr	9	20	20	28	27	ET114	
Shelterwood	M Acres/Yr	21	35	16	4	3	ET114	
Overstory removal on existing stands	M Acres/Yr	53	32	0	0	0	ET114	
Commercial Thin	M Acres/Yr	13	24	67	16	79	ET114	
Reforestation	M Acres/Yr	30	25	36	33	30	ET24	
Timber Stand Improvement	M Acres/Yr	54	54	83	7.2	89	ET25	
TRANSPORTATION SYSTEM								
Passenger Car Use								
Open and Maintained	Miles	844	850	850	850	850	LT1	
High Clearance Use								
Open and Maintained	Miles	2332	2210	2217	2221	2269	LT1	
Closed, Seasonally or Yearlong	Miles	1558	1875	2065	2160	2185	LT1	
TOTAL Forest Service Roads								
Open and Maintained	Miles	4734	4935	5132	5231	5304	LT1	
WATER								
Water Quality								
Watershed Condition	Percent Above Threshold	0	0	0	0	0	FW1	
Watershed/Riparian Improvement	Acres/Yr	319	50	50	50	50	FW1	
Total in Enhanced Condition	M Acres	10 0	11 2	12 7	15.1	17 5	FW1	
Water Yield	M Acre Feet/Yr	57 5	56 3	56 4	55 7	56 7	FW1	
WILDLIFE AND FISH								
Deer Population	M Numbers	18.3	18 3	18 3	18 3	18 3	CW11	
Elk Population	M Numbers	30	29	29	28	26	CW11	
Wildlife Habitat Improvement	M Acres/Yr	5	4	3	2	1	CW222	
Fish Production (Yearly)								
Anadromous	Steelhead Habitat Capability Index (M Smolt)	121 0	136 0	164 0	192 0	220 0	CF11	
Resident	M Numbers	783 9	1105 0	1639 0	2707 0	2707 0		
Fish Habitat Improvement	Acres/Yr	639	50	50	50	50	CF221	
Snag Habitat for Cavity Nesters (Average Across the Forest)	Percent of Potential	47	49	51	55	54	CF112	
Habitat for Old Growth Dependent Species								
Allocated Old Growth	M Acres	19 3	19 3	19 3	19 3	19 3	CF112	
Supplemental Feeding Areas	M Acres	19 3	19 3	19 3	19 3	19 3	CF112	
Unallocated Old Growth	M Acres	30 3	30 3	30 3	30 3	30 3	CF112	Occurs in Wilderness, etc
Total Habitat	M Acres	68 9	68 9	68 9	68 9	68 9	CF112	

Chapter 4

Forest Management Direction

Section 2

Management Area Prescriptions

Chapter 4

Section 2

Management Area Prescriptions

A management area is composed of lands with similar capabilities or characteristics, and is allocated to emphasize a particular resource or mix of resources. The lands may or may not be contiguous.

All areas of the Ochoco National Forest are managed under the Forest-wide standards and guidelines described in Section 3, and by broader multiple use principles directed by laws, regulations, and policies.

Within this broad multiple use guidance, each management area emphasizes a specific resource or mix of resources. For example, in the Winter Range Management Area (MA-F20), production of big game wildlife species will be emphasized, even though a variety of other compatible uses can occur.

In this section of Chapter 4, 28 management areas are presented to provide the reader with the physical description, management emphasis, and desired future condition of each area Management area standards and guidelines are described in conjunction with Forest-wide standards and guidelines in Section 3.

Table 4-29 contains a list of the 28 Management Areas for the Alternative I (Preferred). Also shown are the acres allocated to each area; acres are mutually exclusive--management areas do not overlap. Locations of the management areas are displayed on the map for Alternative I (Preferred). Individual maps for each management area are located at the end of this section of Chapter 4.

TABLE 4-29
OCHOCO NATIONAL FOREST MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	Acres	% Total	Resource Emphasis
MA-F1 Black Canyon Wilderness	13400	2	Wilderness
MA-F2 Bridge Creek Wilderness	5400	<1	Wilderness
MA-F3 Mill Creek Wilderness	17400	2	Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area	1125	<1	Wilderness
MA-F5 Research Natural Areas	4400	<1	Research
MA-F6 Old Growth 1/	19250	2	Wildlife
MA-F7 Summit National Historic Trail	9560	1	Recreation
MA-F8 Rock Creek/Cottonwood Creek	11820	1	Recreation
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter	2480	<1	Timber/Range
MA-F10 Silver Creek Area	3110	<1	Recreation
MA-F11 Lookout Mountain Recreation	15660	2	Recreation
MA-F12 Eagle Roosting Areas	570	<1	Wildlife
MA-F13 Developed Recreation	1810	<1	Recreation
MA-F14 Dispersed Recreation	1970	<1	Recreation
MA-F15 Riparian	18130	2	Riparian
MA-F16 Bandit Springs Recreation	1580	<1	Recreation
MA-F17 Stein's Pillar Recreation	1070	<1	Recreation
MA-F18 Hammer Creek Wildlife/ Recreation	2560	<1	Wildlife
MA-F19 Deep Creek Recreation	770	<1	Recreation
MA-F20 Winter Range	64130	7	Wildlife
MA-F21 General Forest Winter Range	107360	12	Timber/Wildlife

Management Area	Acres	% Total	Resource Emphasis
MA-F22 General Forest	496850	59	Timber/Range
MA-F23 North Fork Crooked River Recreation Corridor	1830	<1	Recreation
MA-F24 North Fork Crooked River Scenic Corridor	830	<1	Recreation
MA-F25 Highway 26 Visual Corridor	6850	<1	Scenic
MA-F26 Visual Management Corridors	33260	4	Scenic
MA-F27 Round Mountain National Recreation Trail	1000	<1	Recreation
MA-F28 Facilities	460	<1	Facilities
TOTAL FOREST ACRES	844640	100	

1/ Includes 8 old growth units within wilderness, unroaded, and WSA

Modifying Management Areas or Prescriptions

The appropriate setting for each management area is determined by the management goals, objectives, desired conditions, and suitability of the area to achieve these conditions. When a project would result in conditions that do not meet these criteria, the need to modify the management area allocation should be addressed (see Chapter 5, Implementation of the Forest Plan). Evaluation of factors including activity extent, duration of impact, season of operation, sight or sound impacts, or feasibility of rehabilitation would be necessary. Cumulative modifications of management areas should not exceed those described in Chapter 5, Implementation of the Forest Plan.

During implementation, it may be discovered that a management area boundary was inaccurately or inappropriately mapped. In such a case procedures for adjusting boundaries will also follow direction in Chapter 5, Implementation of the Forest Plan (Amendment and Revision Process). Final boundary adjustments will be documented and integrated into the Forest data base by the initiating party.

MA-F1 Black Canyon Wilderness

13,400 acres, 2 percent of the Ochoco National Forest

Description

Black Canyon Wilderness contains approximately 13,400 acres and is located on the Paulina Ranger District. Black Canyon Creek drains into the South Fork of the John Day River and falls from 6,000 feet to 2,800 feet in elevation. It is characterized by steep sides and numerous north-south ridges with rolling to flat benches on the edges. Wolf Mountain and Dry Corner are on the south side. Bearskull Mountain is on the north side. The north facing slopes are covered with mixed conifers. The south facing slopes are predominantly ponderosa pine and juniper. The water produced by the watershed is used by livestock, wildlife, anadromous fish, and irrigation from the John Day River.



Emphasis

Protect the Wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

Desired Condition

The Black Canyon Wilderness will be as natural as is possible with reduced or little evidence of human activity. The area will be a place of natural settings with opportunities for solitude. Present road access and hunter caches and camps will

be rehabilitated to the point that their presence is no longer a dominant land feature. Recreational improvements, such as trailheads and access trails, will be evident where they are necessary to control use in order to preserve wilderness qualities. Livestock use will be evident but the successful application of allotment management requirements will also be evident.

Old growth stands will be evident within the management area along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality, resultant of past spruce budworm and other endemic insects and diseases, will be evident, along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning starts occur. (See Appendix H - Wilderness Plans.)

MA-F2 Bridge Creek Wilderness

5,400 acres, less than one percent of the Ochoco National Forest

Description

The Bridge Creek Wilderness, established as a result of the Oregon Wilderness Act of 1984, is managed by the Big Summit Ranger District, Ochoco National Forest. The 5,400 acre wilderness is located in the north central portion of the District.

The topography is benchy, with densely forested slopes, open meadows and some scab flats. Elevations range from 4,700 feet to 6,600 feet. North Point at 6,607 feet is one of the higher peaks on the Ochoco National Forest and provides an outstanding viewpoint. Five springs lie within the area: Thompson, Pisgah, Masterson, Nelson and Maxwell. Bridge Creek and Maxwell Creek flow through the area. A historic diversion and ditch system will continue to exist and be maintained until the permittee no longer needs this to maintain the preexisting water rights.

Vegetation includes lodgepole pine, ponderosa pine, white fir, Douglas-Fir, western larch, sagebrush, snowberry, and other brush species.



Emphasis

Protect the Wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude. The area will be managed as a nontrailed wilderness where people can use their orientation skills.

Desired Condition

The Bridge Creek Wilderness area will be as natural as possible, with reduced or little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Existing roads will be rehabilitated so that its presence is no longer a dominant land feature Recreational improvements, such as trailheads and access trails, will not be evident, but entry points will be signed where necessary to control use and to preserve wilderness qualities.

Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the management area along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality resultant of past Mountain Pine Beetle infestations, and other endemic insects and diseases, will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural lightning starts occur. (See Appendix H - Wilderness Plans.)

MA-F3 Mill Creek Wilderness

17,400 acres, two percent of the Ochoco National Forest

Description

On June 26, 1984, President Reagan signed the Oregon Wilderness Act, and the 17,400 acre Mill Creek Wilderness was created; it is now managed by the Prineville Ranger District. The area is represented by all exposures but is predominately southern. Elevations range from 3,725 feet to 6,240 feet above sea level. The terrain varies from the rugged, rocky cliffs of Desolation Canyon to the flat meadows of Bingham Prairie. Spectacular rock outcrops are present at Twin Pillars and Whistler Point. The Wilderness is within the southwestern extension of the Blue Mountains physiographic unit. Bedrock consists predominantly of older volcanic basalts and pyroclastic sediments. Formations consist of flows, domes, and breccia. Hard basalt forms the steep slopes, ridges, and domes while softer rock dominates the toeslopes, basins, and benches.

Emphasis

Protect the Wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude.

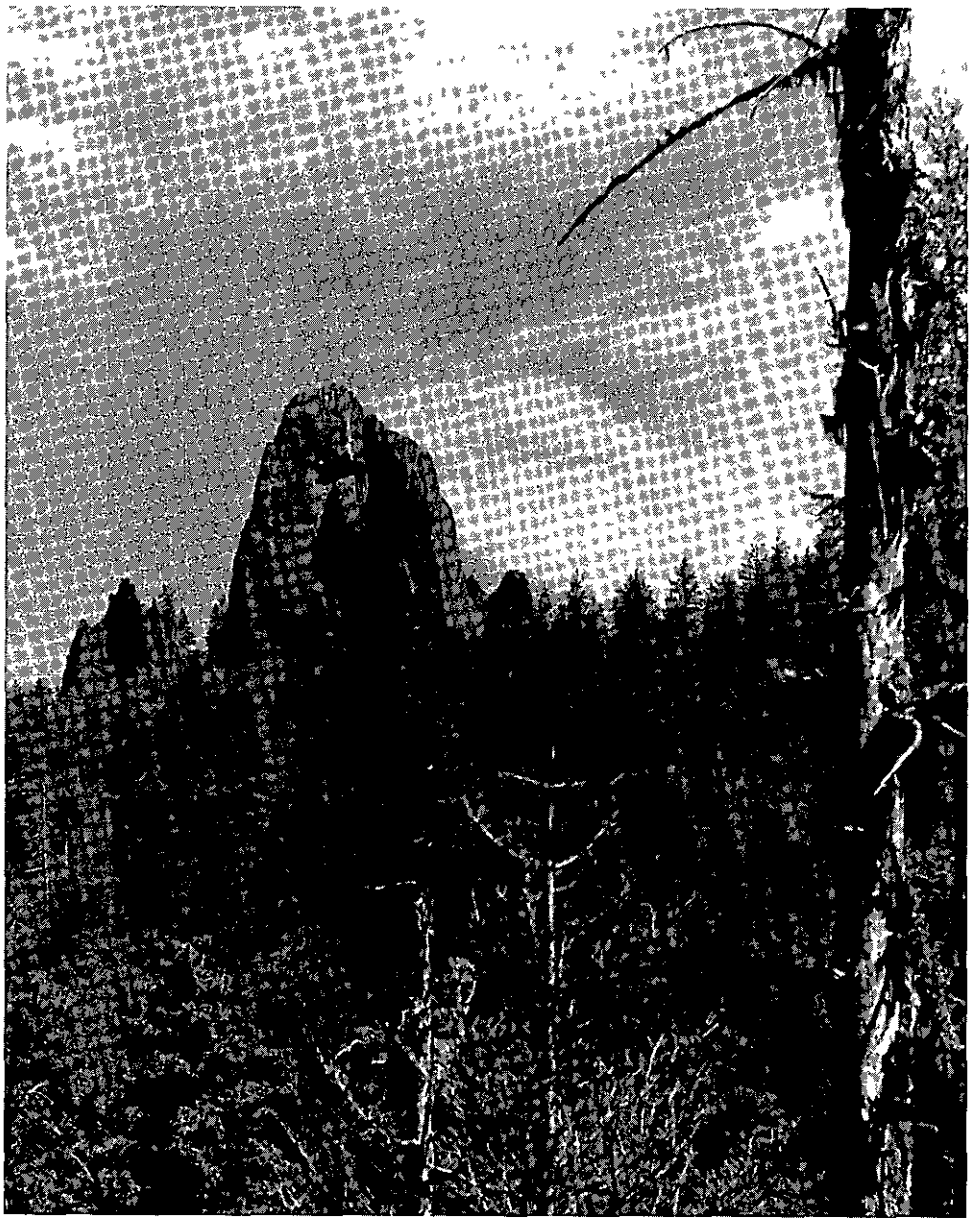
Desired Condition

The Mill Creek Wilderness area will be as natural as is possible with reduced or little evidence of human activity. The area will be a place of natural settings where solitude may be sought. Any existing road will be rehabilitated to the point that its presence is no longer a dominant land feature. Recreation improvements such as trail heads and access trails will be evident where necessary to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident.

Old growth stands will be evident within the management area along with those wildlife species dependent on old growth habitat in the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

Tree mortality resultant of past mountain pine beetle and other endemic insects and diseases will be evident along with associated changes in fuel loadings and plant succession. Fuel loadings will become very significant along the south side of Forest Road 27 within the Wilderness and will pose a serious fire risk. Fire occurrence will be evident where natural lightning and human-caused starts occur. There may be planned ignitions to achieve wilderness objectives.

Minerals activities on valid mining claims will be evident along with authorized access under approved plans of operation. (See Appendix H - Wilderness Plans.)



MA-F4 North Fork Crooked River Wilderness Study Area

1,125 acres, less than one percent of the Ochoco National Forest

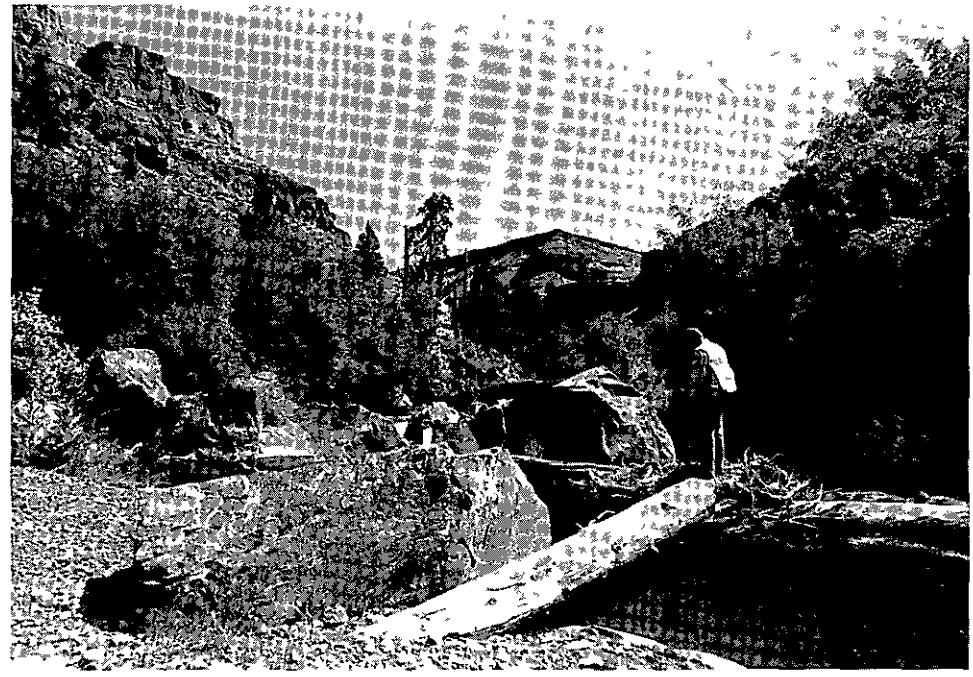
18 percent forested, 82 percent nonforested

Description

The North Fork of the Crooked River Wilderness Study Area includes areas centered on Indian Trail Creek and Fox Canyon Creek which abut BLM land along the North Fork of the Crooked River.

The majority of the area is covered in scabland, although there are islands and stringers of ponderosa pine and juniper stands located along streams on favorable aspects (north facing slopes), and where there are deeper soils than is typical of the area. Part of the area (approximately 300 acres) has been allocated as old growth for dependent species

Primary recreational uses of the area are dispersed camping, hunting, and fishing.



Emphasis

Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress, or until released from further consideration.

Desired Condition

The wilderness study area will be as natural as possible with reduced evidence of human activity. The area will be a place of natural settings where solitude may be sought. Existing roads and hunter caches and camps will be rehabilitated. Recreation improvements, such as trail heads and access trails, will be evident where necessary, to control use in order to preserve wilderness qualities. Livestock use will be evident, but the successful application of allotment management requirements will also be evident. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures.

Old growth stands will be evident within the management area along with those wildlife species in the Ochoco National Forest dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat.

The Final Environmental Impact Statement for Wilderness by the BLM is scheduled to be published during the spring of 1989. If these areas are not designated wilderness by Congress, then for the remainder of this planning period, these areas will be managed under old growth, riparian, and general forest standards and guidelines.

MA-F5 Research Natural Areas

4,400 acres, less than one percent of the Ochoco National Forest

83 percent forested, 17 percent nonforested

Description

This management area includes the Ochoco Divide, Dry Mountain, Silver Creek, and Stinger Creek Research Natural Areas (RNA's). RNA's represent both common and unique forest and rangeland ecosystems in a natural state or as close to undisturbed as possible. The RNA's were designated to be large enough to protect features of interest from management activities on adjacent land.

The Ochoco Divide RNA is 2,035 acres in size and is located on the Big Summit District. It is forested with ponderosa pine, western larch, Douglas-fir, and grand fir in associations typical of the Ochoco National Forest. Approximately 880 acres are ponderosa pine forest, 880 acres are mixed conifer, 190 acres are meadows and grasslands, and 85 acres are juniper/mountain mahogany scabs. There are three drainages which run to the north, south and west. The Ochoco Divide RNA (established in 1935) is fenced to exclude cattle. A nonmaintained historic trail passes through this RNA.

Dry Mountain is approximately 1,187 acres in size and is located on the Snow Mountain Ranger District, 27 miles northwest of Burns/Hines. It includes approximately 679 acres of ponderosa pine forest and 508 acres of nonforest and noncommercial woodland (juniper, mountain mahogany). This area is currently grazed.

Silver Creek is approximately 844 acres in size and is located on the Snow Mountain District, 26 miles northwest of Burns. It includes 758 acres of ponderosa pine forest, and 86 acres of dry to wet associated meadow land. Silver Creek is currently grazed.

Stinger Creek is approximately 453 acres in size and is located on the Snow Mountain District, approximately 24 miles northwest of Burns. It includes 355 acres of ponderosa pine forest and 98 acres of nonforest land. This area is currently grazed.

Emphasis

Allow natural processes to occur for research purposes and education. These processes will provide: baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species



Desired Condition

Natural conditions will be observed. Any management activities within the RNA's will be directed at maintaining the natural conditions of the area. Human-caused changes to the ecosystem will not be readily evident. Continuing baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural and human-caused fire starts occur.

There is a high probability that grazing will not be evident, but this is still to be determined through the official designation (RNA) process.

MA-F6 Old Growth

19,250 acres, two percent of the Ochoco National Forest.

81 percent forested, 19 percent nonforested

Description



Approximately 19,250 acres of old growth are located across the Forest (outside of wilderness and research natural areas) in stands of mixed conifer and ponderosa pine, averaging 300 acres in saze. An additional 19,250 acres of "feeding areas," averaging 300 acres in size, are to be located in areas adjacent to the old growth stands. In combination, these two systems comprise a "habitat area."

Most of the old growth stands show very few signs of past management and represent uninterrupted succession for major plant community types on the Forest. Due to distributional needs, less than seven percent of the allocated acres are in a "capable" condition, i.e. they are in a younger vegetational stage and are not currently "suitable" as old growth habitat. A multilayered canopy with shaded conditions and a large number of dead snags per acre is considered "optimum" for old growth habitat.

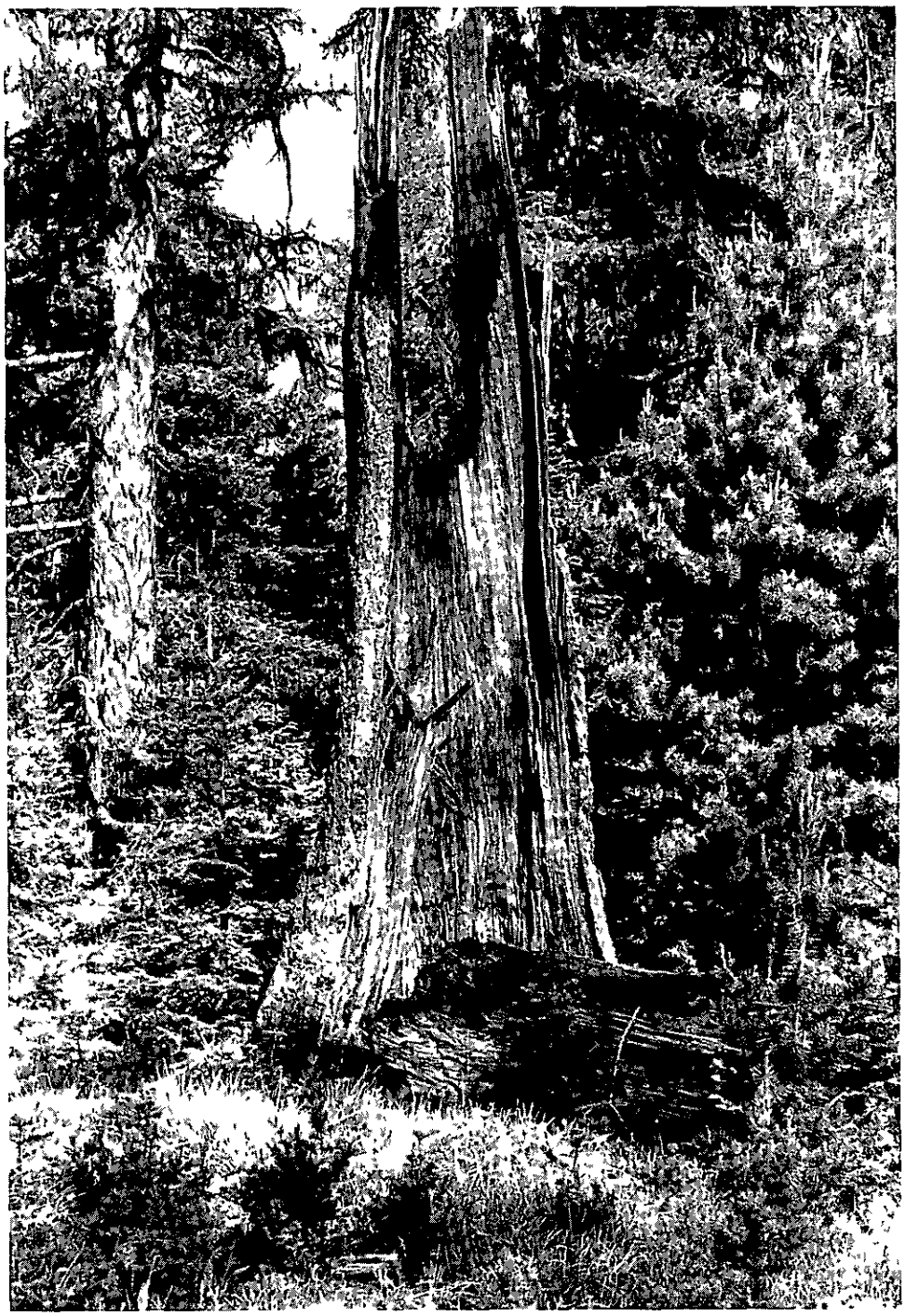
The surrounding feeding habitats provide supplemental snags at relatively high levels (about 90 percent), but are continuous 300 acre areas. These will be located within a 1,000 acre area surrounding each allocated old growth area.

Emphasis

Provide habitat for wildlife species dependent on old growth stands.

Desired Condition

Stands of old growth are not expected to change significantly over the next ten to fifty years, barring a natural catastrophe. They will continue to provide habitat for a number of dependent wildlife species, such as the pileated woodpecker, flying squirrel, white-headed woodpecker, as well as other nondependent species such as deer and elk. This habitat may become more extensively used by these species as the majority of the forest moves towards a "managed condition." High levels of snag habitat will continue as individual trees within the stands die of old age, as well as from periodic infestations by insects and diseases. Management activities and roads will generally not be evident. Fire occurrence will be evident where natural and human-caused starts occur. Prescribed fire may be evident if natural fuels accumulate to dangerous levels, threatening the existence of the old growth stand, or where vegetation manipulation is needed to maintain stand structure and species composition. Grazing by livestock, as well as by big game wildlife species, may or may not be evident.



MA-F7 Summit National Historic Trail

9,560 acres, one percent of the Ochoco National Forest

170 acres - Preservation

5,600 acres - Retention

3,790 acres - Partial Retention

67 percent forested, 33 percent nonforested

Description

The Summit Trail is approximately 74 miles long and traverses the Ochoco National Forest through the Prineville, Big Summit and Paulina Ranger Districts. It was constructed as a pack trail by the U.S. Forest Service in the early 1900's, and was the primary east-west travel route in the Ochoco Mountains until the late 1930's. In the 1920's, lengthy segments of the original trail were widened for motor-vehicles, and subsequent alterations through road building and timber harvest have occurred Despite this, the entire route of the Summit Trail can still be traveled via a combination of foot, horseback, bicycle or motor vehicle.

The Summit Trail is considered a historic resource and was found eligible for nomination to the National Register of Historic Places in January 1987. The Summit Trail Report, a comprehensive survey and evaluation of the trail completed in 1986, also recommended combining this resource with the proposed East-West Intertie Trail (Forest Service, 1986) and/or the proposed New Oregon Recreational Trail (Sullivan, 1986). On January 15, 1988, a Decision



Notice and Finding of No Significant Impact for the Summit Trail was signed by the Ochoco National Forest Supervisor, and established the initial protection and management guidance for this area.

Emphasis

Protect the existing integrity of the Summit Trail. Enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities.

Desired Condition

The Summit Trail will be a place where Forest visitors can enjoy the cultural and recreational resources offered in a visually pleasing environment. The majority of the trail route is along developed roads and will provide pleasurable travel by highway vehicle, as well as by mountain bike and horse. Vegetation may appear manipulated in widely dispersed areas in order to enhance cultural and recreational resources, but will generally not dominate the landscape. Interpretive facilities such as signs and landmarks may be visible in unique, culturally significant areas.

The outer boundary of the management area will generally not exceed 600 feet on either side of the trail.

MA-F8 Rock Creek/Cottonwood Creek Area

11,820 acres, one percent of the Ochoco National Forest

65 percent forested, 35 percent nonforested

Description

These areas contain mature and old growth ponderosa pine and mixed conifer stands with a predominance of western larch and lodgepole pine. The stand ages and size classes are largely a function of past fires; these areas have had very little direct human-caused disturbance from timber harvest, mineral and energy development, or intensive grazing Slopes are generally steeper than 40 percent. In the Rock Creek drainage, there are extensive areas of scabland on steep slopes which result in some natural sheet erosion.

The area contains several important tributaries to the John Day River. Birch Creek and Rock Creek support significant trout and spawning steelhead populations.

The areas are generally summer and transitional range for deer and elk. There is an abundance of cover and consequently less than optimum forage distribution. Because of the relative inaccessibility of the area, it supports a higher proportion of trophy sized animals than in roaded areas to the south and north.

The area supports cattle and sheep allotments

There are several existing and proposed recreational trails, as well as cultural sites associated with early mining that occurred to the north of the Forest.



Recreational use of the area is currently light, consisting largely of hunting, fishing, horseback riding and hiking, and is presently limited by the existing access.

Emphasis

Provide protection of soil, water, and fisheries, and provide opportunities for nonmotorized recreational use and enjoyment. Maintain vegetation on steep slopes to prevent erosion, and to protect water quality and the anadromous fishery.

Desired Condition

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will occur, but the area will appear natural. These activities, along with any desired recreational improvements such as trails, will be the only visible impacts of direct human activities.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the management area along with those wildlife species in the Ochoco National Forest which are dependent on old growth habitat. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Structures may be constructed, or other work may be done to maintain or improve habitat for the anadromous fishery. The area will remain one where there are above average numbers of trophy sized elk and deer. Tree mortality, resultant of past spruce budworm infestations, and other endemic insects and diseases, will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural and human-caused starts occur.

MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter Area

2,480 acres, less than one percent of the Ochoco National Forest

70 percent forested, 30 percent nonforested

Description

This is a roadless area adjacent to Rock Creek/Cottonwood Creek Roadless Area. It includes those areas within Cottonwood, Birch and Payten Creeks which can be harvested by helicopter logging This area has not been harvested except for incidental amounts removed from along the Forest boundary on the north slope. This area is generally heavily forested with mixed conifer or ponderosa pine community types. The steep slopes generally exceed 40 percent.

This area is tributary to the John Day River with Cottonwood and Birch Creeks supporting significant resident trout and anadromous fisheries. It also provides summer and transitional range for elk. There is an abundance of cover and consequently less than optimum forage distribution Due to the relative inaccessibility of the area, it supports a higher proportion of trophy sized animals than in the roaded areas to the south and north.

The area is part of a sheep and cattle allotment in which most of the forage removed is by herded sheep.

Recreational use of the area is currently light, consisting of hunting, fishing, horseback riding and hiking.

Emphasis

Allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes, and big game habitat.

Desired Condition

The area will be unroaded with evidence of timber harvest and associated activities using helicopter systems. Prescribed fire use will also be evident in some areas where its use is desirable to attain management objectives. The area will remain unroaded with landings located outside the management area. Visible harvest impacts will generally be limited to vegetation modification with little soil or other surface disturbance.

Recreational improvements such as trailheads and access trails will be evident where necessary to enhance access. Livestock use may be evident, but the successful application of allotment management requirements will show accept-

able grazing practices. Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the management area along with those wildlife species dependent on old growth habitat on the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality resultant of spruce budworm and other endemic insects and diseases will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural and human-caused starts occur.



MA-F10 Silver Creek Roadless Area

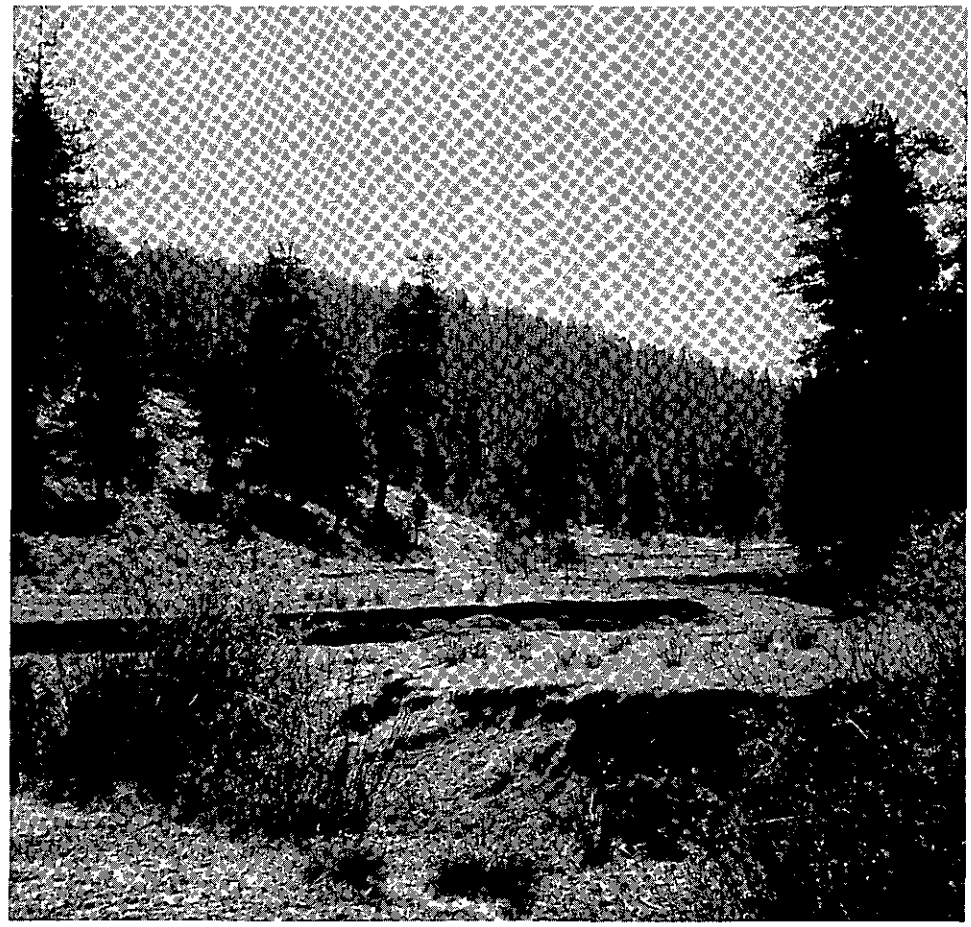
3,110 acres, less than one percent of the Ochoco National Forest

64 percent forested, 36 percent nonforested

Description

The Silver Creek area lies within the canyon rims of Silver Creek. The area is one fourth to one mile wide from rim to rim, and ranges in elevation from 4,600 feet at its south boundary to 5,200 feet at the northern end. The area is dominated by open grown ponderosa pine forests and juniper woodlands. It contributes 574 AUM's to five permittees within two allotments. It supports a yearlong mule deer population, and a resident elk and antelope herd. The bottom land and riparian areas show evidence of heavy overgrazing.

The Silver Creek roadless area contains sections of Silver, Delintment, Short, and Dodson Creeks. There is a resident rainbow trout fishery in Silver Creek which receives light fishing pressure. Recreational use is generally light. Primary recreational activities are fishing, hunting, hiking and horseback riding.



Emphasis

Protect and enhance the roadless qualities and provide nonmotorized recreational use.

Desired Condition

Recreationists will see natural appearing areas free from motorized vehicle use. Recreational use, livestock grazing, prescribed fire and wildfire will be evident. These activities, along with any desired recreational improvements such as trails, will be the only visible impacts of human activities within the management area.

Riparian areas in less than desirable condition will show evidence of recovery from the application of mitigation and rehabilitation measures. Old growth stands will be evident within the management area along with those wildlife species dependent on old growth habitat in the Ochoco National Forest. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Tree mortality resultant of past spruce budworm and other endemic insects and diseases will be evident along with associated changes in fuel loadings and plant succession. Fire occurrence will be evident where natural and human caused starts occur.

MA-F11 Lookout Mountain Recreation Area

15,660 acres, two percent of the Ochoco National Forest

72 percent forested, 28 percent nonforested

Description

Lookout Mountain is located on the Big Summit Ranger District, about 25 miles east of Prineville. It rises above the surrounding topography, and can be seen from many points along Highway 26 as well as from other nearby mountains. Approximately 90 percent is forested. Elevations range from 3,793 feet to 6,926 feet. Most plant communities associated with the Blue Mountains are found in the area. Lookout Mountain is well-known for its scenery, big game habitat, and recreational opportunities.



The forest composition is white fir and Douglas-fir, which generally replace seral species ponderosa pine and western larch. At lower elevations, especially on southern exposures, open stands of ponderosa pine occur. Scattered western larch, evident during the fall, are interspersed in the mixed conifer stands, but are gradually decreasing with time due to plant succession. Steep slopes occur in drainage heads; the west side of the mountain drops off with a precipitous scarp. Above 6,000 feet in elevation, nonforested grasslands, subalpine meadows, and basalt rock outcrops dominate the landscape.

The subalpine, and more gentle, open pine areas, in particular, provide an excellent setting for a variety of recreational activities, including snowmobiling, cross-country skiing, hiking and hunting.

The Lookout Mountain Recreation Area is a roadless area managed to provide big game habitat and semiprimitive recreational opportunities within a natural setting. It has twice been considered for wilderness designation, but was left with Congressional advice to "examine the feasibility of continuing the current use in the National Forest Plan and determine the land allocation in the Forest Plan."

Emphasis

Maintain a natural setting; provide continued opportunities for high quality, semiprimitive recreational activities, and wildlife habitat; while maintaining healthy forests.

Desired Condition

General

The Lookout Mountain Management Area will become a well known area for year-round recreation activities, and will provide excellent habitat for big game.

Prescription Area A

This area will comprise approximately 7,550 acres of forest land in a semiprimitive state with no vegetation manipulation planned. The recreational user and sightseer will experience a highly diverse, natural landscape with interspersed stands of trees, openings, rock outcrops, and talus. A tree species mix to include early successional species such as ponderosa pine, western larch and lodgepole pine will be seen across the lower elevations of the landscape, and lodgepole pine, sub-alpine fir, white fir and Douglas-fir will dominate at the higher elevations. Pockets of mixed conifer old growth will be an integral part of the vegetation mosaic. Natural tree mortality will be evident.

Big game habitat will be excellent due to the secluded nature of the area, high elevation moist meadows, and good year-round springs with heavy dense cover. Elk wallows will be numerous and big game use will be evident.

The area will be roadless, with currently existing roadbeds exhibiting evidence of rehabilitation activities, and eventually revegetation. Man-made improvements will be subordinate to the natural landscape and will be present to enhance recreational use of the area. Typical improvements apparent to the recreational user may include trails, trailheads, signing, trail shelters, livestock fencing, and possible wildlife habitat enhancement projects.

Prescription Area B

This area will comprise about 8,110 acres in a relatively natural appearing condition.

A variety of trails, roads, trail shelters, signs and other improvements for the benefit of recreational users may exist, but will be designed and managed to be subordinate to the natural landscape. Approximately one mile of Forest Road 4205 and one mile of Forest Road 4200-250 will remain open for motorized travel to dispersed campsites and mining activities associated with them.

Vegetation may appear manipulated in widely dispersed places in order to enhance recreational opportunities and wildlife habitat resources, but will not dominate the landscape, nor generally be evident to the casual Forest visitor. Various vegetation manipulation techniques will be used to promote healthy forested stands that are more resistant to catastrophic events that may detract from big game habitat or a recreational experience. As a result of these limited entries, ponderosa pine and western larch, which are tree species valued for their appearance to recreationists, will be maintained and/or become more abundant over time. These species will be interspersed in a mosaic of other mixed conifer species of various size and age classes, including stands of old growth mixed conifer and ponderosa pine.

Minimum standard roads designed for specific projects will exist in low densities on the more gentle ground. Road use will be restricted to project activities and roads will be closed upon completion of each project. Roadbeds and banks will be seeded with mixtures of legumes and grasses to improve wildlife habitat. Activities occurring at any one time will be limited by duration and amount.

MA-F12 Eagle Roosting Areas

570 acres, less than one percent of the Ochoco National Forest

60 percent forested, 40 percent nonforested

Description



This management area includes existing roosting areas for bald and golden eagles. The bald eagle in Oregon is classified as a threatened species under the Endangered Species Act of 1973, and therefore protection of habitat is required by law. On the Ochoco National Forest, the eagle habitat of concern is winter byosting areas. Eagle roosting areas are generally stands with large open crown trees adjacent to feeding areas. Common food sources include large game and livestock carrion, fish, waterfowl and ground squirrels. Consequently, creeks and meadows are typical feeding areas. Preferred trees are often large ponderosa pine and Douglas-fir, although other species such as cottonwood may be used.

Emphasis

Provide winter roosting habitat for migrating bald eagles annually during the period December through April.

Desired Condition

The areas will have uneven-aged stands which contain large trees at least 22 inches DBH, and a few trees which are 36-40 inches DBH. Roost trees generally are at least 22 inches DBH and have an open structure allowing eagles to land easily. Roost trees actively in use will be preserved, along with replacement trees that will be located in the same vicinity to the degree possible.

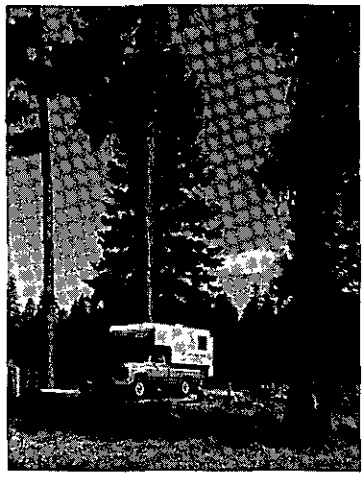
The area will be free of potentially disturbing human activity in the vicinity of roosting areas from December 1 to May 1. When roosting areas overlap with areas which have more restrictive prescriptions, the area will be managed under the most restrictive prescription as long as roost trees are maintained. This management prescription will also apply to any roosting sites discovered in the future.

MA-F13 Developed Recreation

1,810 acres, less than one percent of the Ochoco National Forest

62 percent forested, 38 percent nonforested

Description



This management area applies to sites currently developed or planned for camping, boating, trailhead parking, and other developed recreational activities. Developed recreation sites are located throughout the Forest and provide a variety of recreational experiences.

This management area includes the developed site and a visual influence area that surrounds each site. The visual influence area is variable in size depending on the topography.

Emphasis

Provide safe, healthful, and aesthetic facilities for people to utilize while they are pursuing a variety of recreational experiences within a relatively natural outdoor setting.

Desired Condition

Developed recreation areas will be natural appearing areas, but with obvious man-made controls and structures to direct users, provide for comfort and sanitation, and protect the natural resources while providing a variety of outdoor recreational opportunities. Developed sites will be provided for a broad range of recreational opportunities.

New and upgraded sites will incorporate a barrier-free design in order to accessible to the handicapped.

Timber activities will normally not be visually evident, but may be used for safety and visual enhancement. Scenic views may be enhanced through harvest or thinning but will appear natural.

Facilities, roads, and trails will have a well maintained appearance and provide a safe recreational environment Public use may be prohibited, or discouraged on a seasonal basis, depending on management objectives.

MA-F14 Dispersed Recreation

1,970 acres, less than one percent of the Ochoco National Forest

76 percent forested, 24 percent nonforested

Description

This prescription applies to dispersed recreation sites located throughout the Forest. These sites generally occur along roads, and many are concentrated near riparian areas and stream courses. The prescription applies to the actual site and the influence area immediately around it.

Emphasis

Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.



Desired Condition

The dispersed site will exhibit a relatively natural appearance, even though management activities (such as timber harvest) may be highly visible nearby. Primitive, user-constructed structures or facilities, consistent with the sites use, may be seen. Sites will be managed so that users tend to feel relatively isolated from the sights and sounds of civilization. A strategy will be developed that encourages individuals or groups to "find their own place."

Livestock grazing may be evident but the successful application of allotment management requirements will also be evident.

MA-F15 Riparian

18,130 acres, two percent of the Ochoco National Forest

90 percent forested, 10 percent nonforested

Description



Riparian areas include land adjacent to water, where plants that are dependent on a perpetual source of water occur. They normally have high water tables and soils which exhibit characteristics of wetness. On the Ochoco National Forest, riparian areas exist along 800 miles of designated streams (see Riparian Area Map). They often contain stands of ponderosa pine and mixed conifer, as well as water-loving plant species such as sedges, alder, and willow; and they are among the most productive places on the Forest. Because of this, they are often the most intensively and extensively used areas on the Forest. Signs of past or current management can be seen in most riparian areas across the Forest, and the majority of the Forest road system lies near or adjacent to these areas. Camping, grazing, recreation, and timber harvest are all established uses within streamside areas.

Riparian areas are among the most critical wildlife habitats on the Forest. Over 75 percent of the Forest wildlife species are directly dependent on riparian zones or utilize them more than other habitat areas Wildlife use streamsides as "connectors," or travel lanes between forested habitats.

Fully functional riparian areas are essential for the maintenance of viable fish populations on the Forest. Riparian areas provide food, cover, and a source of large woody material for aquatic insects, fish and land animals. The vegetation of streamside areas filter sediment and shade the water surface to help maintain stable stream temperatures.

Significant investments have been made to rehabilitate or enhance primary streams on the Forest, and restrictions have been placed on uses which have historically had a negative impact on water resources within these areas.

Emphasis

Manage streamside vegetation and habitat to maintain or improve water quality. Meet temperature and turbidity levels as required by state standards under the Clean Water Act (see Forest-wide Standards and Guidelines, Water, and Best Management Practices (BMP'S), FEIS Appendix G).

Desired Condition

Riparian areas will exhibit a low, but apparent level of management. Vegetation

may or may not appear manipulated, depending on the condition of the stream. Suitable amounts of large woody material will be apparent within the riparian area to provide streambank stability and habitat. An abundance of wildlife species should be evident as a result of restrictions on management activities and level of habitat provided. Due to management restrictions and the low risk associated with these areas, the signs of natural or man-caused fire will be infrequent.

For management purposes, a special protection area (100 feet from the edges of perennial bodies of water) will be apparent. In addition, the streams listed below will receive extra protection to 200 feet from the stream edge to provide "connective habitat" for a variety of wildlife species on the Forest:

Prineville District	Big Summit District	Paulina District
Trout Creek	Allen Creek	Cottonwood Creek
Pine Creek	Indian Creek	Baldy Creek
Bear Creek	Porter Creek	Little Windy Creek
Drake Creek	Howard Creek	Windy Creek
	Nicoll Creek	
	Fox Creek (Pisgah)	
	West Fork Bridge Creek	

Roads not planned for future use, through and across riparian areas, will be obliterated and revegetated to a natural or near natural condition.

Within the limits of ecological potential, a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation will exist.

Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time. Sites unable to support a canopy of deciduous or evergreen species will be characterized by vigorous stands of forbs, grasses, and grass-like riparian species.

Bank slopes containing high plant densities, thick root masses, embedded angular boulders, and old logs will also characterize these areas. Extensive scouring of streambanks will be an uncommon occurrence as will soil deposition outside the norm for the individual stream system. Streambeds will be commonly covered by native aquatic growth on assorted sizes of rocks and boulders.

Where cobble and gravel bars are prominent, they will become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are re-built and cutbanks stabilized, a narrower, deeper channel will gradually develop.

Springs and wet meadows are not specifically included in this management area prescription, but should receive appropriate protection as stated in Forest-wide Standards and Guidelines for Water, Section 3, this chapter.

MA-F16 Bandit Springs Recreation Area

1,580 acres, less than one percent of the Forest

97 percent forested, three percent nonforested

Description

The Bandit Springs Recreation Area is between the Mill Creek Wilderness and U.S. Highway 26, on the Big Summit and Prineville Ranger Districts. It has become a popular cross-country ski area due to it's normally satisfactory snowpack and easy access. The area (Ochoco Divide) also has an Oregon State Rest Area and a nearby National Forest developed campground and sled hill. Scenic resources are created by mature stands of ponderosa pine and mixed conifer. Recreational development consists of several miles of established cross-country ski trails.

Emphasis

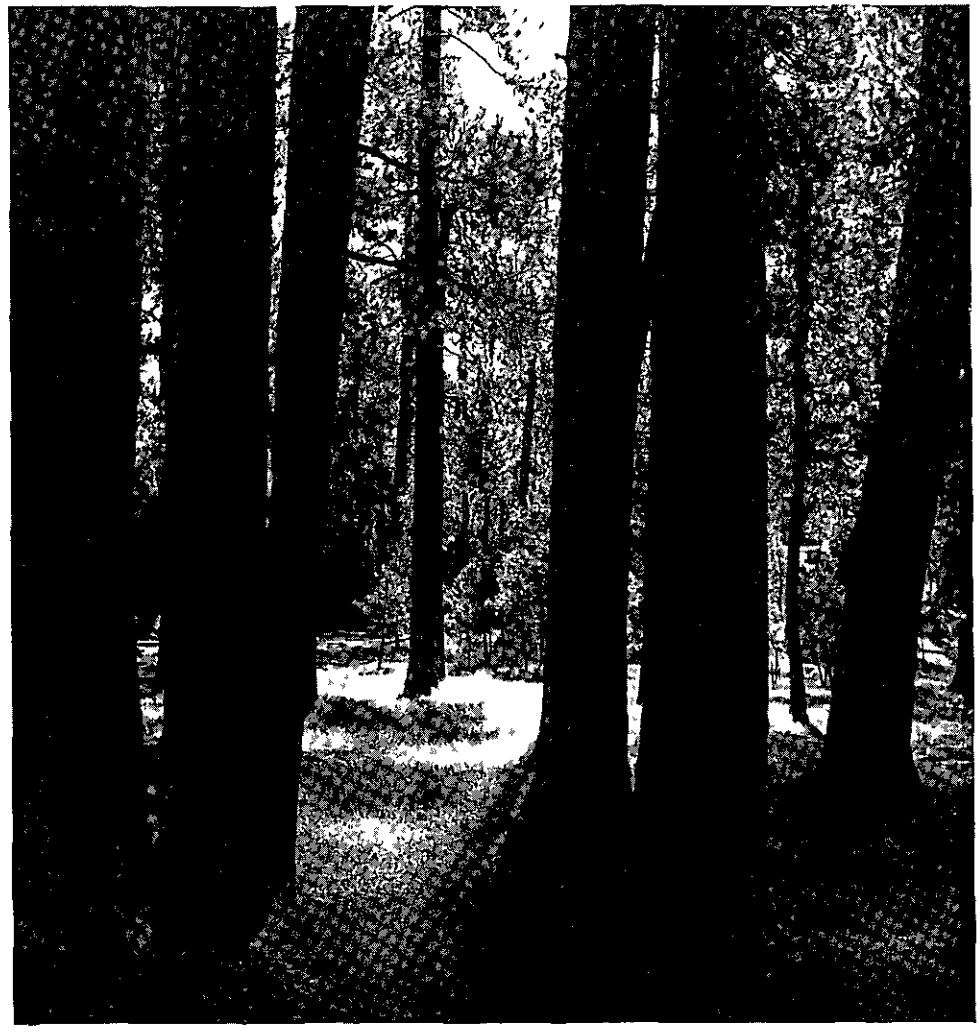
Provide dispersed, nonmotorized recreational opportunities within a setting where most management activities (timber harvest) are generally not evident to the casual observer. Expand the recreational activities and opportunities beyond winter recreation to year-round activities. Provide hubs of more developed facilities to reach a broader recreation audience.



Desired Condition

The Bandit Springs Recreation Area is expected to become an important winter sports use area on the Forest, as well as a setting for other year-round recreational activities, including: environmental education, mountain bike riding, day hiking, hunting, and horseback riding. Developments to accommodate a broad spectrum of nonmotorized recreationists' needs will be built to enhance their experience. Emphasis will be on enjoying the natural scenery, with interpretation aiding the casual visitor. Developments may include: trail shelters, maintained trails, horse unloading ramps, toilets, information areas, parking, picnic areas, and signs.

Periodic manipulation of vegetation to meet recreational and visual objectives for the area will be apparent to the user. Timber stands will be managed to develop and maintain resistance to catastrophic events that would detract from the recreational experience. Both uneven- and even-aged silvicultural practices will be used. A road system will be visible, but secondary to the natural setting. Livestock use will also be evident.



MA-F17 Stein's Pillar Recreation Area

1,070 acres, less than one percent of the Ochoco National Forest.

94 percent forested, six percent nonforested

Description



Located about 20 miles northeast of Prineville, the Stein's Pillar Management Area has forested, rugged terrain with scattered juniper plateaus. There are volcanic plugs and unique geologic formations that offer contrast and interesting views. Stein's Pillar, 300 feet in height, is the most prominent volcanic plug in the area.

The unroaded, conifer forest is dissected by streams running into Mill Creek. The ponderosa pine stands have a dense Douglas-fir understory and are beginning to lose their natural open character. The stands of white fir and Douglas-fir are very dense. Some of the forest is old growth, with large trees, as well as various-aged trees and snags. The entire area is important winter range for deer and elk, which also use it in the summer.

There are no structures in the area, few signs, and one trailhead and trail. A rustic trail accesses Stein's Pillar. The main access to the area is provided by Forest Road 3300-500 along the southern part of the area, and leads to the Stein's Pillar Trailhead. Forest Road 3350 accesses the northern boundary. Forest Road 3300 offers panoramic views of Stein's Pillar.

Current recreational activities are mostly day-use, nonmotorized activities. These activities include hiking, sightseeing, rockclimbing, horseback riding, and some group activities. Both individuals and families enjoy the quiet, natural setting close to Prineville. They have the opportunity to see Stein's Pillar and views of the Ochoco and Cascade Mountains. Many people picnic, as well as participate in the above-mentioned activities in this area.

Emphasis

Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Stein's Pillar. Provide roadless nonmotorized recreation, with various opportunities to enjoy nature.

Desired Condition

The area will be a natural or natural-appearing place with a variety of volcanic plugs, topography, plant communities, and wildlife where recreationists can enjoy nonmotorized recreation.

Ponderosa pine stands will have large, yellow-bark trees, particularly along the Stein's Pillar Trail. There will be a mosaic of these large-tree, open pine stands interspersed with juniper scab flats and fir stands. Created openings will blend with the natural appearance of the area. Scenic views will be created, but most management activities (timber harvest) will not be evident to the casual observer.

The area will offer scenic views of Stein's Pillar and other volcanic plugs, as well as the Ochoco and Cascade Mountains. Recreationists will enjoy closeness to nature in their nonmotorized activities, including hiking, picnicking, rockclimbing, sightseeing, horseback riding, and group activities. These activities will mostly be day use.

Nonmotorized recreation opportunities and facilities will be provided. A rustic trail, designed and maintained for family day walks, will access Stein's Pillar. There will be an associated trailhead and access route. The trail system may be extended to the north to tie to the Benefield Road. Also, a safe way to the base of the pillars will be constructed to allow easier access for climbers and others. Interpretive facilities will highlight geological, recreational, historical, old growth, and wildlife features, and the nearby wilderness

Streamsides will be extremely shady and brushy with an abundance of tall overstory conifer trees and/or shorter hardwoods of alder, willow, and aspen, meeting the Riparian Management Area objectives.

Deer and elk may use the area for winter cover, feed, and security. Deer and elk may summer throughout the area. A 300-acre Old Growth Management Area will be available for wildlife, such as the goshawk and pileated woodpecker. Snags will occur naturally, providing habitat for woodpeckers, nuthatches, owls, and other cavity nesters.

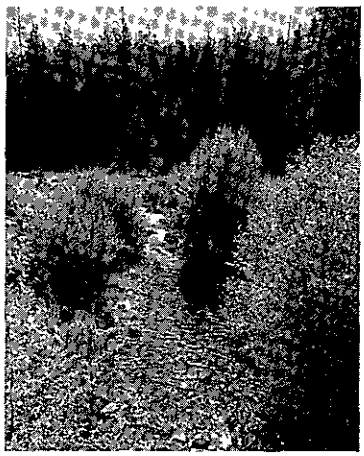
Livestock use will be evident but the successful application of allotment management requirements will also be evident.

MA-F18 Hammer Creek Wildlife/Recreation Area

2,560 acres, less than one percent of the Ochoco National Forest

44 percent forested, 56 percent nonforested

Description



Located in the western Maury Mountains, the Hammer Creek Management Area is a mixture of conifer forest on mostly north-facing slopes, old growth in steep stream drainages, and large juniper plateaus. Existing stands are primarily composed of an overstory of large size ponderosa pine with an understory of Douglas-fir, although stands containing only pine and Douglas-fir are also found within the area. Hammer Creek flows through the northern part of the area and Sherwood Creek bounds the area's western edge. The area is the largest block of land in the Maury Mountains that has not had intensive timber management activities. The area has evidence of a few primitive roads.

The main access to the area is provided by Forest Road 16, which follows the area's western boundary. The area can also be reached by Forest Road 1750 and the Hammer Creek Trail from the south.

The Hammer Creek Area provides habitat diversity not found in the rest of the Maury Mountains. This diversity combined with minimal access makes the area valuable habitat for a wide variety of animal species.

Emphasis

Provide and maintain habitat diversity for a variety of wildlife species where open road density is minimal; and provide a scenic, seminatural or natural-appearing setting for nonmotorized recreational opportunities.

Desired Condition

Forested areas of ponderosa pine will be seen as a wide variety of size/age classes with a major component of large, yellow-barked pine. Mixed conifer areas will be a mosaic of open and closed canopy stands of various size classes to provide an optimum forage and cover mix for big game. Nonforested areas will generally appear natural in character, but with periodic evidence of livestock grazing. Riparian areas will be shady and have an appearance of consisting of a mixture of trees and shrubs. Management activities will remain visually subordinate to the characteristic landscape.

Developed facilities such as trailheads, picnic/camp areas, and associated access routes will be evident on the periphery of the unit. Interpretive facilities will be available to highlight historical, recreational, and wildlife features.

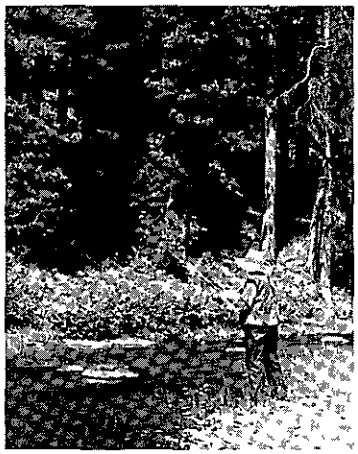
Access roads to trailheads will be open. All other roads will be closed to motorized use and rehabilitated after management projects are completed.

MA-F19 Deep Creek Recreation Area

770 acres, less than one percent of the Ochoco National Forest

66 percent forested, 34 percent nonforested

Description



The Deep Creek Recreation Area is located on the Paulina Ranger District, near the boundary with the Big Summit Ranger District. The area is located along Deep Creek and follows Forest Road 4250 from the junction with Forest Road 42 north to Forest Road 4256. The boundary for this management area is located on the slope break on either side of the Deep Creek drainage.

This area is popular year-round, for fishing, dispersed camping, hunting and sightseeing. Several dispersed recreation sites are located in the area. Forest Road 4250 is used heavily for commercial, public, and administrative traffic.

Conifer vegetation in the area consists of a mixture of Douglas-fir, western larch, ponderosa pine, and lodgepole pine. Some exceptional stands of old growth western larch occur on the north slopes of the drainage. Ponderosa pine occurs more on the south facing slopes. Lodgepole pine occurs primarily in the drainage bottom. Riparian vegetation is present along the creek, and alder is a common occurrence. An old growth area is located contiguous with the boundary of this management area.

Emphasis

Provide a near natural setting for recreational pursuits within the area where management activities are not visually evident.

Desired Condition

Forested areas will contain large size class trees of larch and ponderosa pine. Nonforested areas will generally appear natural in character with little immediate evidence of management activities. The riparian area will contain abundant alder and other riparian hardwood species, where naturally occurring.

Dispersed recreational areas will be protected. Opportunities for camping in developed sites will be provided at Deep Creek Campground.

Trails may be developed that provide day hiking or interpretive recreational opportunities.

Management activities including timber harvest and prescribed burning will not be evident to the casual observer. Livestock use will be evident but the successful application of allotment management requirements will also be evident.

MAF-20 Winter Range

64,130 acres, seven percent of the Ochoco National Forest

45 percent forested, 55 percent nonforested

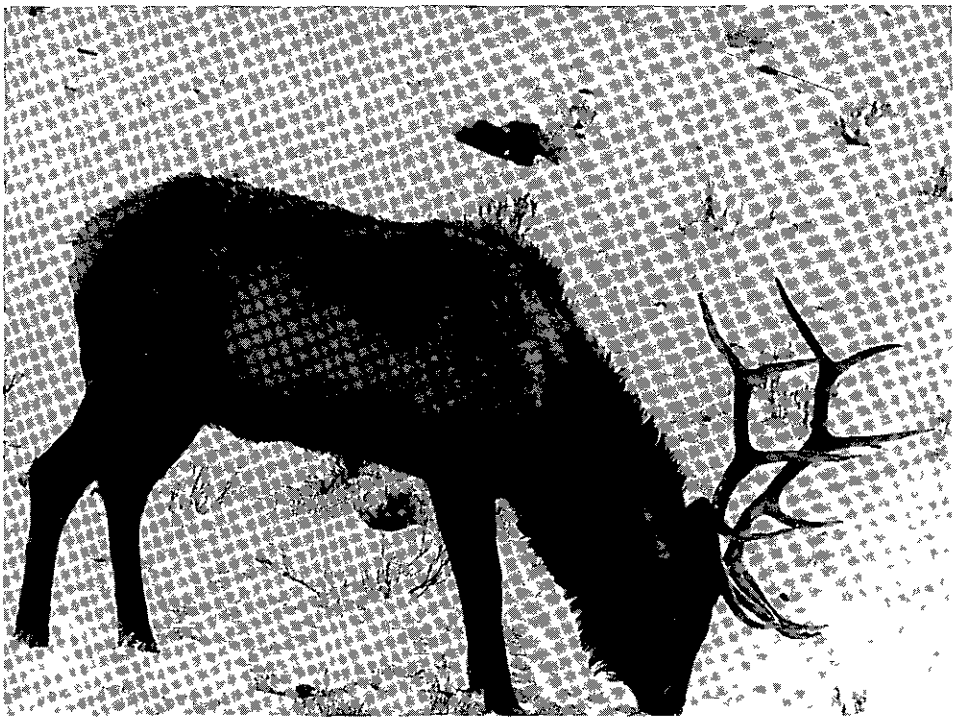
Description

These sites are typically located along the exterior boundaries of the Forest. They are among the lowest elevation sites on the Forest. Ponderosa pine, occasionally associated with Douglas-fir and white fir, functions as the primary cover. Juniper woodlands, wet and dry meadows, sagebrush-grassland and other shrubland, as well as scabland types, provide species that furnish forage.

Several major arterial and collector roads go through designated winter range areas. Many of the arterials are used as snowmobile and winter sports routes to higher elevation areas.

There are both developed campgrounds and dispersed campsites within designated winter range areas.

There are several actual bald eagle winter roost sites within the winter range, in addition, several old growth areas are located within the management area. Most of the winter range management areas incorporate grazing allotments which are utilized during the summer months.



Emphasis

Manage for big game winter range habitat.

Desired Condition

Big game use on winter range will be seen as the primary activity with other management activities and human intervention restricted, from December 1 to May 1. Habitat effectiveness for big game will be improving over time, due to increases in both quality and quantity of thermal cover, and reductions in open road density. Road and trail use will be limited to one mile of open access per section, from December 1 to May 1, a greater density of trail and road access will be available during the remainder of the year, up to three miles per section.

Vegetation cover types, key species condition, big game use, and domestic livestock grazing will be inventoried and mapped. Treatment units will be identified; treatments will be prescribed on a scheduled basis to maintain key forage and browse species. Treatments will be monitored to assure appropriate forage and browse allocations for big game.

Management, including vegetation manipulation, structures, and prescribed fire to maintain or improve winter range, may be apparent. Livestock use of forage is planned, but will be conducted in harmony with big game winter range habitat needs.

Tree mortality, resultant of past spruce budworm and other endemic insects and diseases, may be evident in areas reserved for big game cover, along with associated changes in fuel loadings and plant succession.

MA-F21 General Forest Winter Range

107,360 acres, 12 percent of the Ochoco National Forest

58 percent forested, 42 percent nonforested

Description

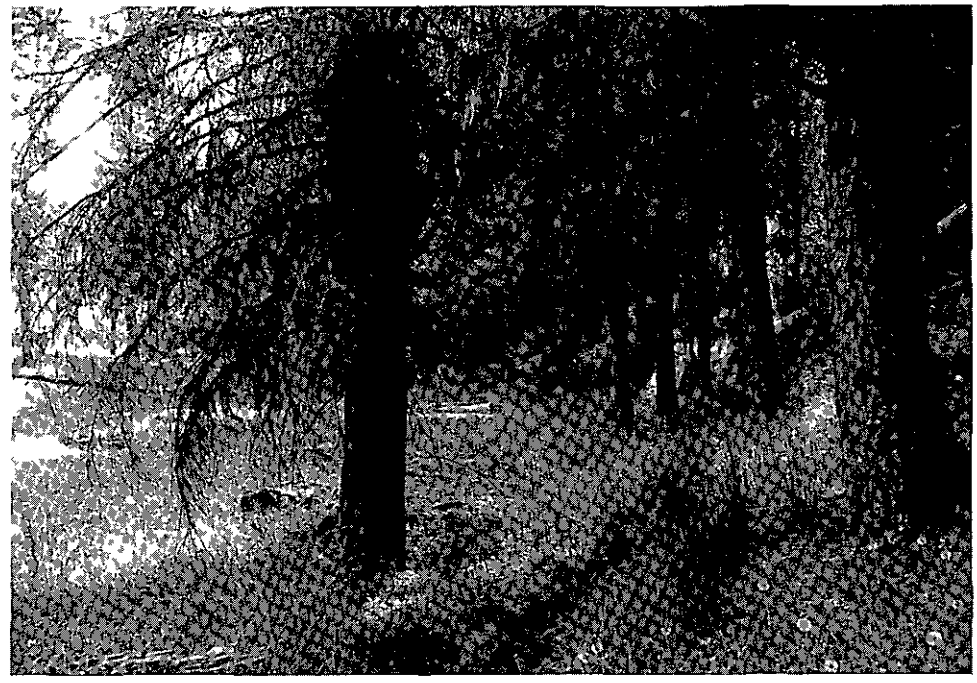
These sites are typically located along the exterior boundaries of the Forest, and they are among the lowest elevation sites on the Forest. Ponderosa pine, occasionally associated with Douglas-fir and white fir, function as cover. Juniper woodlands, wet and dry meadows, and scablands furnish forage. These sites are in addition to those designated as MA-F20 Winter Range.

Several major arterial and collector roads go through designated winter range areas. Many of the arterials are used as snowmobile and winter sports routes to higher elevation areas.

Both developed campgrounds and dispersed campsites are within designated winter range areas.

There are several bald eagle winter roost sites designated as separate management areas within the general forest winter range; several old growth management areas are also located within this area.

Most of the general forest winter range management areas incorporate grazing allotments which receive use during the summer months.



Emphasis

Manage for timber production with management activities designed and implemented to recognize big game habitat needs.

Desired Condition

Big game use on winter range from December 1 to May 1 will be the primary activity, with other management activities and human intervention restricted. Habitat effectiveness will be slowly decreasing in this area, mainly due to future reductions in quality and quantity of thermal cover. This decrease will not be as rapid as in MA-F22 General Forest due to specified road closures and other incidental wildlife improvements. Road and trail use will be limited to one mile of open access per section during December 1 to May 1, but a greater density of trail and road access will be available during the remainder of the year, up to three miles per section.

Fire occurrence will be visible where natural and human-caused starts occur, and where prescribed fire was applied.

Management activities will take into account vegetation types and successional responses of those types in order to apply prescriptions which have beneficial results for habitat. Areas of particular importance as big game habitat will be identified and management activities modified to complement, protect, or improve habitat. Livestock use of forage is planned, but will be conducted in harmony with big game winter range habitat needs.

Tree mortality, resultant of past spruce budworm and other endemic insects and diseases, may be evident in areas reserved for big game cover, along with associated changes in fuel loadings and plant succession.

MA-F22 General Forest

496,850 acres, 59 percent of the Ochoco National Forest

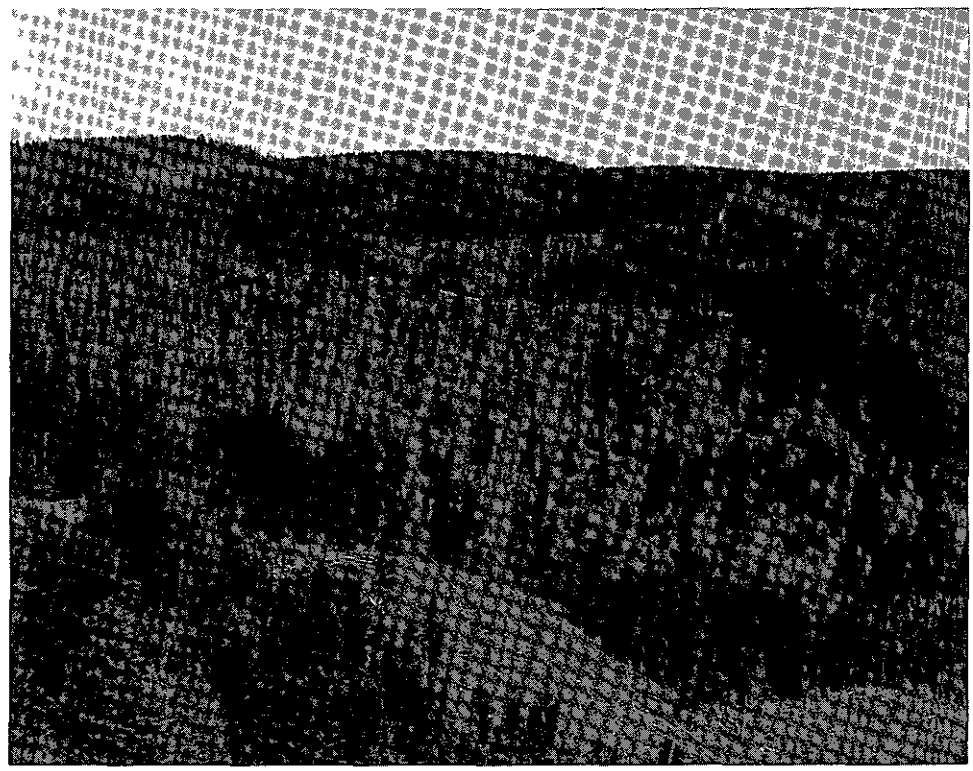
72 percent forested, 28 percent nonforested

Description

The areas of the Forest where this management area is applied contain a wide variety of land types and vegetative cover. Most of the area has some type of tree cover, including ponderosa pine, mixed conifer and juniper. The area also contains scablands, meadows, rock outcrops, seeps and springs.

Emphasis

Produce timber and forage while meeting the Forest-wide standards and guidelines for all resources. In ponderosa pine stands, management will emphasize production of high value (quality) timber.



Desired Condition

Many ponderosa pine stands on slopes less than 30 percent, and some mixed conifer stands on slopes less than 30 percent, will exhibit the application of uneven-aged management. Trees up to 20 inches DBH will be seen in these stands; the evidence of trees managed for high quality lumber where the first log is relatively free of limbs will be noted.

Except in seedling and sapling stages, most mixed conifer timber stands, all stands on slopes greater than 30 percent, and some pine stands not suitable for uneven-aged management, will be even-aged with trees somewhat evenly spaced and fully occupying the site. Regenerated stands will generally be 20 to 40 acres in size. A mix of species with emphasis on the seral species such as pine and larch will be evident where conditions permit. The largest trees will generally be 18 to 22 inches DBH, but occasional larger ones may be found where left for snag replacements or other resource reasons. Trees will have full crowns and be relatively free of defect. Snags will be apparent over the area as the cavity nesters requirement will be at the 40 percent level.

A variety of native grasses, sedges and forbs will be available for grazing animals. Competition from nonforage species such as sagebrush and juniper will not be a major problem. Most of the forested range lands will be in fair and good forage condition class. Forage use will be apparent, and improvements installed to facilitate stock distribution and effective use of available forage will be evident.

Following use for timber haul, local access routes with planned future use will generally be open to high clearance access (maintenance level 2), and for Forest visitor and administrative use, unless there are significant reasons to do otherwise. Access routes/trails will be developed to offer a variety of terrain and experience levels for ATV's, and users will be restricted to these areas. Recreational off-road, motorized use will be allowed, but user's will be encouraged to use designated routes in order to protect forest resources such as soils and water quality.

The area will have dispersed sites scattered throughout which will be maintained in as natural a condition as possible.

Fire occurrence will be visible where natural or human-caused starts occur, and where prescribed fire was applied

MA-F23 North Fork Crooked River Recreation Corridor

1,830 acres, less than one percent of the Ochoco National Forest

52 percent forested, 48 percent nonforested

Description

This management area contains a segment of the North Fork of the Crooked River which extends from the source at Williams Prairie to Big Summit Prairie, and from Big Summit Prairie to Deep Creek Campground. This has been designated as a Recreational River segment in the National Wild and Scenic Rivers System.

The upper-most segments of this river flow through open grassland flats with little riparian vegetation along the banks. Evidence of heavy grazing occurs here. This is a spring fishing stream, but generally flows are too low and temperatures too high to support fish populations during the summer months.



Forest Road 42, a major arterial on the Ochoco National Forest, parallels the lower North Fork of the Crooked River recreation segment along the length of this segment, generally staying within 200 to 600 feet of the river bank. It carries considerable amounts of industrial, administrative, and recreational traffic during late spring, summer, and fall.

There has been some timber harvesting along the north shore of the river. Generally the trees were selected for harvesting on a sanitation-salvage basis.

The majority of the stands on the south side of the river have never been harvested; part of the area is designated as old growth management. The area is grazed by cattle.

Primary recreational uses of the area are camping, fishing, and hunting. There is a developed campground called Deep Creek Campground at the eastern end and several dispersed camping sites along the river. Water flows are generally low during late summer and fall, and are unable to support fish during these times because water temperatures are too high.

Emphasis

Management will maintain the appearance of a natural landscape in the foreground view from Forest Road 42 to enhance recreational and scenic values. Management activities will protect and enhance public use and enjoyment of the river segment. Further planning for this management area will be forthcoming, as required by the Omnibus Oregon Wild and Scenic Rivers Act of 1988.

Desired Condition

This segment of the North Fork of the Crooked River will be a free-flowing river whose shorelines may be accessible by roads. The immediate river environment (up to one-quarter mile from the river) will appear natural, though there may be evidence of past and ongoing timber harvest, as well as grazing. Developed and dispersed campsites and interpretive signing will be seen throughout the area to assist in its enjoyment and protection. The use of prescribed fire may be evident where used to enhance the retention of featured tree species in viewing areas, such as old growth ponderosa pine or western larch

MA-F24 North Fork Crooked River Scenic Corridor

830 acres, less than one percent of the Ochoco National Forest

46 percent forested, 54 percent nonforested

Description

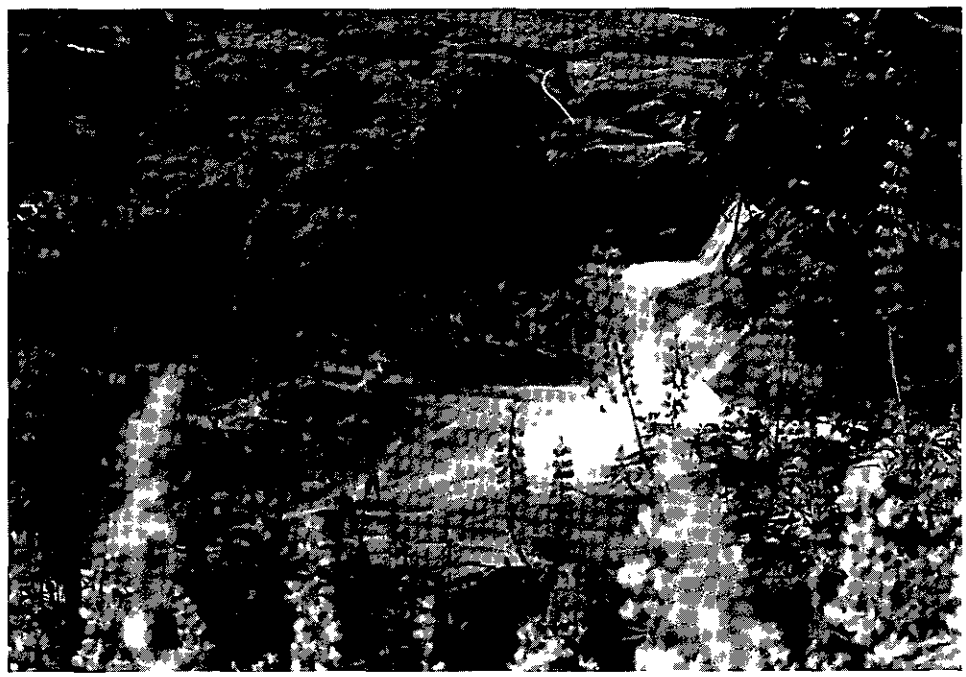
This management area includes the segment of the North Fork of the Crooked River which extends from Deep Creek Campground south to the Forest boundary. It has been included in the National Wild and Scenic Rivers System, designated as a Scenic River segment.

The area is accessed by Forest Road 4260-230 on the east side of the river. Though there can be a considerable amount of industrial traffic on Forest Road 4260; the traffic on Forest Road 4260-230 is recreational and administrative. Access on the west side occurs by Forest Road 4240. This route actually fords the river just above the upper falls on private land.

Part of the area has been designated for old growth; the area is grazed by cattle.

Primary recreational uses of the area are dispersed camping, hunting, fishing, and for a short time in the spring, white-water rafting. Deep Creek Campground borders the north end of the unit, and there are several dispersed campgrounds.

Steep canyon walls, large old growth ponderosa pine, and perennial water make this unit a visually striking area.



Emphasis

Management will maintain and enhance the natural appearing landscape and protect the scenic river designation.

Several stands have been designated for old growth within the scenic river corridor. Where old growth restrictions are more restrictive than scenic river restrictions, the old growth prescriptions will apply. Further planning for this management area will be forthcoming, as required by the Omnibus Oregon Wild and Scenic Rivers Act of 1988.

Desired Condition

This segment of the North Fork of the Crooked River will be seen as a free-flowing river whose shoreline is accessed by a road. The immediate river environment (up to one-quarter mile from the river) will have an overall natural appearance, though there may be evidence of past timber harvest. Other management activities will be evident, including developments such as dispersed campsites and interpretive signing to enhance the public's use of the area while protecting resources. A low standard trail will be developed that will require wading or rock-to-rock natural crossings to cross through the river corridor. Prescribed burning will be apparent where used to enhance the retention of featured tree species such as large old growth ponderosa pine and western larch.

MA-F25 U.S. Highway 26 Visual Corridor

6,850 acres, less than one percent of the Ochoco National Forest

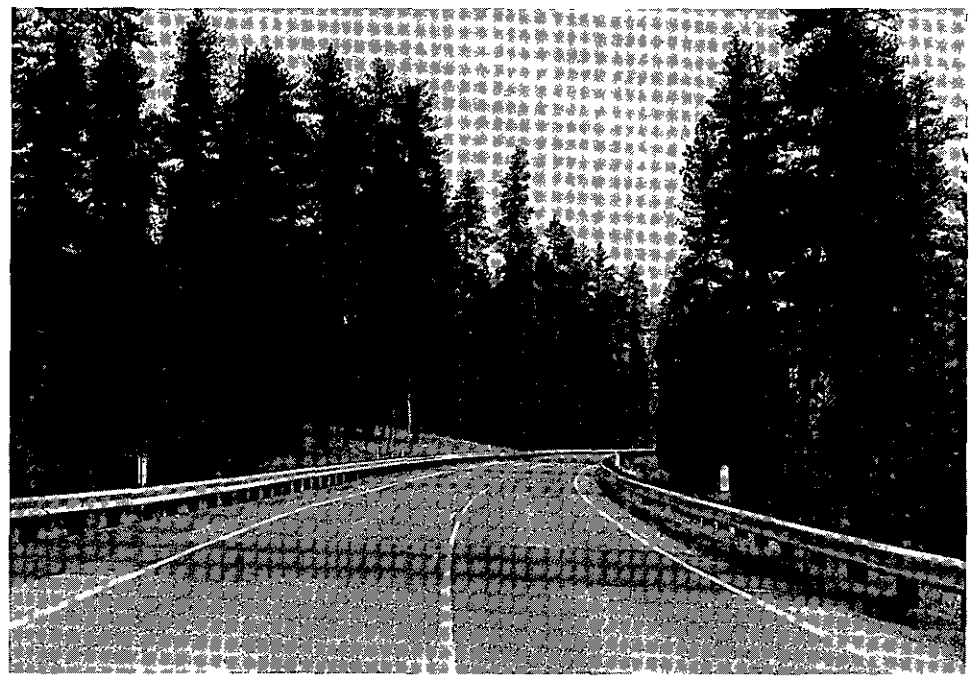
85 percent forested, 15 percent nonforested

Description

This visual corridor includes foreground viewing areas classified as "retention" adjacent to 13 miles of U.S. Highway 26, which traverses the Ochoco National Forest through the Big Summit and Prineville Ranger Districts. It lies within two major drainages, Marks Creek to the south and West Branch Bridge Creek to the north; this is the primary visual corridor on the Forest. The highway constitutes a major east-west route through Oregon and is a designated "National Bike Trail."

In April 1985, a fifty year implementation plan was developed and approved for the area, and is incorporated here to provide specific direction for long-term management.

The corridor contains outstanding stands of old growth ponderosa pine, some of which have been maintained in an open park-like condition through management activities. Other features of the corridor include mixed conifer stands of various ages and visual character, ungrazed meadows, occasional aspen stands, and unique geologic features such as basalt cliffs along Marks Creek. Marks Creek is a Class I stream that supports native trout populations and has received major investments for stream habitat improvement.



Emphasis

Maintain and enhance the scenery for travelers along U.S. Highway 26.

Desired Condition

The U.S. Highway 26 Corridor will be managed to maintain the big tree appearance; primary management activities will not be evident to the casual Forest visitor. Vegetation will be manipulated in order to provide a variety of size and age classes of timbered stands - from open park-like stands of old growth ponderosa pine, to dense, shaded stands of mixed conifer, to small openings with planted and natural tree seedlings. Both uneven- and even-aged stand conditions will exist over time.

An established road system will be in place, but will have been designed to minimize the visual effect on the landscape. Prescribed livestock grazing is planned. Pastoral scenes will add to visual variety. Prescriptive grazing will be designed to be in concert with the visual quality objectives of the area.

Wildlife may be viewed in the corridor. This might include big game, a variety of bird species, and fish. The affects of fire will be periodically evident, as a result of natural and prescribed burning.

Dispersed recreation sites will be abundant throughout the corridor for year-round use. Camping will be encouraged, except where restricted for other resource reasons, such as streamside management areas along Mark's Creek. Snowparks for winter recreation will be constructed to blend into the surroundings.

MA-F26 Visual Management Corridors

(This includes all visual management areas outside of other special management areas, i.e. Highway 26, Summit Trail, etc.)

33,260 acres, four percent of the Ochoco National Forest

9,300 acres - Retention

23,960 acres - Partial Retention

70 percent forested, 30 percent nonforested

Description

This management area includes all foreground areas that are adjacent to approximately 260 miles of roads across the Forest that serve as significant travel ways for the visiting public. In most cases these roads provide recreational access to specific destinations, such as Walton Lake Campground and the Black Canyon Wilderness.

Vegetation in these corridors are of primary importance to the scenic landscape as they represent "The National Forest" to the majority of the visiting public. At lower elevations, a mosaic of juniper, grasslands and ponderosa pine gives an impression of a semi-arid, almost desert environment As one travels deeper into the Forest, this character gradually disappears and is replaced with stands of large, old ponderosa pine interspersed with nonforested grasslands and occasional rock outcrops. Continuing to most higher elevations within the Forest, one will experience a much more diverse and heavily forested setting, with stands of mixed conifer dominating a more subdued area of old growth ponderosa pine, aspen and high mountain meadows. As most of these corridors are located in



drainage bottoms along major streams, the chances of a Forest visitor viewing a number of wildlife species are good.

Emphasis

Maintain the natural appearing character of the Forest along major travel routes, where management activities are usually not evident or are visually subordinate to the surrounding landscape.

Desired Condition

Prescription Area A

This area will encompass about 86 miles of Forest roads and include approximately 9,300 acres of associated landscape. The outer boundary of the management area will generally not exceed 600 feet on each side the road. Retention will be the visual quality objective, which will result in long-term management where primary activities are not visually evident to the casual observer. Forest visitors will encounter a landscape which is diverse, and reflects ecosystems where management activities appear as a natural condition.

Vegetation will be manipulated, but will reflect a natural forest setting where stands of trees exist in multiple age classes, from young seedlings to mature old growth in both uneven- and even-aged conditions. Unique characteristics of the landscape, such as rock bluffs and aspen clones, will appear highlighted, where they are currently hidden from view due to existing vegetation.

Prescription Area B

This area will encompass about 174 miles of Forest roads and include approximately 23,960 acres of associated landscape. The outer boundary of the management area will generally not exceed 600 feet on each side the road. Partial retention will be the visual quality objective, which will result in long-term management where activities may be evident but are visually subordinate to the characteristic landscape. Forest visitors will encounter a near-natural scenic view, with a diverse ecosystem reflecting a low level of management.

Vegetation will appear manipulated and reflect a forest setting where stands of trees exist in multiple age classes in both uneven- and even-aged conditions, set in a more subdued background of rock outcrops, aspen clones and native grass communities.

Prescription Areas A and B

An established road system will be in place, but will have been designed to minimize the visual effect on the landscape. Grazing by livestock may or may not be visible immediately adjacent to these roads, but will be an acceptable resource use within the area

As a consequence of visual management, an abundance of wildlife may be viewed in the corridor, this might include big game, a variety of bird species, and fish. The affects of fire will be periodically evident as a result of natural and prescribed burning.

MA-F27 Round Mountain National Recreational Trail

1,000 acres, less than one percent of the Ochoco National Forest

71 percent forested, 29 percent nonforested

Description



Round Mountain trail goes from the 148 spur of Forest Road 22 at its north end to Forest Road 4205 at its south end. It connects the Walton Lake Campground area on the north, to Forest Road 42, the main access route from the west to Big Summit Prairie. Total trail length is 7.5 miles. It is of low to moderate difficulty, and open to hikers, horseback riding, and mountain bikes. It is also used by cross country skiers and snowmobilers during the winter, and portions of the trail location have been signed for winter use.

From Spur 148 at an elevation of 5,200 feet, the trail is a gradual climb to the base of Round Mountain. At that point, the trail becomes considerably steeper switchbacking to reach the summit of Round Mountain at 6,750 feet. South from the summit of Round Mountain, the trail gradually descends to the 5,500 foot elevation.

The trail goes through ponderosa pine and mixed conifer stands, as well as an existing rock pit. There is no water along the trail except Scissor Springs. The trail goes through a sheep allotment Wild horses may be observed from the trail.

The view from the summit of Round Mountain includes Big Summit Prairie to the east, Lookout Mountain to the south, and Prineville and the Cascade Range to the west.

Emphasis

Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting. Rehabilitate trail sites where management activities conflict with National Recreation Trail objectives.

Desired Condition

The visitor will note a natural appearing forest along the majority of the trail route (visual quality objective of retention). The outer boundary of the management area will generally not exceed 600 feet on either side of the trail. The Round Mountain National Recreation Trail will be linked to trails on Lookout Mountain and the access road to the Summit of Round Mountain, as well as Walton Lake Campground, through appropriate signing. Recreational improvements will be evident in locations necessary to protect the land, for public safety, and to enhance the public's enjoyment of the area.

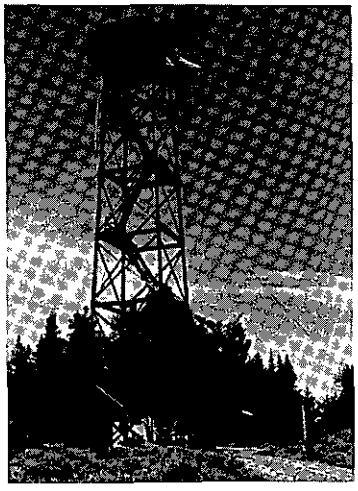
Old growth stands will be seen within the management area. Fire occurrence will be evident where natural and human-caused starts occur. Rehabilitation will be done in areas visually impacted by past management activity along the trail route.

MA-F28 Facilities

460 acres, less than one percent of the Ochoco National Forest

26 percent forested, 74 percent nonforested

Description



This prescription applies to administrative sites located on the Forest. These include ranger stations, work centers, lookouts, and electronic sites.

This prescription does not include the Forest Road System (approximately one percent of the total Forest acres).

Emphasis

Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surrounding area.

Desired Condition

Sites will be efficiently designed work areas consistent with type and intensity of use. Employee wellness and public safety will be the primary design criteria. Color and design of structures and facilities will appear to blend with the surrounding environment

Traffic controls and signing will be apparent and designed to provide a safe driving environment. Roads and trails will be planned, designed, operated and maintained to levels sufficient to provide safe use for the intended traveler and use period.

The historical significance of buildings and structures will be considered during any modifications to sites.

Employee residential areas will be designed to fulfill employee needs for housing and recreation.

Management activities, such as timber harvest, thinnings, and fuel treatments for the protection of facilities from wildfire, may be visually apparent on a short-term basis.

Figure 4-1

BLACK CANYON WILDERNESS (MA-F1)

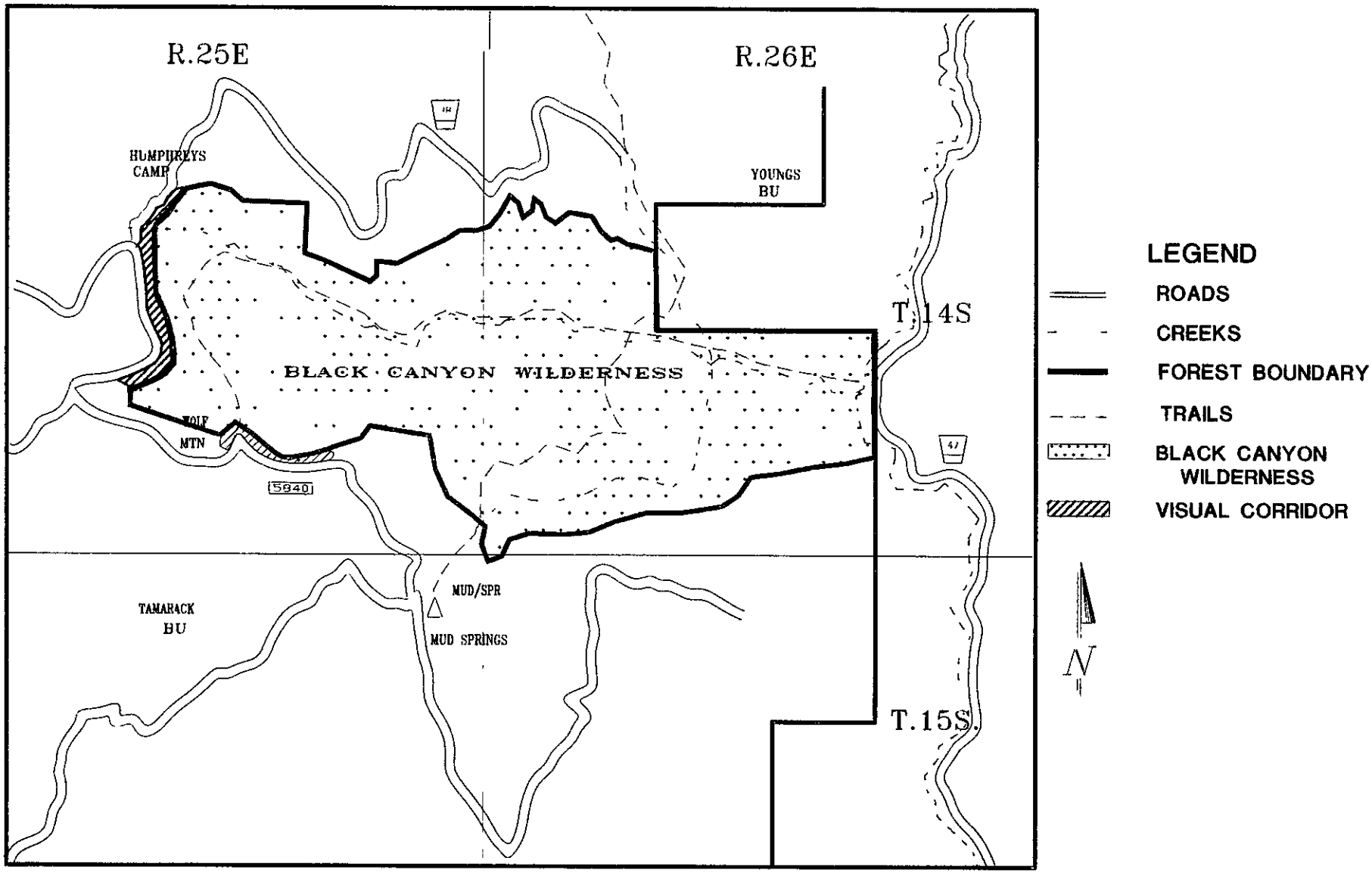


Figure 4-2

BRIDGE CREEK WILDERNESS (MA-F2)

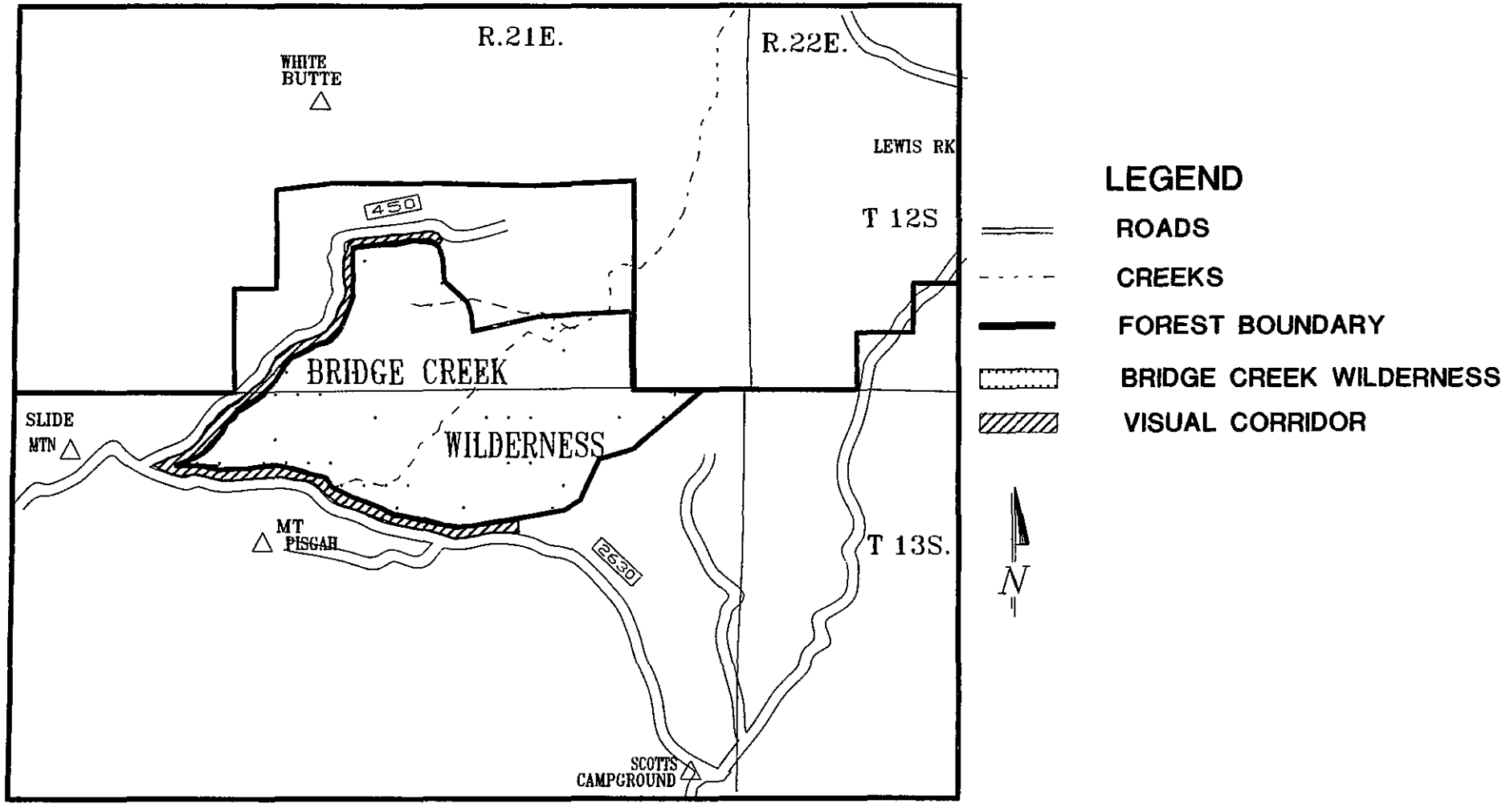


Figure 4-3

MILL CREEK WILDERNESS (MA-F3)

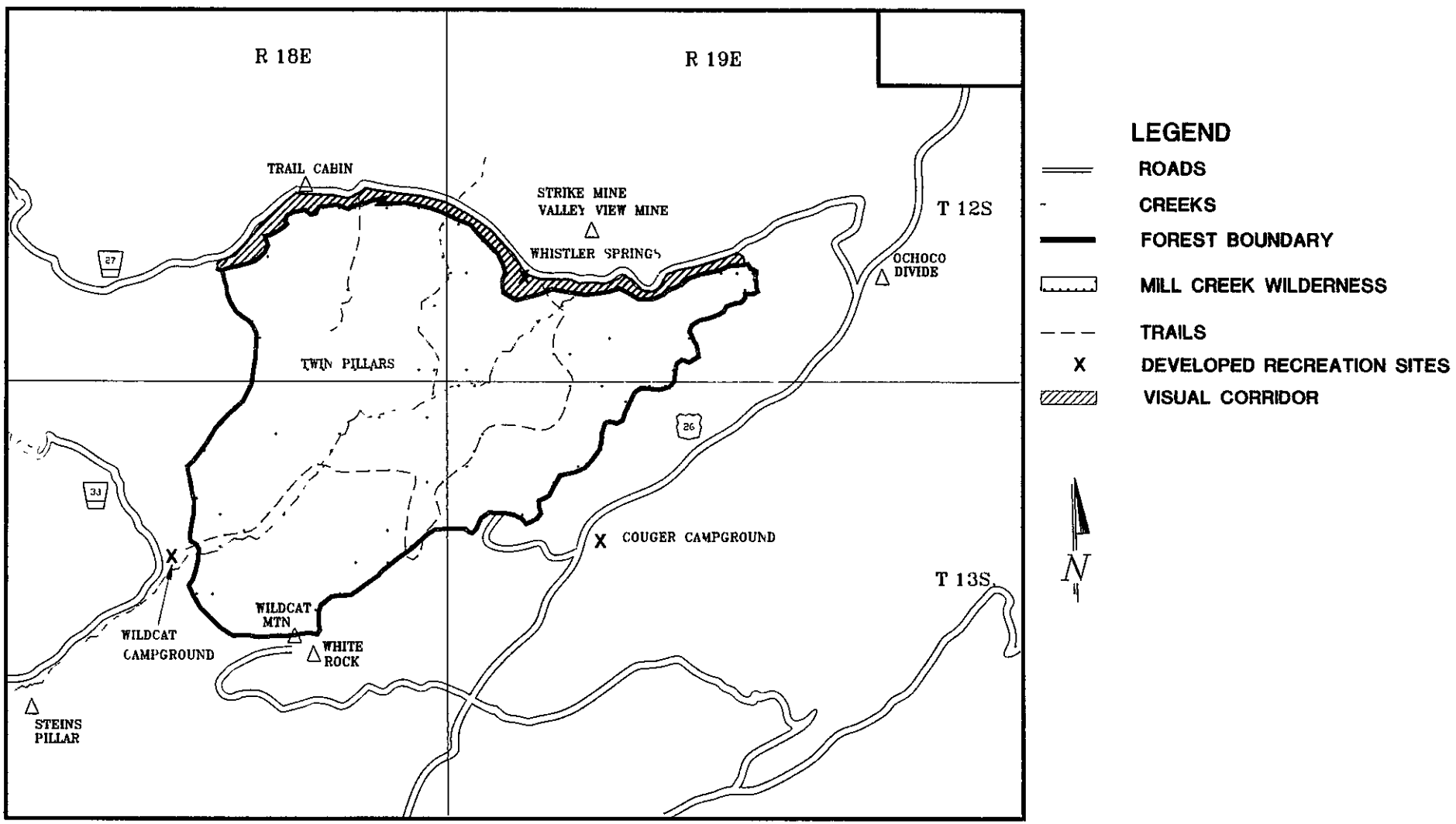


Figure 4-4

NORTH FORK CROOKED RIVER WILDERNESS STUDY AREA (MA-F4)

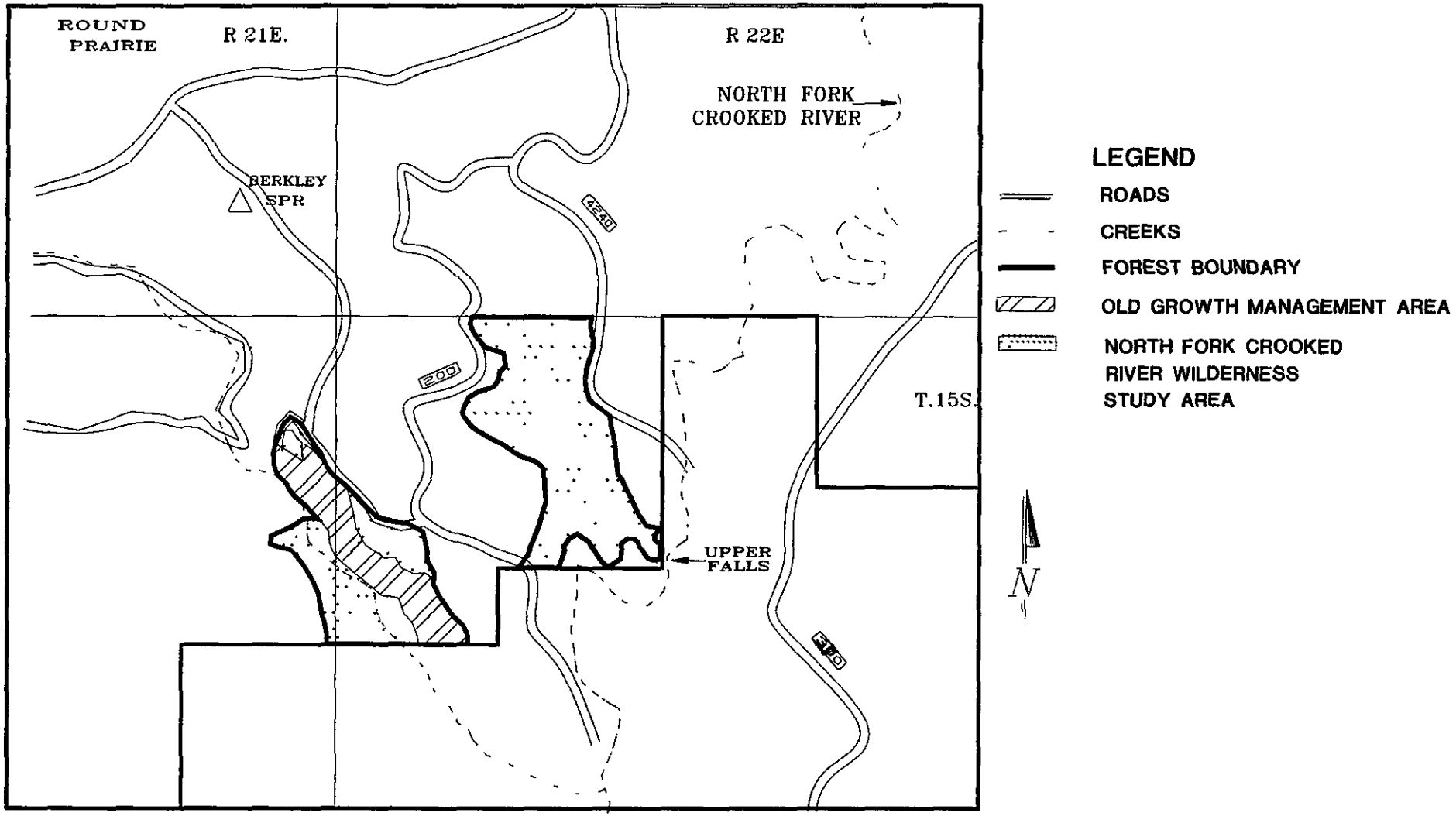


Figure 4-5

ROCK CREEK/COTTONWOOD CREEK ROADLESS AREA (MA-F8)

ROCK CREEK/COTTONWOOD CREEK UNROADED HELICOPTER AREA (MA-F9)

LEGEND

- ROADS
- CREEKS
- FOREST BOUNDARY
- ROCK CREEK/COTTONWOOD CREEK UNROADED HELICOPTER AREA
- ROCK CREEK/COTTONWOOD CREEK AREA
- OLD GROWTH MANAGEMENT AREAS
- SUMMIT TRAIL CORRIDOR
- TRAILS

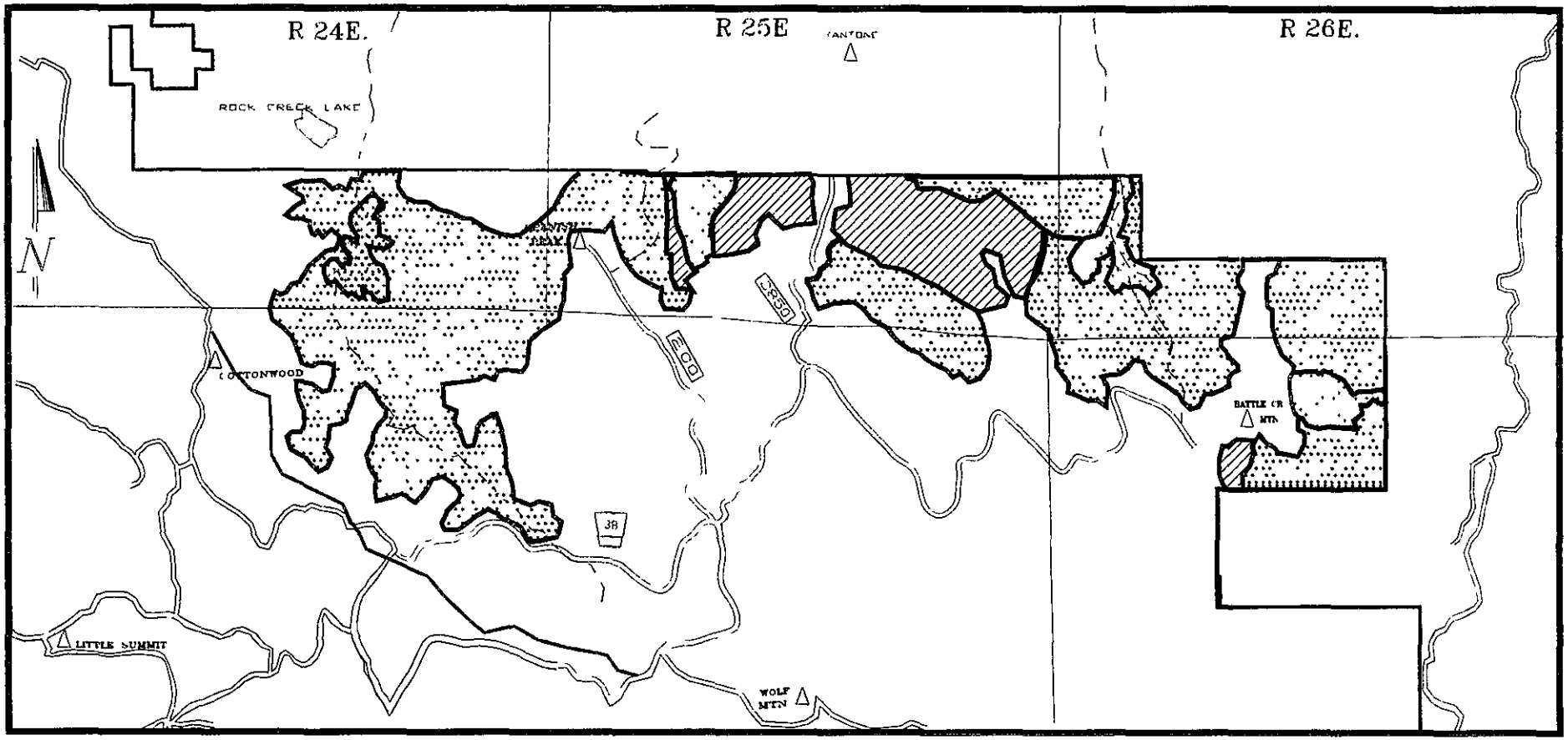
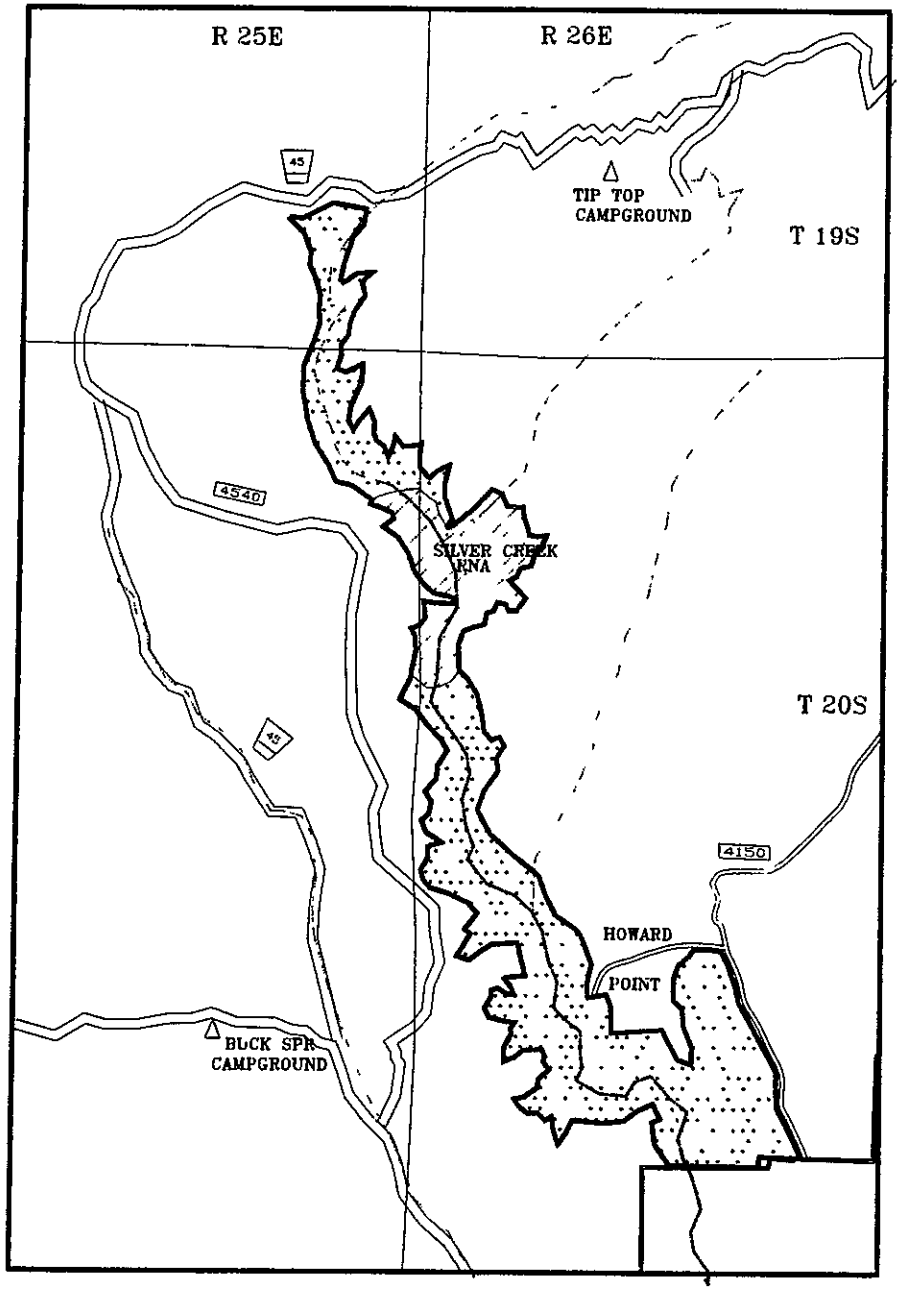


Figure 4-6

SILVER CREEK ROADLESS AREA (MA-F10)



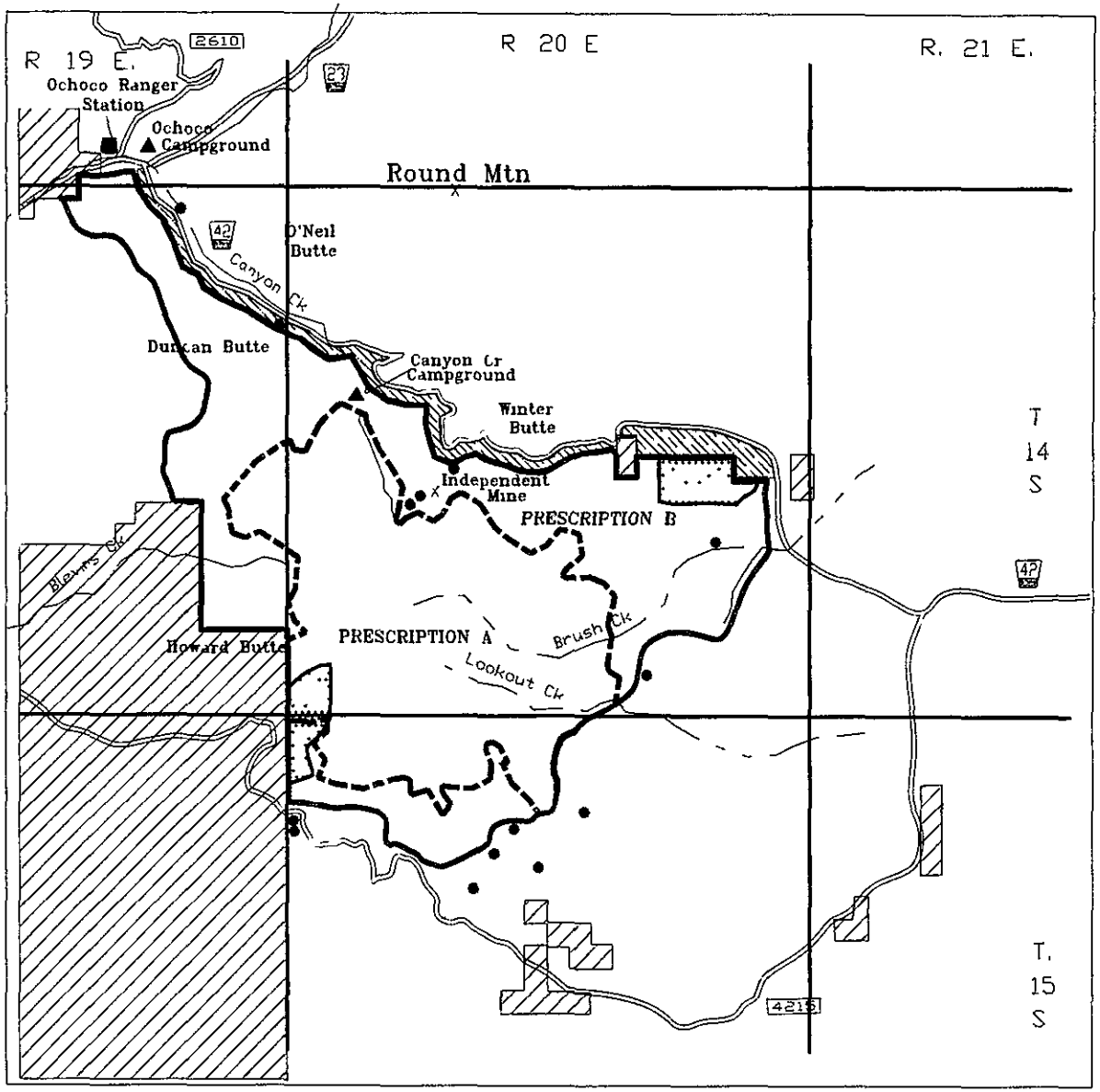
LEGEND

- ROADS
- CREEKS
- FOREST BOUNDARY
- SILVER CREEK RESEARCH NATURAL AREA
- ROADLESS

N

Figure 4-7

LOOKOUT MOUNTAIN RECREATION AREA (MA-F11)



LEGEND

- Roads
- Creeks
- Round Mountain Trail
- Dispersed Recreation Sites
- Campgrounds
- Lookout Mountain Mgmt Area Prescription A
- Lookout Mountain Mgmt Area Prescription B
- Old Growth Mgmt Areas
- Private Land
- Visual Corridor

N

Figure 4-8

RIPARIAN MANAGEMENT AREA (MA-F15)

PRINEVILLE

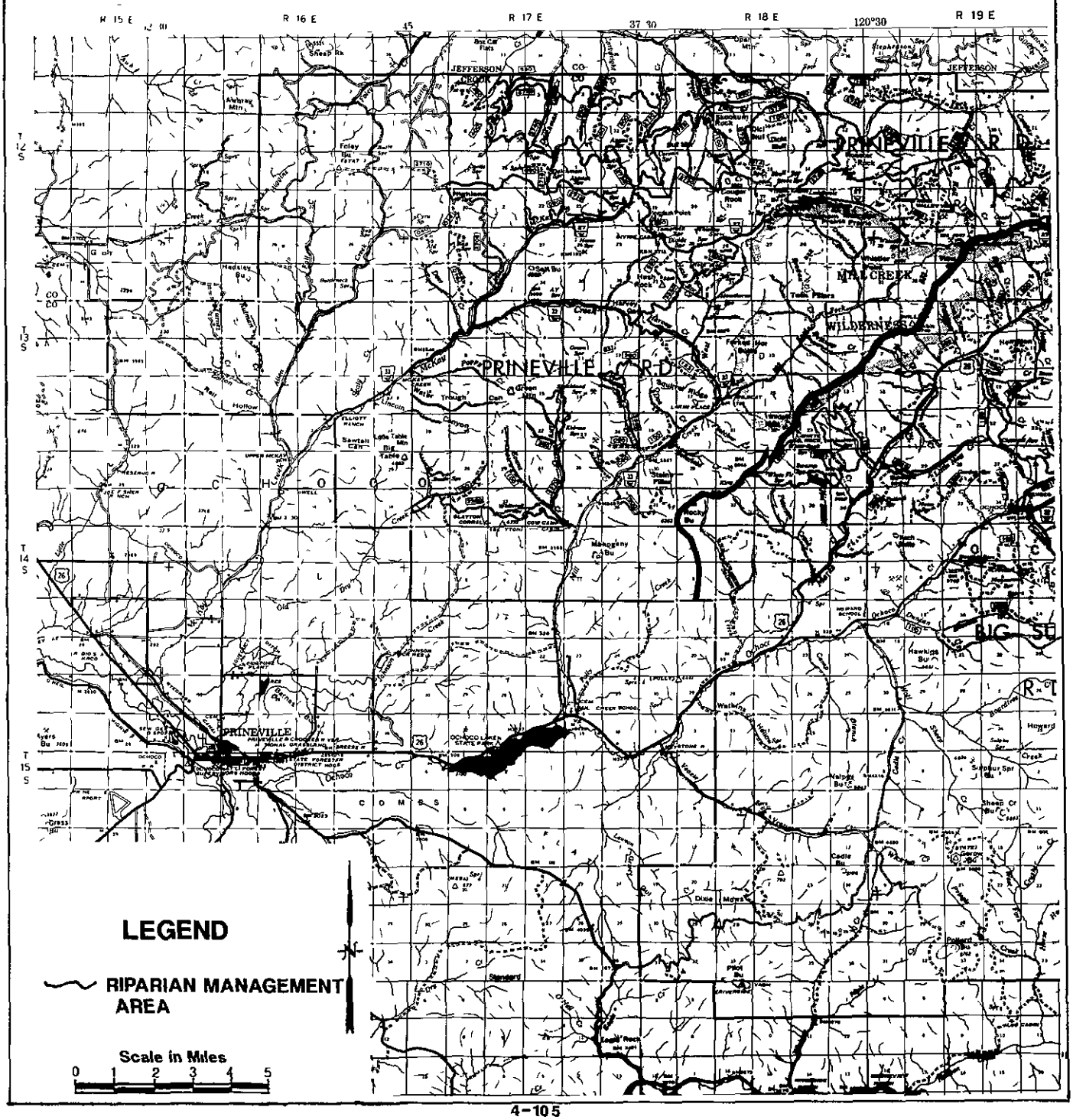


Figure 4-9

RIPARIAN MANAGEMENT AREA (MA-F15)

PRINEVILLE (MAURYS)

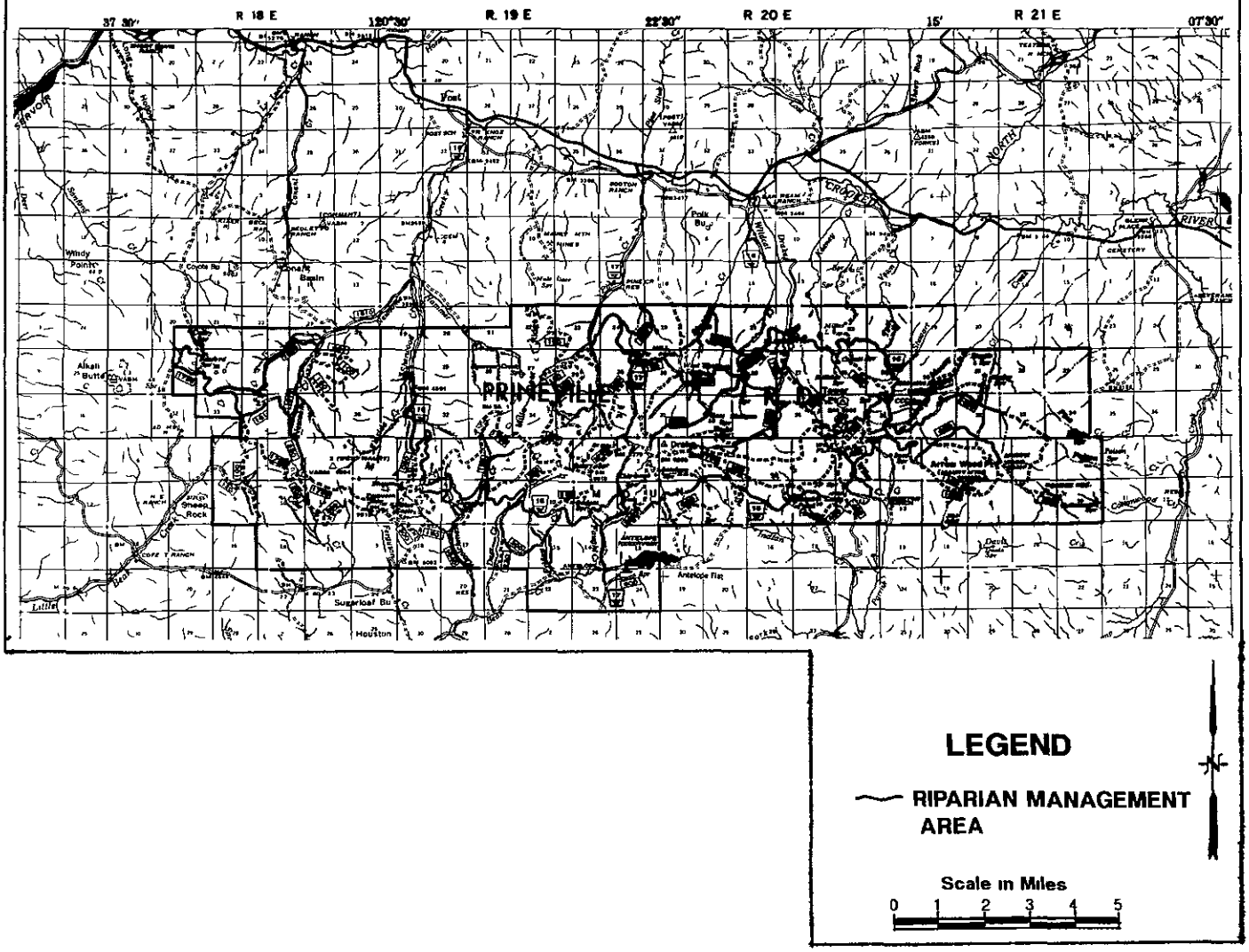


Figure 4-10

RIPARIAN MANAGEMENT AREA (MA-F15)

BIG SUMMIT

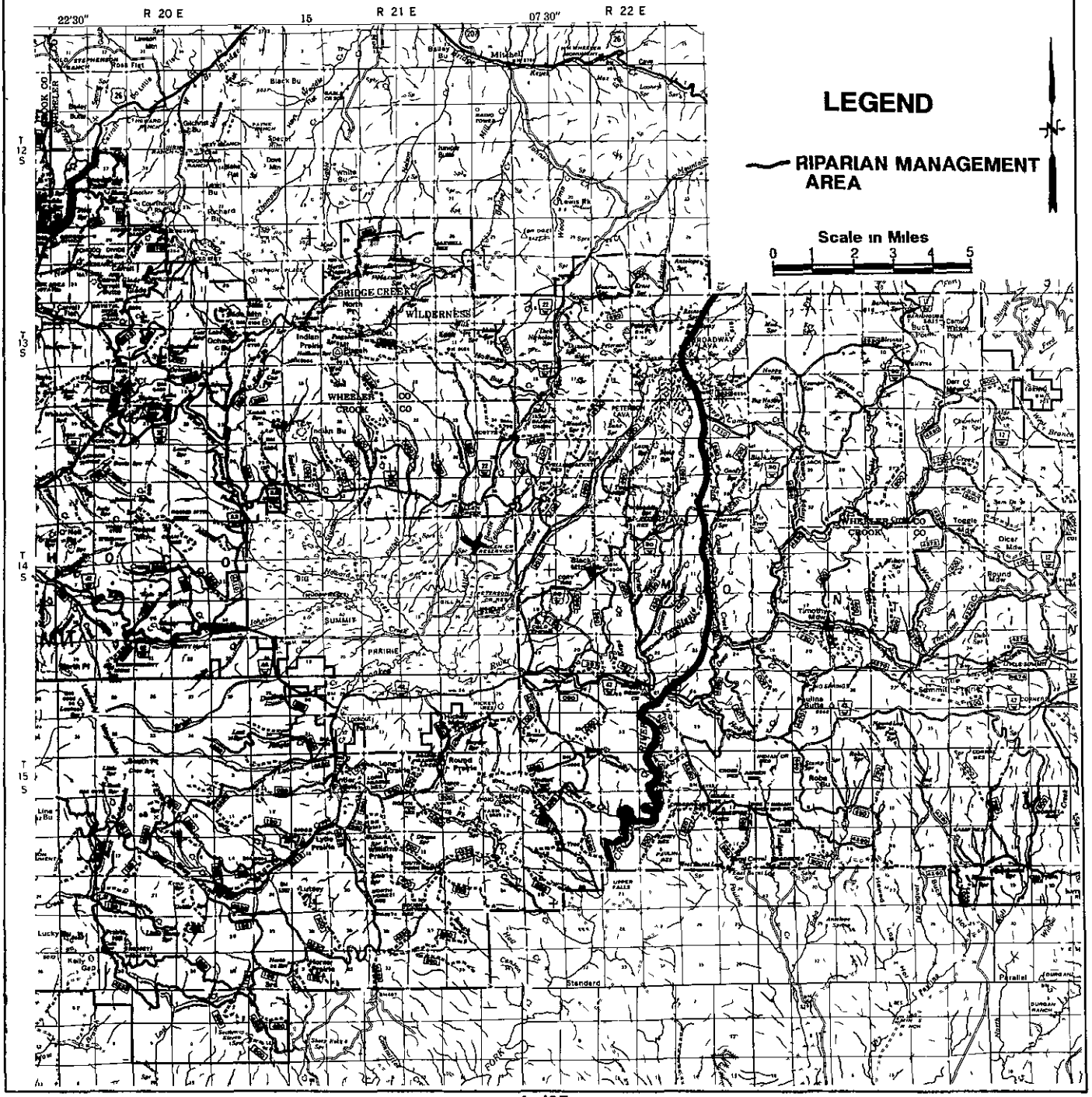


Figure 4-11

RIPARIAN MANAGEMENT AREA (MA-F15)

PAULINA

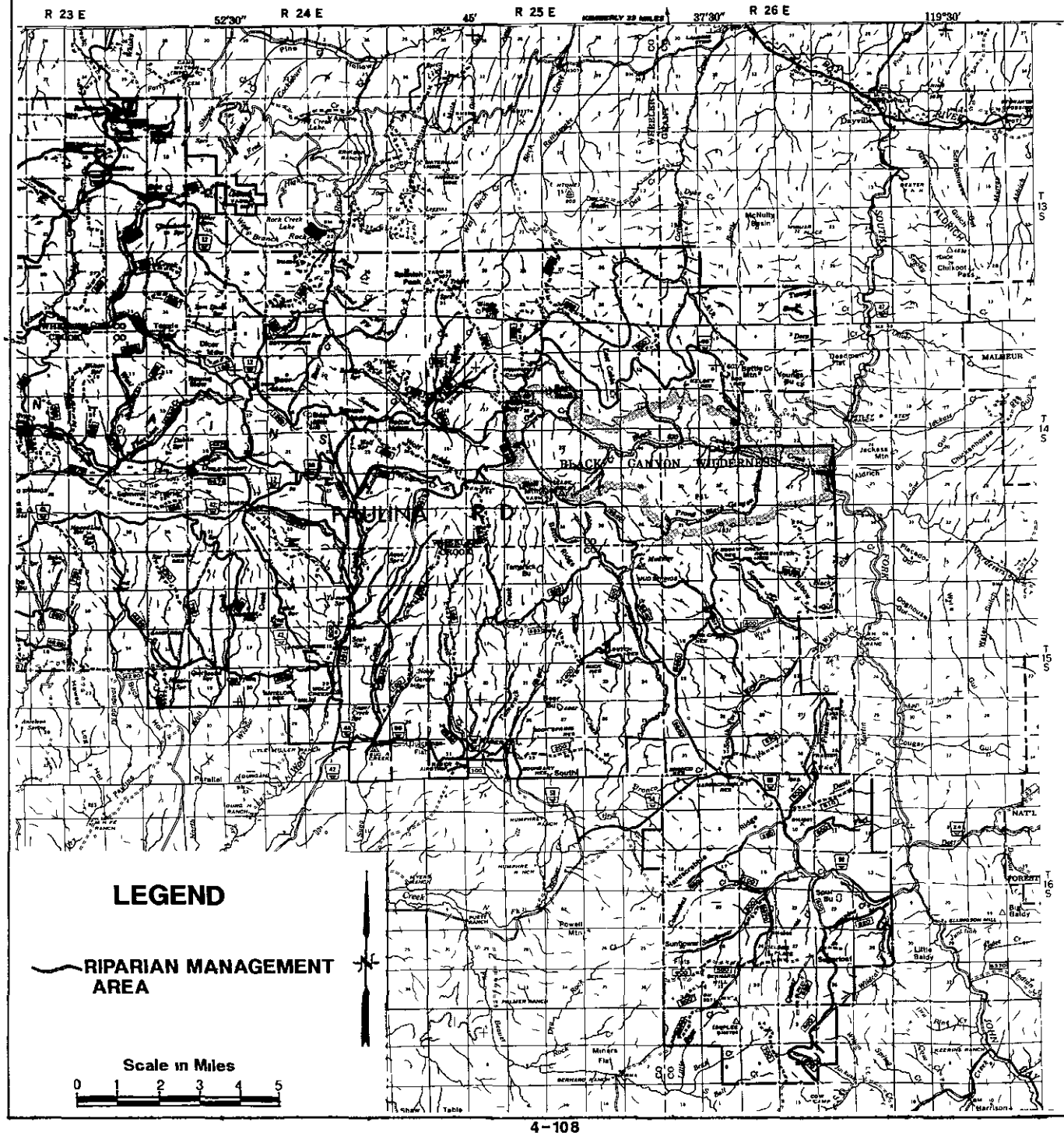


Figure 4-12

RIPARIAN MANAGEMENT AREA (MA-F15)

SNOW MOUNTAIN

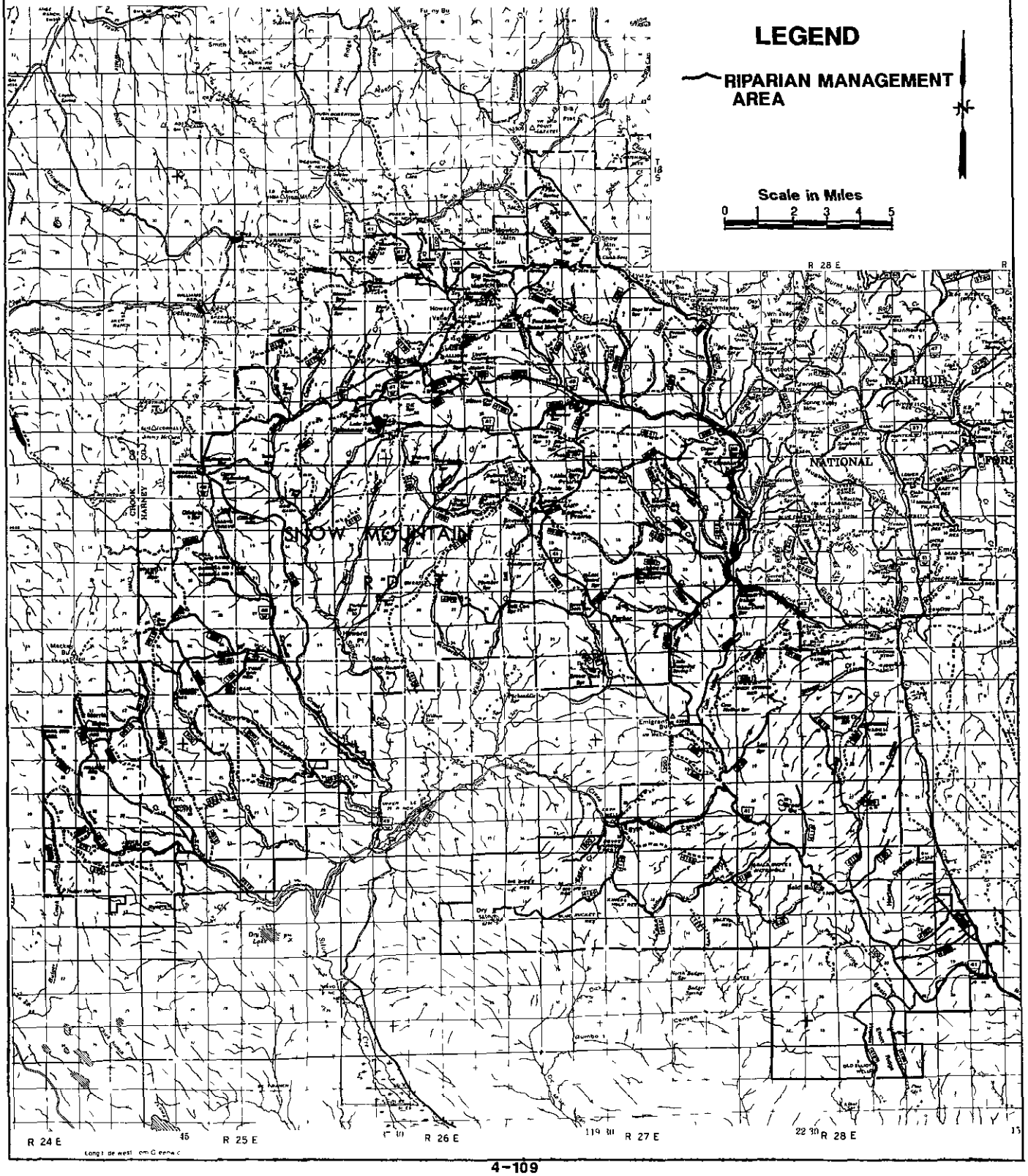


Figure 4-13

BANDIT SPRINGS RECREATION AREA (MA-F16)

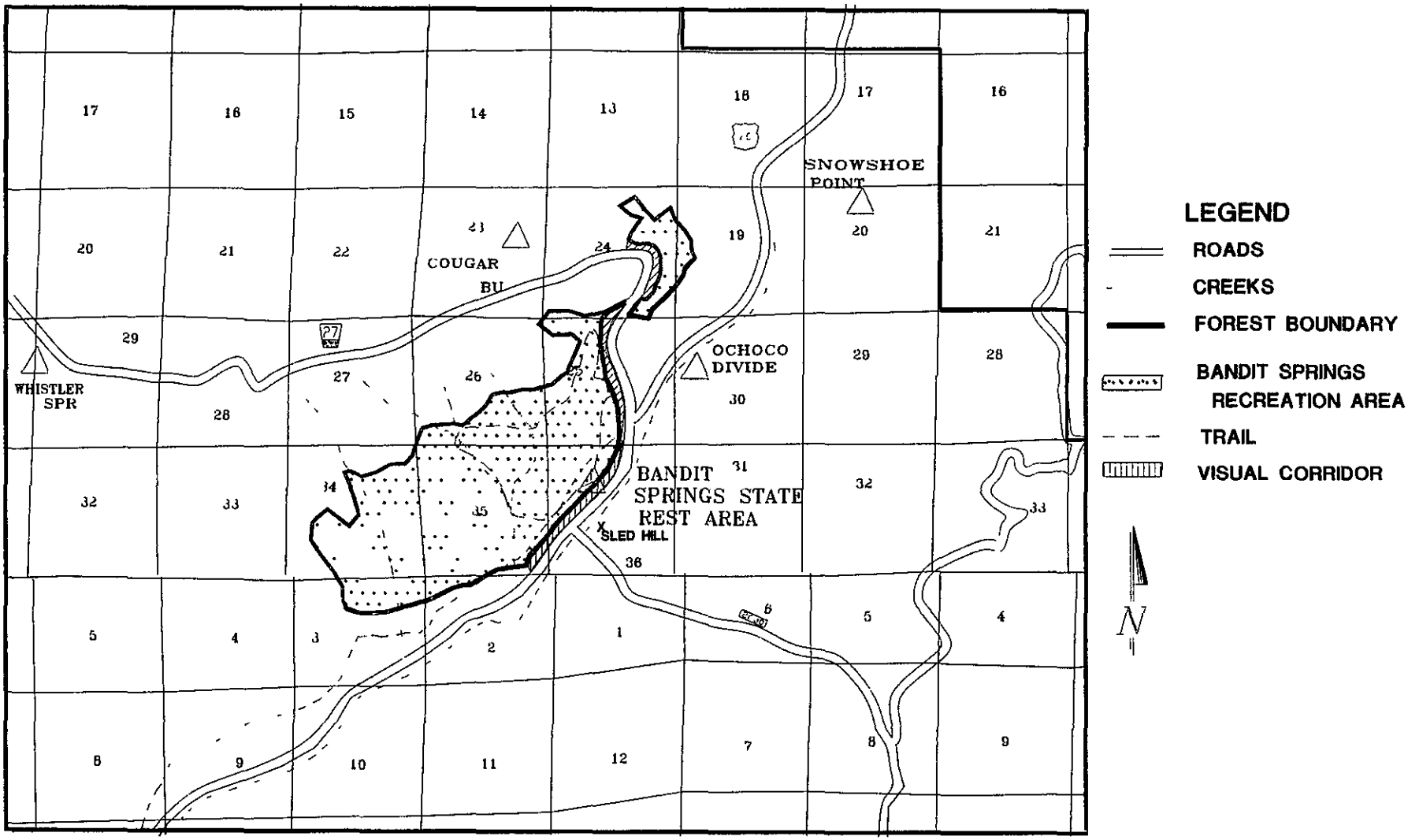


Figure 4-14

STEINS PILLAR RECREATION AREA (MA-F17)

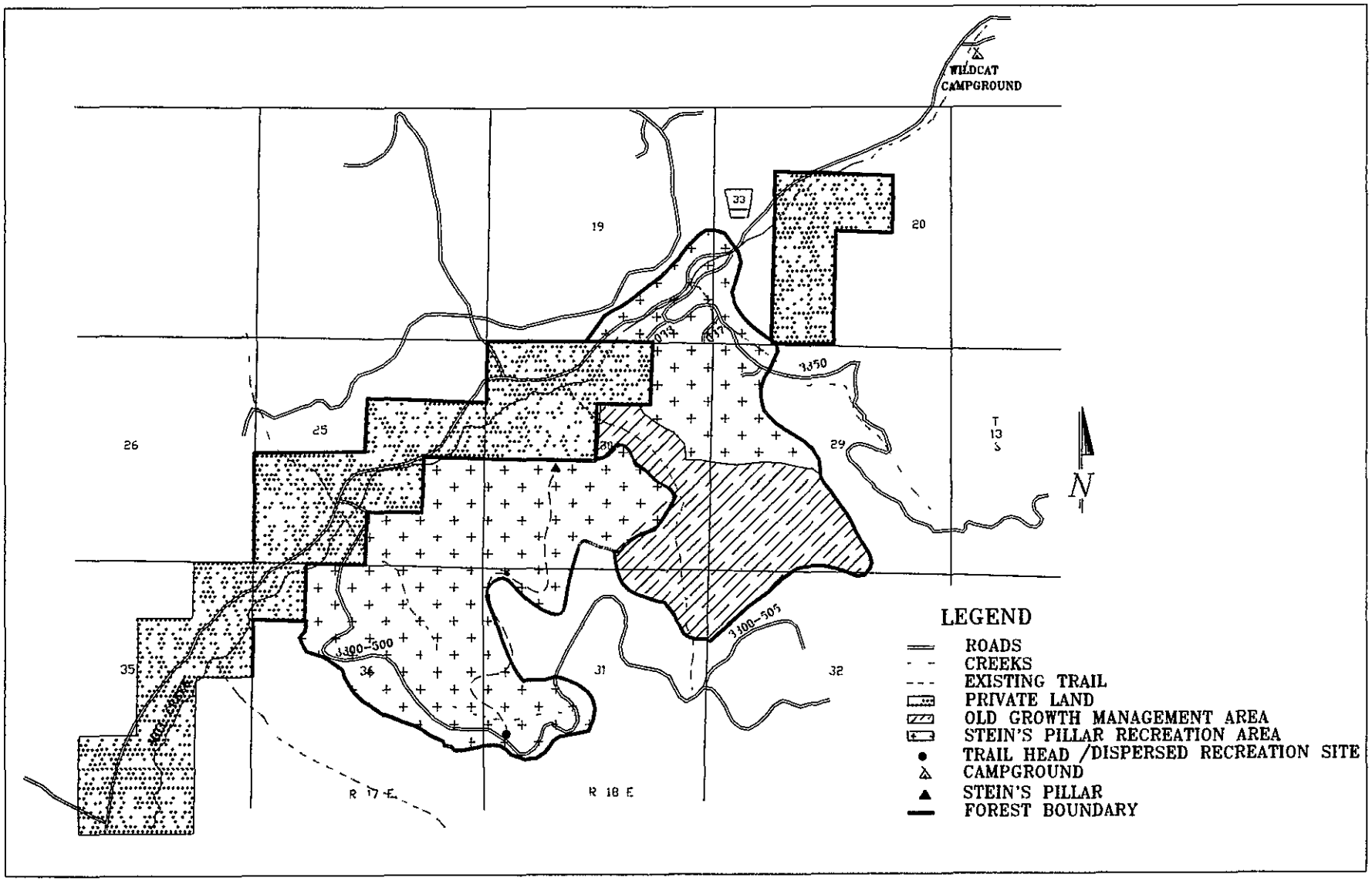


Figure 4-15

HAMMER CREEK WILDLIFE/RECREATION AREA (MA-F18)

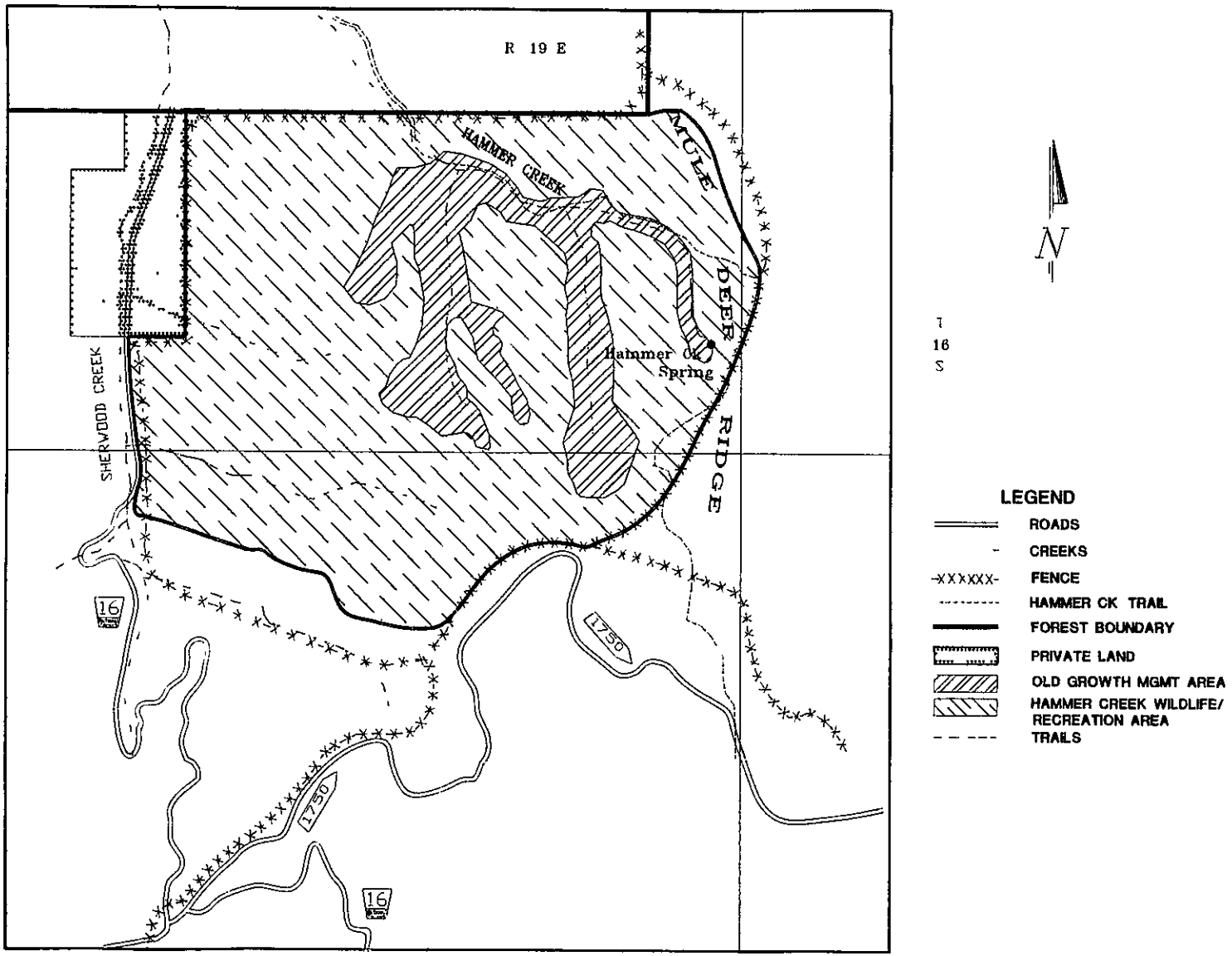


Figure 4-16

DEEP CREEK RECREATION AREA (MA-F19)

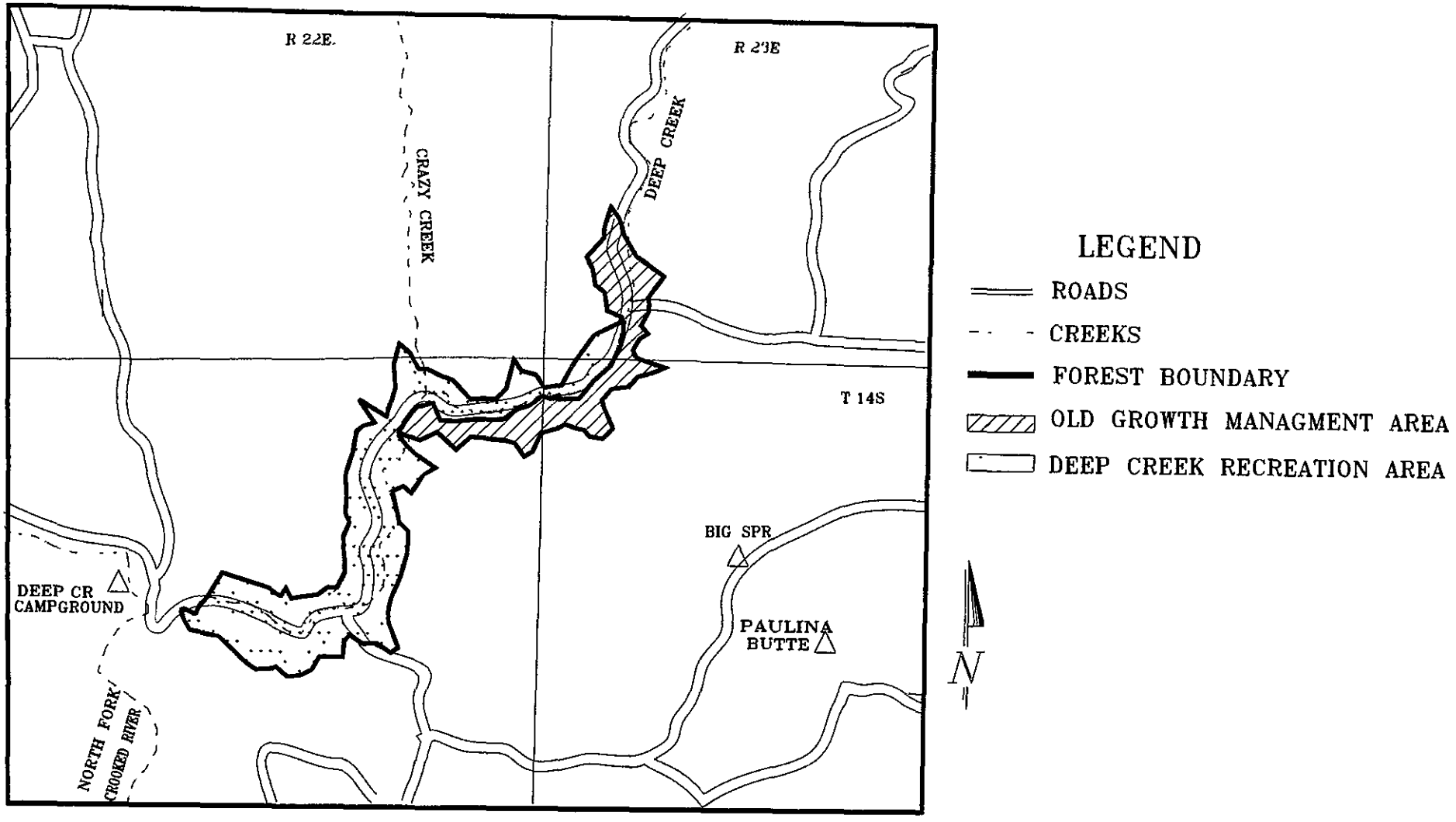


Figure 4-17

NORTH FORK CROOKED RIVER RECREATION CORRIDOR (MA-F23)

(East)

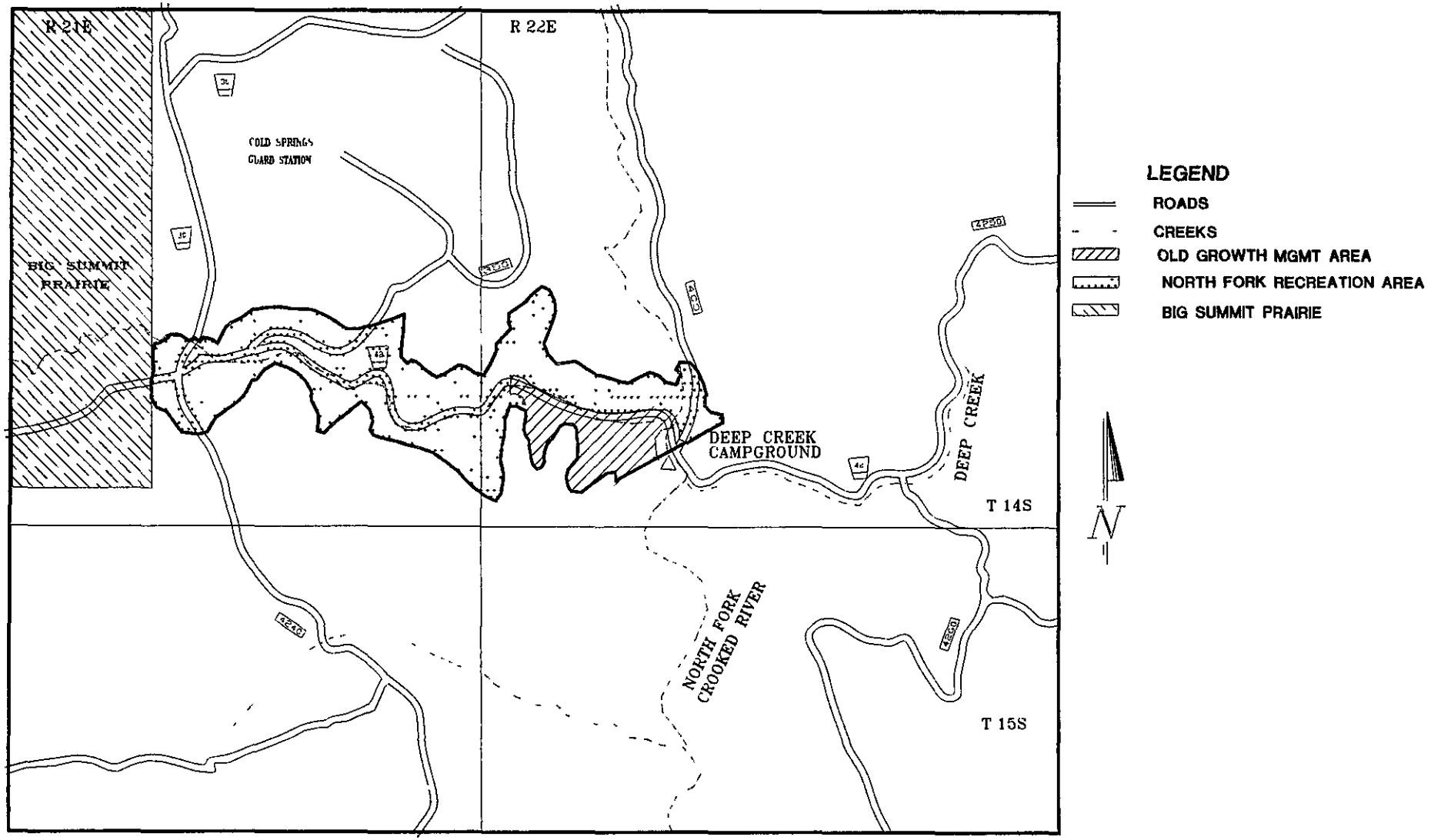


Figure 4-18

NORTH FORK CROOKED RIVER RECREATION CORRIDOR (MA-F23)

(West)

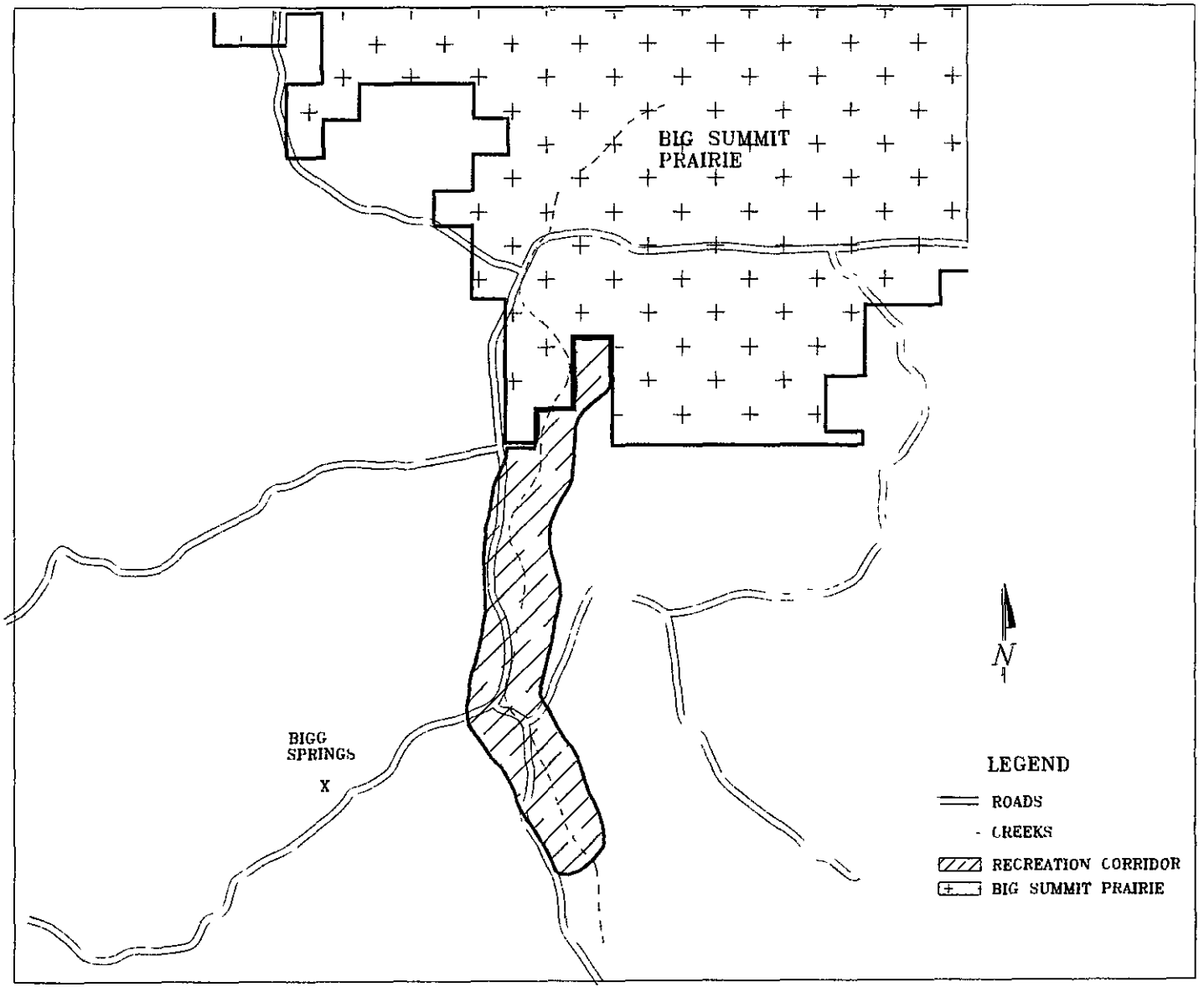


Figure 4-19

NORTH FORK CROOKED RIVER SCENIC CORRIDOR (MA-F24)

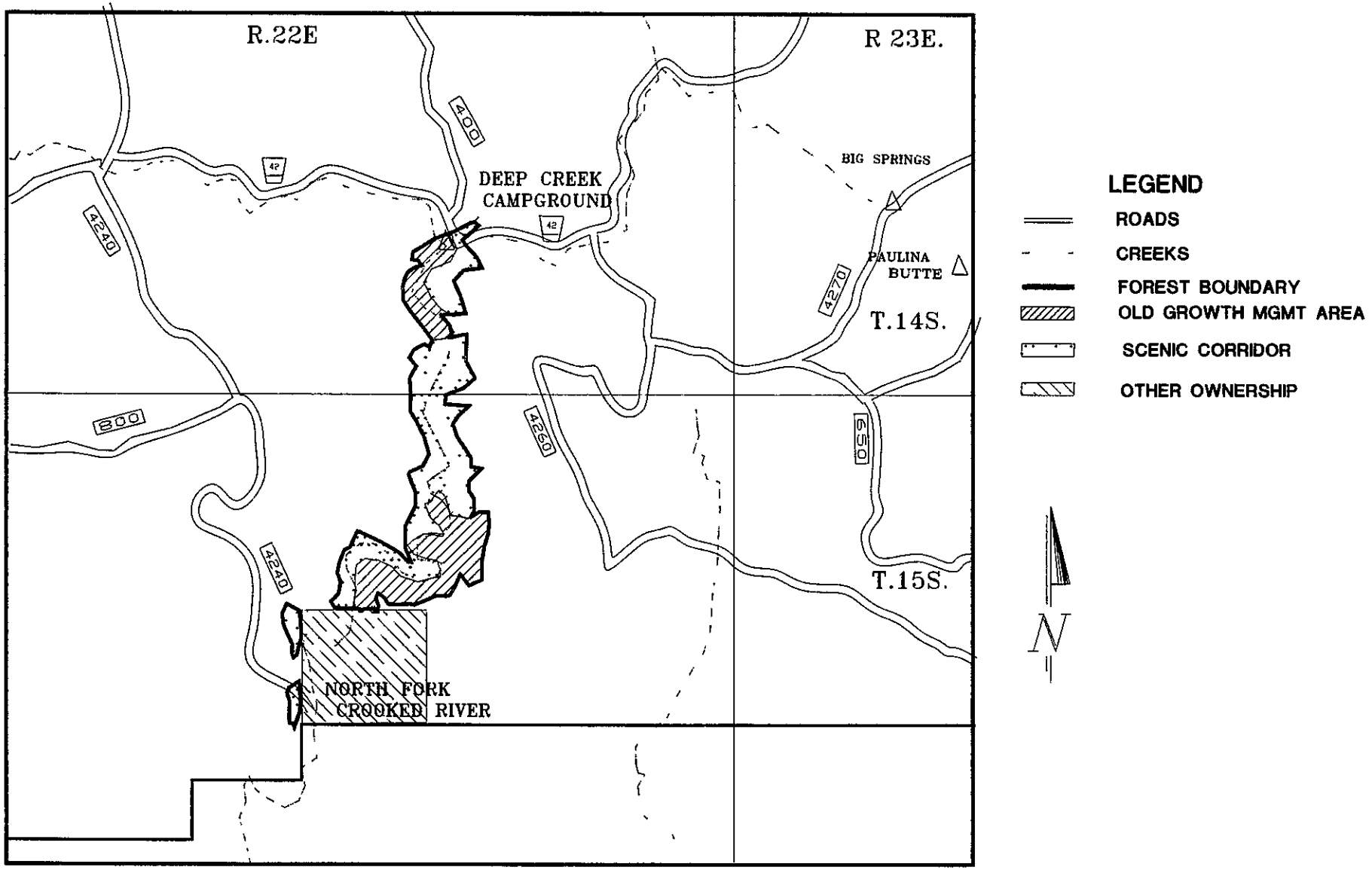


Figure 4-20

U.S. HIGHWAY 26 VISUAL CORRIDOR (MA-F25)

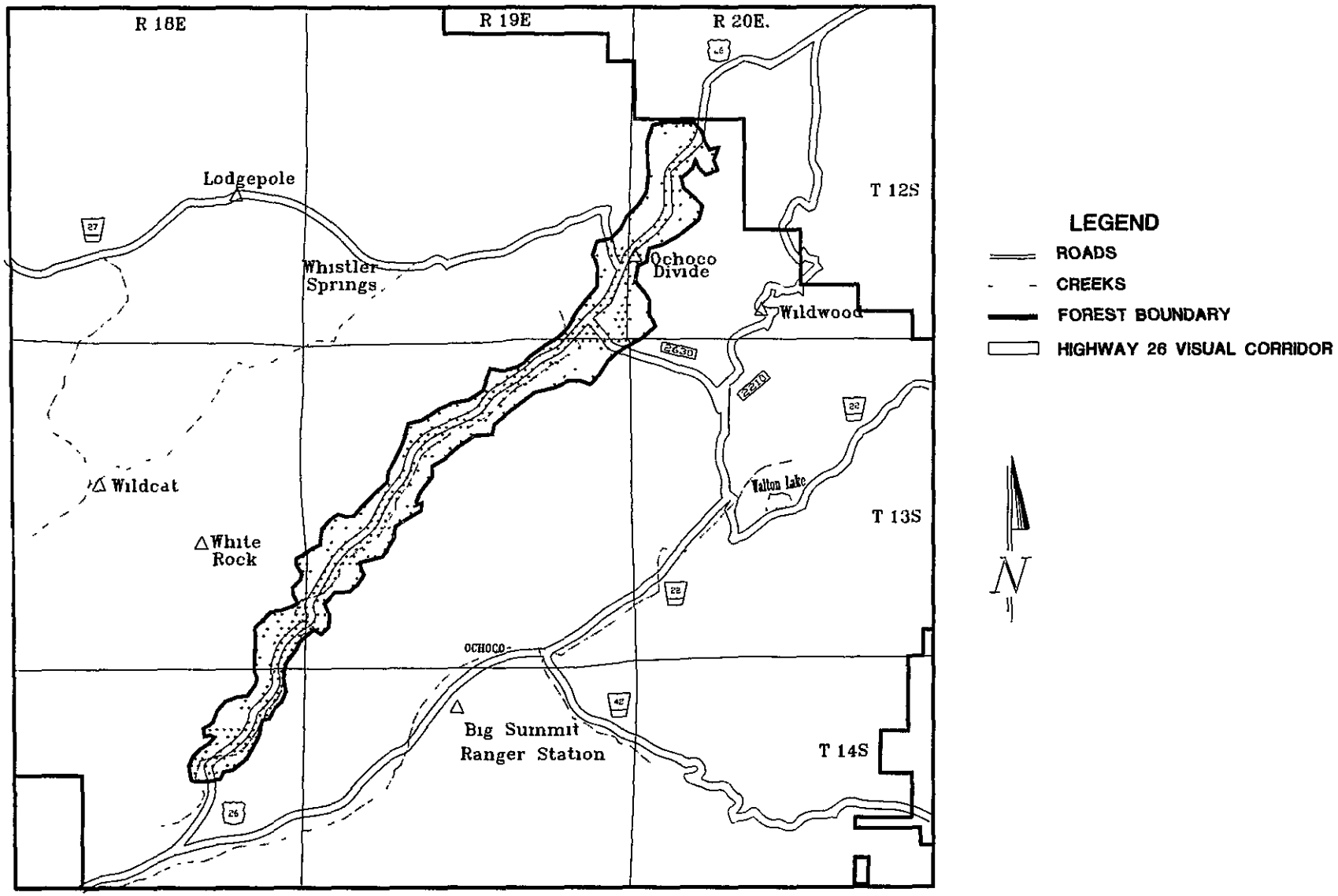
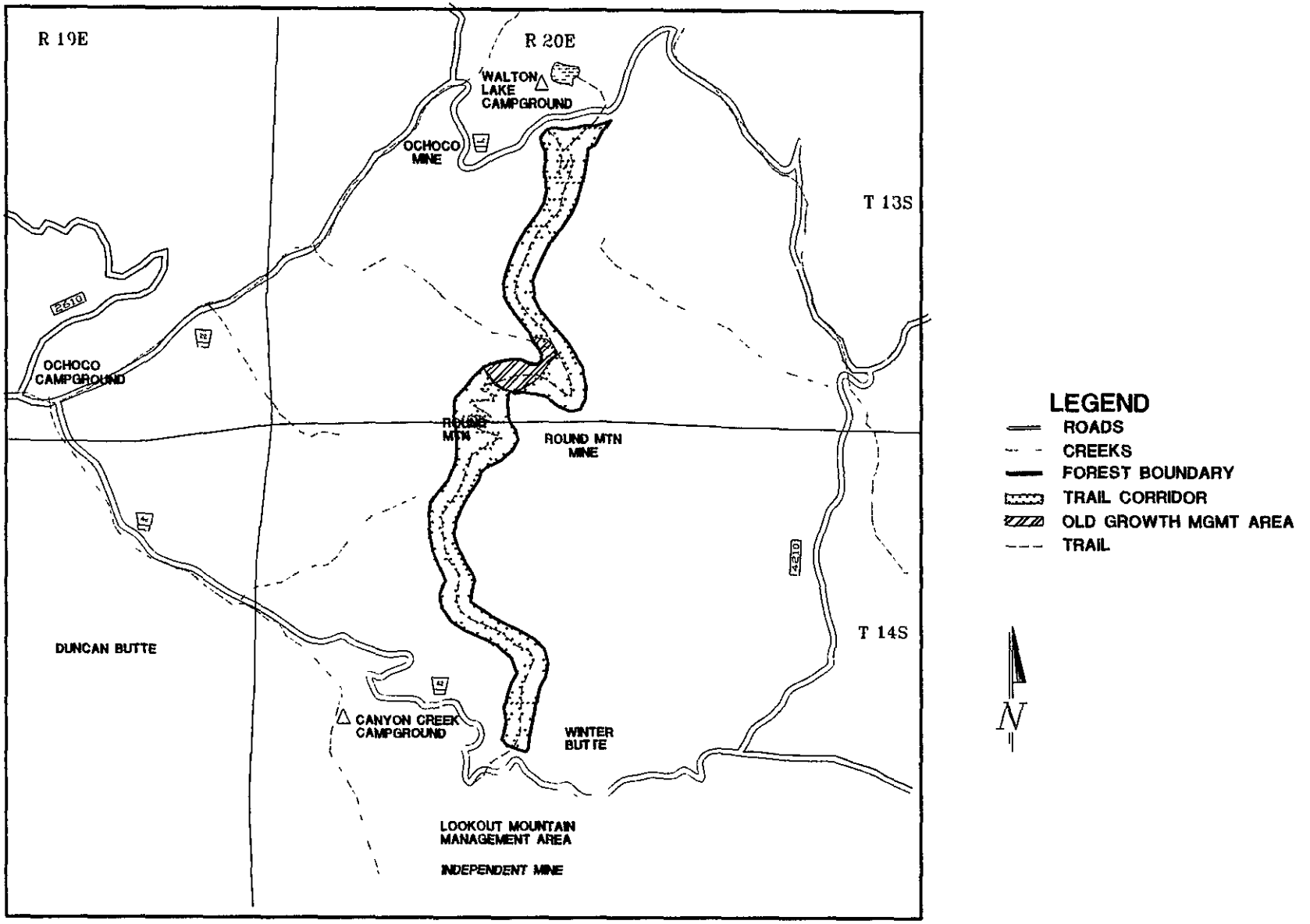


Figure 4-21

ROUND MOUNTAIN NATIONAL RECREATION TRAIL (MA-F27)



Chapter 4

Forest Management Direction

Section 3

Forest-Wide and Management Area Standards and Guidelines

Chapter 4

Section 3

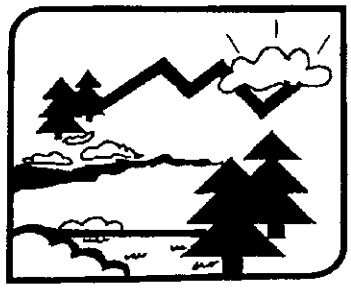
Forest-Wide and Management Area Standards and Guidelines

Standards and guidelines state the bounds or constraints within which all practices are to be carried out in achieving the planned goals, objectives and desired future condition. They are intended to supplement, but do not replace, policy direction found in Forest Service Manuals and Handbooks, and the Regional Guide for the Pacific Northwest Region. They also must comply with applicable State and Federal laws and regulations.

Forest-wide and management area standards and guidelines are grouped together by resource (or functional area), so that the user will have the total management direction available in one package, Management area standards and guidelines are more site-pecific than Forest-wide standards and guidelines, and must be in compliance with them (Forest-wide) as well as higher order policy, regulation and law.

Some resource direction is only applicable on a Forest-wide basis and does not vary by management area. Hence, no management area standards and guidelines are presented for the following resources: Air Quality, Biological Diversity, Old Growth, and Social and Economic.

Air Quality



Forest-Wide Standards and Guidelines

Comply with regulations of the Clean Air Act, as amended, and coordinate activities with the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry.

Demonstrate reasonable progress in reducing total suspended particulate (TSP) emissions from prescribed burning. The starting point for this reduction has been established as 9,200 tons per year for the Forest. Monitor particulate emissions originating from Forest activities as outlined in Chapter 5, Implementation of the Forest Plan.

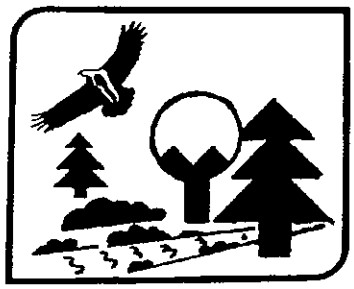
Conduct prescribed burning in accordance with State smoke management plans.

Follow Regional standards and guidelines for smoke emissions as stated in Regional Vegetation Management Final Environmental Impact Statement.

Use the best available predictive methods and models and most cost-efficient technologies to minimize the impact of prescribed burning on designated smoke sensitive areas and Class I areas. Comply with regulations of the Oregon State Implementation Plan for Protection of Visibility in Class I Areas.

Protect the Forest air resources against pollution sources outside the Forest boundaries through application of the Prevention of Significant Deterioration (PSD) regulations contained in the Clean Air Act. Take appropriate action to contact the Oregon State Department of Environmental Quality when outside air pollution sources, in particular those originating on a regular seasonal basis from the Madras basin and the Willamette Valley, exceed Forest standards.

Biological Diversity



Forest-Wide Standards and Guidelines

Protect Research Natural Areas (RNA's) from influences which detract from their purposes. Monitor vegetation to insure that all major vegetative types and unique plant communities are preserved for future knowledge and gene pool diversity.

Manage and protect wildernesses in a manner that allows ecological processes, succession, fire, and similar influences to play a natural role, while protecting resources outside the areas from unnecessary risk of catastrophic fire.

Maintain viable populations of all threatened, endangered, and sensitive plant and animal species (see Standards and Guidelines for Wildlife and Fish).

A minimum of two percent of the Forest, in addition to areas in wilderness and some RNA's, will be managed for old growth, representing climax or near climax forest stand conditions.

Identify and protect unique ecological situations, through the Forest implementation and monitoring process. Examples of these include: eagle roosting, anadromous fish spawning, representative examples of old growth forest, aspen clones, river canyons, riparian areas and important connective habitat.

Disperse created openings and limit their size(s) to that described under the timber management guidelines.

Maintain soil productivity through management practices which reduce erosion and the application of guidelines that limit use of heavy equipment and skid road densities.

Incorporate plant association information (Hall, 1973 and 1989; Hopkins, et al, 1983) and their management implications, into project design and implementation.

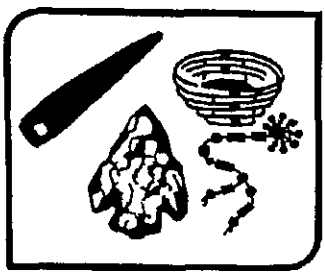
Protect fragile sites such as shallow soil areas (scablands) and natural meadows.

Incorporate and design habitat-specific species requirements--such as those for cavity excavators--into guidelines and prescriptions for individual projects.

Monitor plant communities/associations to determine conditions and trends. Encourage recovery or prevent deterioration where activities may be leading to poor conditions, downward trends, the displacement of native plants or plant communities by undesirable weedy, annual or noxious vegetation, or where cover is unusually low for the particular plant associations (see Hall, 1973 and Hopkins et al, 1983). Manage aspen stands to produce a vigorous population, Forest-wide.

Limit the frequency of underburning of plant communities to the natural fire cycle, or less frequently, until research is completed on ecological effects of burning.

Cultural Resources

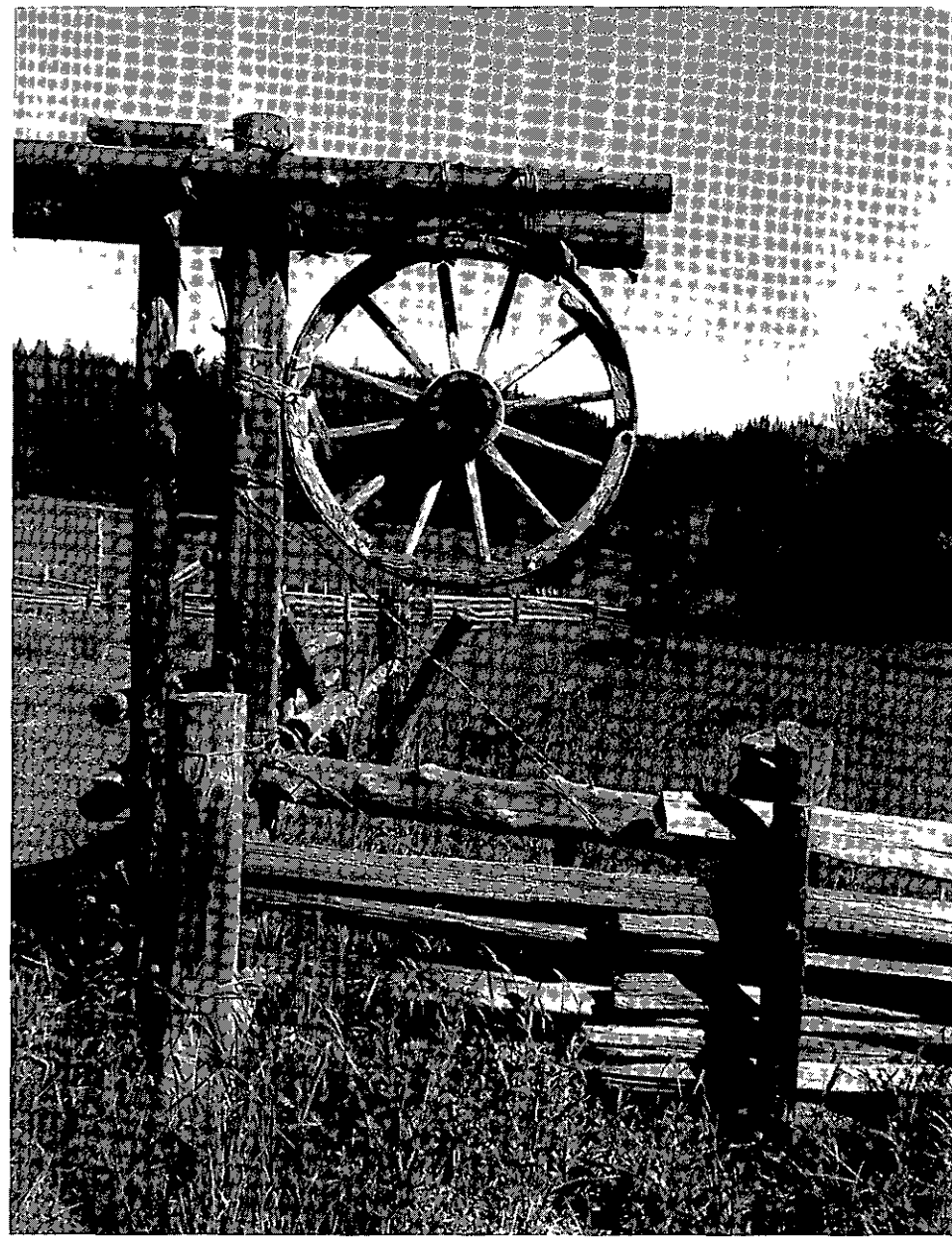


Forest-Wide Standards and Guidelines

Update the existing Cultural Resource Overview each decade to incorporate all known cultural resource information on each District. The Overview will provide a framework for evaluating cultural resources located through survey efforts, will assist in the development of a Forest Inventory Plan approved by the Oregon State Historic Preservation Office (SHPO), and will help to identify opportunities for site interpretation.

Conduct cultural resource surveys (inventories) in advance of all ground-disturbing actions. Accomplish this through the implementation of the Interim Inventory Design (Dyrden, 1988) or Forest Inventory Plan (when formally approved). Survey both project and non-project areas during the earliest stages of the planning (NEPA) process. Submit project Cultural Resource Reports for SHPO review and Section 106 (National Historic Preservation Act, as amended) compliance prior to issuance of the Decision Notice and Environmental Assessment or Environmental Impact Statement.

Evaluate cultural resource properties located during inventory to determine their eligibility to the National Register of Historic Places. This will be accom-



plished through the Lithic Scatter Programmatic Memorandum of Agreement (PMOA), individual site and thematic Determinations of Eligibility.

Develop contexts and themes from which to evaluate all classes of sites through thematic Determinations of Eligibility. Develop management plans, Memorandums of Agreement (MOA's), and PMOA's in cooperation with the State Historic Preservation Office, the Advisory Council on Historic Preservation, and other interested publics (Native Americans, local historical societies, groups and professional organizations) to facilitate cultural resource treatment and future management.

Document through the NEPA process the results of cultural resource surveys for all proposed ground-disturbing projects (Federal, Federally-funded or permitted) or projects determined to have an effect upon cultural resource sites or values.

Prepare a Determination of Effect for all projects and submit for Oregon SHPO review and consultation (i.e. No Effect, No Adverse Effect, or Adverse Effect).

Mitigate adverse effects to eligible and significant sites under consultation with the Oregon SHPO, Advisory Council on Historic Preservation, and interested publics. In ranked order of preference , the following treatment options will be considered:

Avoidance through project design modification or abandonment (No Effect).

Combination of project modification and scientific data recovery under an approved data recovery plan (No Adverse Effect or Mitigation of Adverse Effect).

Data recovery and analysis such that cultural resource values are protected and preserved in forms useful to various scientific, government, ethnic and local groups (Mitigation of Adverse Effect).

Cultural resource sites, districts and thematic classes of such will be nominated to the National Register of Historic Places. Schedule nominations incrementally until the Forest-wide inventory of cultural resources is completed. Protect significant sites from degradation due to public use or natural deterioration. Protection methods may include, but are not limited to, scientific study and collection, the use of fences or barriers, prudent use of signs, site stabilization, closure orders, site monitoring, area patrolling, and restriction of access to site locational information as provided for under the provisions of the Freedom of Information Act.

Interpret and enhance selected sites for the education and enjoyment of the general public. A priority will be given to sites within or adjacent to public use areas, and which are being degraded through natural or human impacts. Produce scientifically accurate and culturally sensitive displays, brochures, posters, tours, lectures, etc. Support the distribution of scientific reports, monographs, video tapes, and books for the benefit of interested members of the public. Promote

public-private partnerships which will benefit Forest visitors through enhancing and interpreting sites.

Burial Sites

Treat historic or prehistoric burial remains as follows:

Evaluate the site to determine if the skeletal material is human and to what time period or ethnic group it may be ascribed.

Contact local authorities, Native American Tribal Group(s), other ethnic groups and County Historical Societies where appropriate.

For Native American burials, reinter in-place with involvement by the appropriate representatives of a federally recognized Tribe or Native American group. Project planning for management activities in the site vicinity shall consider burial location in planning decisions and if necessary modify implementation so as to avoid direct and indirect impacts to the burial site.

Where reinterment in-place is not feasible or prudent, alternative locations for reinterment will be reviewed and selected in consultation with the appropriate Indian Tribal representatives. In situations where a direct link cannot be made to an existing Federally recognized Tribe, this consultation shall take place with the nearest tribe or confederation.

Religious Freedom

Meet all requirements of the American Indian Religious Freedom Act (AIRFA). This law makes it the policy of the Federal government "to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise [their] traditional religions." This protection includes, but is not limited to, access to sites, use and possession of sacred objects, and the enactment of ceremonies and traditional rites. Related activities include the gathering and processing of plants for food, medicinal, or craft uses; the construction of sweat lodges, or "vision quest" structures, and the like.

AIRFA addresses the religious freedom of all Native Americans without regard for Federal tribal recognition, but does not convey exclusive use of areas or free use of Forest products. In considering access to properties or sites within its boundaries, the Forest will examine other potential or existing uses and activities. Publicly owned properties, sites, objects of antiquity, etc. remain the property of the United States government. Activities which may effect such properties, sites, or objects are subject to existing laws, regulations and treaties.

Treaty Rights

Honor the rights reserved by the Confederated Tribes of Warm Springs Indians for lands ceded to the Federal Government through the Treaty of 1855.

On the ceded lands, the Tribes have the right to take fish in streams running through and bordering the Reservation and at all other usual and accustomed stations in common with the citizens of the United States.

The right of hunting, gathering roots and berries, and pasturing stock on unclaimed lands in common with citizens was also secured within the ceded lands.

Management Area Standards and Guidelines

Resource - Cultural Resources

Practice
Enhancement and Interpretation

Standard and Guideline
On-site interpretation and enhancement of cultural resources will not be done. Off-site interpretation and enhancement is permissible.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas

Standard and Guideline
Enhancement and interpretation of cultural resources will not be emphasized. Significant cultural resource sites and features may be enhanced and interpreted if the action does not detract from the management area objectives.

Applicable Management Area
MA-F6 Old Growth
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Area(A)

Standard and Guideline
Selectively enhance and interpret cultural resources, with priority on identifying sites that will complement the management emphasis of the specific areas.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian Areas
MA-F16 Bandit Springs Recreation Area

MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline

Enhance and interpret cultural resources while meeting Forest-wide standards and guidelines.

Applicable Management Area

MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F11 Lookout Mountain Area(B)
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F26 Visual Management Corridors

Practice

Structures

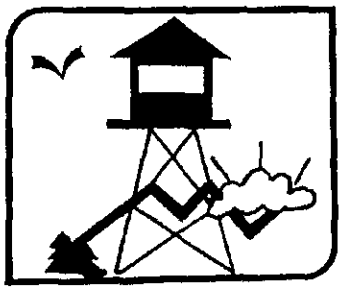
Standard and Guideline

Structures, such as old fences, that do not qualify for the National Register of Historic Places, will be removed or allowed to deteriorate naturally.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas

Facilities



Forest-Wide Standards and Guidelines

Buildings, utility systems and related facilities should be planned, developed, maintained and operated for safe use, support of Forest resource programs, and cost effectiveness. Historic buildings will be managed in accordance with the Programmatic Memorandum of Understanding (PMOA) for Depression-Era Administrative Buildings.

Construction of new buildings, or additions to existing buildings and utility systems, shall comply with approved site development plan.

Provide and manage administrative facilities in a manner sufficient to accomplish land and resource management and protection objectives of the Forest. Prepare administrative site development plans for all Forest administrative sites. Long-term development and maintenance costs will be a consideration in facilities planning.

Management Area Standards and Guidelines

Resource - Facilities

Practice
Construction, Reconstruction and Maintenance of Administrative Buildings and Structures

Standard and Guideline
No administrative buildings or structures allowed.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas

Standard and Guideline
Allow no administrative facilities within floodplains unless no feasible alternative sites exist. (Executive Order 11988).

Applicable Management Area
MA-F15 Riparian Areas

Standard and Guideline
Locate and design facilities to blend into the natural terrain as much as possible; properly use the site; and provide for traffic control, sanitation, public safety, site protection, and use distribution. New and upgraded facilities will incorporate a barrier-free design in order to be accessible to the physically handicapped.

Applicable Management Area
MA-F13 Developed Recreation

Standard and Guideline
Primitive structures will be allowed when they are consistent with management area objectives and are not damaging to resources.

Applicable Management Area
MA-F14 Dispersed Recreation

Practice
Nonconforming Structures

Standard and Guideline
Remove, eliminate, or disguise all nonconforming structures. Retain existing bridges until unusable, then remove without any replacement structures.

Applicable Management Area
MA-F3 Mill Creek Wilderness

Standard and Guideline
Except for facilities necessary to protect fragile resources, limit nonconforming structures to trail shelters, and as needed for sanitary and safety needs. All should be of simple design, and of native, rustic materials. Site modifications for facilities should be very minimal to none.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

Fire

Forest-Wide Standards and Guidelines

Fire Management

Planning

Use the National Fire Management Analysis System to determine the most cost-efficient fire protection organization. Reevaluate organization as conditions change and better information is developed. Due to the nature of intermixed land ownerships, including a number of wildland subdivisions, interagency cooperation must be considered in the planning process.

Prevention

Monitor current and recent fire reports to target specific risks. Coordinate activities through the Central Oregon Fire Prevention Cooperative (or its equivalent).

Detection

Periodically review the mix of aerial and ground detection activities to maintain the most cost-effective combination.

Initial Attack

Apply aggressive suppression action to wildfires that threaten life, private property, public safety, improvements, or investments.



Where wildfires do not threaten to exceed acceptable sizes and intensities, apply the lowest cost suppression option.

If a wildfire escapes initial action and threatens to exceed established limits, prepare an escaped fire situation analysis. Weigh the cost of suppression against the resource potential losses. Suppression costs should be commensurate with the values threatened.

Secondary Attack Forces

Provide equipment and training for Forest Service employees outside of the fire management organization to assist in initial attack.

Fuel Treatments

Burn excess residues from management activities or natural events only after an interdisciplinary team evaluation of site needs and appropriate utilization efforts have been considered. The Ochoco National Forest Residue Management Plan, 3/89, will be used as a guide for identifying site-specific treatment selections. All treatments will comply with Forest-wide and Management Area Standards and Guidelines for Forest Residues.

A desired "protection" residues profile will be identified using an economic efficiency model, such as the Fuels Analysis Process recently developed by Region 6. This will be a guide for developing the appropriate share of cost in helping meet the overall desired residue profile(s) described in Forest-wide and Management Area Standards and Guidelines for Forest Residues.

Prescribed Fire

All planned prescribed fires will have prescriptions approved by the appropriate line officer.

Unplanned ignitions may be used as prescribed fires if:

1) a prescribed fire plan has been prepared and approved,

2) the fire is burning within prescription, and

3) there are enough personnel and equipment available to provide the staffing necessary to carry out the existing prescribed fire plan.

Conduct prescribed burns within existing Federal and State regulations affecting the timing, duration, and dispersal of emissions. Coordination with adjacent local smoke management groups and local agency offices will be required.

Construct water diversions on firelines in hilly or steep terrain to drain water into areas with sufficient vegetation or other protection to avoid erosion.

Provide for a protective strip of undisturbed surface between the prescribed burn area and perennial water courses, considering local topographic, vegetation, and soil characteristics.

Avoid intense prescribed fires on soils that are highly erodible and/or are subject to the development of hydrophobic (nonwettable) conditions.

Fuelbreaks
Use existing transportation and topographic features as much as possible for planned fuel breaks.

Use fuelbreaks only where risk analysis indicates this to be the most economically viable alternative treatment, and where doing so meets the objectives of *management area prescriptions, listed in Section 2, this chapter.*

Piling and Burning
Locate piles outside of the normal high water flow area of natural and man-made drainages or water courses.

Burn slash piles located within mapped floodplains within one year after piling.

Remove slash created within the normal highwater zone of a stream, unless needed for soil protection purposes.

Slash will not be piles on scablands unless there is no other feasible location, i.e. under circumstances dictated by topography or at a skyline landing (See Soils Standards and Guidelines).

Chipping, Burning, Lopping Scattering
Dispose of material so it will not reach stream courses.

Disperse material over a wide area when practical.

Management Area Standards and Guidelines

Resource - Fire

Practice
Fire Suppression (P04)

Standard and Guideline
Confine and contain will be the principle suppression strategies on most natural ignition (lightning) fires. Control strategy will be invoked when lightning fires threaten to escape the Wilderness Areas or pose unacceptable risks to life or wilderness values. Use the "light hand on the land" techniques.

Suppression activities should minimize disturbances of the land surface.

Use of chainsaws, helicopters, air tankers, or pumps must be approved by the Forest Supervisor. Allow no helispot construction for initial attack.

Crawler tractors will not be used without prior approval from the Regional Forester.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline

Fire encroaching on research natural areas should be suppressed as quickly as possible. Confine and contain will be the principle suppression strategies on most natural ignition (lightning) fires.

Ground disturbing activity to suppress fires will be avoided if possible, and only water will be used as fire retardant.

Applicable Management Area

MA-F5 Research Natural Areas

Standard and Guideline

Wildfires within or threatening designated old growth areas will be suppressed with emphasis on the tactical strategy of "contain." The objective is to minimize the acreage affected by wildfire. Minimize damage from suppression activities.

Applicable Management Area

MA-F6 Old Growth

Standard and Guideline

The confine, contain and control strategies may be considered as per preattack block economic efficiency analysis. However, confine and contain will receive emphasis. Emphasize minimum physical disturbance by suppression activities.



Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Area (A and B)
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor

Standard and Guideline
Suppression activities in these prescriptions should emphasize minimum physical disturbance. Confine, contain or control strategies are to be considered and utilized as directed in preattack block economic efficiency analyses.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Strategy is to control all wildfires. Suppression should emphasize minimum physical disturbance.

Applicable Management Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F28 Facilities

Standard and Guideline
Suppression activities should be very limited within the riparian zone. The objective is to minimize soil and vegetation disturbance. Confine and contain are the principle strategies.

Applicable Management Area
MA-F15 Riparian Areas

Standard and Guideline
All three suppression strategies (confine, contain, or control) will be utilized in accordance with the economic efficiency analysis for each preattack block.

Applicable Management Area

MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F12 Eagle Roosting Areas
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest

Maximum acceptable individual wildfire size by Fire Intensity Level, and total area by decade can be found in Fire Management Direction Table, in Appendix A3, for all management areas.

Practice

Treatment of Activity Fuels (P11)

Standard and Guideline

Fuel treatment (particularly mechanical treatments) should be very limited within riparian areas. In particular, activities which reduce the shading potential or woody debris sources of the site should be avoided. Greater levels of wildfire risk are acceptable in these areas.

Nonmechanized treatments will receive preference. When mechanized treatments are necessary they shall be carefully managed to meet the objectives of the management area.

Applicable Management Area

MA-F15 Riparian Areas



Standard and Guideline
Slash treatment should be completed currently with project work and should not be visible for more than one season. Avoid total slash clean up that removes all native vegetative cover. Prescribed burn areas should not exceed 250 acres.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Projects will meet retention visual objectives and emphasis will be on non-mechanized treatments.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (A & B)
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor

Standard and Guideline
Fuels usable by recreationists should be stacked or piled in convenient locations. Unusable fuels should be piled and burned.

Applicable Management Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F28 Facilities

Standard and Guideline
Meet Forest-wide Standards and Guidelines.

Applicable Management Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F12 Eagle Roosting Areas
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest

Practice
Treatment of Natural Fuels (P12)

Standard and Guideline
With the consent of PNW Station Director, manage prescribed fire in natural fuels to perpetuate conditions that the RNA represents, but with prudent measures to avoid catastrophic fire within, and outside the RNA.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Naturally caused ignitions may be allowed to burn if they meet conditions in an approved prescribed burn plan, and funds and necessary staffing are available.

Planned ignitions may be used within wilderness areas if that is the best way of returning fire to its natural role and thus reducing the fuels profile to natural levels and lessening the risk of damaging the wilderness resource. Planned ignitions within the Wilderness are also permitted if there is no other practical and economic way to lessen the likelihood of the escape of damaging wildfire from the Wilderness.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guideline
No prescribed burning allowed.

Applicable Management Area
MA-F6 Old Growth

Standard and Guideline
Fuel treatment (particularly mechanized treatments) should be very limited within riparian areas. In particular, activities which would reduce the shading potential or woody debris sources of the site should be avoided. Greater levels of wildfire risk are acceptable in these areas.

Applicable Management Area
MA-F15 Riparian

Standard and Guideline

Maintain a vegetative type similar to natural conditions as identified through fire history and to meet specific visual resource management objectives on each corridor plan. Planned ignition prescribed burns will be scheduled as follows:

	Years
Ponderosa pine	20-25
Noncommercial	20-25
Grassland	20-25
Mixed Conifer	50-60
Tree shrub	Spot burning

Applicable Management Area

MA-F7 Summit National Historic Trail
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Historic Trail

Standard and Guideline

Maintain a vegetation type similar to natural conditions as identified in the desired residue photos Prescribed burns should be scheduled as follows:

	Years
Ponderosa pine	20-25
Noncommercial	20-25
Grassland	20-25
Mixed Conifer	50-60
Tree shrub	Spot burning

Applicable Management Area

MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (A & B)
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Management Area
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor

Standard and Guideline

Natural fuels on managed stands may be treated by prescribed fire where stand age is 25 years or more when necessary to maintain desired protection residue

profile if this activity is consistent with other management objectives. Emphasis is placed on consideration of cover objectives.

Applicable Management Area
MA-F20 Winter Range

Standard and Guideline
Natural fuels on managed stands may be treated by prescribed fire where stand age is 25 years or more, when necessary to maintain desired protection residue profile if this activity is consistent with other management objectives.

Applicable Management Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter Area
MA-F12 Eagle Roosting Areas
MA-F21 General Forest Winter Range
MA-F22 General Forest

Practice
Fuel Break Construction and Maintenance (P13, P14)

Standard and Guideline
Limited shaded fuelbreak segments may be constructed along boundaries to take advantage of logical natural terrain features aiding in the prevention of fire spread across management area boundaries. The majority of such fuel break systems will be outside of the area.

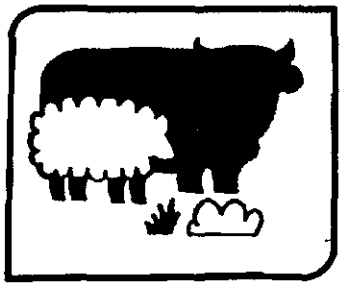
Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F15 Riparian

Standard and Guideline
Use fuel breaks only where they do not conflict with management area emphasis. Also, see Forest-wide Standards & Guidelines.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter
MA-F10 Silver Creek Area

MA-F11 Lookout Mountain Recreation Area
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Forage and Livestock



Forest-Wide Standards and Guidelines

Forage Utilization

Utilization tables have been developed for "Primary Range" (Table 4-30) and "Riparian" (Table 4-31). In addition, special seasonal restrictions (for fall green-up) have been directed for individual management areas. See Management Area Standards and Guidelines for detailed information.

Administration and Grazing Systems

Identify allotments with riparian areas in less than satisfactory condition.

Range allotment management plans will include a strategy for managing riparian areas to meet the emphasis and desired future condition stated in management area prescriptions (See Management Area #15-Riparian, Section 2, this Chapter). The process recommended in *Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington,* 1979, was used in establishing these conditions. Management objectives in grazing allotment plans should follow these. When the current riparian condition is less than that described, allotment objectives will include a schedule for improvement. Measurable objectives will be set for key parameters, such as stream surface shaded, streambank stability, and shrub cover. Allotment plans will address monitoring needed to determine if the desired rate of improvement is occurring. Those

plans currently not consistent with this direction will be developed or revised on a priority basis under a schedule established by the Forest Supervisor.

Develop and maintain allotment management plans to incorporate and reflect other Forest Plan direction (tiering).

Administer lands available and suitable for domestic livestock grazing according to the Forest Service grazing permit system.

Use intensive grazing management systems where feasible.

Coordinate transitory range management with timber management.

Encourage demonstration projects that are compatible with other standards and guidelines.

Grazing on scablands will occur through planned use of other plant communities within an allotment. As a result, scablands will contribute some forage; however, they will not be considered or mapped as primary range in an allotment. The installation of structural improvements, or various types of livestock management will be designed specifically not to concentrate livestock use on scablands.

Wild Horse Management

The Big Summit Ranger District wild horse territory will be managed for a base herd of 60 horses, as is outlined in the Wild Horse Management Plan, Appendix I.



TABLE 4-30
RIPARIAN FORAGE UTILIZATION
Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) By Existing Range Condition			
	Grassland Communities 2/		Shrubland Communities 3/	
Range Resource Management Level	Sat *	Unsat *	Sat	Unsat.
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range	40	0-30	30	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plan vigor include fencing and water development	45	0-35	40	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems	50	0-40	50	0-35

1/ This will be incorporated in annual operating plans and Allotment Management Plans Allotment Management Plans may include utilization standards which are either higher or lower than associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources Includes cumulative annual use by big game livestock.
2/ Utilization based on percent of total annual forage production removed by weight.
3/ Utilization based on percent of the current years growth removed Example measure length of current years growth of browsed and unbrowsed leaders and determine incidence of use Calculate percent of current years growth removed
* For satisfactory and unsatisfactory condition see Glossary in FEIS

TABLE 4-31
PRIMARY RANGE (Except Riparian)
Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) 2/					
	Forested Communities		Grassland Communities		Shrubland Communities	
Range Resource Mgmt Level	Sat	Unsat	Sat	Unsat	Sat	Unsat
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range	40	0-30	50	0-30	40	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plant vigor include fencing and water developments.	45	0-35	55	0-35	45	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	55	0-40	50	0-35

1/ Incorporate into annual operating plans and allotment management plans Allotment management plans may include utilization standards that are either higher or lower when associated with intensive grazing systems and specific management objectives that meet other resource objectives
2/ Utilization based on percent by weight of total annual forage production removed for grass, grasslike, and forbs, and percent of current years growth removed for shrubs See example in riparian table for shrubs
* For satisfactory and unsatisfactory condition see Glossary in FEIS

Management Area Standards and Guidelines
Resource - Forage

Practice
Forage Utilization

Standard and Guideline
No livestock grazing allowed.

Applicable Management Area
MA-F5 Research Natural Areas*/
MA-F13 Developed Recreation Areas (Core Area Only)

*/ Final determination will bemade during the official RNA designation process.

Standard and Guideline
Follow Table 4-31 of this section, Riparian Forage Utilization.

Applicable Management Area
MA-F15 Riparian

Standard and Guideline
Follow Table 4-30 of this section, Primary Range Utilization.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area Recreation Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F12 Eagle Roosting Areas
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest

MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline
Fall green-up after the regularly scheduled grazing season will be reserved for big game. Grazing extensions will generally not be permitted.

Applicable Management Area
MA-F18 Hammer Creek Wildlife Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Increased forage production due to vegetation management activities will not be programmed for livestock use. The forage will be allocated for wildlife use.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area

Practice
Nonstructural Improvements

Standard and Guideline
Nonstructural improvements are not allowed, except in connection with approved research projects.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Seeding for forage improvement prohibited.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline
Allow nonstructural improvements such as seeding and burning unless they conflict with the management emphasis for the area.

Applicable Management Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Practice
Structural Improvements

Standard and Guideline
Allow construction and maintenance of structures to exclude livestock from the research area only, except in connection with approved research projects.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Encourage developments to disperse livestock away from riparian areas.

Applicable Management Area
MA-F15 Riparian



Standard and Guideline

Maintain existing developments. New developments can be constructed only to protect the wilderness resource or to alleviate problems or conflicts, and only with the approval of the Regional Forester. Use of power equipment for maintaining range improvements will be for exceptional needs only, and approved on a case-by-case basis by the Forest Supervisor (for chainsaws, etc.), and Regional Forester for mechanized equipment (tractors, backhoes, etc.). Use native or natural-appearing materials and design improvements to blend into the surrounding landscape.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline

Maintain existing developments. New developments may be constructed to alleviate resource problems or to enhance public enjoyment. Fences within view from the river banks should be constructed of native or natural-appearing materials. Exterior boundary fences may be constructed of barbed wire.

Applicable Management Area

MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor

Standard and Guideline

Allow new developments unless they conflict with the management emphasis for the specific management areas.

Applicable Management Area

MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Practice

Use of Motorized Equipment for Improvements and Maintenance

Standard and Guideline

Require permittees to maintain improvements with nonmotorized equipment except where requests to use motorized equipment (chainsaws, etc.) have been approved by the Forest Supervisor, or mechanized equipment (tractors, back-hoes, etc.) by the Regional Forester, on a case-by-case basis.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline
Use of motorized equipment prohibited, except in connection with approved research projects.

Applicable Management Area
MA-F5 Research Natural Areas
MA-F6 Old Growth

Standard and Guideline
Allow use of motorized equipment with District Ranger approval only.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline
Use of motorized equipment prohibited from December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas

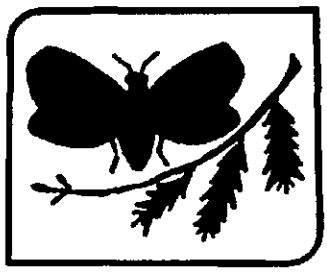
Standard and Guideline
Use of motorized equipment restricted to open roads from December 1 to May 1.

Applicable Management Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
All other management areas within the boundary of winter range or general forest winter range.

Standard and Guideline
No special restrictions.

Applicable Management Area
MA-F22 General Forest

Forest Health



Forest-Wide Standards and Guidelines

Use Integrated Pest Management (IPM) strategies to manage pests within the constraints of laws and regulations, and meet Forest management objectives. IPM strategies include manual, mechanical, cultural, biological, chemical, prescribed fire, and regulatory means. Select strategy through the environmental analysis process, and in compliance with the Regional Vegetation Management, Environmental Impact Statement, 1988.

Coordinate strategies with the Agricultural Pest Health Inspection Service (APHIS) when proposing major Forest-wide control projects.

Pesticide application, if used, will conform with EPA regulations, label restrictions, and the Regional Environmental Impact Statement on chemical applications.

Use the integrated pest management strategies on forested types, as displayed in Table 4-32. Exceptions for individual management areas are discussed in management area standards and guidelines for Forest Health.

Noxious Weeds

Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity.

TABLE 4-32
FOREST PEST MANAGEMENT STRATEGIES

Host Type	Pest	Conditions Favoring Damage	Management Strategies
Ponderosa Pine	Mountain Pine Beetle	Overstocked Stands	Control stocking levels by thinning, cleaning, or prescribed burning Keep stands in vigorous condition, i.e. growth at least one inch per decade
	Western Pine Beetle	Overmature, low vigor trees	Employ rotations of 150 years or less when possible Where large, old trees are desired in the stand (1) Salvage infested trees as rapidly as possible, (2) remove high risk trees that exhibit declining crown vigor preferentially during normal entries, and (3) decrease intertree competition by thinning, cleaning, or under burning.
	Western Dwarf Mistletoe	Multistoried host stands with already-infected overstories	Eliminate inoculum by regeneration harvest of infected stands If a seed tree system is employed, remove infected seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries
Lodgepole Pine	Mountain Pine Beetle	Stands of low vigor trees due to overstocking and old age	Keep lodgepole pine stands vigorous Control stocking by thinning, cleaning, or prescribed fire to insure that crop trees are free to grow Use rotations of 80 years or less
	Lodgepole Dwarf Misletoe	Multistoried host stands with already infected overstories	Eliminate inoculum by regeneration harvest of infected stands If a seed tree system is employed, remove seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries
Mixed Conifer*	Defoliating Insects (western spruce budworm and Douglas-fir tussock moth	Stands with major true fir/ Douglas-fir components, multistoried stands	Long-term strategy--develop stands composed of larch and pines Short-term strategy--treat infested fir stands with biological or chemical insecticides

Host Type	Pest	Conditions Favoring Damage	Management Strategies
	Root Diseases** (Laminated root rot, Armillaria root disease, and annosus root disease)	Stands with major true fir/ Douglas-fir components where inoculum is present	Remove all sosts in root disease centers and 50 foot buffers. Regenerate these areas with tolerant or resistant tree species For laminated root rot and Armillaria root disease, discriminate against white and Douglas-fir; favor pines and larch For annosus root disease, discriminate against white fir, favor any other species In areas where white fir management is desired, consider stump treatment with borax within 48 hours of cutting to prevent annosus infection
	Douglas-fir Dwarf Mistletoe	Multistoried host stands with alreasy infected overstories	Alternative I--eliminate inoculum by regeneration harvest If a seed tree system is employed and Douglas-fir regeneration is desired, remove infected seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries Alternative II--favor non-hosts *(any species but Douglas-fir)*
	Larch Dwarf Mistletoe	Multistoried host stands with alreasy infected overstories	Alternative I--eliminate inoculum by regeneration harvest If a seed tree system is employed and western larch regeneration is to be managed, remove infected larch seed trees before regeneration is 3 feet tall or 10 years old Establish mistletoe-free unit boundaries Alternative II--favor non-hosts (any species but western larch and lodgepole pine)
	White Fir Stem Decays (mainly Indian paint fungus)	Stands that contain a major component of white fir and have a history of tree suppression and wounding Do not manage high risk understories Eliminate and start over Where whit fir management is desired, keep rotations under 120 years and promote tree vigor throughout the life of the stand Avoid wounding of white fir crop trees	

*Mixed conifer stands on the Ochoco National Forest are composed of white fir, Douglas-fir, western larch, lodgepole pine, and ponderosa pine with Engelmann spruce at high elevations Firs tend to dominate

**Fir engraver beetles and Douglas-fir beetles are common associates of root diseases Management of the diseases will usually also minimize beetle damage

Management Area Standards and Guidelines

Resource - Forest Health

Maintenance of a healthy forest resource is important as it relates to the ability of forest stands to meet the objectives of each management area. A major factor in the overall health of the forest is the vigor of the trees and other forest vegetation. If the majority of the trees in a given area have reached or exceeded their pathological age, or have densities that result in stagnated stands, they become vulnerable to attack by insects and disease.

The Ochoco National Forest will use a combination of silvicultural practices and the concept of Integrated Pest Management to manage the health of the forest resource. Integrated Pest Management (IPM) is a process that incorporates all factors and strategies for evaluating and treating pest and host conditions to manage pest populations.

Stands of trees on the Ochoco National Forest will be managed according to the objectives of each management area. The health of the forest resource will be managed to meet the objectives, within the management constraints, for each management area. Some management areas will be more restrictive in treatment options, and may also accept more risk to the Forest from pest damage.

Table 4-33 will be used to guide forest health management practices for each management area. The table provides guidance for the identified major insects and diseases affecting the Ochoco National Forest.

TABLE 4-33
FOREST HEALTH STANDARDS AND GUIDELINES AND ALLOWABLE TREATMENT OPTIONS FOR MAJOR PEST GROUPS BY MANAGEMENT AREA

		Pine		Mixed Conifer		
Management Area	Standards & Guidelines	BB 1/	DM 2/	DEF 3/	RR 4/	DM
1-4 Wilderness	Insect and disease outbreaks will not be controlled unless treatement is necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the wilderness resource due to exotic pests FSM 2324 12 (1) Management of insects and diseases in wilderness will follow direction in FSM 2324 1	NT	NT	NT	NT	NT
5 Research Natural Areas	Take no action to control insects or diseases, unless an outbreak will drastically alter the natural processes within the RNA Treatment to control insects and diseases within a research natural area must support and promote the basic objectives and purposes of establishing the area FSM 4063 3(8)	NT	NT	NT	NT	NT
6 Old Growth	Generally, insects and diseases will not be controlled or suppressed Exceptions, may occur when treatment is necessary to prevent unacceptable damage to resources on adjacent lands or to the old growth resource Acceptable treatments are prescribed burning and use of synthestic or biological chemicals, based on site specific environmental analysis	PF	NT	S	NT	NT
7, 25, 26, 27 Visuals	All treatment strategies may be utilized to manage insects and diseases, to meet the management area objectives Emphasize strategies that improve aesthetics and safety Treatment of bark beetles and root diseases are emphasized	ALL H	ALL	ALL	ALL H	ALL
8, 10, 11A Roadless	Prescribed fire may be used to help reduce conditions favorable for bark beetle and dwarf mistletoe in ponderosa pine and root diseases in mixed conifer types Control of defoliators may also be done by spraying following an environmental analysis Use of salvage harvest is limited to catastrophic events	PF	PF	S	PF	NT
9 Rock Creek/ Cottonwood Creek Unroaded Helicopter	Utilize prevention strategies that preserve the unroaded character of this area Stocking level control and prescribed fire are recommended for treatment of bark beetles in pine types Control prevention for dwarf mistletoe in pine and root rot in mixed conifer are low priority	SC,PF	ALL L	ALL	ALL L	ALL
11(B), 16-19, 23, 24 Recreation/Wildlife Emphasis Areas	Generally, treatment of insect and disease conditions will not be in high priority, except when the ability of the forest resource to meet the area objectives is threatened Treatment of pest conditions will also be considered when damage is catastrophic and threatening to the surrounding area There are no constraints for selection of control strategy Treatments to control or prevent bark beetles and root disease may be emphasized to meet visual objectives	ALL H	ALL	ALL	ALL H	ALL

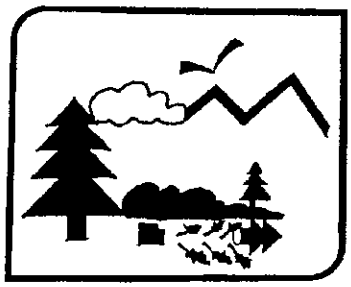
Management Area	Standards & Guidelines	BB 1/	DM 2/	DEF 3/	RR 4/	DM
12 Eagle Roosting Areas	Utilize all strategies to meet the area objectives for providing roosting habitat for bald eagles Emphasize reducing risk of bark beetle infestation, through stocking level control, to maintain large diameter trees All treatments must meet seasonal restriction (Dec 1 to May 1)	ALL H	ALL L	ALL	ALL	ALL L
13, 14, 28 Recreation Sites and Facilities	Utilize all methods to prevent or suppress insect and disease outbreaks Emphasize detection and treatment of bark beetle and root disease occurrences, as these relate to providing a safe environment Control of defoliators in the mixed conifer type is also emphasized to meet visual objectives	ALL H	ALL	ALL H	ALL H	ALL
15 Riparian Areas	Utilize all methods, except chemical spraying, to prevent or suppress insect and disease outbreaks Pest management activities must consider the effects on the stands ability to provide shade, bank stability, and large woody material to the stream Minimize use of mechanized equipment (tractors, backhoes, etc)	ALL L	ALL L	ALL	ALL	ALL L
20. Winter Range	Take aggressive action to suppress insect or disease caused mortality, where action could prevent loss of winter thermal cover and is cost effective Design harvest and thinning schedule so that no more than 50% of stands would be in moderate to high susceptibility to bark beetle attack	ALL H	ALL L	ALL	ALL	ALL L
21 General Forest Winter Range	Utilize all methods to prevent or suppress insect and disease outbreaks Consider thermal cover objectives when prescribing stocking levels for ponderosa pine stands	ALL H	ALL H	ALL H	ALL H	ALL H
22 General Forest	Utilize an integrated pest management approach to managing insect and disease conditions Aggressive monitoring and detection of pest conditions and populations will be done so corrective treatments can be prescribed early Emphasis will be on the prevention of stand and fuels conditions that will provide favorable habitat for pests to increase above endemic levels Sanitation and salvage harvest treatments will be used where they are appropriate and meet the objectives of the management area	ALL H	ALL H	ALL H	ALL H	ALL H

Treatment Options
NT - No Treatment
PF - Prescribed Fire
S - Spraying
SC - Stocking Control
All- All Methods Used

Emphasis
H - High
L - Low

1/ BB - Bark Beetles
2/ DM - Dwarf Mistletoe
3/ DEF - Defoliators
4/ RR - Root Rots

Forest Residues



Forest-Wide Standards and Guidelines

Residue Management

Retain the kind and amount of residues needed on-site for the benefit of multiple resources (e.g. soil, water, wildlife).

If residues need to be removed, encourage the use of these residues for a mix of appropriate products.

Provide for individual firewood gathering and other family oriented endeavors centered around residue use.

Table 4-34 shows Forest-wide averages and ranges of acceptable residue combinations identified from the Photo Series for Natural Forest Residues in Common Vegetation Types of the Pacific Northwest. They provide target levels for average loadings in the stand size classes represented by the photos. These are arranged by stand types found on the Forest and provide general guidance on acceptable residue loads on both natural and managed stand conditions. The photo series can be consulted for specific break down into smaller size class combinations that are considered acceptable

A series of desired residue profiles have been developed to meet the management emphasis for each of the 28 management areas on the Forest.

Management Area Standards and Guidelines

Resource - Forest Residues

Practice
Residue Management

Standard and Guideline
Manage residues through the natural processes of accumulation and decomposition (including natural fire). Activity fuel residues shall be treated to a level consistent with the immediate surroundings in the wilderness and which will protect wilderness values.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guideline
Reduce fuel loading to natural conditions on 20 percent of the Wilderness (about 3,500 acres) each decade when feasible.

Applicable Management Area
MA-F3 Mill Creek Wilderness

Standard and Guideline
Manage residues through the natural processes of accumulation and decomposition (including natural fire regimes). Activity fuel residues shall be treated to a level consistent with the immediate surroundings. Vegetation and residue mosaic management guidelines may be developed for each area in the future. At that time a mix of desired residue profiles may be identified.

Applicable Management Area
* MA-F5 Research Natural Areas
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor

* Only with approval of PNW Station Director

Standard and Guideline
Manage residues to allow natural accumulations of dead and down woody debris Reduce fuel load only if created or natural fuels accumulate to a level likely to result in a catastrophic fire. Fuel reductions should leave adequate downed material to meet the criteria for old growth. Desired residue profiles for this prescription area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F6 Old Growth

Standard and Guideline
Manage residues to allow natural accumulations of dead and down woody debris. A natural appearance consistent with riparian stand types is the goal of activity fuel treatments and vegetation management. Desired residue profiles for this management are approximated by the residue photos in Table 4-35.

TABLE 4-34
TONS PER ACRE LOADINGS

	FUEL DIAMETER SIZE CLASSES (INCHES)		
Stand Type	Less Than or Equal To 3	Greater Than 3	Total
MIXED CONIFER			
Average	4 82	9 18	14 0
Range	3 30 - 5 80	2 00 - 15 50	6 8 - 20 9
LODGEPOLE			
Average	4.75	1 25	6 0
Range	2 20 - 9 00	0 80 - 2 10	3 0 - 11 1
PONDEROSA PINE & ASSOC			
Average	3 28	8 52	11 8
Range	0 40 - 5 80	1 00 - 27 60	1 4 -31 8
PONDEROSA			
Average	2 38	9 11	11 5
Range	0 70 - 4 50	0 10 - 44 0	0 8 - 48 5

TABLE 4-35
DESIRED RESIDUES PROFILE

The desired residue profile references shown below are extracted from "Photo Series for Quantifying Forest Residues," a cooperative publication by the Pacific Northwest Forest and Range Experiment Station, U S Department of Agriculture, Forest Service, Portland, Oregon, (1976-1980) PNW 52, PNW 95, and PNW 105 This information may be technically confusing to some readers, but it is needed to provide specific direction in lieu of duplicating the photo series document

	STAND TYPE					
FUEL TYPE	PP	LP	MC	TS	GL	Management Area(s)
NATURAL (PNW 105)	7-PP-3 2-PP-4 8-PP-4 3-PP-3		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3 3-MC-3	1-JU-2		MA-F6
	3-LP-3 1/ 8-PP-4 2/					MA-F15
	1-PP-3 7-PP-3 1-PP-4 8-PP-4		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3	1-JU-2	1-JU-1	MA-F7 MA-F25 MA-F26 MA-F27
	1-PP-3		1-MC-3	1-JU-2	1-JU-1	MA-F13 MA-F14 MA-F28
	7-PP-3 2-PP-4 8-PP-4 3-PP-3		3-PP&ASSOC-3 2-PP&ASSOC-4 1-MC-3 3-MC-3		1-JU-2 2-JU-2	MA-F9 MA-F18 MA-F20 MA-F21
	7-PP-3	3-LP-3	3-PP&ASSOC-3			MA-F12 MA-F22

FUEL TYPE	PP	LP	MC	TS	GL	Management Area(s)
THINNING 3/						MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
THINNING (PNW 52 & 95)	1-PP-1TH 1-MC-3-PC 1-PP-1-TH		1-PP-1-TH			MA-F9 MA-F18 MA-F20 MA-F21 MA-F12 MA-F22
PARTIAL CUT (PNW 52)	1-PP-4-PC		1-MC-4-PC			MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
	2-PP-4-PC 3-PP-4-PC 4/		2-PP&ASSOC-4-PC			MA-F9 MA-F18 MA-F20 MA-F21
PARTIAL CUT (PNW 52 & 105)	3-PP&ASSOC-3 2-PP-4-PC	2-LP-3-PC	2-MC-3 (FOR LT 3") 5/ 1-MC-4 (FOR GT 3")			MA-F12 MA-F22
CLEARCUT (PNW 52 & 95)	2-LP-3-PC		1-MC-4-PC			MA-F7 MA-F25 MA-F26 MA-F27 MA-F13 MA-F14 MA-F28
CLEARCUT (PNW 52)	2-PP&ASSOC-4-PC		2-PP&ASSOC-4-PC			MA-F9 MA-F18 MA-F20 MA-F21
	2-PP&ASSOC-4-PC	1-LP-3-CC 2-LP-3-PC	2-PP&ASSOC-4-PC			MA-12 MA-F22

1/ 3-LP-3 For discouraging livestock use
2/ 8-PP-4 For more open conditions
3/ All thinning photos contain too much slash
4/ Jackpot burn recommended if area is greater than 40 acres
5/ The fuel bed depth in this photo is too high Lopping is needed to bring high particle intercept to less than 18"

These are found in "Photo Series for Quantifying Forest Residues," a cooperative publication by the Pacific Northwest Forest and Range Experiment Station, U S Department of Agriculture, Forest Service, Portland, Oregon (1976-1980) PNW 52, PNW 95, and PNW 105

Applicable Management Area
MA-F15 Riparian Areas

Standard and Guideline
Allow natural accumulations of dead and down woody debris Desired residue profiles for this management area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Manage residues to allow light natural accumulations of dead and down woody debris. A natural appearance consistent with stand types is the goal of activity fuel treatments and vegetation management Desired residue profiles for this prescription area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F28 Facilities

Standard and Guideline
Manage residues to maintain site productivity, protect wildlife habitat, and reduce the loss of thermal cover to wildfire. Desired residue profiles for this management area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

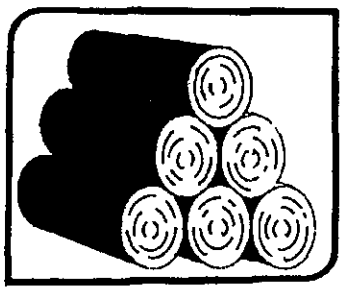
Standard and Guideline
Manage residues to protect stand characteristics desirable for eagles. Residues shall be treated to minimize risk of stand destructive fires. Desired residue profiles for this management area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F12 Eagle Roosting Areas

Standard and Guideline
Manage residues to maintain site productivity, reduce the chance of wildfire damage to timber, enhance forage productivity and access, and provide for wildlife habitat needs. Desired residue profiles for this management area are approximated by the residue photos in Table 4-35.

Applicable Management Area
MA-F22 General Forest

Fuelwood



Forest-Wide Standards and Guidelines

General

The fuelwood program should be considered as a means to meet resource objectives in appropriate areas, such as low productivity lodgepole pine stands and bug-killed material in mixed conifer understory.

Fuelwood availability, as well as public demand, will be considered during preparation, administration, and post sale activities associated with timber sales.

Permit removal of standing dead or down lodgepole pine and juniper for firewood unless otherwise specified.

Sign wildlife trees, which are not to be cut, that are near roadsides or otherwise accessible to firewood cutters.

Commercial Firewood

Make commercial fuelwood sales available in areas less accessible to the general public, areas where National Forest funds are expended to make wood available, and areas where control is needed to meet environmental concerns. Examples are:

Contract areas with concentrations of slash where heavy equipment may be required for removal (timber sales, backlog slash, thinning areas).

More remote areas where hauling costs make large loads more economical to haul than small loads.

Areas where timing or environmental constraints require special control.

Beetle or insect infested low value green trees.

Personal Use

The following areas will be used for gathering personal firewood:

Areas with easy access (landings, extensive areas of dead trees, slash piles, forest fires, etc.).

Areas designated and reserved for fuelwood gathering.

Management Area Standards and Guidelines

Resource - Fuelwood

Practice
Commercial and Personal Gathering

Standard and Guideline
Commercial and personal use prohibited.

Applicable Management Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F28 Facilities

Standard and Guideline
Commercial use prohibited, personal use of down material for on-site use only.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife & Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Trees, downed logs, or other significant features will be "signed" to prohibit use as fuelwood, otherwise, fuelwood (commercial and personal) is allowed.

Applicable Management Area
MA-F7 Summit National Historic Trail

Standard and Guideline
All firewood gathering prohibited from December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas

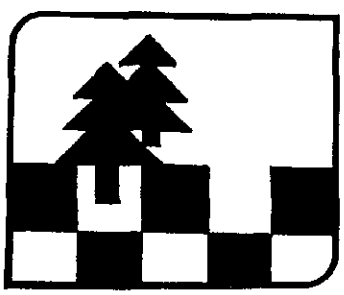
Standard and Guideline
All firewood gathering restricted to open roads and adjacent areas from December 1 to May 1.

Applicable Management Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Firewood gathering subject to permit regulations only.

Applicable Management Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F16 Bandit Springs Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors

Lands



Forest-Wide Standards and Guidelines

Special Uses

Utility Corridors
Coordinate analysis of utility corridors with other Forests and land management agencies. Determine the lead agency and develop a study plan prior to the start of any analysis. Develop environmental analysis and documentation in compliance with this Plan, and with procedures set forth in the Regional Guide.

Determine the compatability of each alternative with management areas affected.

Designation of corridors does not imply entitlement of use and environmental review must precede occupancy on a project-specific basis. Whenever possible, utility rights-of-way will be designated to allow joint use of the right-of-way.

Electronic Sites

Manage Round Mountain Electronic site in accordance with the approved site plan (Ochoco National Forest Analysis File). In accordance with Environmental Assessment Report "Selection of Sites for Electronic Communication Facility Development," 1979, (also the Forest Analysis File), the following sites are designated as electronic sites:

Drake Butte
Dry Mountain (existing site)
Mt. Pisgah
Round Mountain (existing site)
Wolf Mountain

Other Sites

Review applications for other uses through the NEPA process.

Issue special use permits though a prospectus process when a competitive interest has been identified.

Recreational Special Uses

Issue recreational special use permits only after a public need has been demonstrated that applies to a significant number of the recreating public, which may not necessarily include business opportunities.

The experience provided through the permit must be compatible with the Recreational Opportunity Spectrum (ROS) classification of the management area.

Limit the number of special use permits for a specific use, to the extent possible, in order to minimize administrative costs and to create economic conditions that provide a high quality public service.

Minimize the impact of special use permits on other users through the operating plans.

Land Ownership Adjustment

Acquire and dispose of lands in accordance with the Land Adjustment Map (Map Packet) and management area standards and guidelines.

Survey and mark property boundaries to prevent encroachments, protect present corners or references where the possibility of disturbance exists, and assist in administration of the Forest.

Management Area Standards and Guidelines
Resource - Lands

Practice
Special Uses

Standard and Guideline
Compatible uses, such as nondestructive research projects, may be permitted with Regional Forester approval. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise. Award outfitter guide permits only when it will meet management objectives to provide a needed wilderness opportunity.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline
Compatible uses, such as nondestructive research projects and simple fish habitat improvement projects, may be permitted with consent of PNW Station Director. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Compatible uses, such as nondestructive research projects and simple fish habitat improvement projects, may be permitted with Line Officer approval. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise.

Applicable Management Area
MA-F6 Old Growth
MA-F10 Silver Creek Area

Standard and Guideline
Compatible uses are permitted. Terminate existing noncompatible permits as opportunities arise. Land occupancy permits are prohibited

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F27 Round Mountain Recreation Trail
MA-F28 Facilities

Standard and Guideline
Compatible uses are permitted. Activities prohibited from December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Compatible uses are permitted.

Applicable Management Area
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Steins's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors

Practice

Land Ownership and Adjustment (By Ownership Category)

Standard and Guideline

Category 1

Retain and acquire lands, or scenic easements, under Congressional direction, that are necessary to maintain or enhance the management emphasis of the specific areas.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F12 Eagle Roosting Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor

Standard and Guideline

Category 2

Retain and acquire lands that are necessary to maintain or enhance the management emphasis of the specific areas.

Applicable Management Area

MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline
Category 3

Retain and acquire lands where the primary objective is for commodity production (regardless of ownership). Federal lands may be used to acquire (exchange) lands in Categories 1 and 2. However, lands in this category will not be disposed of if that would result in a breach in a sold block of Federally-owned land Private lands within this category may be acquired in order to consolidate Federal ownership.

Applicable Management Area
MA-F21 General Forest Winter Range
MA-F22 General Forest

Standard and Guideline
Category 4

Use small, isolated blocks of lands which do not contain special features, and which are expensive and difficult to manage, to acquire lands in Categories 1, 2, and 3. Disposal of Category 4 lands will have priority over the disposal of lands in Category 3.

Applicable Management Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Category 5

More intensive study and planning are necessary to determine the optimum land ownership patterns.

Applicable Management Area
MA-F4 North Fork Crooked River Wilderness Study Area

Practice
Rights-of-Way Grants for Roads and Trails, and Cost-Share Agreements

Standard and Guideline
Grant no rights-of-way, enter into no cost-share agreements, except as prescribed by law.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F27 Round Mountain Recreation Trail

Standard and Guideline

Grant rights-of-way, and enter into cost-share agreements, only when no other reasonable alternatives exist to maintain the integrity of the management area.

Applicable Management Area

MA-F6 Old Growth
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F15 Riparian

Standard and Guideline

Grant rights-of-way, and enter into cost-share agreements, only when no other reasonable alternatives exist to maintain the integrity of the management area. Include stipulations to prohibit activities from December 1 to May 1.

Applicable Management Area

MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline

Grant rights-of-way, and enter into cost-share agreements, that are compatible with the management areas emphasis.

Applicable Management Area

MA-F7 Summit National Historic Trail
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F20 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F28 Facilities

Practice
Federal Energy Regulatory Commission Licenses and Permits

Standard and Guideline
Allow uses that are compatible with management emphasis for the specific areas.

Applicable Management Area
All Management Areas except Wildernesses and RNA's

Standard and Guideline
Stipulate additional restrictions to prohibit activities from December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F21 General Forest Winter Range
MA-F22 Winter Range

Practice
Utility and Transport Corridors

Standard and Guideline
Exclusion Areas for utility corridors; significant barriers in which legislation exists to preclude establishment and use.

Applicable Management Area
MA-F1 Black Canyon Wilderness Area
MA-F2 Bridge Creek Wilderness Area
MA-F3 Mill Creek Wilderness Area
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas

Standard and Guideline
Category 1 Avoidance Areas for utility corridors; establishment and use of corridors conflict with management objectives.

Applicable Management Area
MA-F6 Old Growth
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline

Category 2 Avoidance Areas for utility corridors, management areas with unique values that have been accorded specific and protected management status through legislative action.

Applicable Management Area

MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline

Establishment and use of utility corridors must be compatible with management emphasis for the specific areas. Additional stipulation to prohibit activities from December 1 to May 1.

Applicable Management Area

MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

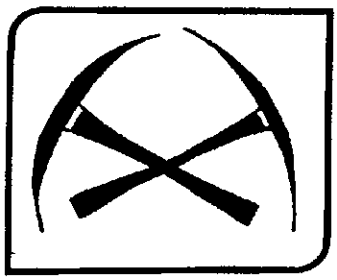
Standard and Guideline

Establishment and use of utility corridors must be compatible with management emphasis of the specific areas.

Applicable Management Area

MA-F7 Summit National Historic Trail
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F28 Facilities

Minerals & Energy



Forest-Wide Standards and Guidelines

Leasing

Include stipulations needed to protect surface resources and/or meet management objectives in leases. Refer to management area standards and guides for specific guidance.

Issue leases with a stipulation stating "no surface occupancy" on slopes greater than 40 percent.

Evaluate surface-use plans of operation through the environmental analysis and documentation process.

Common Variety Minerals

Use existing sources instead of developing new sources, exceptions include:

when existing sources are unable to economically supply the quantity and quality of material needed,

when conflicts with other resource uses are found to be unacceptable.

Cinder, hardrock, and gravel sources which are available for use during the planning period are designated on the Material Source Map (Forest Supervisor's Office).

Evaluate the supply of gravel or aggregate on the Forest before selling to the private sector. Insure that the public interest is being maintained during this process.

Sell minor amounts of clay, sand, and stone to the public on a case-by-case basis.

Develop a management plan describing development and reclamation for each mineral material source to be developed or used during the planning period.

Proposals for capital investments and improvements on structures, which may occur on known material source deposits, should be analyzed within the context of management direction within this Plan. Do not unnecessarily reduce options for future removal of materials, by making significant investments on sources when equally viable options exist in other areas.

Mining Claim Administration

Administer appropriate laws and regulations relating to minerals in a reasonable and consistent manner.

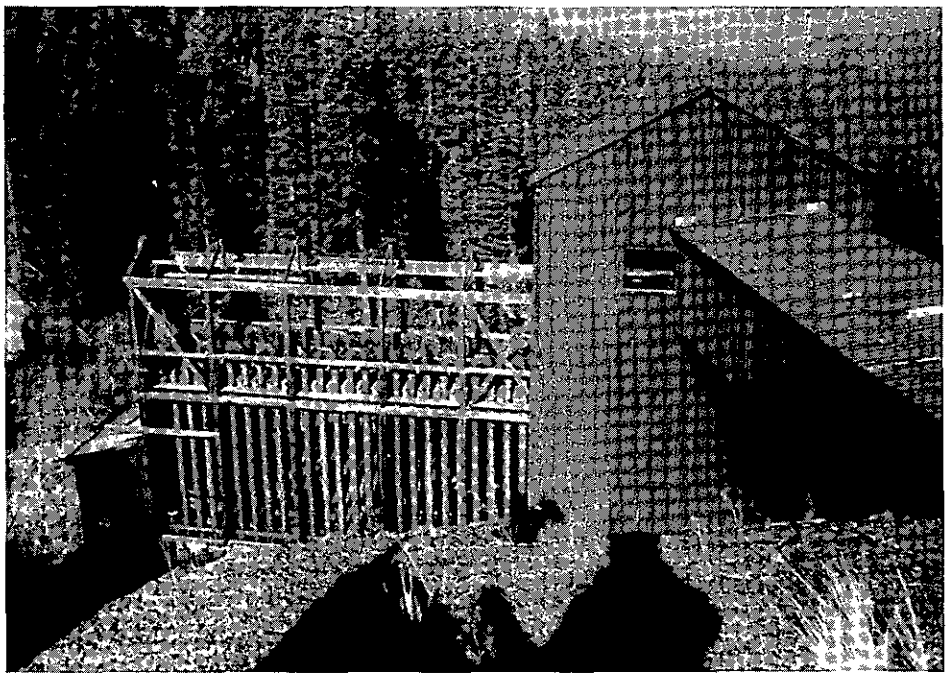
Assure that operating plans include reasonable and operationally feasible requirements needed for timely and effective coordination with other resources.

Require that reclamation plans describe final management objectives for specific mined areas and detail reasonable procedures and time frames which will be followed to accomplish those objectives. Formulate reclamation bond amounts on actual reclamation costs.

Under the mining laws, claimants are entitled to access to their mining claims. Analyze access for exploration and development of locateable mineral resources through the environmental analysis process, and include reasonable provisions for access in operating plans.

Notify mining claimants of impending Forest Service actions that may affect their claims. When possible, protect claim corners and mine workings from disturbance resulting from Forest Service activities.

Recommend withdrawal from mineral entry when an established or anticipated use is not compatible and cannot be mitigated as part of the mineral entry.



Rockhounding

Rockhounding (hunting and collecting rocks and minerals as a hobby) on land under Forest Service jurisdiction will be allowed without a permit, providing: the activity does not conflict with existing rights, and specimens are used for personal, noncommercial use. Activities involving other than casual removal of small amounts of material with minimal surface disturbance are provided for under the mining laws or Materials Act.

Management Area Standards and Guidelines
Resource - Minerals and Energy

Practice
Oil And Gas Leasing

Standard and Guideline
Issue no leases.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline
Issue leases with consent of PNW Station Director only. Include a "no surface occupancy" stipulation.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Issue leases with a "no surface occupancy" stipulation.

Applicable Management Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F28 Facilities

Standard and Guideline
Issue leases with a seasonal use stipulation prohibiting exploration, drilling and other development activity from December 1 to May 1. This limitation does not apply to maintenance and operation of producing wells.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Issue leases with a stipulation requiring drilling and storage facilities to be set back a specified distance from the area or feature.

Applicable Management Area
MA-F12 Eagle Roosting Areas (660 feet from roost trees)
MA-F15 Riparian (Outside of management area)

Standard and Guideline
Issue leases with a stipulation requiring drilling and storage facilities to be set back 100 feet from developed facilities and maintained trails.

Applicable Management Area
MA-F16 Bandit Springs Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area

Standard and Guideline
Issue leases with a stipulation requiring all permanent and semipermanent facilities to blend into the surrounding landscape or be located out of view.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
No special restrictions.

Applicable Management Area
MA-F20 General Forest

Practice

Locateable Minerals (Mining Claims)

Standard and Guideline

The following areas are withdrawn from mineral entry under the mining laws. Prospecting will be allowed if conducted in a manner compatible with the wilderness environment.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness Area (except existing valid claims)

Standard and Guideline

The following areas are currently withdrawn from mineral entry under the mining laws.

Applicable Management Area

MA-F5 Research Natural Areas (Ochoco Divide only)
MA-F13 Developed Recreation (Delintment Lake and Walton Lake Campgrounds only)
MA-F25 Highway 26 Visual Corridor (600 ft. right-of-way corridor only)
MA-F28 Facilities (Ochoco Ranger Station and Rager Ranger Stations only)

Standard and Guideline

Recommend withdrawal from mineral entry.

Applicable Management Area

MA-F5 Research Natural Areas (Dry Mountain, Silver Creek and Stinger Creek)
MA-F28 Facilities (Allison Guard Station)

Standard and Guideline

Include reasonable measures in operating plans in order to meet management emphasis for the specific areas. Include stipulation to prohibit activity from December 1 to May 1.

Applicable Management Area

MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Include reasonable measures in operating plans in order to meet management emphasis for the specific areas.

Applicable Management Area
MA-F3 Mill Creek Wilderness (existing claims)
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Practice
Common Variety Minerals

Standard and Guideline
Do not develop material sources.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
MA-F15 Riparian

MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline
Do not remove material from sources from December 1 to May 1.

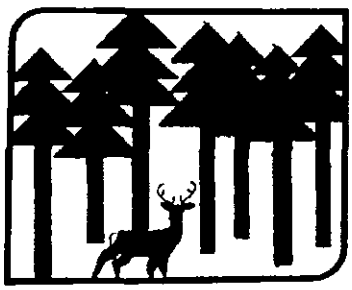
Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
*MA-F21 General Forest Winter Range

* Removal will be permissible with Line Officer approval on a case-by-case basis.

Standard and Guideline
Material sources development allowed.

Applicable Management Area
MA-F22 General Forest

Old Growth



Forest-Wide Standards and Guidelines

All old growth stands meeting the definition stated in the Regional Guide, 1984, will be periodically inventoried and monitored (see Monitoring Plan, Chapter 5, Implementation of the Forest Plan).

Specific allocations have been made to provide habitat for old growth dependent species, with the pileated woodpecker as the indicator species. A portion of these acres are included in wilderness, roadless areas, and Research Natural Areas due to the distributional needs of dependent species. See Management Area Prescription #4 (MA-F4) - Old Growth in Section 2 and management area

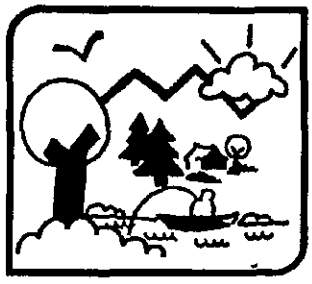
standards and guidelines for Wildlife and Fish.,

Other old growth, outside of that allocated for wildlife habitat, is also available throughout the Forest, but subject to less stringent standards and guidelines, depending on the management area in which it is found.

For example, old growth stands currently existing in visual management areas, or riparian areas are available for management and will decline over time.

Old growth in research natural areas, wilderness and roadless areas, but not included in the wildlife habitat allocation, are also subject to the standards and guidelines for the respective management areas (i.e. underburning in wilderness and research natural areas).

Recreation



Forest-Wide Standards and Guidelines

General

Recreational activities will be managed to prevent site deterioration within riparian areas.

Developed Sites

Prepare site plans prior to rehabilitation, expansion, or construction projects.

See the management area prescription for MA-F13 Developed Recreation, Section 2.

Dispersed Recreation

Provide facilities needed to protect public health and safety (e.g., portable toilets, campfire rings), and for environmental protection.

See the management area prescriptions for MA-F14 Dispersed Recreation, Section 2.

Off-Road Vehicles (ORV's)

ORV use varies by management area. See management area standards and guides for Transportation.

ORV use on scablands will be limited to over snow vehicles (also see Forest-wide Standards and Guidelines for Soils and Transportation System).

Trails

Construct and maintain the trail system to standards suitable for type and amounts of use. Maintain trails to prevent resource damage, protect the investment in the system and provide for user safety. In areas of concentrated

use, trails should be designed and maintained to minimize impacts on riparian communities.

Encourage volunteer groups or individuals to maintain or construct parts of the trail system.

Additional direction on trails is contained in specific management area prescriptions.

Management Area Standards and Guidelines

Resource - Recreation

Practice
Wilderness Recreation Spectrum (WRS)

Standard and Guideline
Primitive and Semiprimitive.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Practice
Recreation Opportunity Spectrum

Standard and Guideline
Semiprimitive Nonmotorized.

Applicable Management Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F24 North Fork Crooked River Scenic Corridor

Standard and Guideline
Semiprimitive Nonmotorized, except snowmobiles operating on an adequate snow base between December 1 and May 1.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline
Roaded Natural.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F15 Riparian Areas
MA-F16 Bandit Springs Recreation Area
*MA-F17 Stein's Pillar Recreation Area
*MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F27 Round Mountain National Recreation Trail

* These areas will exhibit some semiprimitive characteristics, but will not meet ROS criterion for a Semiprimitive, Nonmotorized classification.

Standard and Guideline
Roaded Natural, Roaded Modified or Rural.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F28 Facilities

Practice
Developed Recreation

Standard and Guideline
Develop no interpretive, demonstration, or recreational sites.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
MA-F6 Old Growth

Standard and Guideline

Do not locate developed sites in floodplains unless no feasible alternative sites exist. (Executive Order 11988).

Activities within floodplains must meet water quality standards and goals.

Applicable Management Area

MA-F15 Riparian Areas

Standard and Guideline

Trails, trail heads and trail shelters may be built to facilitate nonmotorized recreation. Minimum site modifications are allowed. Some minor improvements at high use camp sites, such as fire pits, may be allowed.

Applicable Management Area

MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F24 North Fork Crooked River Recreation Corridor

Standard and Guideline

Develop facilities to compliment recreational opportunities and protect resource values, in a manner consistent with management area emphasis and desired future condition. Developed fee campgrounds will not be provided in these areas during this planning period.

Pursue opportunities for interpreting natural resources, history, geology, scenic views, and management practices.

Design or modify improvements to blend with the natural landscape, using native, rustic materials.

Applicable Management Area

MA-F7 Summit National Historic Trail
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline

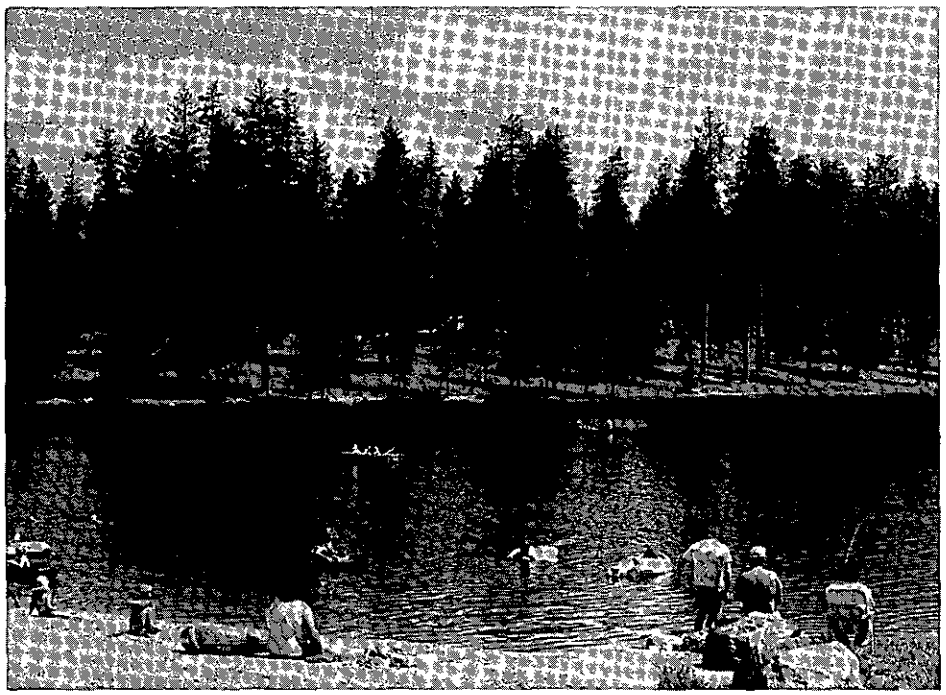
Use the State Rest Area as a snowpark during the winter months. Develop

additional snowparks to facilitate parking at the sled hill for snowmobiling at the old guard station. Coordinate with the State Highway Department concerning future plans for this area.

Applicable Management Area
MA-F16 Bandit Springs Recreation Area
MA-F25 Highway 26 Visual Corridor

Standard and Guideline
Developed camp sites may be opened to the public from May 1 to December 1. New or additional developed campgrounds must be analyzed in a site specific plan.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range



Standard and Guideline
Prepare environmental analysis and documentation, and design narratives and site plans prior to rehabilitation, expansion, or construction of projects.

Applicable Management Area
MA-F13 Developed Recreation

Practice
Dispersed Recreation

Standard and Guideline
Discourage recreational activities and use, including overnight camping, and pack and saddle stock use.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Manage to protect the naturalness of the areas. Use of the areas for nonmotorized recreation is acceptable, but should not be encouraged.

Applicable Management Area
MA-F6 Old Growth

Standard and Guideline
Where conflicts develop, riparian objectives will take precedence over dispersed recreational needs.

Applicable Management Area
MA-F16 Riparian Areas

Standard and Guideline
Protect the naturalness of the immediate area encompassing the dispersed campsites.

Applicable Management Area
MA-F14 Dispersed Recreation

Standard and Guideline
Promote driving for pleasure and mountain biking.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F19 Deep Creek Recreation Area
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors

Standard and Guideline
Develop a variety of all-terrain vehicle (ATV) routes for a variety of terrain and experience levels.

Applicable Management Area
MA-F22 General Forest

Standard and Guideline
Promote backcountry recreational opportunities for hiking, horseback riding, and mountain biking.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F16 Bandit Springs Recreation Area
MA-F27 Round Mountain National Recreation Trail



Standard and Guideline

Camp Sites

Discourage development of "permanent" dispersed campsites or facilities. Disguise, obliterate, or rehabilitate such campsites when found

Allow no caching of camping supplies.

No more than two campsites will be visible or audible from any other campsite (within 500 feet).

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Encounters

Primitive Area, encounters per day 80% of the time:

7 or less	MA-F1 Black Canyon Wilderness
7 or less	MA-F2 Bridge Creek Wilderness
6 or less	MA-F3 Mill Creek Wilderness
7 or less	MA-F4 NFCR Wilderness Study Area

Semiprimitive Area, encounters per day 80% of the time:

10 or less	MA-F2 Bridge Creek Wilderness
12 or less	MA-F3 Mill Creek Wilderness

Group Size

Maximum permissible group size:

12 people	MA-F1 Black Canyon Wilderness
10 people	MA-F2 Bridge Creek Wilderness
12 people	*MA-F3 Mill Creek Wilderness
12 people	MA-F4 NFCR Wilderness Study Area

* In Mill Creek Wilderness, "12" includes people and livestock in any combination.

Camp Sites

No more than two camp sites should be visible or audible from any other camp site (within 500 feet).

Encounters

During all use periods there should be no more than 10 other groups encountered per day.

Group Size

The maximum permissible party size is 12 people with 18 head of livestock.

MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area

MA-F11 Lookout Mountain Recreation Area

Camp Sites
Various types of camp sites, some allowing interaction with other camp sites. Other sites remote from any others.

Encounters
During all use periods, there should be no more than 10 other groups encountered per day.

Group Size
The maximum permissible party size is 12 people with 18 head of livestock.

MA-F24 NFCR Scenic Corridor

Standard and Guideline
Manage use to keep contacts between users low to moderate (15 encounters with groups per day). Utilize minimum on-site controls and restrictions necessary to protect resources and promote safe use of the area.

Applicable Management Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife Recreation Area

Standard and Guideline
Nonmotorized recreational opportunities will be emphasized. Limit motorized winter access to Forest Road 27 and trailheads from December 1 to March 30. Limit motorized access during other times of the year to designated existing roads.

Applicable Management Area
MA-F16 Bandit Springs Recreation Area

Standard and Guideline
Pursue necessary steps to officially designate the trail/motorway section of the Summit Trail as the East-West Intertie Trail and the New Oregon Recreation Trail. Vigorously promote the use of this cultural resource for recreation including: mountain biking, driving for pleasure, horseback riding, cross-country skiing, and backpacking.

Applicable Management Area
MA-F7 Summit National Historic Trail

Standard and Guideline
Close area to camping from December 1 to May 1 except within 300 feet of designated access roads.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Utilize minimum on-site controls and restrictions to protect resources and promote safe use of the area.

Applicable Management Area
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Provide recreational improvements where needed to protect the resources or sites.

Sites receiving recurring use should be checked periodically for safety considerations (water sources, hazard trees).

Applicable Management Area
MA-F14 Dispersed Recreation
MA-F22 General Forest

Standard and Guideline
Recommend the pack it out policy for garbage.

Promote leave no trace camping techniques.

Applicable Management Area
All Management Areas except
MA-F13 Developed Recreation

Practice
Search and Rescue

Standard and Guideline
Use of motorized vehicles for search and rescue must be approved by the Forest

Supervisor.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guideline
Use of motorized vehicles for search and rescue must be approved by the District Ranger.

Applicable Management Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F24 NFCR Scenic Corridor

Practice
Signing



Standard and Guideline
Use minimum natural appearing signing identifying destinations and trail names where needed, but not mileages.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guideline
Signing for recreational purposes should comply with management area emphasis and desired future condition.

Applicable Management Area
All remaining management areas

Practice
Trails

Standard and Guideline
Emphasize these areas with a nontrailed objective.

Applicable Management Area
MA-F2 Bridge Creek Wilderness

Standard and Guideline
Coordinate trail and trailhead planning to disperse users and offer a range of challenges. Design trails to blend with landscape, and construct with native materials.

Applicable Management Area
MA-F1 Black Canyon Wilderness
*MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F24 NFCR Scenic Corridor

* No new trails will be developed in Mill Creek Wilderness.

Standard and Guideline
Trails that allow year-round use of the area will be developed. This will facilitate use of the area by horseback riders, mountain bikers, and hikers and cross-country skiers.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area
MA-F16 Bandit Springs Recreation Area

Standard and Guideline
No motorized or mechanized use allowed on trails.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guideline
No motorized use allowed on trails.

Applicable Management Area
MA-F6 Old Growth
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F24 NFCR Scenic Corridor

Standard and Guideline
No motorized use of trails, except snowmobiles operating on designated routes, and on an adequate snow base between December 1 and May 1.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
No motorized use of trails or roads during the period of December 1 to March 30, except for the designated route on Forest Road 27.

Applicable Management Area
MA-F16 Bandit Springs Recreation Area

Standard and Guideline
No motorized use of trails, except snowmobiles operating on an adequate snow base. In some cases, snowmobile routes may be designated.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline
Motorized use on designated trail routes is allowed. Restrict motorized use to designated open roads during the period December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
No motorized use of trails except on designated routes for research purposes.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
No motorized use of trails except on designated routes.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian Areas
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline
Motorized use of trails encouraged on designated routes. Off-trail use will be discouraged.

Applicable Management Area
MA-F22 General Forest

Scenic Resources



Forest-Wide Standards and Guidelines

Manage for the visual quality objectives (VQO's) listed for each management area. See management area standards and guidelines for SCENIC RESOURCES.

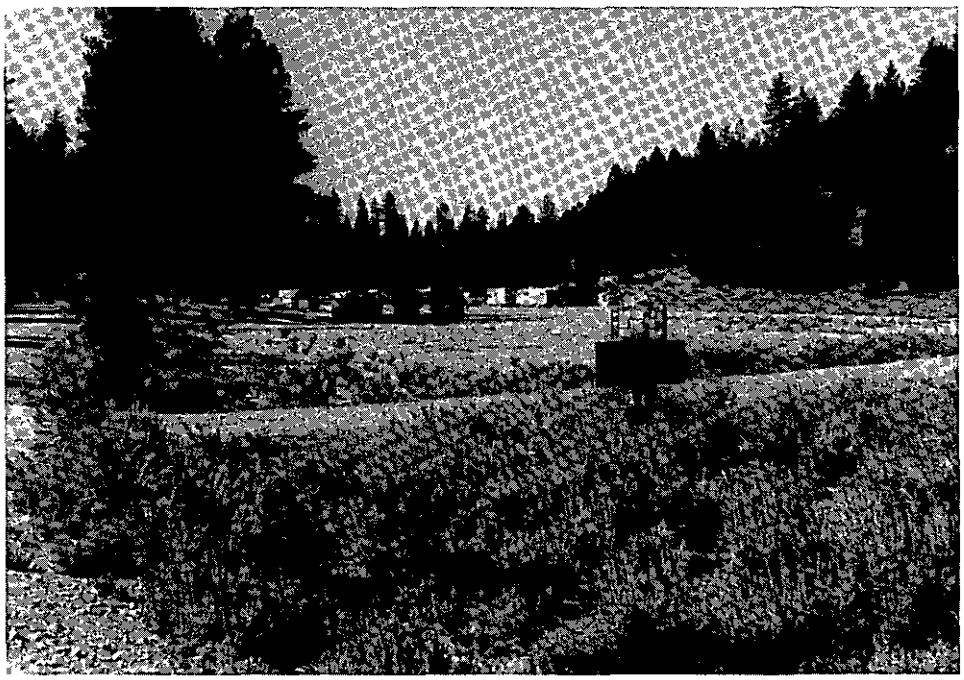
Where natural catastrophes such as large wildfires, insect epidemics, or windthrows occur, management activities may differ from stated visual quality objectives.

In areas of the Forest managed for a Visual Quality Objective of "modification" or "maximum modification," be sensitive to the needs of the viewing public. Use cost-effective visual management techniques while meeting the emphasis of the management area. Examples of these techniques may include:

Leaving visually appealing seed-trees in regeneration units;

Modifying harvest boundaries to eliminate "sharp line" effects; and

Construction of facilities, roads and other physical structures, with native materials, where possible.



Management Area Standards and Guidelines
Resources - Scenic Resources

Practice
Visual Quality Objective (VQO)

Standard and Guideline
Preservation.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
*MA-F7 Summit National Historic Trail (Minor segments)

Standard and Guideline
Retention.

Applicable Management Area
MA-F6 Old Growth
*MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F13 Developed Recreation
**MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F24 NFCR Scenic Corridor
MA-F25 Highway 26 Visual Corridor
*MA-F26 Visual Management Corridors (Retention Sections)
*MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

* These areas will be managed within a general border of 600 feet on each side of the edge of the road or trail Flexibility is encouraged to take advantage of natural topographic features and "special scenery" areas The management intent is not to manage the areas to the full background viewing area, but rather to provide a natural setting within the most visible foreground

** Within actual dispersed sites only

Standard and Guideline
The general VQO for the area is partial retention except along designated trails and roads where the VQO is retention.

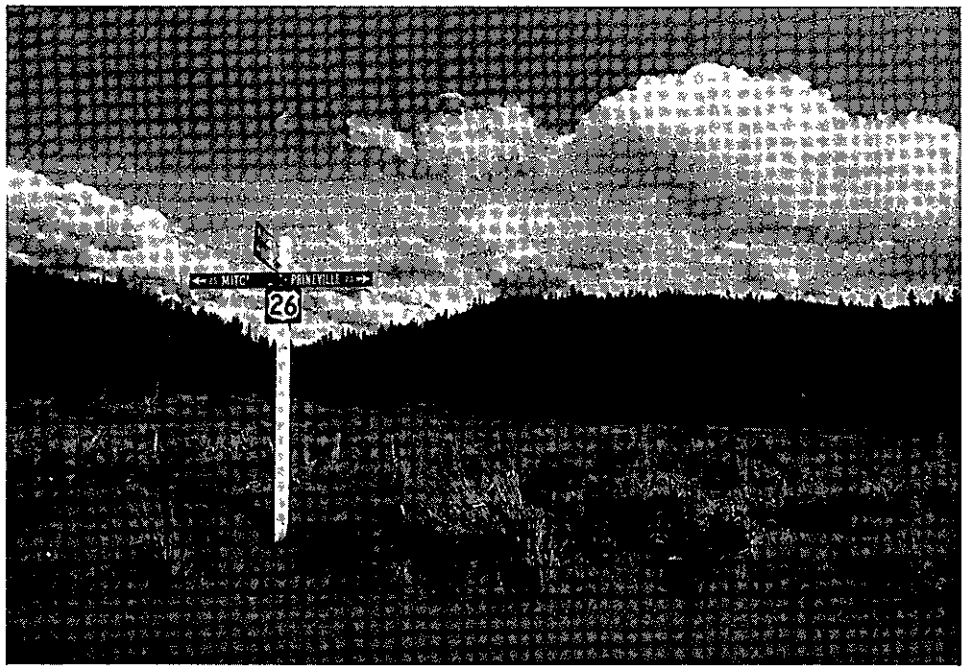
Applicable Management Area
MA-F18 Hammer Creek Wildlife/Recreation Area

Standard and Guideline
Partial Retention.

Applicable Management Area
*MA-F7 Summit National Historic Trail
MA-F23 NFCR Recreation Corridor
*MA-F26 Visual Management Corridors (Partial Retention Segments)

Standard and Guideline
Retention as viewed from Highway 26, maximum modification when viewed from other perspectives.

Applicable Management Area



MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area

Standard and Guideline
Modification.

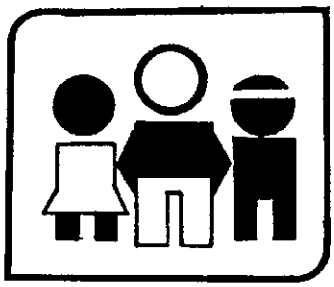
Applicable Management Area
MA-F12 Eagle Roosting Areas
MA-F15 Riparian Areas

Standard and Guideline
Maximum Modification.

Applicable Management Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest

* These areas will be managed within a general border of 600 feet on each side of the edge of the road or trail Flexibility is encouraged to take advantage of natural topographic features and "special scenery" areas The management intent is not to manage the areas to the full background viewing area, but rather to provide a natural setting within the most visible foreground

Social and Economic



Forest-Wide Standards and Guidelines

Human Resources

Minimize social, cultural and administrative barriers to legitimate uses of the Forest, within the legal authority of the agency.

Maintain and implement an affirmative action plan.

Consider needs of the handicapped in the design of facilities and in other possible ways.

Conduct compliance reviews as required by the Title VI of the Civil Rights Action of 1964.

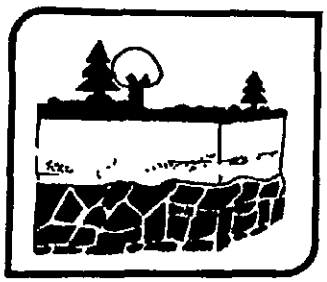
Inform the general public, including minorities and the underprivileged, of benefits they are eligible to receive from Forest programs. Use techniques and the media best suited to increase awareness and participation.

Protect and preserve for American Indians, access to, and use of traditional sites, possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. Coordinate location and protection of these areas with representatives of the Confederated Tribes of the Warm Springs Indian Reservation and Burns Paiute tribes. Consider the plans and policies of other Federal, State, local, and American Indian tribal governments in plan implementation.

Consider and provide for the ceded land rights (treaty rights) of the Warm Springs Confederated Tribes in all Forest related management activities (cf. Middle Oregon Treaty of June 25, 1855).

Coordinate resource activities with the designated representatives of the Confederated Tribes of the Warm Springs Indian Reservation.

Soil



Forest-Wide Standards and Guidelines

General

The standards and guidelines stated below apply to all proposed activities occurring on the Ochoco National Forest. Other standards and guidelines are specific to certain types of activities, such as timber harvesting and road building, and are listed under those applicable sections in order to increase the ease and effectiveness of management direction.

Compaction, displacement, puddling, and severely burned soils are to be considered collectively, when assessing impacts

Watershed Management

Even though watershed effects are the cumulative result of all activities occurring in a particular watershed (including road building, recreation, grazing, etc.), timber management has the greatest potential for detrimental impacts. Therefore, Forest-wide standards and guidelines have been established and designed in the appropriate context, towards timber harvest scheduling and dispersion (see Forest-wide Standards and Guidelines-Timber).

Soil Compaction and Displacement

The threshold level of detrimental compaction is defined as any bulk density increase of 15 percent or more, or any macro pore space reduction of 40 percent or below 15 percent. These values are critical changes over the natural state in the top 12 inches of soil.

In order to maintain site productivity, all project activities will be planned to reduce soil compaction and displacement to the lowest reasonable level. Strive to reduce compaction and displacement to get as close to 90 percent of the total activity area (including permanent, rocked, and non-surface roads) remaining in a non-compacted/non-displaced condition, as realistically possible, one year after any land management activity. The minimum will be 80 percent of the total activity area. Existing areas exceeding these standards will be scheduled for rehabilitation as soon as possible

Surface Soil Erosion

Land management activities will be planned to achieve effective ground cover as defined by the following classes:

Soil Resource Inventory Erosion Hazard Class	**Minimum % Effective Ground Cover**	
	First Year	**Second Year**
Low	20-30	30-40
Moderate	30-40	40-50
Severe	50-60	60-75
Very Severe	60-75	75-90

Effective ground cover is defined as the basal area of perennial vegetation, plus litter and coarse fragments (greater than 2mm sizes), including tree crowns and shrubs that are in direct contact with the ground. Exceptions may occur where specific projects meet erosion control objectives without meeting the ground cover objectives stated above.

Soil Mass Wasting

When a project could result in an increased potential for mass wasting, which could cause significant soil loss or sedimentation, hazards to property, loss of fish habitat, or damage to other resource values, alternative project proposals will be evaluated and documented through the project's environmental analysis.

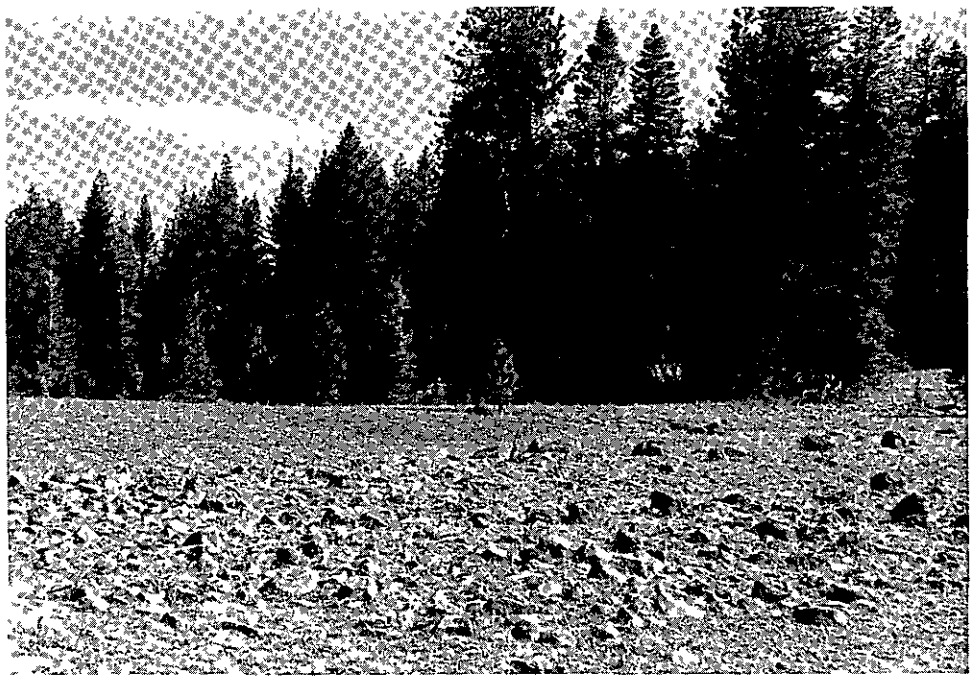
An activity area is the total area for which a ground-impacting activity is planned, for example, a unit for a timber sale, slash disposal project, or grazing allotment. The area would also include transportation systems within and directly adjacent to the project.

Fragile Areas

Recognize the sensitivity and potential of certain areas and/or situations to be adversely affected by management activities and plan accordingly to minimize those effects. Fragile areas include scablands (shallow soil areas), elk wallows, and other isolated soil areas which exhibit sensitivities that require special care.

Scablands

Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. This is a result of their having very shallow soils which are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible. For this reason, all management activities will be analyzed as to their affect on scablands prior to implementation. Use *Plant Communities of the Blue Mountains in Eastern Oregon and Southwestern Washington,* Hall, 1973, to identify scabland plant communities.



Other standards and guidelines for scablands are specific to certain types of activities, such as timber harvesting, livestock grazing, and road building, and are listed under those applicable sections.

Management Area Standards and Guidelines

Resource - Soil

Practice
Soil Conditions

Standard and Guidelines

Limit displacement and erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment except at some campsites and in designated trail tread.

Locate, relocate, or close campsites to prevent excess soil erosion and compaction when necessary.

Correct areas of human-caused soil instability which contribute to resource degradation, utilizing measures compatible with the Wilderness objectives.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 NFCR Wilderness Study Area

Standard and Guidelines

Allow activities that do not conflict with the objectives of RNA's, such as special studies, monitoring, and research. Develop soil rehabilitation plans to implement in the event of soil disturbing activities such as fire suppression.

Applicable Management Area

MA-F5 Research Natural Areas

Standard and Guidelines

Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment.

Applicable Management Area

MA-F6 Old Growth

Practice
Soil Conditions

Standard and Guidelines
Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment except at some camp sites or on designated trails.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

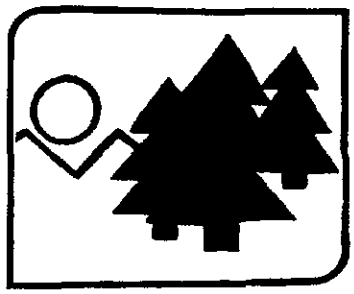
Standard and Guidelines
No more than 10 percent of an activity area can be compacted or displaced to a degree which degrades vegetative productivity.

Applicable Management Area
MA-F15 Riparian Areas

Standard and Guidelines
Comply with Forest-wide Standards and Guidelines only.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors (Retention Sections)
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Timber



Forest-Wide Standards and Guidelines

Suitable Forest Land

Regulated timber harvest will only be allowed on lands classified as available, capable and suitable. Lands currently classified as suitable but found unsuitable in project analysis will be identified as such on planning maps and treated as unsuitable.

Where unmapped, unsuitable lands are found, project implementation will recognize these areas and plan mitigation measures to avoid adverse impacts. An example of this may be small slumps (unstable soil areas) where soil disturbing activities are avoided.

Silviculture

Prepare silvicultural prescriptions for all activities proposing the management of trees or timber stands to meet resource management objectives. Prescriptions will be recorded in analysis files and stand records.

All prescriptions will be prepared or approved by a Certified Silviculturist.

Elements required in a silvicultural prescription are documented in FSH 2470, the Silvicultural Examination and Prescription Handbook, and by Regional direction. No standardized format will be required, but all requirements must be addressed in the prescriptions or through project environmental analysis.

Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington, Hall, 1973, or any future accepted guide, will be used as a guide to site productivity of forest communities and for other applicable management considerations.

The silvicultural prescription should consider integrated pest management. Pests refer to any biotic or abiotic influence on the Forest, including insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices, and competing vegetation.

Develop site-specific prescriptions to provide for biological diversity and ecosystem function, including consideration for long-term productivity. Vegetation management should allow for all natural species to function. None should be eliminated from the site.

Silvicultural prescriptions must provide for snags, and trees for future snags, that will meet the habitat requirements for cavity nesting species, according to management area objectives (see Management Area Standards and Guidelines for Wildlife and Fish); exceptions could be fuelbreaks or situations where snags could cause a safety hazard. During preparation of marking guides, include provisions which specify that damaged, defective, or low value trees be used for replacement snags as much as possible, especially in commercial thinnings.

However, take precautions not to leave disease ridden trees that may spread infection to adjacent healthy trees.

Retain trees whose roots stabilize streambanks along Class III and IV streams, especially where fair to poor streambank stability conditions exist. Generally large mature trees provide bank stability for a distance of 5 to 10 times the diameter of the trunk, though this area of influence may be considerably larger. Understory trees and juniper play a role in bank stability in an area approximately equal to their crown diameter. Merchantable trees may be removed if sufficient trees remain to provide root strength for bank stability or if streambank stability is good or excellent.

Stand examinations and/or other data gathering processes will be used to verify or develop silvicultural prescriptions.

A regeneration system providing the desired establishment conditions will be selected. Leave trees per acre and leave basal area per acre for seed tree or shelterwood systems will be silviculturally prescribed on a site-specific basis.

Uneven-Aged Management

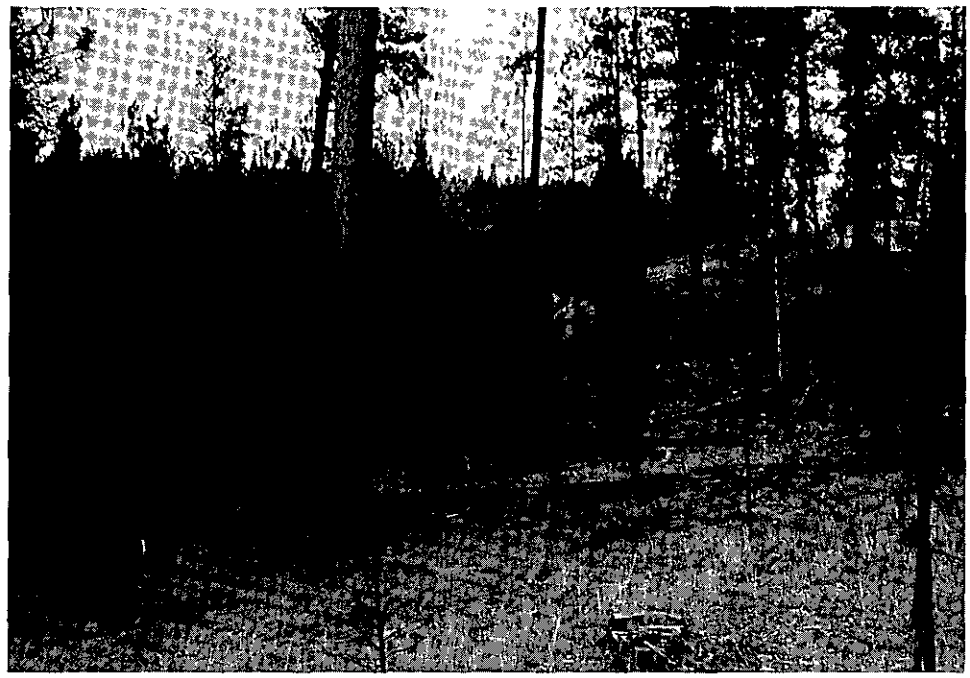
The application of uneven-aged management is characterized by stands which contain at least two well defined age classes. Even-aged aggregations of trees within these uneven-aged stands should be of a size such that regeneration never loses the protection of the adjacent older age classes. Regulation of the rate of harvest within uneven-aged stands requires the control and maintenance of a desired distribution of size classes.

Uneven-aged management can be applied using either individual tree or group selection silvicultural systems. The decision to apply either system should be based on actual stand and site conditions.

Uneven-aged management is applicable to immature, mature, and overmature stands of essentially pure ponderosa pine within the ponderosa pine community types. Uneven-aged management can be most readily applied to relatively vigorous pure stands of ponderosa pine which display an uneven or mixed stand structure.

Uneven-aged management is most applicable to the mature and overmature stands within the pine/associated community types, but only where silvicultural activities will result in stands dominated by early successional species including ponderosa pine and western larch. Dominance in these community types is established when stocking by early successional species can be maintained at or above 50 percent of the minimum stocking level basal area established in the silvicultural prescription, on 80 percent of the treated acres. As an objective, dominance by early successional species should assure long term stand health and vigor, as well as provide for the final harvest of preferred species as planned in the silvicultural prescription.

Stands which are severely understocked, overmature and single-storied, decadent, heart-rotted, or are producing little net growth are generally poor candidates for uneven-aged management.



Uneven-aged management is not recommended in lodgepole pine community types.

Uneven-aged management is applicable where there is reasonable assurance that natural regeneration of acceptable genetic quality and diversity will occur within 10 to 15 years. Planting or interplanting is also appropriate to maintain acceptable genetic quality and/or diversity, dominance by early successional species, or to assure timely regeneration under extremely harsh site conditions.

Uneven-aged management is most applicable on slopes less than 30 percent where tractors normally operate.

Uneven-aged management is most applicable where the total area impacted by detrimental soil compaction, erosion or displacement can be restricted to less than 20 percent of the stand.

Uneven-aged management is most applicable where stands are free from dwarf mistletoe. Where stands are lightly infected, uneven-aged management is applicable only where dwarf mistletoe can be confined to the lower half of the tree crowns and within a single canopy layer. The infection of lower canopy layers by upper canopy layers should be avoided. The objective is to maintain stand growth within 80 percent of its disease-free potential.

Uneven-aged management is most applicable where stands are free from root rots. Where stands are lightly infected, uneven-aged management is applicable only where root rot can be managed to maintain stand growth within 80 percent of its disease-free potential. Root rot centers should be managed using even-aged systems.

Silvicultural prescriptions should be designed to maintain or improve the existing size class diversity and uneven-aged structure. Emphasis should be given to managing the existing growing stock. The existing relationship between trees in all size classes, and the condition of those trees, should be considered first as a basis for developing marking guidelines, rather than the ultimately desired size class distribution or upper diameter limit.

Timber harvest and post sale activities should generally be planned on a 20-year entry cycle. All post sale activities should be completed within nine years following the harvest entry. Stands should not be salvage logged at other than the prescribed entry cycle except where wildfire, bark beetles, disease, or other conditions have created catastrophic mortality.

No minimum or maximum sized stand treatment units are specified where an uneven-aged structure can be maintained throughout the stand treatment unit. An average treatment unit of approximately 100 acres or larger is recommended to facilitate inventory and record keeping needs.

Timber marking guidelines should be developed which retain the most vigorous trees of best quality. First priority for leave trees are those with demonstrated good vigor. Second priority are those trees which will produce high value products in the future.

Following each commercial harvest entry, post sale activities should emphasize natural regeneration and stocking level control. Where natural regeneration is a planned objective, post sale activities should be closely coordinated to produce disturbance to the litter and vegetation as necessary for natural regeneration to occur.

Timber harvest, fuel treatment, and site preparation activities should strive to avoid damage to residual trees.

Treatment areas will be coordinated with wildlife habitat needs for cover. Silvicultural prescriptions will address the size, spacial arrangement, and opportunities presented by the existing vegetation within a treatment area.

Pruning may be done where it is economically efficient to produce clear, quality lumber.

Even-Aged Management

General

Size of units for intermediate treatments, over-wood removal treatments, and precommercial thinning will be determined through the interdisciplinary process during environmental analysis. Normally these units will not exceed 100 acres. Possible exceptions are stands which have a high susceptibility to insects and disease or where they are exhibiting retarded growth due to disease.

Vegetation diversity will be considered when preparing prescriptions and schedules for large homogenous areas that are generally the same age, in order to provide a mosaic of stands at different conditions and ages.



Rotation Age

The minimum rotation age (at which stands are scheduled for harvest) will be the age at which the mean annual increment (MAI) is equal to or greater than 95 percent of culmination of mean annual increment (CMAI). Harvesting may be at older stand ages to meet specific management objectives (see management area standards and guides for Timber).

Dispersion

The maximum size of a created opening will be 40 acres, except when openings up to 60 acres will be allowed:

When larger created openings will reduce the disturbance to soil, water, fish, or riparian resources, and residual vegetation by: (1) allowing economically feasible logging systems that reduce landing and road construction; or (2) locating roads away from unstable soils, and (3) reducing soil and vegetation disturbance from dragging logs.

Where groups of dwarf mistletoe or root rot disease infected trees need to be incorporated into the created opening to avoid infection, and their inclusion cannot be achieved by centering the created opening over the area of infection.

Where the visual quality objectives require shaping and blending of openings to fit landforms.

When natural catastrophic situations such as fires, windstorms, or insect and disease attacks occur.

On an individual case basis, after a 60-day public notice and review by the Regional Forester.

A harvested area will no longer be considered a created opening when (a) trees are four and one half (4.5) feet tall, free to grow, and meet minimum stocking requirements, or (b) when the vegetation in the harvested area meets the management area objectives, emphasis and desired future condition as stated in Section 2, Management Area Prescriptions, this chapter.

Created openings will be separated by blocks of land generally not classed as created openings as described above. The blocks of land between created openings shall vary in size and contain one or more logical harvest units. These blocks of land shall be large enough and of a stand structure appropriate to meet resource requirements of the Forest Plan.

Openings to be created contiguous to natural openings should receive an exceptional level of attention during the analysis and prescription for treatment since natural openings are recognized as important or critical. The decision to create openings contiguous to natural openings shall be supported by prescriptions specific to individual natural openings or to a group of natural openings where their importance is diminished by more frequent occurrence. Created openings should generally not exceed 1/3 the size and/or be contiguous to more than 1/3 the edge of a natural opening where the natural opening exceeds 30 acres in size.

Limitations for created openings contiguous to natural openings less than 30 acres in size will be subject to the interdisciplinary decision-making process and its review of land management objectives.

Reforestation

Stocking

Forest stocking guides will be utilized to assess adequate stocking on all regeneration units prior to certifying them as being satisfactorily reforested. See below.

Standards are established for each of the three timber types (low site pine, ponderosa pine, and mixed conifer) and by logging method (tractor or cable). They are based on 4.5 feet tall crop trees (usually between five and ten years of age). Make allowances for expected mortality and natural fill in that will occur prior to crop trees reaching 4.5 feet, based on staked tree and/or stocking surveys of similar stands. If rework is necessary, the stocking should be brought to the recommended level.

Recommended range of stocking is that which will produce the yields predicted in the Forest Plan A variety of harvesting and cultural activities are allowed for, so recommended stocking varies to cover this range.

Tree species used in planting harvest units should be based on the potential of the site as indicated by plant communities. Consideration should be given to regenerating and maintaining a mixture of species, where appropriate for the site.

The recommended stocking for each stand will be established by the silviculturist in the prescription, based on local conditions and objectives, with consideration given to meeting costs and outputs projected in the Forest Plan.

STOCKING STANDARDS AT 4.5 FEET

Level	Low Site Pine	Ponderosa Pine		Mixed Conifer	
	Tractor [1/]	Tractor	Cable	Tractor	Cable
Recommended	50 - 200	150-300	125-250	150-350	150-300
Minimum	50 [2/]	75 [3/]	75 [3/]	75 [3/]	75 [3/]

[1/] No reforestation work planned for cable ground on low site

[2/] Overstory will not be removed if stocking is below this level

[3/] Replanting or additional effort will be required if stocking is below this level Area can not be certified as stocked, and will need to be reported as a failure

Natural regeneration opportunities will be taken advantage of if acceptable genetic quality and diversity is likely to result If artificial regeneration is necessary, the recommended method will be to plant.

Planting should generally not be prescribed for low site pine types.

In clearcut units, site preparation should normally be completed within two years of harvest. Planting shall occur within one year of site preparation. Exceptions can occur, but only for resource objectives that have been documented through environmental analysis. These units should be suitable and certified as satisfactorily reforested three years after planting.

Planting will be done with seed from selected trees for all ponderosa pine seedlings and for other species when available.

Precommercial Thinning

Precommercial thinning is recommended when:

Existing overstocking will reduce future yields below predicted or planned levels (1973, op cit) which varies by Hall's Community Types and management emphasis.

The expected return from increased timber production and value exceeds the cost of precommercial thinning.

It is consistent with management objectives.

Stands with an average DBH over six inches should not be precommercially thinned, except when threatened by insects and disease. Sanitation cutting may be done to control mistletoe, or to remove defective or damaged trees that will not make a merchantable product.



The maximum acceptable stocking for ponderosa pine is 450 trees per acre, and for mixed conifer is 500 trees per acre. If the DBH for the stand is under three inches (excluding trees planned for overstory removal, if any) include all trees. If DBH is three inches or larger, exclude seedlings under 4.5 feet high from the trees per acre calculations.

There needs to be at least minimum stocking in trees capable of responding to release. This includes a minimum of 30 percent with live crown ratio, and sufficiently free of disease (such as mistletoe) or damage, to make a merchantable product.

Consider economics, as well as stocking, mistletoe (disease), and management objectives as criteria before arriving at decisions to precommercially thin stands. Thinning must be determined to be economically viable and to meet management prescription objectives.

Thinnings should retain a diversity of species based on site potential.

Harvest Schedule

Allowable Sale Quantity

The allowable sale quantity (ASQ) is planned to remain constant over the next five decades and beyond (See Objectives for Timber, Section 1 of this Chapter). The ASQ represents projected, potential outputs based on available inventory and assumptions, and accountability is on a decade basis. The planned harvest does not infer a commitment on the part of the Forest to supply the stated level on a regular basis, but rather states the maximum output available, subject to budgetary constraints and the broad discretion of the agency.



Salvage

Salvage volume is standard sound material from dead trees, standing or down, that is calculated outside of the planned ASQ. Harvest levels will vary from decade to decade and from year to year within a decade depending on mortality, economics of harvesting, etc., but total timber sold (ASQ plus salvage) for the decade will not exceed planned level by more than five percent (10 MMCF or 62 MMBF). If a catastrophic event makes more salvage volume available, it will be substituted for ASQ volume to keep total sale volume within five percent per decade. The salvage program may be increased up to ten percent of ASQ (12 MMBF) to harvest timber killed by a catastrophic event. Any increase above this will require an equal reduction in the ASQ sell volume. The amount of salvage available may be constrained by snag habitat requirements for the Forest, in any one year (See Cavity Nester Habitat, Wildlife and Fish Standards and Guidelines, this section of this chapter).

Harvest Levels by Forest Watershed

Based on current conditions, the following equivalent harvest acres (EHA) guidelines will be in effect and will remain in effect until updated or changed in the Forest Plan. This guideline assumes that suitable dispersion of harvest within a given watershed is achieved as well (also use for meeting water quality objectives).

Watershed Sensitivity	EHA Threshold Harvest Level
High	25 percent
Moderate	30
Low	35

Forest Watersheds by Sensitivity Class

High

John Day River
Rock Creek
Trout Creek
Bridge Creek
Deep Creek
Wolf Creek
Nicoll/Sawmill Creek (s)
Badger Creek
Bear Creek

Moderate

Marks Creek
North Fork Crooked River
Emigrant Creek
McKay Creek
Howard/Porter Creek (s)
Ochoco Creek
Mill Creek
Silver Creek

Low

Middle Fork Crooked River
Dry/Stinger Creek (s)
Beaver Creek
Bear/Camp Creek (s)
Keeton Creek

If during project implementation, an alternative is selected that is predicted to exceed appropriate threshold values shown above, a Forest level interdisciplinary review will occur, with full public disclosure.

Logging Methods

Ground skidding and slash piling equipment will be avoided on slopes exceeding 35 percent, and on soil conditions with high compaction, erosion or displacement hazards, or wherever soil productivity standards cannot be met.

Designated skid trails will be confined to 20 percent or less of the activity area for all timber harvest practices (including disposal of slash), unless it can be demonstrated beyond a reasonable doubt, that particular circumstances or equipment exist which will not detrimentally impact soils as stated in Soils Forest-Wide Standards and Guidelines.

Locate skid trails and roads to avoid paralleling stream channels. New landings *should not be placed in riparian areas. Existing landings within streamside areas* which are impacting or could impact water quality should be rehabilitated.

Scablands will not ordinarily be used for landings and skid trails. An exception to this would be in the case of skyline logging where a particular location would necessitate using a scab. Should this occur, the affected area will be erosion-proofed through use of rock or other appropriate methods.

Low Productivity Lands

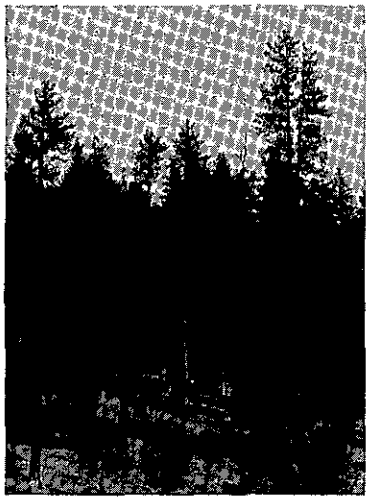
On timbered lands where site productivity is expected to be less than 20 cu.ft./acre/year, the regeneration method will be natural regeneration. This will be accomplished under the shelterwood method. Overstory will not be removed until regeneration is securely established.

Christmas Trees

Consistent with other resource objectives, Christmas trees will be offered for sale. Emphasis will be placed on personal use by individuals. Special restrictions are to be applied to prevent indiscriminate cutting of trees.

Management Area Standards and Guidelines
Resource - Timber

Practice
Scheduled Harvest



Standard and Guideline
No timber harvest allowed (including salvage).

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F7 Summit National Historic Trail (Preservation Segment Only)

Standard and Guideline
No scheduled timber harvest. Salvage harvests may be allowed under catastrophic conditions only.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area A)
MA-F28 Facilities

MA-F11(B) Lookout Mountain Recreation Area
The following standards and guidelines apply to MA-F11(B), the lower portion of the Lookout Mountain Recreation Area. Emphasis is to provide a natural setting for high quality, semiprimitive recreational activities, while maintaining healthy forested conditions. Vegetative manipulation will occur to benefit wildlife and recreational opportunities. The Pacific Northwest Experiment Station may assist the Forest in development of strategies to meet management area objectives. No timber harvest is scheduled, but area-related planning activities, including public involvement and environmental analysis will be initiated during the first decade in preparation for nonscheduled harvest possibilities.

Silvicultural Systems
Both uneven- and even-aged silviculture may be applied in specific stands in order to meet recreational and wildlife objectives, but regeneration cutting should not exceed five percent of the total mixed conifer acreage, or four percent of the ponderosa pine acreage per decade.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Encourage large, ponderosa pine and larch as primary species, but maintain 20-30 percent other species for visual diversity.

Reforestation

Rely primarily on natural regeneration. Plant only where needed to meet recreation or wildlife objectives.

Prescriptions should encourage stocking by seral species (i.e. ponderosa pine and western larch). Managed stands should be 70 percent pine and larch, and 30 percent other species.

Precommercial Thinning

Thin stands at varied spacings to meet visual management objectives and to maintain health and vigor.

Commercial Thinning

May vary *from zero to three entries.*

Harvest

Cutting practices may be used that meet the following objectives.

	PP	MC
Unit Size (acres)		
Even-aged		
Two Story Stands	4-10	2-5
Regeneration Cuts [1/]	2-5	2-5
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No Limit	No Limit
Rotation Age (years)		
Even-aged	250	200
Entry Cycle(years) [2/]		
Uneven-aged	20	20
Diameter [3/]	30"	27"
Lineal Feet of Trail Frontage in an Open Condition per Mile [4/]	300	200

[1/]Utilize seed-tree cuts where acceptable western larch and ponderosa pine exist Strive to leave all existing western larch and ponderosa pine saplings

[2/]Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[3/]The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter.

[4/]Refers to regeneration openings Does not apply to intermediate treatments such as commercial thinnings, or single tree selection

Landing locations will be used as parking areas, trailheads or other recreational facilities.

Give preferential treatment to land and vegetation for a 300 foot radius surrounding elk wallows and calving areas.

MA-F17 Stein's Pillar, MA-F19 Deep Creek, MA-F24 NFCR Scenic Corridor.

The following standards and guidelines allow limited scheduled harvest. Harvest treatments will meet the objectives of these management areas. The visual quality objective is retention. These areas also have unique qualities requiring additional consideration when planning timber harvest activities.

Silvicultural Systems

Emphasize uneven-aged systems to meet the objectives for the area. Even-aged systems may be used on a limited basis when needed to meet the area objectives. Emphasize maintenance of large, yellow bark ponderosa pine and western larch.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Cultural Treatments

Precommercial thinning and commercial thinning may be done to meet the visual quality objectives and maintain healthy stands.

Harvest

Cutting practices may be used that meet the following objectives.

	PP	MC
Unit Size (acres) [1/]	20-50	2-5
Rotation Age	300	250
Target diameter [2/]	30"	20-30"

[1/] Pine types will be individual tree selection while mixed conifer types will be group selection

[2/] The diameter shown is average for group selection and the target diameter for individual tree selection

Entry Cycle

An average entry cycle of 40 years is prescribed for stands in this management area. Actual harvest entry cycle may vary as prescribed in site specific silvicultural prescriptions.

Manage ponderosa pine to encourage large trees and open park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as aspen stands and rock outcroppings.

Restrictions on Harvest

For Stein's Pillar only, harvest activities should take place during the period from December 1 though May 1.

MA-F13 Developed Recreation

Developed Site Area

Harvest Scheduling

Harvest only for the purpose of maintaining safe and attractive recreational sites. No scheduled timber harvest.

Reforestation

Rely primarily on natural regeneration. Planting may be done to meet management area objectives.

Visual Influence Area

Silvicultural System

Both even- and uneven-aged silvicultural systems may be used. Emphasize maintenance of large, ponderosa pine and western larch.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Cultural Treatments

Precommercial thinning and commercial thinning may be done to meet the visual quality objectives and maintain healthy stands.

Harvest

Cutting practices may be used that meet the following objectives.

	PP	MC
Unit Size (acres)		
Even-aged		
Two Story Stands	4-10	2-5
Regeneration Cuts	2-5	2-5
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No Limit	No Limit
Rotation Age (years)		
Even-aged	250	200
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]	30"	27"

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter.

Manage ponderosa pine to encourage large trees and open park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as aspen stands and rock outcroppings.

MA-F7 (Retention) Summit National Historic Trail, MA-F14 Dispersed Recreation, MA-F16 Bandit Springs, MA-F25 Highway 26 Visual Corridor, MA-F26 (Retention) Visual Management Corridors, MA-F27 Round Mountain National Recreation Trail



Silvicultural Systems

Utilize both uneven-aged and even-aged systems where ecologically suitable. Manage ponderosa pine for a combination of 1) multiple age class stands and 2) open, park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as distant landscapes, aspen stands and rock out-crops.

Uneven-aged management systems will follow Forest-wide standards and guidelines while protecting and enhancing the scenic qualities in these areas.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives:

	PP	MC
Unit Size (acres)		
Even-aged		
Two Story Stands	4-10	2-5
Regeneration Cuts	2-5	2-5
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No Limit	No Limit
Rotation Age (years)		
Even-aged	250	200
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]	30"	27"
Lineal Feet of Trail Frontage in an Open Condition per Mile [3/]		
MAF-7 and MAF-27	300	200
MAF-25 and MAF-26	600	400

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter

[3/] Does not apply to intermediate treatments such as commercial thinnings, or single tree selection

Restrictions on Harvesting

For Bandit Springs only, harvest activities are allowed from April 1 through December 1. Restrict harvest activities during times of high recreational use.

MA-F12 Eagle Roosting Areas

Silvicultural Systems

Harvest ponderosa pine on an uneven-aged management system. Timber stands will be treated over time to produce the optimum number and size trees (36 to 40 inches at DBH) while avoiding a high risk of insect attack or disease. There are no limitations on thinning trees below 20 inches at DBH and thinning to maintain the health and growth of roost trees and future roost trees is desirable.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Restrictions on Harvesting

Harvesting will only be allowed between May 1 and December 1. Actual and designated roost trees will not be designated for harvest nor will adjacent trees where falling might cause the loss of roost trees. Snags will be left where safely possible to do so.

A site-specific management Plan will be written for each roosting area which will be designed to maintain existing roost trees and develop suitable future roost trees. Stand conditions will be modeled and results incorporated into a certified silvicultural prescription. This Plan will require consultation and final review by the U.S. Fish and Wildlife Service.

Precommercial Thinning

Consider desired size for future roost trees when thinning.

Commercial Thinning

Consider desired size of future roost trees when thinning.

MA-F15 Riparian Areas

Silvicultural System

Utilize both uneven-aged and even-aged systems where ecologically suitable for meeting riparian objectives. Emphasize stand health and long-term shade production.

Both even- and uneven-aged management systems will follow Forest-wide standards and guidelines.

Reforestation

Avoid mechanical site preparation, aerial herbicide application and fertilization.

Silviculturist will determine reforestation and intermediate treatment needs, based on meeting the following objectives:

	PP	MC
Unit Size (acres) (range)		
Even-aged		
Two Story Stands	10-20	5-10
Regeneration Cuts	2-5	2-5
Uneven-aged		
Group Selection	0-2	0-2
Single Tree Selection	No Limit	No Limit
Rotation Age (years)		
Even-aged	200	200
Entry Cycle (years) [1/]		
Uneven-aged	40	40
Diameter [2/]	20"	20"
Large Woody Material [3/]		

[1/]Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/]The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter

[3/]Provide suitable amounts of large woody material within the riparian area to provide streambank stability and habitat

MA-F7 (Partial Retention) Summit National Historic Trail, MA-F23 NFCR Recreation Corridor, MA-F26 (Partial Retention) Visual Management Corridors.

Silvicultural Systems

Utilize both uneven-aged and even-aged systems where ecologically suitable. Manage ponderosa pine for a combination of 1) multiple age class stands and 2) open, park-like stands. Manage mixed conifer for a mix of species with emphasis on maintaining western larch where possible. Provide views of scenic features such as distant landscapes, aspen stands and rock outcrops.

Uneven-aged management systems will follow Forest-wide standards and guidelines while protecting the scenic qualities in these areas.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives.

	PP	MC
Unit Size(acres)(range)		
Even-aged		
Two Story Stands	10-20	5-8
Regeneration Cuts	5-8	5-8
Uneven-aged		
Group Selection	<2	<2
Single Tree Selection	No Limit	No Limit
Rotation Age (years)		
Even-aged	200	150
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]	27"	22"
Lineal Feet of Road Frontage in an Open Condition per Mile [3/]	800	600

[1/]Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/]The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter.

[3/]Does not apply to intermediate treatments such as commercial thinnings, or single tree selection



MA-F18 Hammer Creek Wildlife/Recreation Area

Silvicultural Systems

Both even- and uneven-aged systems will be used in appropriate stands to meet the objectives for the area. Silvicultural treatments will be prescribed to maintain or improve habitat diversity and aesthetic qualities of the area.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives:

	PP	MC
Rotation Age (years) Even-aged	200	150
Entry Cycle (years) [1/] Uneven-aged	20	20
Diameter [2/]	27"	22"
Lineal Feet of Trail Frontage in an Open Condition per Mile [3/]	300	200

Unit size will vary according to habitat requirements and silvicultural treatment. Created openings should be designed to optimize big game forage/cover ratios.

[1/]Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/]The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter

[3/]Does not apply to intermediate treatments such as commercial thinnings, or single tree selection

MA-F20 Winter Range

Silvicultural Systems

Both even and uneven-aged management systems may be used. However, emphasis should be on using even-aged management to provide stand conditions for cover.

Reforestation

Practices may vary from natural regeneration to planting at normal or increased stocking. Utilize natural regeneration on lower productivity sites and where natural regeneration is likely to be successful.

Precommercial Thinning

In ponderosa pine-wheatgrass (CP-G1-11), ponderosa pine-fescue (CP-G1-11), ponderosa pine-bitterbrush-Ross sedge (CP-S2-21) plant communities, thin to obtain cover prior to commercial thinning or final removal. Additional thinning may be required if stand condition deteriorates to the point that there is substantial increasing mortality because of bark beetles. Precommercial thin plantations at earliest stage possible to produce a thick crowned tree for cover enhancement.

In all plant communities with higher productivity levels than those listed above, 50 percent of all stands on a watershed basis (within the Winter Range) should be thinned to 150-250 trees per acre until the first commercial thinning entry. The remaining 50 percent will either not be thinned or be thinned to 300-400 trees per acre. It is desirable that thinned and unthinned stands are 30 to 60 acres in size and evenly distributed.

Commercial Thinning

In ponderosa pine-wheatgrass, ponderosa pine-fescue, ponderosa pine-bitterbrush-Ross sedge, thin to develop a mix of size classes toward uneven-aged management, when not in conflict with cover objectives.

On higher sites, in stands which have been left unthinned, thinning may be delayed based on big game habitat requirements and stand health. Thinning should emphasize developing a mix of species, stand health, and 25-40 percent crown closure immediately after thinning.

Sanitation-Salvage Harvesting

While meeting snag levels, an active program of sanitation harvesting will be done to protect stand condition while meeting cover objectives.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives:

	PP	MC
Rotation Age (years)		
Even-aged	125	90
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]	16"	15"

Unit size will vary according to habitat requirements and silvicultural treatment. Created openings should be designed to optimize big game forage/cover ratios.

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription.

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated is a target diameter

MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter Area

Silvicultural Systems

Both even- and uneven-aged management systems may be used in appropriate stands to meet the objectives for the area. Uneven-aged systems may be applied to stands on slopes greater than 30 percent. Silvicultural treatments will be designed to improve stand conditions while protecting the anadromous fishery, soil stability, and big game habitat.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Reforestation

When site preparation is necessary, burning will generally be used. Natural regeneration may be practiced if it can result in successful seedling establishment. Otherwise regeneration units will be planted.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives:

	PP	MC
Rotation Age (years) (range)		
Even-aged	130-200	90-120
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]		
Even-aged	18"	16"
Uneven-aged	20"	

Unit size will vary according to habitat requirements and silvicultural treatment. Created openings should be designed to optimize big game forage/cover ratios.

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription.

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter

Logging Systems

Only helicopter yarding will be permitted. Locate landings outside the management area boundary.

MA-F21 General Forest Winter Range

Silvicultural Systems

Both even- and uneven-aged silvicultural systems may be used. However, uneven-aged management is the preferred system on low pine sites and will comply with Forest-wide standards and guidelines.

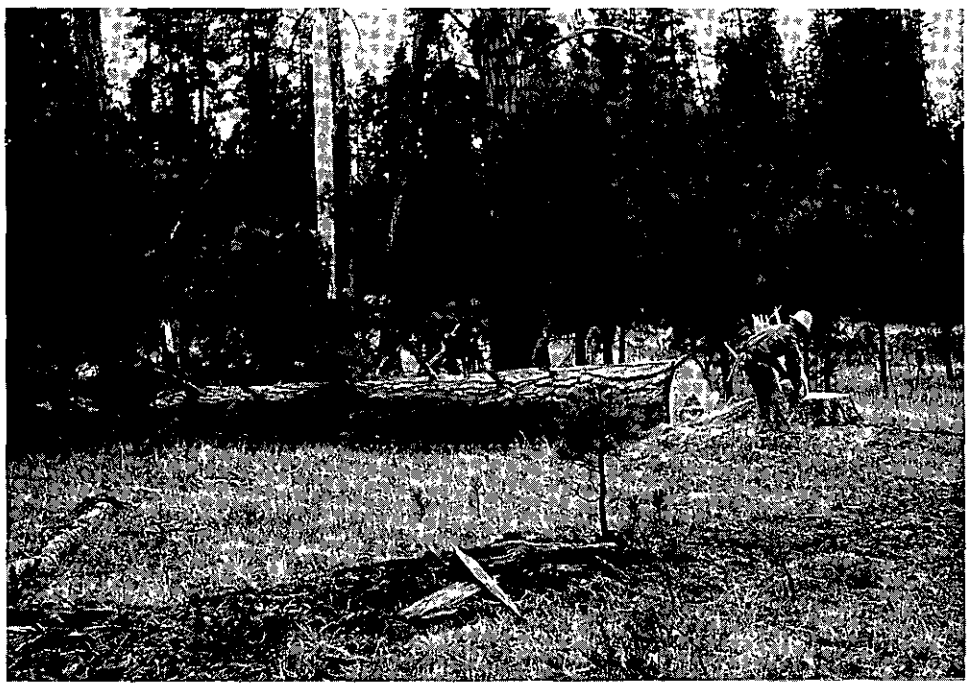
Cultural Treatments

Precommercial thin plantations at the earliest stage possible to produce a thick crowned tree for cover enhancement.

Thinnings, in ponderosa pine stands, will be to stocking levels that minimize the risk of bark beetle infestation. But, avoid thinning large continuous areas that may create stand conditions devoid of age and size diversity.

Pruning may also be done in ponderosa pine stands when determined to be economically efficient; preference is to wait until commercial thinnings, when future production of a merchantable log (17 feet or greater) can be reasonably assured.

Silviculturist will model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives.



	PP	MC
Rotation Age (years)		
Even-aged	130	90
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]		
Even-aged	18"	16"
Uneven-aged	20"	

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter.

MA-F22 General Forest

Silvicultural Systems

Most mixed conifer stands and stands (all species) on slopes greater than 30 percent should be managed using even-aged systems. Ponderosa pine stands, on slopes less than 30 percent and with suitable age class distributions, should be managed using uneven-aged systems, when free of relevant insects and diseases.

Uneven-aged management systems will follow Forest-wide standards and guidelines.

Silviculturist should model stand conditions in order to determine reforestation and intermediate treatment needs, based on meeting the following objectives.

	PP	MC
Rotation Age (years)		
Even-aged	130	90
Entry Cycle (years) [1/]		
Uneven-aged	20	20
Diameter [2/]		
Even-aged	18"	16"
Uneven-aged	20"	

[1/] Actual harvest entry cycle will be prescribed in a site specific silvicultural prescription.

[2/] The indicated diameter is an average end point diameter at rotation age for even-aged stands For uneven-aged stands, the indicated size is a target diameter

Reforestation

Select the most productive and accessible sites for increased stocking. Utilize natural regeneration on lower productivity sites and where natural regeneration is likely to be successful.

Cultural Treatments

Precommercial and commercial thinnings will receive high priority in development of stand management activities, in order to meet objectives for stand health (especially resistance to bark beetles), economic efficiency, and production of high quality wood. But, avoid thinning large continuous areas that may create stand conditions devoid of age and size diversity. Silviculturist will develop stocking levels in thinning prescriptions to meet these objectives, based on specific site conditions. Timing of future commercial entries should be considered when prescribing these levels, so that additional intermediate thinnings (especially precommercial) are not unnecessarily required to maintain stand health. Pruning may also be done in ponderosa pine stands when determined to be economically efficient, preference is to wait until commercial thinnings when, future production of a merchantable log (17 feet or greater) can be reasonably assured.

Transportation System



Forest-Wide Standards and Guidelines

Planning

Transportation systems will be planned to support resource activities in the management areas and to serve multiple resource needs rather than individual project proposals.

Roads and trails will be at the lowest density which meets long-term resource needs. Where existing roads or trails are impacting water quality steps will be taken to mitigate the problem.

The planned transportation system will be constructed to the required standards to meet the needs of the planned resource activities of the area. This standard will be such that repeated reconstruction to upgrade any given section of the system will be minimized during the planning period.

Prepare and maintain road management objectives (RMO's) for proposed and existing system roads and identify roads not needed for future maintenance.

Coordinate with the State and Counties on management of their roads to complement Forest uses.

Identify roads that require Forest Service jurisdiction to meet resource objectives.

Update the "Forest Sign Plan" annually to reflect road management objectives.

Traffic Management

General

The adequacy and safety of the transportation system will conform to the Forest Service Manuals and Handbooks. If a road does not exist at an adequate and safe standard for the traffic expected to use it, traffic can be restricted to a level where the existing road is adequate. This could eliminate the need to reconstruct the road.

Manage traffic as needed to control access due to structural limitations of the road, safety, or to meet resource objectives, such as those to meet wildlife needs or off-road vehicle (ORV) travel management needs.

Strategies for managing traffic will range from highly restrictive low impact, single user, short-term roads to unrestricted long-term roads.

Strategies for managing traffic could include prohibiting use on a seasonal or yearlong basis, or eliminating all standard vehicle use for more than one year.

Put sign traffic control devices (such as gates) to let users know why use is restricted and for what period of time.

No construction or logging equipment parking or turnarounds will be allowed on scablands except under landings.

Commerical Hauling

During commercial hauling activities, public access will generally be discouraged or prohibited on single user local access roads.

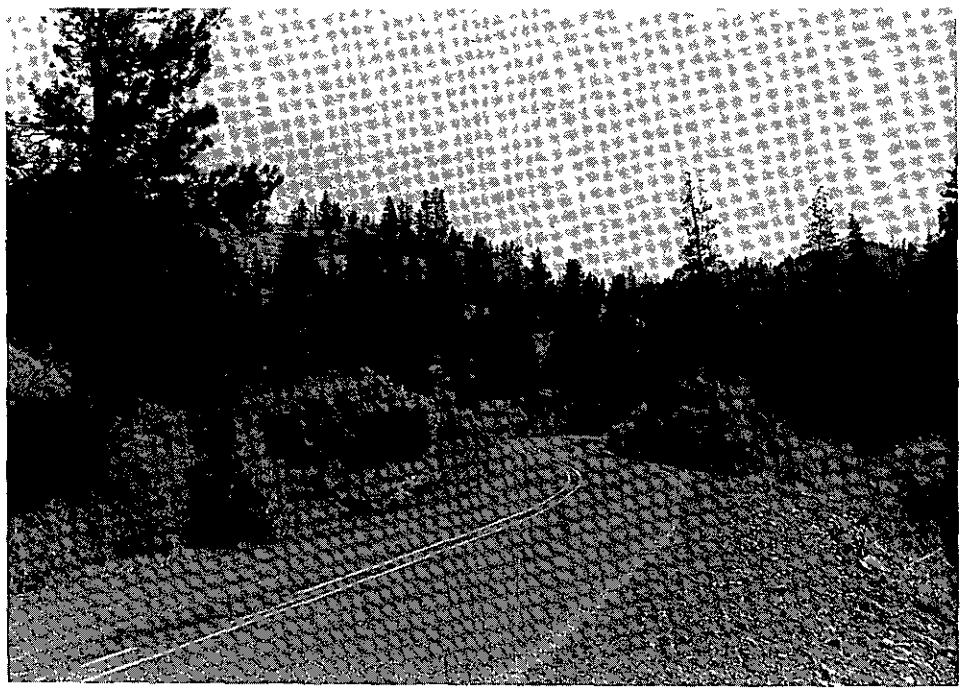
Generally, primary commercial haul routes are reconstructed, operated and maintained to permit low clearance (passenger car) traffic. However, some commercial haul routes may be maintained for high clearance vehicles, Maintenance Level 2.

Recreation

Encourage ORV use only on roads where all standard vehicle use has been eliminated, or on roads which have no current or planned future use, where appropriate with other resources.

Access routes to developed sites will generally be reconstructed, operated and maintained to permit low clearance (passenger car) traffic. However, public use may be seasonally discouraged, or restricted.

Local road access to historical dispersed recreation sites are generally graveled to prevent investment loss and resource damage during wet periods of the year.



Road access management strategies to the dispersed sites will generally be "accept" or "encourage" use by dispersed recreationists.

Construction and Reconstruction

Design, construct, and reconstruct roads according to standards based on the following criteria: resource management objectives, environmental constraints, safety, physical environmental factors, traffic requirements, traffic service levels, vehicle characteristics, road users, and economics.

Roads will not be constructed through the length of a riparian area. Roads crossing a riparian area will not alter stream or groundwater flow characteristics to a degree which will impact the riparian characteristics.

Road drainage will be designed and maintained to eliminate any influx of sediment road runoff directly into stream channels, to the extent possible.

Road construction activities will be managed to minimize the amount of unprotected soil surfaces when heavy rain or heavy surface runoff are most likely to occur.

Ensure that erosion control measures are completed prior to times of year when heavy rain or heavy runoff are normally expected.

Whenever practical, roads should be located on areas with the lowest erosion hazard.

Provide cost effective timber haul based on the various seasons of the year.

Ensure that temporary culverts or bridges are used where stream bottoms or banks would otherwise be damaged, and that these temporary structures are removed after use.

Roads which pass through high water table areas should be constructed in a manner which does not alter the flow characteristics of the groundwater.

Stream Crossings

Design and construct the transportation system to minimize the numbers of stream crossings.

Locate stream crossings and the approach alignment to minimize stream damage.

Bridge approach fills should be riprapped or protected by wing walls.

Ensure adequate sizing of culverts or bridges to accommodate anticipated high streamflows and to allow fish passage.

Schedule stream crossing construction during low streamflow and/or outside fish spawning periods.

Stream crossings should not change floodplain or streamflow characteristics.

Maintain existing riparian communities both upstream and downstream from the crossing.

Scablands

Road construction on scablands will be limited to long-term collector, arterial and local roads. Temporary or short-term roads or trails will not be constructed across scablands unless there is no other feasible alternative. Should a specific activity necessitate the construction of temporary access, the area affected will be completely erosion proofed through use of crushed rock and other appropriate methods.

Thoroughly analyze the long term need before establishing borrow pits on scablands.

Visuals

Include parking areas and view points in road plans and designs where appropriate.

Locate material stockpiles out of site of the main travel route.

Gravel pits, barrow areas, landings, etc. should meet visual objectives for the management area.

Avoid locating roads in the visual foreground other than at junctions. Design roads to fit the topography, minimizing cuts and fills. Roads should not dominate the natural pattern of line, form or color.

Necessary road closures in visual management areas should be designed and constructed to blend with the natural characteristics of the landscape.

Road Operations and Maintenance

Operate and maintain all roads within available financing according to maintenance levels established in Road Management objectives and standards defined as follows:

Minimum Maintenance Level	**Use**
Obliterated	No current or future use (36 CFR 261.5)
1 (Closed)	No current use, planned future use
2	High clearance vehicles
3,4,5	Low clearance vehicles

If funding is inadequate to maintain some roads at the intended maintenance level, maintain roads at a lower maintenance level, such as high clearance access (Level 2) to a closed level (Level 1).

Stabilize and re-establish vegetation on obliterated roads.

Ensure that necessary road and trail maintenance is performed on all runoff control and drainage structures (dips and culverts).

Provide for additional maintenance of road drainage and crossing structures during periods when unusual runoff is expected.

Ensure that appropriate traffic management is established to prevent the creation of pollution-generating conditions, such as deep wheel tracks in roads during wet weather.

Management Area Standards and Guidelines
Resource - Transportation System

Practice
Construction and Reconstruction

Standard and Guideline
None allowed.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area A)

Standard and Guideline
None allowed except for research purposes, and approved by PNW Station Director.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Construction and reconstruction activities restricted from December 1 to May 1.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Avoid construction of new roads, except where analysis results in no other reasonable alternatives

Applicable Management Area
MA-F6 Old Growth

Standard and Guideline
Where possible, road locations will be guided by recreation needs. Existing open roads leading to dispersed campsites and mining claims will remain open for these uses. New roads will be constructed to minimum standards with limited use of rock, and cuts and fills, and closed to motorized use except snowmobiles.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)

Standard and Guideline
Limit total road crossings to not more than one crossing in two miles.

Applicable Management Area
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Construction and reconstruction are allowed to access Forest resources, according to management area emphasis. Subject to Forest-Wide Standards and Guidelines, Section 2, this Chapter.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range
MA-F22 General Forest
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F28 Facilities

Practice
Operations and Maintenance

Standard and Guideline
Obliterate and revegetate all existing roads except those authorized for mining operations. Where appropriate, utilize the old the road system for a nonmotorized trail.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F8 Rock Creek/CottonwoodCreek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area A only)

Standard and Guideline
Hazard tree felling is permitted. Felled trees shall remain in place unless lying across an approved road or trail.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Maintenance activities, including tree felling, prohibited from December 1 to May 1. Maintain all open roads for public safety.

Applicable Management Area
MA-F12 Eagle Roosting Areas

Standard and Guideline
Maintenance activities, including tree felling, restricted to open roads from December 1 to May 1.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)
MA-F18 Hammer Creek Wildlife Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Hazard tree felling is permitted for public safety.

Applicable Management Area
MA-F6 Old Growth
*MA-F7 Summit National Historic Trail
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation

MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

*Blaze trees will be cut off above blazes.

Practice
Traffic Management

Standard and Guideline
No access permitted except for authorized mining claims.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area A Only)

Standard and Guideline
Access routes will be restricted to administrative use and use by permit for research related purposes only.

Applicable Management Area
MA-F5 Research Natural Areas

Standard and Guideline
Except for constant service through routes and short, existing, local access, use will be restricted to approved projects designed to meet management area objectives. These will be closed to motorized use at the end of the projects.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)
MA-F15 Riparian
MA-F16 Bandit Springs
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor

Standard and Guideline
Except for constant service through routes, use will be restricted to administrative use and use by permit only during December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas

Standard and Guideline
Except for constant service through routes, use will be restricted during the period of December 1 to May 1. Access routes will be limited to one mile per section during that period, and three miles per section on the average, the remainder of the year.

Applicable Management Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Certain local roads may be restricted to administrative use and use by permit only.

Applicable Management Area
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F16 Bandit Springs Recreation Area
MA-F28 Facilities

Standard and Guideline
Constant service roads will remain open. Use on all other roads across the management areas will be eliminated.

Applicable Management Area
MA-F6 Old Growth
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Generally, access routes will be open subject to Forest-wide Standards and Guidelines.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F22 General Forest
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors

Practice
Off-Road Use

Standard and Guideline
No motorized use allowed.



Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas
MA-F6 Old Growth
MA-F13 Developed Recreation
MA-F27 Round Mountain National Recreation Trail

Standard and Guideline
Motorized use restricted to designated routes and prohibited from December 1 to May 1.

Applicable Management Area
MA-F12 Eagle Roosting Areas

Standard and Guideline
Motorized use restricted to over-snow use only, and from December 1 to May 1.

Applicable Management Area
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline
Over-snow motorized use restricted to designated routes from December 1 to March 30.

Applicable Management Area
MA-F16 Bandit Springs Recreation Area

Standard and Guideline
Motorized use restricted to designated routes. Over-snow use prohibited from December 1 to May 1.

Applicable Management Area
MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range

MA-F21 General Forest Winter Range

Standard and Guideline
Motorized use encouraged on designated routes.

Applicable Management Area
MA-F14 Dispersed Recreation
MA-F22 General Forest

Standard and Guideline
Motorized use prohibited except for over-snow use on designated routes.

Applicable Management Area
MA-F17 Stein's Pillar Recreation Area

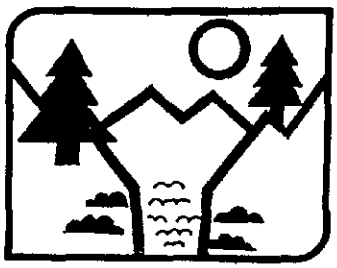
Standard and Guideline
Motorized use restricted to designated routes.

Applicable Management Area
MA-F15 Riparian
MA-F23 NFCR Recreation Corridor
MA-F24 NFCR Scenic Corridor
MA-F28 Facilities

Standard and Guideline
Motorized use restricted to designated routes except snowmobiles over snow.

Applicable Management Area
MA-F7 Summit National Historic Trail
MA-F19 Deep Creek Recreation Area
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors

Water



Forest-Wide Standards and Guidelines

Water Quality

Comply with State requirements in accordance with the Clean Water Act for protection of waters of the State of Oregon (Oregon Administrative Rules, Chapter 340-41), through planning, application, and monitoring of Best Management Practices (General Water Quality Best Management Practices, Pacific Northwest Region, November,1988) in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.

In cooperation with the State of Oregon, the Forest will use the following process:

Select and design BMP's based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for those waters potentially impacted.

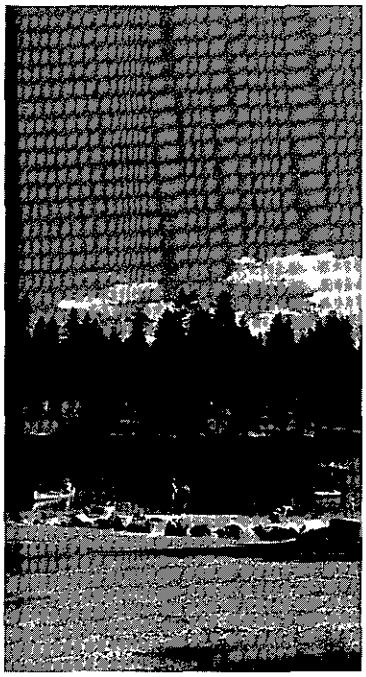
Implement and enforce BMP's.

Monitor to ensure that practices are correctly applied as designed.

Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.

Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMP's do not perform as expected.

Adjust BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Consider recommending adjustment of water quality standards.



Use the existing, agreed upon, process to implement the State Water Quality Management Plan on lands administered by the USFS as described in Memorandums of Understanding between the Oregon Department of Environmental Quality and U.S. Department of Agriculture, Forest Service (2/12/79 and 12/7/82). Also use "Attachments A and B" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest, 12/78, and Best Management Practices for Range and Grazing Activities on Federal lands, respectively).

Temperature

Crooked River, John Day River and Tributaries

Existing temperatures at or above 68° F. will not be increased. Temperatures at or below 66° F. may be raised a maximum of 2° F.

Where stream temperatures exceed 68° F., management activities will include objectives for reducing temperatures to levels that will improve fish habitat capability.

Turbidity

Stream channel cutbanks should not exceed an average of 20 percent for any given stream drainage.

Waste Disposal

Dispose of waste effluents (e.g. sanitary waste, fuels, solvents, and pesticides) in a manner that will prevent contamination of surface or subsurface water.

Project Planning

See Forest-wide Standards and Guidelines for Timber for direction on equivalent harvest acres (EHA) guidelines.

Plan for no management activities in and around Class III and Class IV streams that contribute to the deterioration of water quality below standards set for downstream Class I and II streams. Protection will be provided primarily through mitigation measures. Some short-term temperature and/or turbidity increases may be allowed, providing the standards for Class I and II streams continue to be met. Consider the potential for cumulative impacts. Provide suitable amounts of woody material based on specific characteristics of individual stream courses.

Develop specific objectives for the management of streams through the NEPA-process for all projects that could impact water quality.

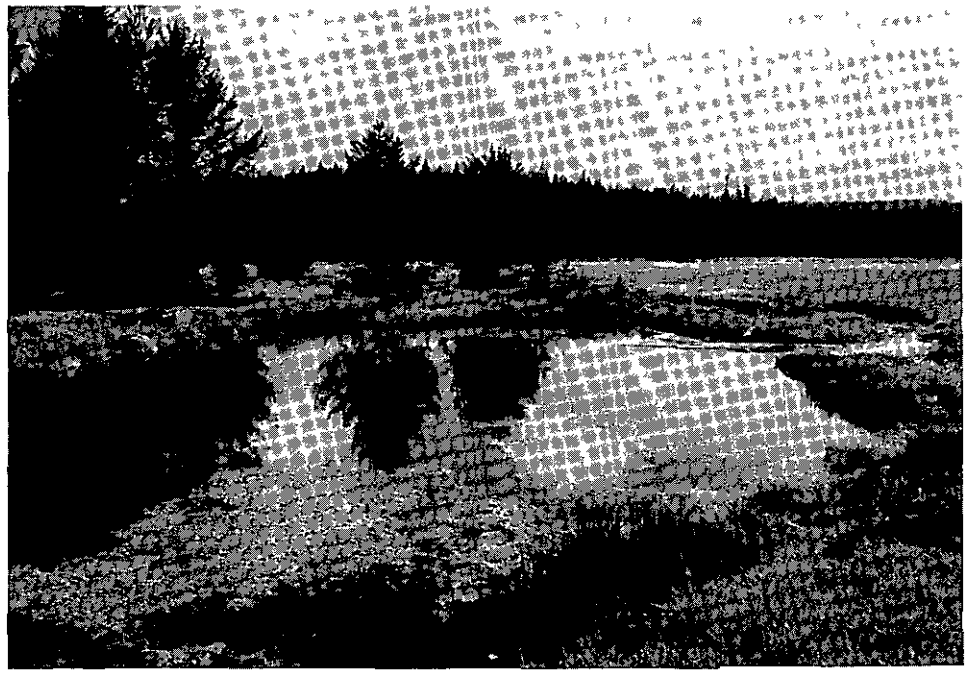
Floodplains, and Wetlands (including springs and wet meadows).

Consider the presence of, and potential impacts to, any inventoried floodplain in project area environmental analysis.

Do not locate major structures, roads, or other facilities within floodplains unless no feasible alternative sites exist outside floodplains.

Allow projects causing short-term impacts on floodplain values only if specific mitigation measures designed to minimize the impacts are documented in the project environmental analysis. Restore natural floodplain characteristics after the activity has ceased.

See Management Area F15 Riparian (Section 2, this chapter) for emphasis and desired future condition of riparian as a management area prescription (not including springs and wet meadows), and management area standards and guidelines for desired resource areas, such as Fire, Timber, Transportation System, and Water.



Management Area Standards and Guidelines

Resource - Water

Practice

Water Quality Improvement Projects

Standard and Guideline

Enhancement of riparian vegetation or other water related resources, is restricted to research purposes, unless authorized by PNW Station Director.

Applicable Management Area

MA-F5 Research Natural Areas

Standard and Guideline

Use of mechanized equipment for water improvement projects will be approved by the Regional Forester on a case-by-case basis. Power equipment such as chainsaws can be used with Forest Supervisor approval on a case-by-case basis.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Area

Standard and Guideline
Construction of structural improvements can be done with approval of the Chief of the Forest Service.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area



Standard and Guideline
Use of mechanized equipment for maintaining existing improvements will be approved by the Regional Forester. Power equipment such as chainsaws can be used with Forest Supervisor approval on a case-by-case basis.

Applicable Management Area
MA-F2 Bridge Creek Wilderness

Standard and Guideline
Construction and maintenance for water improvement projects restricted from December 1 to May 1.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area B)
MA-F12 Eagle Roosting Areas
MA-F18 Hammer Creek Wildlife Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Construction and maintenance for water improvement projects allowed, subject to Forest-wide Standards and Guidelines.

Applicable Management Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Creek Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area (Prescription Area A)
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F22 General Forest
MA-F25 Highway 26Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Practice
Temperature

Standard and Guideline
The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this can not be attained, 100 percent of the potential for shade is the standard.

Shade requirements may be reduced in cases where management is necessary to sustain a thrifty community of shade providing species over time, e.g., in the case of local infestation or disease, or for managing for future shade in a decadent stand, but activities may not result in an increase in temperatures above the limits specified.

Applicable Management Area
MA-F15 Riparian

Practice
Turbidity

Standard and Guideline
Allow no more than 10 percent cumulative increase in stream turbidity. Short-term (plus or minus 50 years) deviations from this standard to accommodate emergency or other legitimate activities will comply with state requirements for notification and approval.

Applicable Management Area
MA-F15 Riparian

Practice
Project Activities

Standard and Guideline
Riparian areas are a unique and biologically important system on the Forest. Special attention shall be given to land and vegetation for approximately 100 feet form the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas. Topography, vegetation type, soil, climatic conditions, management objectives, and other factors shall be considered in determining what management practices may be performed within these areas, or the constraints to be placed upon their performance. (36 CFR 219.27e.)

Give preferential consideration to riparian-dependent resources over other resources in cases of unresoluble conflicts.

Provide suitable amounts of large woody material based on specific characteristics of riparian areas.

Discuss the presence of potential impacts to riparian areas in all project-level environmental documents.

Vegetation and ground cover requirements.

Where site potential and topographic factors permit, manage riparian areas to provide the shade necessary to meet stream temperature goals.

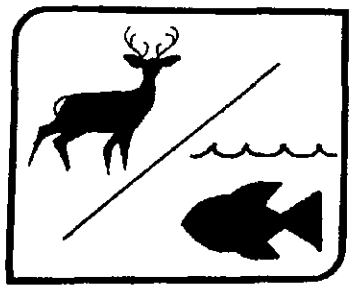
Maintain upper streambanks in a stable condition along at least 80 percent of the length of a stream.

Retain at least 80 percent of the potential ground cover in grass-forb riparian communities. Also, retain at least 80 percent of the potential tree or shrub cover in riparian areas dominated by trees or shrubs. In riparian areas with mixed layers, the cover requirement may be met by taking credit for the effective cover provided by all vegetative layers of the riparian community including shrubs, tree understories, and the dominant overstory. Consider the mitigating effect of stream size and orientation as well as surrounding topography when determining the amount of cover that may be removed.

Kovalachik's Riparian Plant Community guide will be used for determining site potential until more specific data is available.

Applicable Management Area
MA-F15 Riparian

Wildlife and Fish



Forest-Wide Standards and Guidelines

Coordinate activities that affect fish or wildlife resources with the Oregon Department of Fish and Wildlife, Columbia River Inter-tribal Council, Bureau of Land Management, and the U.S. Fish & Wildlife Service. The level at which coordination occurs will be based on the magnitude of proposed activities, and the species involved.

Structural improvements to provide water, or otherwise concentrate wildlife (big game) use will not be planned specifically for scablands (See Forest-wide Standards and Guidelines, Soils)

Management Indicator Species

Determine if the species' use of the area is incidental or if it is essential habitat. If it is determined to be essential habitat (roosting sites, for example) protect it from adverse modification through curtailment of conflicting activities, modification of activities, seasonal restriction of activities, or avoiding the area. For bald eagles, request an informal consultation with the Endangered Species Branch of the Fish and Wildlife Service on proposed actions which may adversely affect the species.

For newly discovered essential habitat, conduct environmental analysis under the NEPA process to determine if it is necessary to designate the area as essential habitat. If so, the Forest Plan will be amended or supplemented where appropriate, and the essential habitat designation will supersede previous land allocations or can be substituted for other habitat allocated to threatened or sensitive species.

Pileated Woodpecker

Approximately 19,250 acres of old growth, and another 19,250 acres of supplemental feeding habitat have been allocated across the Forest (outside of wilderness and Research Natural Areas) to meet the needs of old growth dependent wildlife, with the pileated woodpecker as the major indicator species.

Another 2,100 acres of old growth within wilderness and Research Natural Areas are considered necessary to meet the distributional needs of the woodpecker, but have not been specifically allocated, due to legal precedence for these areas. Natural processes (natural fire ignitions, etc.) shall continue to occur in these stands and may circumvent management desires to maintain them for wildlife habitat. But, any planned management activities in wilderness and RNA's (planned ignitions or research) should be done in such a way as to protect the integrity of these areas. See management area standards and guidelines for specific management direction. Also, see locations of old growth stands for habitat (both inside and outside wilderness and Research Natural Areas) on the Alternative I (preferred) map.

Primary Cavity Excavators

Primary cavity excavators create cavities for themselves and other cavity users. In addition to the ecological diversity provided by these species, they also play an economic role in the forest environment. These species, plus the secondary cavity nesters, consume insects that are destructive to forests. While these birds may not prevent epidemic populations from building, many authors have indicated a suppressive influence on insects at endemic levels. For these reasons, more than a minimum population of the primary excavators is desirable. Effective population levels of these excavators is believed to be above 40 percent of their potential population levels, as compared to a viable population of only 20 percent. See *Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington*, Thomas, 1979, for further discussion of management of this specialized habitat.

Provide habitat to support populations of cavity nesters at various levels by management area in order to achieve a Forest-wide objective of 47 percent of maximum potential over the first decade (see management areas standards and guidelines, Wildlife and Fish).

Snag Distribution

Provide snags within areas that are generally no larger than normal harvest unit size (40 acres). These snags will be maintained through the full rotation on these areas by providing for green replacement trees that will become snags of adequate size when existing snags fall. It is not intended or possible that dead and defective tree habitat be uniformly distributed over every acre. But, do not (arbitrarily) combine areas with high concentrations of dead and defective tree habitat with non-adjacent areas devoid of dead and defective habitat to arrive at a prescribed average number per acre. Plan dead and defective tree habitat by units, such as project planning areas or subdrainages (3,000 to 5,000 acres maximum) where specific management levels can be monitored.

Where adequate snags are not currently available to meet the desired level (40%,etc), created snags should be used to meet the direction as nearly and as soon as possible.



If snags are not present and cannot be created, higher snag levels can be managed in adjacent areas and averaged with the low levels in deficient areas to meet management objectives. However, averaging should be done over as small an area as possible, and replacement snags should be planned for in the deficient areas to meet the distribution requirements as soon as possible.

In a forested setting (uneven-aged management or mid- to late-successional stages in even-aged management), either clumped or evenly distributed snags are acceptable

In early successional stages (grass/forb, seedlings and saplings) of even-aged management areas (i.e. clearcut and overstory removal), it is more desirable to manage snags in patches because:

Snag patches can provide foraging as well as nesting habitat;

Snag patches are more likely to support species that won't nest in the open than are single, uniformly distributed snags;

It is operationally safer and more efficient to provide snags in patches rather than in single, uniformly distributed patterns, and

Snag patches better provide opportunities for live trees that can become replacement snags through the rotation of a stand.

Golden Eagle and Prairie Falcon

Carefully evaluate activities having the potential to alter or disturb cliffs, talus, or cave habitats.

Bald Eagle

Preserve the integrity of actual and potential bald eagle winter roost sites. Utilize the findings and recommendations of a bald eagle winter roost survey, conducted by the Oregon Cooperative Wildlife Research Unit in 1986 through 1987. See Bald Eagle Management Prescription (Management Area 12-Eagle Roosting Areas), Section 2, this chapter.

Rocky Mountain Elk and Mule Deer

Big game capability models should be used in project planning to determine habitat effectiveness (HE), as affected by quality and quantity of cover and forage, and open road density. Resulting HE values will be compared with those predicted for future outputs, to determine whether or not big game objectives are being met. Specific actions should be taken when project alternatives chosen for implementation are shown to reduce HE values below those predicted over the planning horizon. See management area standards and guidelines for Wildlife and Fish,this chapter for predicted HE values and specific actions to take. Also see Chapter 5, Implementation of the Forest Plan, for monitoring requirements.

The model used to predict the influence of forest management on elk is a Habitat Effectiveness model. It is a biologically based model that tells us how effective an area will be in supporting elk. The model was designed to measure effectiveness on a scale of 0 to 180, with 180 representing the highest potential effectiveness and 0 representing the least desirable situation for elk. It is intended to be only a relative measure of effectiveness, and does not consider many factors that would influence the actual number of elk found in an area. These additional factors include the effects of hunting, predators, disease, yearly changes in weather and forage production, competition with other animals, and the rate at which elk populations can change from one level to another.

To make the results of the model easier to interpret, the effectiveness index was translated into a number of animals that could be supported on an area. This was done by estimating the density of animals that could be supported on an area if the habitat were maintained at optimum effectiveness. It was then assumed that a habitat effectiveness value of 180 translated to this highest possible density of elk, and that lower values would translate to proportionally lower densities. The numbers shown in this document (see objectives for Wildlife and Fish, Section 1, this chapter) are those numbers of elk that could potentially be supported on the area. The numbers are not projections of actual elk populations. As noted above, many additional factors would have to be considered in order to project actual elk populations. It is especially important to note that the current elk numbers on an area may not be the direct result of factors that are measured in the habitat effectiveness model. The current population in an area could be limited by the availability of winter range on private land, by hunting pressure, or by any of the other factors discussed above. In this case, habitat effectiveness might decline but have no real influence on the number of elk that occupy the area, or habitat effectiveness might increase but still have no net influence on the number of elk. Because the numbers shown as outputs in Section 1, Goals, Objectives and Desired Future Condition, for Wildlife only represent habitat effectiveness, it is important to read the full text in order to understand the effect of forest management on the elk population.

Protect the character of elk calving sites. Minimize disturbance from human activity during calving season (approximately May 15 to June 30). Also protect wallows during rutting season (September 1 to October 15).

Provide forage sufficient to meet management objectives for population levels of Rocky Mountain elk and mule deer (see Management Objectives for Wildlife and Fish, Section 1, this chapter).

Rainbow Trout, Brook Trout, Steelhead

Provide habitat by managing as per riparian prescriptions (Management Area F15-Riparian, Management Area Prescriptions, Section 2, this chapter).

Threatened, Endangered, and Sensitive Plant and Animal Species

Inventory and protect threatened and endangered species and their habitat(s).

Cooperate with State and Federal fish and wildlife agencies in developing and implementing recovery plans for threatened or endangered species.

Consult with the U.S. Fish and Wildlife Service when conflicts between project activities and habitat needs cannot be resolved, or when uncertainty exists.

Maintain inventories of essential or critical habitats including their locations and distribution.

Maintain contacts with Federal, State, and other agencies, groups, and individuals concerned with the management of threatened, endangered, and sensitive species. Consult with the Oregon Department of Fish and Wildlife, Oregon Natural Heritage Data Base and U.S. Fish and Wildlife Service for technical assistance in developing species management guides and in determining viable population levels.

During environmental analysis of each project activity, available habitat, location records, and other information should be reviewed to determine whether known or suspected locations of sensitive species or their habitat occur.

If no suitable habitat or reported locations of sensitive species are identified, these findings should be documented, and no further investigation is required.

When suitable habitats or reported locations are suspected to occur in the area of influence of the project, a field reconnaissance will be performed to more precisely verify the presence, abundance, and distribution of the sensitive species. If the search is conducted during a season of the year when positive identification is probable and no listed species are found, this fact should be documented and no further investigation is needed.

If listed species are found in the project influence area, their actual distribution and current status will be determined. Informal consultation with the Endangered Species Branch of the Fish and Wildlife Service will be initiated if the species is Federally listed. If the proposed project would jeopardize the existence of the species it would be modified or curtailed.

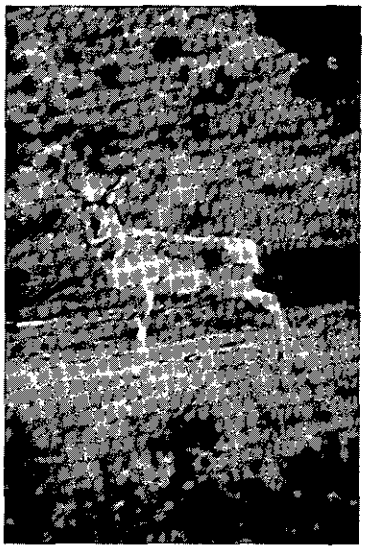
Identified safeguards will be clearly spelled out in the environmental analysis and project plan and project personnel will be fully responsible for being aware of and implementing them. Supervision of the activity must assure that actions which jeopardize the listed species do not occur.

If actions which may adversely affect habitat for Federally listed endangered or threatened species cannot be avoided, the activity will be deferred until a formal consultation with the Endangered Species branch of the Fish and Wildlife Service is completed to determine a course of action.

In cases where other high values or uses would be foregone if the proposed activity were modified or deferred, a full investigation of the species involved may be conducted. Management guidelines will be developed that will make possible an assessment of the significance of the specific population involved. Based on these findings and consultation with appropriate state and federal agencies, a course of action will be determined.

Coordinate with the Native Plant Society of Oregon to exchange information on local plant distributions and status.

An updated list of Threatened, Endangered and Sensitive species (1989) is shown in Appendix C.



Other Species

Antelope

Manage antelope habitat on the Forest in accordance with Oregon Department of Fish and Wildlife population objectives. Population control necessitated by conflicts will also be dealt with by that agency.

Raptor Habitat

Protect active bird of prey nests from human disturbance until nesting, feeding, and fledging are completed. Provide protection of nest sites and nesting habitat sufficient for the species involved.

Bald and Golden Eagles

Nesting sites, and roosting sites used in conjunction with nesting sites, will be protected under the "Act for Protection of Bald and Golden Eagles" ref. title 50 CFR, USC 668-668d.

Nesting

Eagle nesting territories are divided into primary and secondary management zones.

Primary

The boundary of the primary zone shall not be less than 20 chains from the nest.

Human activities should be controlled during the critical period. The critical period is the time between arrival of adults at the nest site and three weeks after the fledging of any young. The critical period will usually fall between March 1 and August 15.

Secondary

The purpose of this zone is to further minimize disturbance.

The size of the secondary zone will be determined by local topography and resulting visibility from the nest. It shall lie outside the primary zone and be approximately circular with a minimum boundary of 40 chains from the nest.

Human activities into the secondary zone should be restricted during the critical period.

Roosting

Within 1/2 mile (40 chains) of existing nests, save three to five old growth trees for potential roost and perch trees during the breeding season.



Hawks and Owls, except Prairie Falcons

Nesting

Nesting areas are divided into primary and secondary zones.

Primary

The boundary of the primary zone should not be less than five chains. The management objective for this zone will be to maintain the present habitat characteristics.

The critical period, during which human activities should be restricted, will usually fall between March 1 and August 1.

Secondary

The boundary of the secondary zone should be an additional five chains radius beyond the primary zone (total 10 chain radius). In this secondary zone, modified treatments will be required. "Modified" means intermediate between that required in the primary zone, and that normally prescribed outside of the whole protection zone.

The critical period is the same as for primary zone 'Hawks' above.

Prairie Falcons

Nesting

Nesting areas are divided into primary and secondary zones.

Primary

Size: same as for primary zone Hawks.

Critical period: same as for primary zone Hawks.

Secondary

The boundary of this zone should be an additional 15 chains beyond the primary zone. The management direction for this zone will be a modified treatment between the primary zone, and full treatment beyond the secondary zone.

Critical period: same as for primary zone Hawks

Species Associated with Dead and Downed Logs

Down dead log requirements for wildlife are expected to be met through attrition of standing snags as they fall. Removal of these logs will not be allowed for other purposes. Wherever possible, two uncharred logs per acre should be left for wildlife habitat. These logs should be at least 12 inches in diameter or greater, and at least 20 feet in length.

Species Associated with Various Plant Communities and Successional Stages

Diversity is to be provided for by maintaining representative portions of all plant associations and having various successional stages represented in an area through time.

Species Associated with Springs, Bogs and other Unique Habitat

Seeps, springs, bogs, wet areas, and any other unique habitats, often or generally less than 10 acres in size, will be identified and evaluated on a project level basis and given appropriate protection.

Introduced Species

Evaluate proposals for introducing wildlife (case-by-case) through the National Environmental Policy Act (NEPA) process.

Management Area Standards and Guidelines

Resource - Wildlife and Fish

Practice
Habitat Management

Standard and Guideline

General

Manipulation of habitat to sustain the value of wilderness or to perpetuate a threatened or endangered wildlife species may be allowed with approval of the Chief of the Forest Service.

Applicable Management Area

MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area

Standard and Guideline

Manipulation of habitat will be allowed only for research purposes, with consent of the PNW Station Director.

Applicable Management Area

MA-F5 Research Natural Areas

Standard and Guideline

Project activities for habitat management are restricted from December 1 to May 1. If exceptions are necessary, they will require informal or formal consultation with the U.S. Fish and Wildlife Sevice.

Applicable Management Area

MA-F12 Eagle Roosting Areas

Standard and Guideline
Project activities for habitat management are restricted to open roads and adjacent areas from December 1 to May 1.

Applicable Management Area
MA-F18 Hammer Creek Wildlife Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline
Pileated Woodpecker Habitat

(As Management Indicator)

For every 12,000 to 13,000 acres, provide one habitat area of 600 acres per mating pair. Each habitat area consists of a reproductive area and a feeding area. Both should be within a 1,000 acre unit.

Reproductive areas should be maintained in contiguous 300 acre blocks where possible. If not possible, habitat may be arranged in blocks no less than 50 acres and no more than 1/4 mile apart. Maintain a minimum average of two hard snags per acre, greater than or equal to 12 inches DBH. Forty five of these 600 snags should be greater than or equal to 20 inches DBH.

Feeding areas should also be maintained in 300 acre blocks and adjacent to reproductive areas, where possible. Feeding areas should be no further than one half mile from reproductive areas. Maintain a minimum average of two hard snags per acre, greater than or equal to 10 inches DBH for feeding (approximately 90 percent snag level).

Vegetative management (except prescribed livestock use) will not be allowed, until further research is available on the needs of the dependent species.

Applicable Management Area
MA-F6 Old Growth

Standard and Guideline
Connective Habitat

Suitable connective habitat between old growth stands for pileated woodpeckers, will be provided to some degree by riparian areas, and other restricted management areas on the Forest. Specific management for this habitat has been provided for through approximately 41 miles of priority riparian corridors on the Forest. In these areas, the "protection zone" has been increased from 100 feet to 200 feet wide, to provide security for travelling woodpeckers. Riparian management emphasis and desired future condition will apply to connective habitat.

Applicable Management Area
MA-F15 Riparian

with additional protection in the following stream courses:

Trout Creek
Bear Creek
Drake Creek
Pine Creek
Allen Creek
Indian Creek
West Fork Bridge Creek
Porter Creek
Howard Creek
Fox Creek (Pisgah)
Cottonwood Creek
Baldy, Little Windy and Windy Creeks
Nicoll Creek

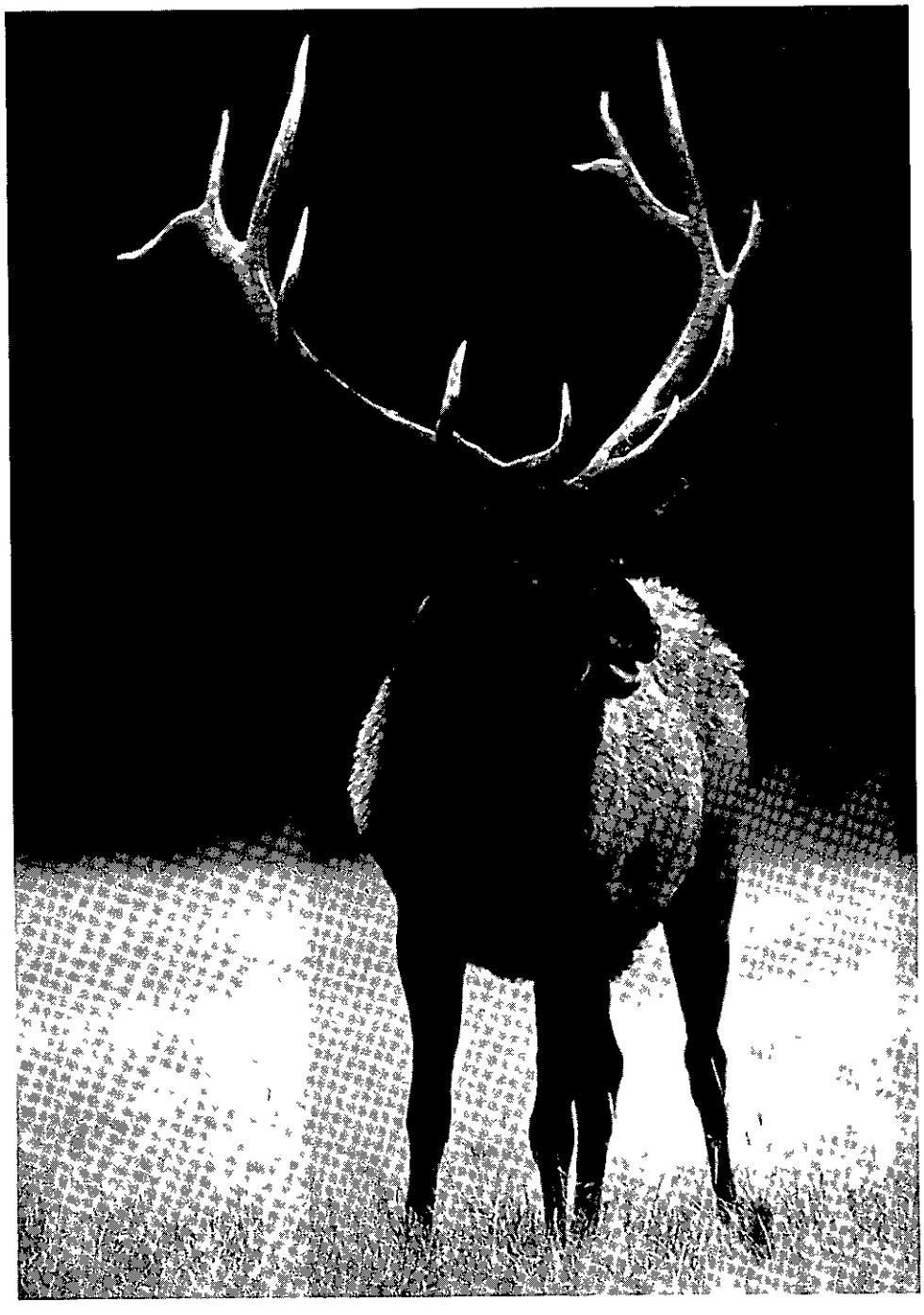
Standard and Guideline
Provide habitat for wintering bald eagles, which at a minimum includes at least one 36 to 40 inch DBH tree for roosting. Consult with U.S. Fish and Wildlife Service when conflicts between project activities and habitat needs cannot be resolved, or uncertainty exists. A certified Silviculturist will model tree stand conditions to meet large tree objectives, and prepare a prescription for implementation, subject to U.S. Fish and Wildlife Service review and approval.

Applicable Management Area
MA-F12 Eagle Roosting Areas

Standard and Guideline
Big Game Habitat

Manage to provide high quality habitat for elk and deer.

Management objectives are based on achieving habitat effectiveness over time. Quantity and quality of cover, and open road density are the main factors influencing the Habitat Effectiveness Index (HEI), and should be designed in concert to achieve the desired HEI shown. Habitat manipulation (including timber sale projects) should be designed to achieve both the short term and long term values for HEI shown below. Preference is to plan for long term values, as current habitat is usually limited by existing cover.



	Decade				
	1	2	3	4	5
Habitat Effectiveness Index[1/]	5	6	8	8	32

[1/] See Forest-wide Standards and Guidelines for explanation of HEI. Procedures for calculating HEI are available at the Ochoco National Forest Supervisors Office

Cover types may include mountain mahogany and conifer species, as well as that provided by other management areas within the project area, i.e. old growth, riparian, etc.

Preference for cover is mixed conifer.

Minimum crown closure for cover is 40 percent. Up to 50 percent of the total pine acres may remain in a moderate to high susceptibility to bark beetle attack in order to meet cover needs.

It is recognized that MA-F18 (Hammer Creek) has a somewhat higher HEI due to existing conditions, including cover, therefore the HEI objective may be higher than those shown in Table 4-36.

Table 4-36 shows a detailed breakdown of the HEI components for MA-F18 and MA-F20. It should be noted that the values displayed are "weighted averages." It is expected that individual projects will be above and below these values, but that the overall objective for the management areas will be met.

When a project planning area has an inherent low potential for production of cover, size of desired cover patches should vary, based on the ratio of cover within the area as follows:

Percent of Area in Cover	Cover Patch Size
40% and over	30-60 acres
30% to 40%	20-30 acres
20% to 30%	10-20 acres
Up to 20%	10 acres

TABLE 4-36
HABITAT EFFECTIVENESS INDEX (HEI)
MA-F18 AND MA-F20

	DECADE				
	1	2	3	4	5
HEI					
Ponderosa Pine	4	4	7	7	32
Mixed Conifer	18	38	18	14	42
Percent of Area in Cover By Species 1/					
Ponderosa Pine	7	7	18	19	26
Mixed Conifer	23	26	23	23	35
Cover Quality (Average % Crown Closure)					
Ponderosa Pine	44	44	41	41	44
Mixed Conifer	54	53	53	48	50
Open Road Density 2/ (Miles/Sq Mile)	3(1)	3(1)	3(1)	3(1)	3(1)

1/ Following is an example of how this percent should be used

PROJECT AREA

Total Acres	10,000
Total Forested Acres	5,000
Pine Acres	70%
MC Acres	30%

EXAMPLE Acres of Cover
Pine 7% (from Table) x [70% x 10,000] = 7% x 7,000 acres
MC 23% (from Table) x [30% x 10,000] = 23% x 3,000 acres

2/ *One mile of open road per section is a management objective from December 1 to May 1, three miles per section the remainder of* the year. These are the averages based on management area-wide conditions and may be adjusted up or down to meet HEI goals and objectives

Applicable Management Area

MA-F18 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range

Standard and Guideline

Manage to provide habitat for big game, while meeting the primary emphasis for the specific management area (see Management Area Prescriptions, Section 2).

Management objectives are based on achieving habitat effectiveness over time. Quantity and quality of cover, and open road density are the main factors influencing the habitat effectiveness index (HEI), and should be designed in concert to achieve the desired HEI shown. Habitat manipulation (including timber sale projects) should be designed to achieve both the short term and long term values for HEI shown below. Preference is to plan for long term values, as current habitat is usually limited by existing cover.

	Decade				
	1	2	3	4	5
Habitat Effectiveness Index [1/]	5	6	8	7	21

[1/] See Forest-wide Standards and Guidelines for explanation of HEI Procedures for calculating HEI are available at the Ochoco National Forest Supervisors Office.

Cover types may include mountain mahogany and conifer species, as well as that provided by other management areas within the project area, i.e. old growth, riparian, etc.

Preference for cover is mixed conifer.

Minimum cover is defined as that having 40 percent crown closure on greater than 40 foot tall trees. Pine stands will generally remain in low susceptibility to bark beetle attack.

In the early decades, habitat effectiveness is limited by the lack of cover in existing stands. Strive for higher HEI where biologically feasible, within the bounds of the management area emphasis.

Table 4-37 shows a detailed breakdown of the HEI components for MA-F21. It should be noted that the values displayed are "weighted averages." It is expected that individual projects will be above and below these values, but that the overall objective for the management areas will be met.

TABLE 4-37
HABITAT EFFECTIVENESS INDEX (HEI)
MA-F21

	DECADE				
	1	2	3	4	5
HEI					
Ponderosa Pine	4	4	7	7	32
Mixed Conifer	18	38	18	14	42
Percent of Area in Cover By Species 1/					
Ponderosa Pine	7	7	18	19	26
Mixed Conifer	23	26	23	23	35
Cover Quality (Average % Crown Closure)					
Ponderosa Pine	44	44	41	41	44
Mixed Conifer	54	53	53	48	50
Open Road Density 2/ (Miles/Sq Mile)	3(1)	3(1)	3(1)	3(1)	3(1)

1/ Following is an example of how this percent should be used

PROJECT AREA

Total Acres	10,000
Total Forested Acres	5,000
Pine Acres	70%
MC Acres	30%

EXAMPLE: Acres of Cover
Pine· 7% (from Table) x [70% x 10,000] = 7% x 7,000 acres
MC 23% (from Table) x [30% x 10,000] = 23% x 3,000 acres

2/ One mile of open road per section is a management objective from December 1 to May 1, three miles per section the remainder of the year These are the averages based on management area-wide conditions and may be adjusted up or down to meet HEI goals and objectives

When a project planning area has an inherent low potential for production of cover, size of desired cover patches should vary, based on ratio of cover within the area as follows:

Percent of Area in Cover	Cover Patch Size
40% and over	30-60 acres
30% to 40%	20-30 acres
20% to 30%	10-20 acres
Up to 20%	10 acres

Applicable Management Area

MA-F21 General Forest Winter Range

Standard and Guideline

Manage to provide habitat for big game, while meeting the primary emphasis for the specific management area (see Management Area Prescriptions, Section 2).

Habitat manipulation (including timber sale projects) should be designed to achieve both the short term and long term values for habitat effectiveness (HE) shown below. Quality and quantity of cover, and open road density should be designed in concert to achieve the desired habitat effectiveness index (HEI) shown. Preference is to plan for long term values (5th decade). Short term HE may be reduced in order to meet management area emphasis if long term HEI values are achieved.

	Decade				
	1	2	3	4	5
Habitat Effectiveness Index [1/]	32	28	28	24	21

[1/] See Forest-wide Standards and Guidelines for explanation of HEI Procedures for calculating HEI are available at the Ochoco National Forest Supervisors Office.

Cover types may include mountain mahogany and conifer species, as well as that provided by other management areas, i.e. old growth, riparian, etc.

Preference for cover is mixed conifer.

Minimum cover is defined as that having 40 percent crown closure on greater than 40 foot tall trees. Pine stands will remain in low susceptibility to bark beetle attack.

Table 4-38 shows a detailed breakdown of the HEI components for MA-F22. It should be noted that the values displayed are "weighted averages" It is expected that individual projects will be above and below these values, but that the overall objective for the management areas will be met.

TABLE 4-38
HABITAT EFFECTIVENESS INDEX (HEI)
MA-F22

	DECADE				
	1	2	3	4	5
HEI					
Ponderosa Pine	4	4	7	7	7
Mixed Conifer	63	56	52	46	35
Percent of Area in Cover By Species 1/					
Ponderosa Pine	9	9	11	12	13
Mixed Conifer	39	43	34	33	26
Cover Quality (Average % Crown Closure)					
Ponderosa Pine	51	51	41	41	51
Mixed Conifer	70	62	61	54	52
Open Road Density (Miles/Sq Mile)	3	3	3	3	3

1/ Following is an example of how this percent should be used

PROJECT AREA

Total Acres	10,000
Total Forested Acres	5,000
Pine Acres	70%
MC Acres	30%

EXAMPLE. Acres of Cover

Pine: 9% (from Table) x [70% x 10,000] = 9% x 7,000 acres

MC: 39% (from Table) x [30% x 10,000] = 39% x 3,000 acres

Size of cover patches will be cased on Forest-wide standards and guidelines for "Timber," and management objectives for the management area.

Applicable Management Area
MA-F22 General Forest

Standard and Guideline
Manage to provide habitat for big game, while meeting the primary emphasis for the specific management area. There is no cover objective or minimum cover requirement for these areas. Cover will be incidentally provided through implementation of management prescriptions. Road objectives are based on management area emphasis and are stated under Management Area Standards and Guidelines-Transportation System. Also see Management Area Prescriptions, Section 2, for management area emphasis.

Applicable Management Area
MA-F6 Old Growth
MA-F7 Summit National Historic Trail
MA-F8 Rock Creek/Cottonwood Area
MA-F9 Rock Creek/Cottonwood Creek Unroaded Helicopter Area
MA-F10 Silver Creek Area
MA-F11 Lookout Mountain Recreation Area
MA-F12 Eagle Roosting Areas
MA-F13 Developed Recreation
MA-F14 Dispersed Recreation
MA-F15 Riparian
MA-F16 Bandit Springs Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F19 Deep Creek Recreation Area
MA-F23 North Fork Crooked River Recreation Corridor
MA-F24 North Fork Crooked River Scenic Corridor
MA-F25 Highway 26 Visual Corridor
MA-F26 Visual Management Corridors
MA-F27 Round Mountain National Recreation Trail
MA-F28 Facilities

Standard and Guideline
Give preferential treatment to land and vegetation for a 300 foot radius surrounding elk wallows and calving areas.

Applicable Management Area
MA-F11 Lookout Mountain Recreation Area

Standard and Guideline

Grass seeding is recommended on acres disturbed by timber harvesting or other activities which are not treated with normal erosion seeding. Exceptions will occur when grass seeding would seriously interfere with reforestation efforts or other management objectives. Recommended is two pounds per acre of orchard grass. Fall green-up after the regularly scheduled grazing season will be reserved for big game.

Applicable Management Area

MA-F11 Lookout Mountain Recreation Area
MA-F17 Stein's Pillar Recreation Area
MA-F12 Hammer Creek Wildlife/Recreation Area
MA-F20 Winter Range
MA-F21 General Forest Winter Range

Standard and Guideline

Cavity Nester Habitat

Strive to provide snag habitat at the levels shown, while meeting the primary management emphasis for the specific area. The 40 percent level is the lowest level for any management area, except where safety is involved (MA-F's 13, 14 & 28). See Table 4-39 for applicable management areas.

Snags may be provided through either identifiable snag patches, or evenly distributed. Snag patches (clumping) is the preferred method in most cases. See Forest-wide Standards and Guidelines for Wildlife and Fish, Section 3 of this chapter for direction on selection of best method.

Snag Patch Method (Clumping)

When using the snag patch method, the acreage and number of the untreated clumps or units will vary according to timber type and acres treated. These areas may be managed on a double rotation, and made available for harvest in the future when adjacent and previously harvested areas are suitable for snag habitat production.

Snag patches should be distributed as evenly as possible, and located (on the average) one per 10 acres. This is necessary to meet the smallest territory size needs of a pair of excavator species.

Permanence of snag patches is more effectively achieved when size of snag patches exceeds one acre. But, it may be necessary to designate patches less than one acre in size in order to meet the territory needs stated above, which is the more important habitat need.

Table 4-40 shows size of areas needed to be left for a double rotation based on major species groups and snag level. Areas selected for double rotation should be fully stocked and have a variety of size and tree conditions. In two-story pine types, full stocking may very often not occur. When this is encountered, use the Individual Snag Distribution Method instead.

TABLE 4-39
SNAG LEVEL BY MANAGEMENT AREA

Management Area	Snag Level (%)
MA-F1 Black Canyon Wilderness	100
MA-F2 Bridge Creek Wilderness	100
MA-F3 Mill Creek Wilderness	100
MA-F4 North Fork Crooked River Wilderness Study Area	100
MA-F5 Research Natural Areas	100
MA-F6 Old Growth	100
MA-F7 Summit National Historic Trail	80
MA-F8 Rock Creek/Cottonwood Creek	100
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter	40
MA-F10 Silver Creek Area	100
MA-F11 Lookout Mountain Recreation	100
MA-F12 Eagle Roosting Areas	80
MA-F13 Developed Recreation	0
MA-F14 Dispersed Recreation	0
MA-F15 Riparian	100
MA-F16 Bandit Springs Recreation	100
MA-F17 Stein's Pillar Recreation	100
MA-F18 Hammer Creek Wildlife/Recreation	100
MA-F19 Deep Creek Recreation	100
MA-F20 Winter Range	60
MA-F21 General Forest Winter Range *	40
MA-F22 General Forest *	40
MA-F23 North Fork Crooked River Recreation Corridor	80
MA-F24 North Fork Crooked River Scenic Corridor	100
MA-F25 Highway 26 Visual Corridor	100
MA-F26 Visual Management Corridors	80
MA-F27 Round Mountain National Recreation Trail	100
MA-F28 Facilities	0

* These levels are hard target objectives Others are anticipated and predicted results of implementation of the primary prescription.

TABLE 4-40
ACRES MANAGED FOR SNAGS PER ACRES TREATED ON EXISTING STANDS

	Ponderosa Pine		Mixed Conifer	
Snag Level (percent)	Size of snag patch at 1 per 10 acres (Acres)	% Y T Reduction	Size of snag patch at 1 per 10 acres (Acres)	% Y T Reduction
20	0 3	3	0 2	2
40	0 6	6	0 4	4
60	0 9	9	0 6	6
80	1 2	13	0 8	8
100	1 4	17	1 1	10

Individual Snag Distribution Method

Table 4-41 shows the number of large green trees to leave per acre when using the individual snag distribution method. This will ensure a supply of large snags and part of the smaller snags (10-20").

TABLE 4-41
GREEN TREES LEFT PER ACRE TO MEET DIFFERENT SNAG LEVELS
(20" DBH +)

	Understory Managed 1/		Understory Not Managed 2/	
Snag Level	Trees/Acre	% Volume	Trees/Acre	% Volume
20	2	3	3	4
40	4	6	5	7
60	6	9	7	10
80	8	11	9	12
100	1 0	13	1 1	14

1/ Assumes 100 years before large snags will be produced

2/ Assumes 120 years before large snags will be produced

Clump and Individual Tree Methods

The size of residual stocking and adjacent stand conditions need to be considered to ensure a supply of small snags. If there is a predicted shortage of small snags, then additional trees in the 10 inch plus size class should be left within the managed stand to meet this need.

Practice
Species Management

Standard and Guideline
Native animal species will be maintained. Allow no intentional introduction of non-native wildlife species.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area
MA-F5 Research Natural Areas

TABLE 4-42
CROSS-REFERENCE TABLE

	MANAGEMENT AREA													
Resource Area	MA-F1	MA-F2	MA-F3	MA-F4	MA-F5	MA-F6	MA-F7	MA-F8	MA-F9	MA-F10	MA-F11	MA-F12	MA-F13	MA-F14
Cultural Resources	125-126	125-126	125-126	125-126	125-126	125	125	125	126	126	125	125-126	125	125 125
Facilities	127	127	127-128	127	127			128	128	128	128		128	128
Fire	131, 136-138	131, 136-138	131, 136-138	131, 136-138	132, 136-138	132, 136-138	133-138	133-138	134-135, 138	133-138	133, 135-139	134-135, 138-139	133-135, 139	133-135, 139
Forage	142-146	142-146	142-146	142-146	142-143, 147	142-147	143-146	142, 144-147	142, 144, 146	142, 144, 146-147	142-147	142-147	142-146	142-146
Forest Health	152	152	152	152	152	152	152	152	152	152	152-153	153	153	153
Forest Residues	154	154	154-155	154	155	155-156	156-158	155	156-158	155	155	156-159	156-158	156-158
Fuelwood	160	160	160	160	160	160	161	160	160-161	160	160	161	160	160
Lands	163-168	163-168	163-168	163-168	163-168	163-168	164-169	164-168	164, 167-169	163-168	164-168	164-169	164-169	164-169
Minerals & Energy	172-174	172-174	172-175	172, 175	172-175	172, 175	172-175	172, 175	172, 175	172, 175	172, 175	173-174	172-175	175
Recreation	178-179, 184-188	178-179, 184, 187-188	178-179, 184, 187-188	178-179, 184-188	178-179, 182, 190	178-179, 182, 189	179-182, 185, 190	178-180, 183-184, 188-189	178-180, 184, 188-189	178-180, 184, 187-189	178-180, 183-188	179-181, 186, 189	179-181, 186, 190	179-180, 182, 186, 190
Scenic Resources	192	192	192	192	192	192	192-193	192	194	192	192	194	192	192
Soil	198	198	198	198	198	198	199	199	199	199	199	199	199	199
Timber	210	210	210	210	210	210	210-217	210	220	210	210-212	215-216	213-214	214-215
Transportation System	228-234	228-234	228-234	228-234	228-234	228-234	229-230, 233-235	228-234	228-234	228-234	228-234	228-234	229-234	229-232, 235
Water	238-239	238-239	238-239	238-239	238-239	240	240	240	240	240	240	240	240	240
Wildlife & Fish	250, 262-264	250, 262-264	250, 262-264	250, 262-264	250, 262-264	251, 262-263	260-263	260-263	260-263	260-263	260-263	250-252, 261-263	260-263	260-263

	MANAGEMENT AREA													
Resource Area	MA-F15	MA-F16	MA-F17	MA-F18	MA-F19	MA-F20	MA-F21	MA-F22	MA-F23	MA-F24	MA-F25	MA-F26	MA-F27	MA-F28
Cultural Resources	125	125	126	126	126	126	126	126	126	126	126	126	126	126
Facilities	127													
Fire	133-138	133-139	133-139	133-139	133-139	134-139	134-139	134-139	133-139	133-139	133-139	133-139	133-139	133-135, 139
Forage	142-146	142-146	144-146	143-147	142-146	142-147	142-147	142-147	143-146	143-146	143-146	143-146	143-146	143-146
Forest Health	153	153	153	153	153	153	153	153	153	153	152	152	152	153
Forest Residues	156, 158	155	155	156-158	155	156-158	156-158	156-159	155	155	156-158	156-158	156-158	156-158
Fuelwood	160	161	160	160	161	161	161	161	160	160	161	161	160	160
Lands	164-169	164-169	164-165, 169	164-169	164-169	164-169	164-169	164-169	164-169	164-169	164-169	164-169	164-169	164-169
Minerals & Energy	173-175	173-176	172, 175-176	173-176	172, 175-176	173-176	173-176	175-176	172, 175-176	172, 175-176	173-176	173-176	173-176	172-176
Recreation	179-180, 190	179-189	179-189	179-189	179-182, 186, 190	179-181, 186, 189	179-181	186, 189	179, 183, 186, 190	179-180, 186, 190	178-189	179-182, 190	179, 182, 190	179-183, 186-190 179, 190
Scenic Resources	194	192	192	193	192	194	194	194	193	192	192	192-193	192	192
Soil	199	199	199		199				199	199	199	199	199	199
Timber	216	214-215	212-213	218	212	218-219	221-222	222-223	217	212	214-215	214-217	214-215, 229	210
Transportation System	229-232, 235	229-232, 234	229-232, 235	228-234	229-232, 235	228-234	228-232, 235	229-235	229-232, 235	229-232, 235	229-233, 235	229-233, 235	229-234	229-232, 235
Water	240	240	240	240	240	240	240	240			240	240	240	240
Wildlife & Fish	252, 260-263	260-263	260-263	251-252, 256, 262-263	260-263	251-252, 256, 261-263	251, 256-262	258-263	260-263	260-263	260-263	260-263	260-263	260-263

NOTE The Forest-wide standards and guidelines for Air Quality, Biological Diversity, Old Growth, and Social and Economic resources apply to all management areas as appropriate with no management area standards and guidelines This table will assist the reader in locating the applicable standards and guidelines for each management area by referencing the applicable pages (only the page number suffix is listed, all are preceded by a 4-)

Chapter 5

Implementation of the Forest Plan

Chapter 5

Implementation

Introduction

This chapter explains how management of the Ochoco National Forest will move from the current direction and situation into Alternative I. Implementation can be influenced by previous management activities and objectives, project analysis, budget, monitoring and evaluation, and when necessary, the required amendment process.

Implementation will require a transition from an existing management program with a "pre-allocated" budget and accomplishment targets to a new management program, represented by Alternative I, with budget, goals, and objectives based on identified issues and concerns. The Plan establishes the management direction for the Ochoco National Forest for the next 10 to 15 years. In doing so, it conforms to existing laws, regulations, and policies, including those found in the Forest Service Manual and Handbooks, and the Regional Guide.

Project Scheduling

An initial schedule of proposed projects is contained in the appendices of this document. These activities represent possible projects and time frames from which annual work programs (dependent on approved funding) are developed. The listing of projects and schedules for a ten-year period are maintained by unit managers. Listings will routinely change as projects are implemented or are removed from the lists for other reasons, and as new projects take their place. Projects are implemented in response to public demand, planned outputs and the annual budgeting process.

Budget Proposals

Multiyear budget proposals that identify funding needed to implement the scheduled outputs will be developed Upon approval of a final budget for the Forest, the annual program of work is finalized and carried out. The annual program is an incremental implementation of the management direction in this Plan. Outputs and activities in individual years may vary from those shown in the Management Objectives (Chapter 4, Section 1) and schedules (Appendix A), depending on actual budget, but will progress toward the desired future condition.

The rate of progress is dependent to a large extent upon funding to support activities needed to achieve plan objectives. Table 5-1 compares the projected funding level that will be required to implement Alternative I to funding levels received by the Ochoco National Forest from 1985 to 1989.

Environmental Analysis

Projects and activities are subject to analysis under the National Environmental Policy Act (NEPA) process before they can be implemented. Depending on expected environmental consequences, a categorical exclusion, environmental assessment, or environmental impact statement may be prepared. All documents, including categorical exclusions, will be available for public review.

Monitoring and Evaluation

Monitoring is the means of measuring and evaluating the effectiveness of the Forest Plan implementation. Monitoring provides quantitative and qualitative information on the progress and results. It is a

TABLE 5-1
HISTORY OF OCHOCO NATIONAL FOREST BUDGET 1985-1989
COMPARED TO ESTIMATED PLAN BUDGET (IN $1,000)

	YEAR					
RESOURCE	85	86	87	88	89	Estimated Plan Budget 1/
Fire	955	829	923	864	966	1000
Timber	1578	1251	1391	1664	1448	2400
Range	202	181	173	288	201	511
Minerals	57	54	63	64	33	108
Recreation 2/	228	212	223	304	540	900
Wildlife/Fish	91	115	195	188	192	451
Soil/Water	111	93	95	155	249	306
Maintenance of Facilities	63	62	57	116	95	180
Real Estate Management	38	27	22	31	41	130
Landline Location	143	194	178	120	112	274
Appropriated REF	422	61	109	25	25	35
Appropriated TSI	0	106	41	68	36	65
Genetic Tree Improvement	216	319	254	238	331	414
Human Resource	40	40	40	40	40	272
Construction-Recreation	1	5	4	31	12	496
Construction-FA&O	191	327	4	2	2	800
Road Maintenance	622	493	510	685	611	683
Trail Maintenance	8	6	9	25	25	40
Road Construction	1075	1179	876	1026	1010	3511
Trail Construction	3	3	3	21	21	450
RBF	40	27	49	43	35	40
G A	875	863	845	965	1000	1200
Timber Purchase Road Credits	600	1094	1188	1187	500	1200
KV Reforestation	510	476	1150	1092	834	1400
KV TSI	722	523	844	1137	829	900
Other 3/				102	219	215
Recreation				0	25	30
Range				74	124	152
Wildlife/Fish				107	175	103
Watershed				86	100	74
Co-op Road Maintenance	298	346	264	478	483	366
Quarters Maintenance	35	51	56	60	73	90
Salvage Sale	58	149	134	159	255	158
Brush Disposal	573	691	983	912	858	1000
Totals	9857	9996	10898	12255	11281	19759

1/ Implementation will begin in Fiscal Year 1990 The Program Budget for Fiscal Year 1992 scheduled for completion in late 1989 will be the first to reflect the final plan Budget levels requested during the draft planning period will be amended to support our final document

2/ Includes Recreation, Cultural Resources, Visual Management, and Wilderness

3/ Other is a composite of Recreation, Wildlife, Water, etc
Accounting system did not identify detail until FY88

means to determine how well assumptions used in preparing the Plan reflect actual conditions, how well objectives of the Plan are being met, and the appropriateness of the management standards and guidelines. Monitoring may lead to changes in management practices, or provide a basis for minor adjustments, amendment, or possible revision of the Plan.

Monitoring is intended to help keep the Forest Plan dynamic and responsive to changes When a situation is identified as being outside the limits of acceptable variability, appropriate amendment, revision, or other changes may be made. Monitoring and evaluation have a distinctly different purpose and scope. Monitoring consists of gathering data, observations, and information. During evaluation, the data and information are analyzed and interpreted. This process provides information necessary to determine if planned conditions or results are being attained and are within the intent of the Plan, and if not, why.

It will provide information to help determine, for example:

whether laws, regulations, and policies are being followed, including those found in the Regional Guide, Plan standards and guidelines, and the Forest Service Manual and Handbooks;

whether the Forest Plan responsively addresses the issues, concerns, and opportunities in a publically acceptable manner;

whether management prescriptions are producing the predicted or desired environmental results,

if costs of implementing the Plan are within projected limits;

if projected outputs are being produced;

whether there are new issues and concerns not adequately addressed by the Plan.

There are a number of monitoring systems currently in place to comply with administrative and legal responsibilities. Examples include MAR, PAMARS, RAMIS, TSPIRS, STARS, NIRP, etc. Additional examples may be found in Forest Service Handbook 1309.14 Forms and Reports.

Forest Plan monitoring does not replace or substitute these systems, but rather complements them by addressing specific issues and concerns identified through the planning process and providing additional information for evaluating the effectiveness of the Plan.

Table 5-3 outlines monitoring actions, including a number of ongoing monitoring items that will help evaluate how implementation is progressing. Following the process matrix in Figure 5-1, evaluation of the monitoring data will lead to decisions of the following types:

1. Continue practice, no change necessary.
2. Refer the problem to the appropriate Forest officer for corrective action.
3. Modify the management practice through Plan amendments.
4. Modify land designations through Plan amendments.
5. Revise output schedules.
6. Revise unit output costs.
7. Revise the Plan

The first step in monitoring will be comparing the Plan to the annual budget received by the Forest. This will include a review of Forest capabilities to implement the prescriptions in the Plan, cost comparisons and output levels. Variances beyond a threshold of 10 percent will be presented to the Ochoco National Forest Management Team for decision. Resolution may be accomplished through allocation adjustments, requests for change to the Regional Office or other adjustments or amendments. Figure 5-2 shows schematically how the process proceeds.

Amendment and Revision Process

The Forest Plan incorporates legal mandates, professional judgement and the public's stated concerns into a future vision of the Forest. It charts a path for getting there by developing management goals and

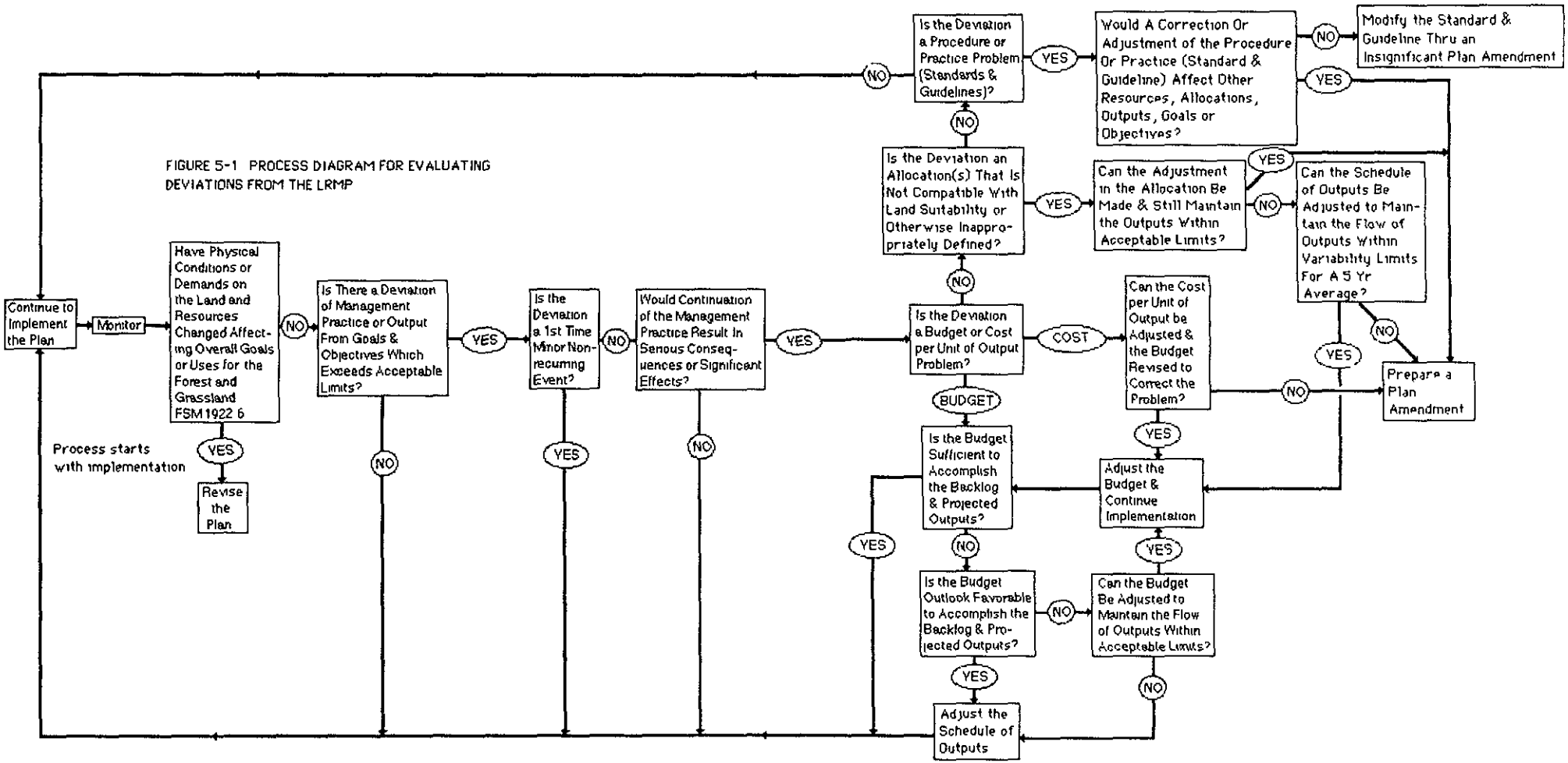
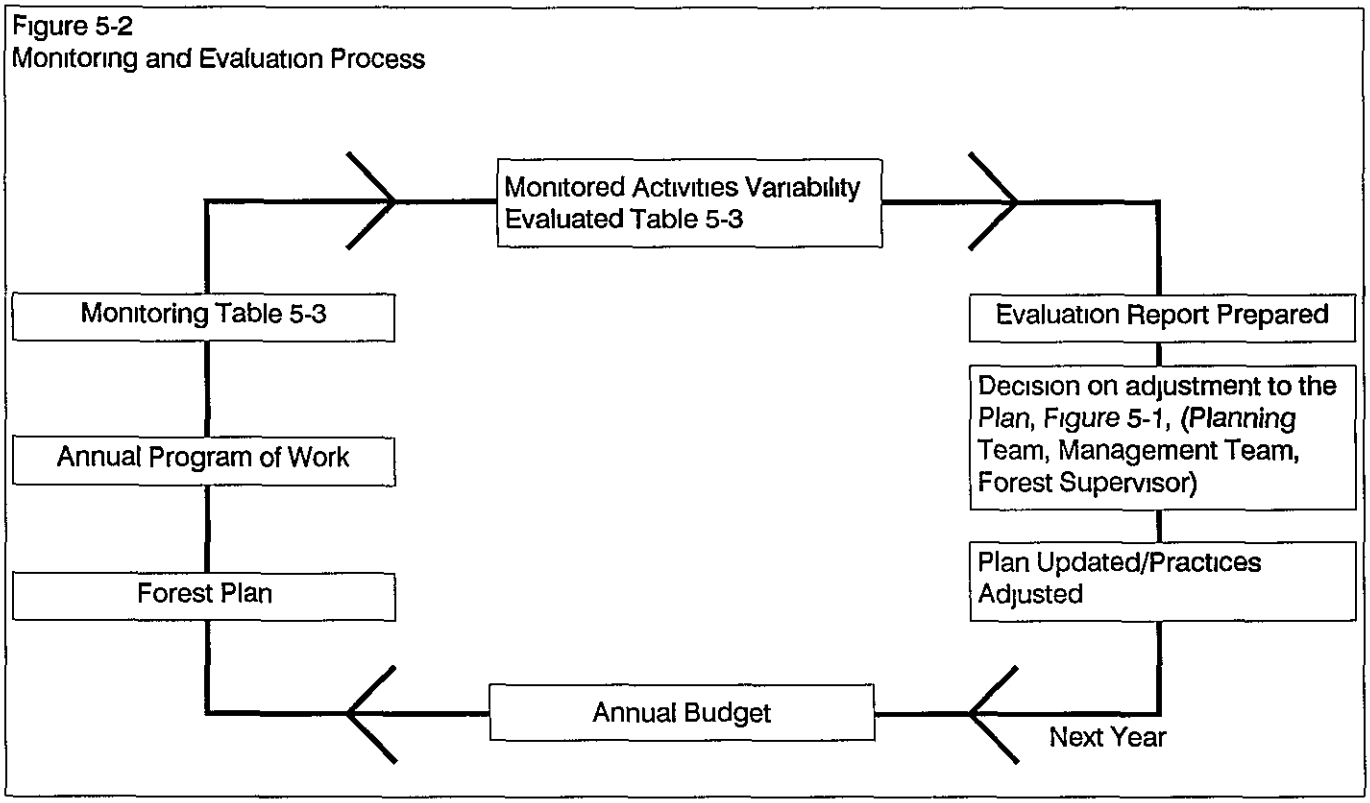


FIGURE 5-1 PROCESS DIAGRAM FOR EVALUATING DEVIATIONS FROM THE LRMP

Figure 5-2
Monitoring and Evaluation Process



objectives and translating them into management direction in the form of standards and guidelines for management areas on the Forest. National Forest planning is a dynamic process, and the products -- Forest Plans -- are similarly dynamic. Forest Plans can and should be modified if conditions warrant. As mangement goals are applied on the ground or as new information is learned about resources, the Plan's goals and objectives, or activities the goals generate, may no longer be appropriate. In such instances, activities may be tailored to fit the resource, or planning objectives as stated in the Plan may be ammended. Plans do not apply direction in site-specific management activities. It would be unrealistic and wrong to try to identify, analyze and schedule the myriad projects or activities that occur on a National Forest. Instead, this type of site-specific planning occurs at the project-level planning stage, such as allotment management planning.

This Forest Plan may be changed either by an amendment or a revision. Such changes may come about as a result of the monitoring process or project analysis (Figure 5-2). An amendment may become necessary as a result of different situations. They can include:

recommendations of the Interdisciplinary Team based on their review of monitoring results;

the determination that an existing or proposed permit, contract, cooperative agreement, or other instrument authorizing occupancy and use is not consistent with the Forest Plan, but should be approved, based on project level analysis,

changes in proposed implementation schedules needed to reflect differences between funding levels assumed in the plan and funds actually appropriated;

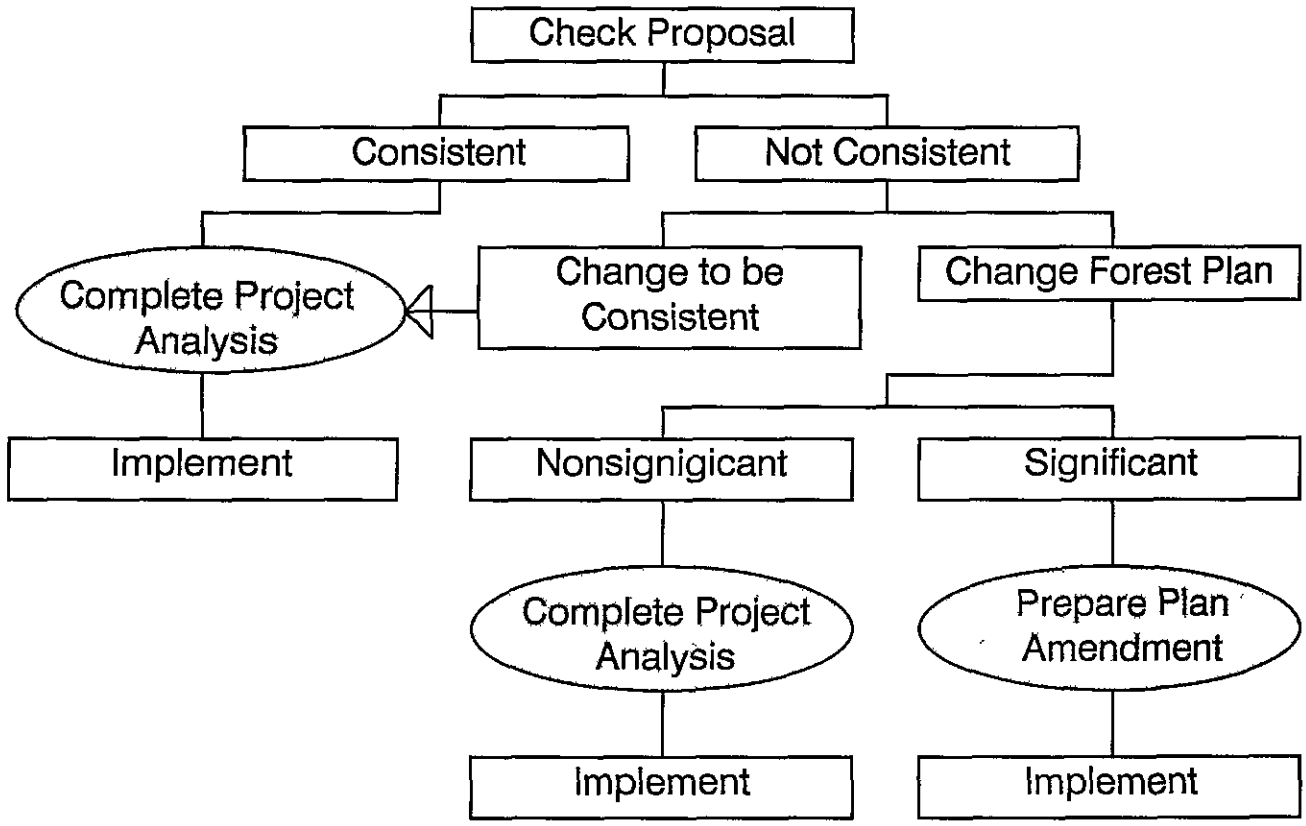
changes necessitated by resolution of administrative appeals,

changes to correct planning errors;

changes made necessary by altered physical, social, or economic conditions.

Based on an analysis of the objectives, guidelines, and other aspects of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change to

Figure 5-3
Amendment Process and Dynamic Nature of the Plan



the Plan. If the change is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a plan. If the change is determined not to be significant, the Forest Supervisor may implement the amendment after appropriate public notice and compliance with NEPA (see Figure 5-3).

The Regional Forester will approve significant amendments, and the Forest Supervisor will approve "not significant" amendments. The determination of significance will be documented in a decision notice and would be appealable under 36 CFR 217.

With respect to revision, the NFMA requires revision of the Forest Plan at least every 15 years. However, it may be revised sooner if physical conditions or demands on the land and resources have changed sufficiently to affect overall goals or uses for the entire Forest. If a revision becomes necessary, the procedures described in 36 CFR 219.12 will be followed. The Chief, however, must approve the scheduling of such revision.

Consistency with Other Instruments

This Forest Plan serves as the single land management plan for the Ochoco National Forest. All other land and resource management plans are replaced by the direction in this Plan; a list of plans revised, superseded, or updated by this Plan are shown in Table 5-2.

All outstanding and future permits, contracts, cooperative agreements and other instruments for occupancy and use of lands will comply with direction in the Forest Plan as soon as practicable, subject to the valid existing rights of the parties involved. This will occur generally within three years of the date of implementation of this Plan.

Recreation

All leases and Memoranda of Understanding between the Ochoco N.F. and the State of Oregon, Bureau of Reclamation, or other agencies, will be consistent with Forest Plan direction at the first reissuance of said leases and Memoranda following plan implementation.

Wildlife and Fish

Within two years after implementation, habitat survey schedules and habitat improvement project schedules will be prepared for a five-year period.

Range

Existing Allotment Management Plans and Grazing Permits will be in compliance with Forest Plan direction on the first update or reissuance following Plan implementation.

In implementing the Forest Plan, any necessary adjustments between existing permitted livestock numbers and plan direction will be made by evaluating management direction for allotments, and determining if a change in management intensity for the allotment is necessary. Factors influencing this decision will include: permit status, condition of improvements, funds available, priority needs on other allotments, and ability to meet standards and guidelines in this Plan.

Timber

The schedule of timber sale offerings in Appendix A10-2 of the Plan will be updated at least annually. Timber sales offered, and stand management contracts issued, after implementation of the Forest Plan will comply with direction contained in the Plan. Changes to existing contracts, including timber sales and other stand management projects, may be considered on a case-by-case basis where overriding resource considerations are present. Otherwise, all existing contracts will be administered in accordance with original provisions.

Timber implementation plans, such as the Forest Tree Improvement Plan, Seed Orchard Management Plan, and Tree Seed Inventory Plan, will be brought into compliance with the direction contained in the Forest Plan within two years of Plan implementation.

Lands

All development and management plans for facilities will be consistent with Forest Plan direction as soon as practicable, subject to valid existing rights of outstanding permits, contracts, and cooperative agreements.

Minerals

New mineral leases, permits, contracts, and operating plans will be evaluated for consistency with the Forest Plan as they are received or proposed. Existing permits and operating plans will be reviewed for consistency with Forest Plan standards and guidelines. Modifications of these permits will be required only when authorized by law or regulation. Operating plans may be modified on a case-by-case basis if over-riding resource considerations are present.

Since the Forest Service has no authority to modify stipulations attached to existing mineral leases, modification will be recommended to the proper agency when found necessary.

TABLE 5-2
REVISED OR SUPERSEDED PLANNING DOCUMENTS

PLAN/AGREEMENT TITLE	SUPERSEDED	UPDATE/REVISE 1/	Prepare
1979 Timber Resource Plan	X		
1978 Silvies Malheur Unit Plan	X		
1979 Ochoco Crooked River Unit Plan	X		
1980 Crooked River National Grassland Unit Plan	X		
1978 South Fork Planning Unit Land Management Plan	X		
1982 Round Mountain Electronics Site Management Plan		X	
Transportation Plan		X	
Fire Management Plan(s)		X	
Residue Management Plan		X	
Special Use Permits		X	
Memoranda of Understanding		X	
Coop Agreements		X	
Allotment Management Plans		X	
Tree Improvement Plan		X	
Land Adjustment		X	
Recreation Development Plans		X	
Summit Trail Management Plan	X		
Statewide Comprehensive Wildlife Plan		X	
1977 Off-Road Vehicle Plan	X		
Facilities Management Plans		X	
Site Development Plans		X	
Seed Orchard Management Plan		X	
Tree Seed Inventory Plan		X	
Timber Sale Harvest Schedules		X	
Gray Butte Electronic Site Plan		X	
Dry Mountain Electronic Site Plans		X	
Highway 26 Corridor Plan		X	
Wild and Scenic River Plans			X
Wilderness Plans		X	
Wild Horse Management Plan		X	
Forest and District Multiple Use Plans		X	
Cove-Palisades Cooperative Agreement		X	
Bald Eagle Recovery Plan		X	
Capital Improvements Plan		X	
Hazardous Materials Plan		X	
Recreation Development Site Plans (Haystack, et al)		X	X
1983 Law Enforcement Plan		X	

TABLE 5-3

MONITORING ACTIONS

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
MONITORING DIRECTLY RELATED TO ISSUES AND CONCERNS									
RESOURCES									
FACILITIES, ROADS Transportation System Management.	Open road density Operation, construction, and reconstruction of arterial, collector, and local roads as related to objectives established in the Forest Plan road standards	Miles of open road per square mile by traffic service and maintenance levels	Departure from Forest Plan estimates.	H/H	Compare road mileage with Management Area Objectives	Forest Engineer and District Ranger	Annually, with 5 year report	GIS 1/, Annual Accomplishment Report, Project files	$5,000
FISHERIES Habitat capability and productivity, species and size composition (Steelhead)	Determine if anadromous habitat meets management objectives for John Day River tributaries and Trout Creek	1) sedimentation (% imbededness), 2) temperature (F), 3) channel morphology (cross sectional area), 4) riparian community composition, 5) large woody material (number of pieces), 6) smolt numbers	Loss in habitat capability, objectives not being met.	H/M	1) Bucket or ocular (hoop) 2/, 2) hydrothermograph, 3) cross section and pool riffle ratio 3/, 4) line transects, 5) riparian plant community survey (photo points) and 6) electrofishing or trapping	District Ranger, Fisheries Biologist & wildlife biologist	1) June thru Sept., 2) winter & summer daily, 3) every 3 yrs on selected streams, 4) every 3 years on selected streams, 5) 5% of streams annually and 6) every 3 yrs on selected streams	GIS 2600 Files	$7,000
RANGE AUM s output	Comparison of produced vs planned outputs	Animal Unit Months	10% below targeted Animal Unit Months for the Forest.	H/H	Annual Use Report	Range Staff	Annually for first 3 years, every 3 years thereafter	Report file	$500
Utilization of forage	Determine if forage utilization levels in (1) riparian areas and (2) upland areas are consistent with applicable standards and guidelines	Percent utilization in grazing allotments	10% over recommended use per allotment.	M/H	Sample key areas on at least 20% of the allotments annually Each allotment should be sampled at least once every four years with the highest priority placed on known or suspected problem areas 4/	District Ranger, Range Staff	Annually	District GIS files	$5,000

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
Conditions of Range resources	Determine if vegetative condition and trend is being maintained or improved to meet Forest Plan and allotment management plan objectives Determine if areas are in a satisfactory condition	Condition evaluation in grazing allotment.	Allotment condition and trend not fair or better condition with upward trends.	M/M	Range condition and trend transects, photo transects	District Ranger	10% of the allotments annually	District 2200 files	$15,000
RECREATION Semiprimitive	Comparisons of actual use with social and managerial setting criteria for ROS Class 5/	Recreation visitor days and encounters per visitor day	When desired physical, social and managerial setting for each Recreation Opportunity Spectrum Class would not be achieved 15 *encounters/day over 20% off-season*	M/M	Visitor contacts, trail registration, observations of resource conditions at heavy use area.	District Ranger, Rec Staff	Annually	RIM data	$2,500
ORV Effects	ORV use effects on soil, water, vegetation, fish and wildlife, visuals, other visitors or cultural and historic resources	On-site conditions and public comments	If ORV use conflicts with management direction for a management area, such as unacceptable damage to soil, vegetation or visual quality, the area will be considered for closure or restriction of ORV use, and rehabilitation of area.	H/H	On-ground review of ORV use areas Review of public comments	District Ranger Collect on-ground information and propose changes to ORV Management Plan Recreation and Lands Staff Review District comments	Annually	Files	$2000/yr
Use	Compatibility of recreation use with ROS class and management area allocation	RVD as per RIM	Inappropriate use in congressionally designated areas, more than 5 complaints annually of inappropriate use	M/M	Joint review, by District and S O Rec. staff, of use levels by mgmt. area.	District Rec Staff	2 Districts per year Each District would be reviewed at least every 3 years	S O	$1500
TRAILS	Trail system	Miles of trail established or maintained	50% of planned system not built in first 5 year period Trails not being maintained to standard Trails lost to resource development.	H/H	Visitor contact, condition survey, review of trail system	Recreation Staff	5 years	Trail inventory	
RIPARIAN Watershed Risk	Watershed Risk	Index using EHA model 6/	5% above the EHA index	M/M	Index measure of subdrainage susceptibility to damaging flood events	Hydrologist & Distnct *staff*	annually at the project level	2520 TRI / GIS 7/	$2,000/every 5 yr

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
MANAGEMENT ACTIVITIES	Riparian Management Area Activities.	Variable depending on standard	Activities depart from established standards more than 10% of the time or Indications that management goal of any area may be compromised	M/M	Activity/Area specific monitoring to gauge accomplishment of management area standards. Number and frequency of reviews in each category will be dependent on relative risk rating associated with activities and management area category a. Key Site b Special emphasis c General	Range & Watershed Staff	Annually 2 samples per District.	2520 2620 TRI / GIS	$5,000/yr
TIMBER Acres per Management Area of various silvicultural practices	Silvicultural practices are accomplished as planned for each Management Area.	Number of acres harvested by silvicultural system by Management Area. Number of acres harvested in roadless areas	Total acres treated by each practice is plus or minus 10% of planned objective When threshold is exceeded, ASQ should be adjusted based on new FORPLAN runs	H/H	Field exams SILVA, TSI, and Reforestation Attainment element in TRACS data base a/	District Ranger and S O Staff	Annually	2400 planning files	$3,000
Timber Harvest by Type	Timber harvest outputs by applicable management area	MCF and MCF/Ac. MBF	+ 5% per decade for total vol sold & + 10% and/or + 2MCF by emphasis area.	H/H	Accomplishment report, action plans - TIA.	Forest Silviculture Staff	Annually	TRI, MARS, Accomplishment reports, Gate System	$4000
FUELWOOD	Fuelwood - Amount of fuelwood provided	Cords/MBF	Supply exceeded by demand	M/M	Field Observations Public Comment # of permits	Timber Staff	Annually	Annual Free Use Timber Report, Timber Cut & Sold Report	$1000 1, 2, 3, 5
SCENIC RESOURCES	Whether the condition of the visual resource is commensurate with standards required in the management prescription	Visual quality objective achievement.	Management conflict with VQO on more than 10% of the area.	M/M	Program and Activity Reviews, corridor plans, photo log of corridors	District Ranger, Landscape Arch	Annually, the rate of three districts per year	File (2380)	$5000/yr
WATERSHED Stream Improvement	Improvement in stream conditions (morphology)	Miles	Average stream condition less than excellent; not showing improvement, or stream condition declining	M/M	Survey of stream morphology using established survey points on selected streams	District, Soil & Water Biologist	5 years	District, S O	$3000
Vegetation Improvement	Improvement in riparian vegetation	Miles	Riparian vegetation in condition that is declining, lacking in vigor, or otherwise no contributing to stream stability	M/M	Survey using established survey points on selected streams.	District, Soil & Water Biologist	5 years	District, S.O	$5000

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
WILDERNESS Physical, social and management settings for wilderness opportunities (R.O.S.)	Changes in Limits of Acceptable Change for attributes of each WROS Class	WROS (Wilderness Recreation Opportunity Spectrum)	When minimum limits of acceptable change for each WROS Class are not being met or a downward trend is indicated	H/M	Sample field observations of heavy use areas and travel corridors.	District Ranger	Annually	District 2320 Files	$5,000
WILDLIFE Old Growth (pileated woodpecker)	Old Growth habitat.	Acres old growth & allocation	Less than 1 designated stand or habitat area per 12,000 acres	H/M	Review of old growth management acres	Wildlife Staff, District Ranger	Annually	GIS Files	$400
Deer and elk habitat and population trends	Determine if habitat is managed to meet big game management objectives	Habitat capability based on cover/forage relationships, trend of vegetation, open road densities	Project level HEI (% thermal cover, % crown cover, road density) 9/ varies no more than 10% from applicable management standard	M/M	Analysis of habitat using HEI model, with field verification Population trends using ODFW data. Densiometer	District Ranger Rep and Wildlife Staff	Project level analysis annually	File 2600 GIS	$10,000
Primary cavity excavators population trends and snag numbers, sizes, species and use	Determine if habitat for snag dependent species is being managed properly	1) Number of snags and live wildlife trees per acre, 2) primary cavity excavator use (numbers & species observed)	1) Not Sufficient standing and down, dead and defective trees to meet objectives 2)to be determined	M/M	Pre- and post project review of snag numbers and live wildlife trees/acre in 25% of harvest units	District Ranger Rep and Wildlife Staff	At least one presale and one postsale project/district/year, randomly selected	2600 GIS files	$8,000
WILD AND SCENIC RIVERS	Determine the effects of activities on Wild and Scenic River attributes on North Fork Crooked River	Lands adjacent to North Fork Crooked River	When resource condition or level of activities would lower Wild and Scenic River designation, or experience level Management *plan not complete within first half* of decade	H/M	Review Project Activity considering activity on adjacent lands	District Ranger and Recreation Staff	Annually	Supervisor's Office wild and scenic river files.	$5,000
SOCIO-ECONOMIC									
AMERICAN INDIAN INTERACTION	Responsiveness of Forest Management activities to the rights, interests and concerns of American Indians as reserved by Treaty and defined by the American Indian Religious Freedom Act.	Documentation of contacts	Potential conflict identified between Forest Management objectives, and American Indian rights to, and/or for, an area or resource	M/H	Coordination of project plans and Environmental Analysis, where appropriate, with affected tribal representation	Forest Supervisor, Native American Coordinator, District Ranger	Annually	Project Files	$1,000/year

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
COMMUNITY LIFESTYLES	Responsiveness to local lifestyles, attitudes, beliefs or values	Various	Established trend toward Forest-Community conflict or identification of problems	M/H	Interviews with key publics and opinion leaders in communities, observation, etc (See FSH 1909 17) Public involvement.	Planning Staff, Line Staff Officers	Annually	Files, newspapers, anecdotal data	$500
EFFECT OF NF MANAGEMENT ON INDIVIDUALS AND OTHER GOVERNMENT AGENCIES	Identify emerging issues, concerns, opportunities Includes problems of interagency cooperation		Failure to have general acceptance of Forest management.	M/M	Collect public input through contacts, letters, verbal comments, interagency contacts, etc	Public Affairs	Annually	S O and Districts	$300
HUMAN AND COMMUNITY DEVELOPMENT	Whether Human and Community Development goals are met.	Enrollee years by program	-10% variation from goals	H/H	Maintain personnel record by Forest Dervice programs (YCC, CETA, Senior Citizens, Volunteers, other)	Admin Officer, Planning Staff	Annually	Personnel Records Forest Attainment Reports	$200
COMMUNITY ECONOMIC PARAMETERS	Population, income, employment, industrial needs	Varies	Developing problems in local economy	M/M	Retrieve data from IMPLAN at FCCC	Budget and Accounting Analyst	5 years	State Employment Office, Personnel	$1000
ECONOMICS Economic effects of Plan implementation	To compare projected estimated economic effects with actual	Dollars	25% variation from estimated	H/H	Compare expenditures, contracts, salaries, actual payments to counties and returns to the Treasury with Forest Plan projections	Budget & Accounting Analyst	Annually	TSPIRS, Supervisor s Office	$1,000
MONITORING NEEDED TO EVALUATE PLAN EFFECTIVENESS OR MEET LOCAL/ADMINISTRATIVE RESPONSIBILITIES									
ADMINISTRATIVE									
LAND OWNERSHIP	Lands being acquired or disposed as opportunities arise consistent with plan direction	Acres	Review and ownership plan not complete	M/M	Review, update ownership plan	Lands Staff, District Ranger	Annually	5400 files	$200
CIVIL RIGHTS & EQUAL EMPLOYMENT OPPORTUNITIES	Workforce diversity	Number minorities and women employed, retained	-5% deviation from goals	H/H	Personnel Records Review	Admin Officer	Annually	Personnel Files	$200

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
ECONOMICS Comparison of actual and planned implementation costs	To compare projected expenditures and value with actual expenditures	Dollars spent	2% deviation from total Financial Work Plan as compared to Forest Plan projections	H/H	Extract actual costs and compare with plan estimates	Budget & Finance	Annually	PAMARS	$1,000
NEPA Project compliance with National Environmental Policy Act, including cumulative effects analysis	All project level decisions	Management activities	Meet NEPA Regulations and FSM direction on environmental documentation, meet standards and guidelines	M/H	EA review by office and field staff of 1-2 projects per District per year	District Ranger and Planning Staff	Each project	1950 files	$25,000
PLANNING MODELS Modeling assumptions (primarily FORPLAN)	Comparison of the projected outputs and effects modeled in the Forest Plan with the actual outputs and effects	Selected parameters	Plus or minus 20% in each area, subsequent analysis to determine if pattern exists	H/H	Review outputs per area FORPLAN projection	Land Management Planning	One analysis per district per year	S O	$8,000
STANDARDS AND GUIDELINES	Adherence to standards and guidelines not covered by separate monitoring *item, goals and objectives* met by standards and guidelines	All standards and guidelines	Unacceptable deviation from stated goals and objectives	M/H	Review of selected activities	District Ranger and S O Staff	Annually	Files	$5,000
RESOURCES									
AIR QUALITY	Total suspended particulate (TSP) production	Tons of TSP	Any increases of annual tons of TSP over last 5 yr average	L/L	Project burns planning, further research, annual treatment reports	Fire Staff & Water/ Soil Staff	Annually	Accomplishment Reports	$500
CULTURAL RESOURCES	Protection of significant *cultural resources during* project implementation (where specified)	Properties	Any disturbance to, or alteration of, the property	H/M	Review Environmental Analyses and project work plans, sytematic field inspection during project activities inspection of selected projects to determine effectiveness of *mitigation actions*	Forest Archeologist, District Ranger	Annually	Project plan files, District and S O cultural resource files	$10,000
USE/ OCCUPANCY Permits, Leases, Claims	Effects on resources by management emphasis areas of mining claims and mineral permits	Operating plans requirement & stipulations	Any noncompliance	M/M	Review of operating plans & on site inspections	District Ranger	Annually	2810, 2850 files	$1000

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
SPECIAL USES	Special uses	Operation plans, requirements & stipulations	Noncompliance	M/M	Review Special Uses	District Ranger	Annually	Paper Files	$500
OIL & GAS	Oil, Gas, & Geothermal leases	Number of leases	Inadequate surface resource protection	M/M	Review Leases	Forest Supervisor	Annually	2820 Files	$500
FIRE Fire Effects	Ecological effect of under burning	Ecological effects	Prescription not being met on 20% or more of areas	M/M	Research PNW	Research PNW	Annually	PNW Report	$500
Fire Protection	FMEI - Cost of pre-supression & suppression plus net value change effect of wildfire	$/1000 acres protected (FMEI)	+ 25% increase in FMEI in any year or > 10% increase in FMEI of 5 yr average	M/H	FEP costs FFFcosts NVC assoc with acres burned by Fire Intensity Level (Form 5100-29)	Fire Staff	Annual comparing to last 10 year acreage	FCCC Fire History Files - Budget Records - Nat l Fire Mgmt. Planning System - FCCC	$500
FISHERIES Habitat capability and productivity, species and size composition (rainbow and brook trout)	Determine if habitat meets management objectives	1) sedimentation (% imbededness), 2) temperature (F), 3) channel morphology (cross sectional area), 4) ripan an community composition, 5) large woody material (number of pieces), 6) smolt numbers	Loss in habitat capability, objectives not being met.	H/M	1) Bucket or ocular (hoop) 2/, 2) hydrothermograph, 3) cross section and pool riffle ratio 3/, 4) line transects, 5) riparian plant community survey (photo points) and 6) electrofishing or trapping	District Ranger, Fisheries Biologist & wildlife biologist	1) June thru Sept., 2) winter & summer daily, 3) every 3 yrs on selected streams, 4) every 3 years on selected streams, 5) 5% of streams annually and 6) every 3 yrs on selected streams	GIS 2600 Files	$7,000
RECREATION User experience and physical setting in dispersed and developed use sites and areas	Site conditions and user satisfaction assure that a broad spectrum of ROS settings and recreational opportunities are provided	Developed and dispersed sites and areas	>20% physical, social, and managerial setting for each ROS Class not achieved Developed site not providing barrier free facilities, not maintained, not meeting public expectations, facilities deteriorating	M/M	Condition surveys, user satisfaction surveys ROS/ RIM vehicle counts, visitor use counts, visitor con tacts	District Ranger, Rec Staff	Annually	R.I M Data and File 2300	$15,000
INFORMATION	Information available to inform public of areas suitable for proposed use	ROG 8/	ROG not available at District or information in guide outdated	H/M	Review of ROG's	Rec Staff, District Ranger	Minimum every 2 years	Districts	$1,500
SOIL	Growth losses caused by accumulative compaction	Cubic foot/yr	>10% decline in tree growth	H/M	25% of earth disturbing projects sampled	Soil Staff/ Silviculture, District Ranger Rep	Annually	2550	$10,000/yr

MONITORING ITEM	ACTIONS/ EFFECTS *MONITORED*	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION *RELIABILITY*	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
Changes in soil productivity	To determine if soil management and conservation practices are being implemented and to assess their effectiveness	1) % compaction, 2) % soil disturbance, 3) % soil puddling	Minimum of 80% of an activity area will be left in a non-detrimental impacted state following a soil disturbing activity	M/M	25% of earth disturbing projects sampled 1)line transects using shovel probe transecting, 2) nuclear guage testing, 3) *relative percentages of* undisturbed, displaced, mixed and deposited soil will be recorded also along the transect	Soil/ Watershed Staff, District Ranger *Reps*	Annually	GIS, 2550 files	$25,000
TIMBER Restocking of lands	To determine if NFMA requirements and plan assumptions for cutover lands are being met.	Harvest unit, number, type, and distribution of regeneration	The elapsed time from site availability to stocking exceeds [CFR 219 27(c)(3)] Plantation success drops below 90%.	H/H	Reforestation stocking surveys Post sale reviews of accomplishment reports	District Ranger, Timber Staff, Forest Silviculturist	Annually	GIS timber reports	$8,000
	Population levels of insects & disease following management activities	Acres infected	As recommended by Regional Office specialists	M/M	Annual insect & disease survey (by R 6 Forest Pest Mgmt specialists) Compare with past surveys to detect trends	Timber Staff Officer	Annually	Survey Report	$500/yr
	Land Suitability	Acres	+ or - 5000 acres	H/H	Stand Exams Aerial Photos Field Observation	Forest Silviculturist	Annually	DBMS R2MAP	$2000
	Harvest Unit Size	Acres	Departure from Regional Guide direction	H/H	EA Project Review	District Ranger, *Ranger* District Staff	Annually	1950 NEPA project files	
	Intensified Forest Management	Acres	1) >10% of acres needing precommercial thinning at age 15, but not treated, 2) >10% acres prescribed for release but not treated within 3 years, >10% of acres needing prunning but not treated within 3 years	H/H	District Silviculturist, Forest Silviculturist	Annually	TRI/GIS		

MONITOR-ING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESH-OLD	DATA PRECI-SION RELI-ABILITY	SUGGESTED METHODS	WHO WILL MONI-TOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
WILD HORS-ES	Herd number	number of animals	10% above upper herd limit.	M/M	Aerial and ground census	District	3 years	District 2200 files	$1000
THREAT-ENED, EN-DANGERED AND SENSI-TIVE ANIMALS AND PLANTS	Bald eagle roost sites	Acres of suit-able habitat.	No loss of habitat under individual roost site plans due to manage-ment activities	H/M	Five year activity schedule evaluations, habitat re-view, EA project review	District Ranger, Range and Wildlife Staff and District Biologist	Update activity schedule evaluations at least every 5 years Annual review of habitat and project EA's	GIS, File 2670	$2,500

MONITORING PLAN NOTES

This monitoring plan is intended to be a dynamic plan subject to revision as the Forest and Grassland Plans are implemented The process to update and, or amend the plans is iterated in figure 5-2, p ___

Definitions of monitoring plan elements

Monitoring Item - Primary resource or activity to be monitored
Action or Effect to be Monitored - A specific statement of what will be checked
Units of Measure - A quantifiable amount related to the action or effect.
Variability Threshold - Levels which, if exceeded, may trigger the need for re-evaluation of the Forest Plan
Data Precision/ - How exact or accurate the measurement, rated high, moderate or low (H, M, L)
Reliability - Expected probability that information acquired through sampling will reflect actual conditions Rated high, moderate or low (H, M, L)
Suggested Methods - Statement of how monitoring will be accomplished
Who Will Monitor - Identifies Program Manager in charge of implementation of monitoring, data collection, analysis, evaluation, and report preparations
Monitoring Frequency - The scheduling of sampling for the item to be monitored stated in years or parts of years
Data Location - Indicates where the collected monitoring data, analysis and evaluation reports for the item monitored are accumulated
Estimated Annual Cost - This cost includes existing and planned monitoring items
Action Indicated - Codes related to types of procedures implemented when variability thresholds are exceeded

FOOTNOTES

1/ GIS Graphic Information System The monitoring plan recognizes that when GIS is implemented on the Forest and Grassland, it will provide the base data upon which monitoring will rely In the interim, the existing data bases will be used

2/ Bucket or ocular sampling using techniques outlined by Munther and Lilburn (Aquatic Environment and Fisheries Habitat, 1986 Monitoring Report. 1987 Bitteroot, Deerlodge, and Lolo NF)

3/ Cross section and pool rifle ratio- Use standard Inventory procedures outlined by Hankin and Reeve s stream survey process (Estimating Total Fish Abundance and Total Habitat Area in Small Streams Based On Visual Estimation Methods, Hankin, D G & Gordon H Reeves, Canadian Journal of Fish & Aquatic Science, Vol 45, 1988)

4/ Utilization levels will be incorporated into allotment management plans

5/ Recreation Opportunity Spectrum

6/ EHA model Equivalent harvest acres model tarcks harvest by watershed and provides a risk assessment of unacceptable hydrologic activity resultant of management practices such as timber harvest and road development.

7/ Timber resource inventory

8/ TRACS

9/Habitat effectiveness index- The HEI model, using cover, forage relationships, vegetation trends and road density, measures habitat capability for big game at a point in time The HEI provides trend information over time to determine whether habitat capability objectives are being met.

Appendix A

Schedules

APPENDIX A1-1

CULTURAL RESOURCE OUTPUTS AND C I P SCHEDULES

OCHOCO NATIONAL FOREST
FY 90-99

FOREST AGGREGATES FOR ALL CRM OUTPUTS

PROJECT / ACTIVITY	FY	FUND	MEASURE	UNIT	COST (M$)
Survey (Project Inventory)	90	NFCR	Acres	49M	104
Lookout Mtn Data Recovery	90	NFCR	Project	1	26
Summit Trail Management Plan	90	NFRN	Project	1	3
Inventory Plan	90	NFCR	Project	1	5
Allison G S Enhancement	90	CWKV	Project	1	10
Divide Cabin Interpretation	90	CWKV	Project	1	3
Survey	91	NFCR	Acres	54M	111
CRM Data Base Installation/GIS	92	NFCR	Project	1	10
Lookout Mtn Interp Feasibility	91	NFCR	Project	1	3
Summit Trail Interpretive Feas	91	NFRN	Project	1	11
Delintment Lake Data Recovery	91	NFRN	Project	1	20
Thematic Study, Historic Mining	91	NFCR	Project	1	5
Survey	92	NFCR	Acres	53M	109
Delintment Lake Data Recovery	91	NFRN	Project	1	20
Lookout Mtn. Intrepretive Design	92	NFRN	Project	1	5
Summit Trail Interpretive Design	92	NFRN	Project	1	21
Thematic Nomination Mining Dist	92	NFCR	Project	1	5
Survey	93	NFCR	Acres	48M	99
Lookout Mtn Interpretive Site	93	NFCR	Project	1	31
Summit Trail Interp Implem Ph 1	93	NFRN	Project	1	75
Historic Mining Interp Feasib	93	NFCR	Project	1	3
Survey	94	NFCR	Acres	51M	105
Summit Trail Interp Implem Ph 2	94	NFRN	Project	1	75
Historic Mining Interp. Design	94	NFRN	Project	1	12
Thematic Study Rockshelters	94	NFCR	Project	1	25
Survey	95	NFCR	Acres	49M	101
Historic Mining Interp Implement	95	NFRN	Project	1	40
Thematic Nomination Rockshelters	95	NFCR	Project	1	12
Rockshelter Interpretation Feas	95	NFCR	Project	1	3
Survey	96	NFCR	Acres	48M	99
Rockshelter Interpretation Design	96	NFRN	Project	1	15
ARPA/Protection Monitoring Survey	96	NFCR	Project	1	10
Lamonta Bldg Group Interp Feas	96	NFCR	Project	1	3
Survey	97	NFCR	Acres	46M	95
Rockshelter Interp Implement	97	NFRN	Project	1	45
ARPA/Protection Plan	97	NFCR	Project	1	10
Lamonta Bldg Group Interp Design	97	NFRN	Project	1	8

PROJECT / ACTIVITY	FY	FUND	MEASURE	UNIT	COST (M$)
Survey	98	NFCR	Acres	44M	91
ARPA/Protection Outreach	98	NFCR	Project	1	5
Lamonta Bldg Group Implementation	98	NFRN	Project	1	25
Cultural Resource Overview	98	NFCR	Project	1	35
Survey	99	NFCR	Acres	44M	91
Contemp Native Amer Use Study	99	NFCR	Project	1	20
CRM Data Base Update	99	NFCR	Project	1	10
Inventory Plan Update	99	NFCR	Project	1	10

• Surveys are performed for all proposed ground-disturbing projects, such as timber sales, road construction and reconstruction, range, wildlife and recreation improvements as well as energy transmission corridors

APPENDIX A1-2

SCHEDULE OF CULTURAL RESOURCE INVENTORY PROJECTS

Project	Year	Cost ($M/Yr) 1/	Survey Output (M Ac /Yr) 2/
D-1 Big Summit	90	26	12
	91	32	15
	92	26	12
	93	26	12
	94	28	13
	95	28	13
	96	28	13
	97	26	12
	98	26	12
	99	26	12
D-2 Paulina	90	11	5
	91	15	7
	92	17	8
	93	17	8
	94	17	8
	95	13	6
	96	13	6
	97	11	5
	98	11	5
	99	11	5
D-3 Prineville	90	29	14
	91	16	8
	92	18	9
	93	16	8
	94	16	8
	95	16	8
	96	16	8
	97	16	8
	98	14	7
	99	14	7
D-4 Snow Mountain	90	38	18
	91	48	24
	92	48	24
	93	40	20
	94	44	22
	95	44	22
	96	42	21
	97	42	21
	98	40	20
	99	40	20

These totals represent Section 106 clearance of proposed timber sale activities as per Forest's "Interim Cultural Resource Inventory Design " Monies for protection, mitigation, and enhancement are not included

1/ Cost of inventory varies between an estimated $2 00 to $2 15 per acre cleared

2/ M acres represents project area cleared by field inventory, usually 3 times larger than actual sale area, as per Forest's "Interim Cultural Resource Inventory Design"

APPENDIX A2

SCHEDULE OF FACILITY CONSTRUCTION/RECONSTRUCTION

First Five Years

Project Name	Cost ($M)	Preconstruction Cost ($M)	Output
Snow Mountain/Burns Ranger District Offices	1400	100	1
Rager Ranger Station Quarters - Phase I	370	30	7
Ochoco Hazardous Storage Buildings	172	8	2

Second Five Years

Project Name	Cost ($M)	Preconstruction Cost ($M)	Output
Rager Ranger Station Service Buildings	220	15	2
Rager Ranger Station Quarters - Phase II	357	20	3
Lamonta Service Buildings	241	15	2
Ochoco Ranger Station Work Center Paving	32	1	1
Rager Ranger Station Quarters - Phase III	536	40	1

APPENDIX A3-1

SCHEDULE OF FUELS MANAGEMENT ACTIVITIES

First Five Years

Project Name	Cost ($M/Yr)	Outputs (M Ac /Yr)
Activity Fuels Hazard Reduction	955	142
Natural Fuels Hazard Reduction	329	49

Second Five Years

Project Name	Cost ($M/Yr)	Outputs (M Ac /Yr)
Activity Fuels Hazard Reduction	955	142
Natural Fuels Hazard Reduction	329	49

APPENDIX A3-2

FIRE MANAGEMENT SCHEDULE
OCHOCO NATIONAL FOREST

				Wildfire Suppression Strategy							Based on NFMAS Run	Annual Acres Use of Fire	
				Control		Contain		Confine					A=Activity N=Natural
Management Area (Land Allocation)	Primary Resource Allocation	M Acres Protected	Protection Level 1/	Flame Length	Max. Individual Fire Size Objective	Flame Length	Max. Fire Size Obj	Flame Length	Max. Fire Size Obj	Maximum Allowable Burn Acreage Objective - 10 yr	Expected Burn Acreage - 10 yr	Unplanned	Planned
22	General Forest	497	2	4+	2500	2-4	50	0-2	10	5000	2125		A 9300 N 4900
20, 21	Winter Range	171	8	4+	1000	2-4	100	0-2	100	2000	730		A-3200 N 1700
6	Old Growth	19	4	All	10					100	80		
7, 25-27	Visuals	51	4	4+	100	2 4	10	0 2	50	1000	220		A 1000 N 1500
12	Eagle Roosts	1	2	All	10					10	5		
1 4	Wilderness	37	4	4+	3000	2-4	1000	0 2	500	6000	160		N-1100
8, 10, 11A	Road less	22	4	4+	1500	2-4	500	0 2	250	3000	95		N 700
9	Rock Cr Cottonwood	3	3	4+	1000	2 4	100	0 2	10	1000	15		A-100 N 0
13, 14, 28	Developed Recreation	4	1	All	1					0	15		N-100
5	R N A.	5	4	4+	50	2-4	25	0 2	100	100	20		
15	Riparian	18	3	4+	100	2 4	50	0-2	100	700	75		A 300 N 200
11B, 16 19, 23, 24	Special Areas	17	4	4+	500	2-4	100	0 2	50	500	70		A 300 N 200
TOTAL		845									3610		A 14200 2/ N 10400 3/

* For Desired Residue Profile see Management Prescriptions

1/ 1 Life and Property, 2 - High Value Commodity of Investments (Social/Political), 3 - Commodity, 4 - Noncommodity

2/ Sale Activity Residues

3/ Hazard Reduction=4900, Habitat Management=5500

APPENDIX A4-1

SCHEDULE OF FORAGE IMPROVEMENTS

First Five Years

Project Name	Cost ($M/Yr)	Output/Year
STRUCTURAL IMPROVEMENTS Water Developments (Number)	33 5	14
Fence Construction (Miles)	71 4	35 7
Fence Removal (Miles)	3	3 0
NONSTRUCTURAL IMPROVEMENTS Juniper Removal (Acres)	6 0	80 0
Seeding (Acres)	6 0	80 0
Range Burning	141 4	4,072.0

** Second Five Years are the same as the First Five Years.

APPENDIX A4-2

RANGE VEGETATION ANALYSIS AND ALLOTMENT MANAGEMENT PLAN UPDATE SCHEDULE

District	Project	Year
BIG SUMMIT	Brush Creek	1990
	Crystal Creek	1990
	Marks Creek	1991
	Gray Prairie	1991
	Wildcat	1992
	Fox Canyon	1992
	Lost Horse	1993
	Pringle	1993
	Elkhorn	1994
	Lookout	1994
	Canyon Creek	1995
	Reservoir	1995
	North Fork	1996
	Pisgah	1996
	Snowshoe	1997
	Badger	1997
	Big Summit	1998
		(last update 1989)
	Burn	1999
		(last update 1989)
PAULINA	Sunflower	1990
	Roba	1991
	Happy	1992
	Little Summit	1993
	Derr	1994
	Deep Creek	1995
	Heisler	1996
	Rock Creek	1997
	Bearskull-Cottonwood	1998
	Dry Corner	1999
	Wolf Creek	2000
		(last update 1988)
	Wind Creek	2001
		(last update 1989)
PRINEVILLE	East Maury	1990
	Mill Creek	1991
	Bear Creek	1992
	Trout Creek	1993
	Shotgun	1994
	Baby Allotment	1995
	Double Cabin	1996
		(last update 1987)
	Klootchman	1997
		(last update 1988)
	West Maury	1998
		(last update 1989)

District	Project	Year
SNOW MOUNTAIN	Buck Mountain	1990
	Lower Nichol	1990
	Sawmill	1991
	Donnelly	1992
	Snow Mountain	1993
	Green Butte	1994
	Emigrant Creek	1995
	Silver Creek	1996
		(last update 1989)
	Allison	1997
		(last update 1989)

APPENDIX A5

LAND EXCHANGE OR TRANSFER

Project Name	Total Cost ($M)	Output (Acres)
Ochoco Lumber Company	35	7,832
Wonser	11	360
Other cases, 1st 5 years	34	800
Other cases, 2nd 5 years	34	800

RIGHTS-OF-WAY

Project Name	Total Cost ($M)	Output (Acres)
Cases for decade (5/year)	112	50

APPENDIX A6

SCHEDULE OF LAND LINE LOCATION ACTIVITIES

First Five Years

Project Name	Cost ($M/Yr)	Outputs (Ac./Yr)
Land Line Location	126	?

Second Five Years

Project Name	Cost ($M/Yr)	Outputs (Ac /Yr)
Primarily Maintenance	105	?

APPENDIX A7

SCHEDULE OF MINERALS PROPOSALS, LEASES, AND APPLICATIONS

Project Name	Cases for Decade	Total Cost ($M)	Output (Cases)
Locatable minerals	15/year	322	150
Common Variety minerals	10/year	70	100
Oil and Gas	175/year	700	1750

APPENDIX A8

SCHEDULE OF DEVELOPED RECREATION PROJECTS - LISTED BY PRIORITY

First Five Years

Project Name	Cost (M$)	Outputs (Additional Paot's)
Ochoco Forest Camp	200	220
Sugar Creek Campground	95	50
Ochoco Divide	135	50
9 Water Systems Upgrade	432	-
Delintment Lake Dam & Campground	355	100
Elkhorn Campground	60	20
Wiley Campground	60	40
Mud Springs Campground	77	30
Upgrade Remaining Water	108	-
Information & Wilderness Stations	140	-
Antelope Campground	176	100
Big Springs Campground	35	15
Barnhouse	72	20
Allen Creek Horse Camp	190	20
Wildcat Campground	230	0
Divide Cabin Interpretative	156	50
D-4 Auto Tour Interpretative	60	-

Second Five Years

Project Name	Cost (M$)	Outputs (Additional Paot's)
Deep Creek	116	0
Double Cabin	132	100
Dispersed Sites D-4	72	0
Whistler Relocate	120	10
High Horse Camp	120	50
Frazier	114	20
Hammer Horse Camp	108	30

APPENDIX A9

SCHEDULE OF TRAIL/TRAILHEAD PROJECTS - LISTED BY PRIORITY

SUMMER PROJECTS

First Five Years

Project Name	District	Cost (M$)	Miles
TRAILS/SNOWPARK			
Lookout Tie	Big Summit	60	8.1
Rock Creek Walk	Paulina	18	7 0
Walton Lake Loop	Big Summit	6	1 0
Black Canyon	Paulina	60	4 0
Highway 26 Snowpark	Big Summit	120	.2
Divide Cabin Interpretive Site	Prineville	42	2 0
Rim	Paulina	66	5 0
Back Creek/Apple Road	Paulina	76	6 8
Cougar/Bear Creek	Prineville	40	6 6
RECONSTRUCTION			
Stein's Pillar	Prineville	5	5
Allen Creek Horse Camp	Big Summit	157	14.0
OHV Routes	Prineville	300	30 0
Lookout Brush Creek	Big Summit	123	6 0
Sugar Creek Interpretive	Paulina	60	2.0
Keaton Relocate	Paulina	120	10 0
Keaton Tie	Paulina	36	2 0
Hammer Creek	Prineville	60	8 0
Payton Right-of-Way	Paulina	26	3 0
North Fork Crooked River	Big Summit	66	5 0
Dry Creek Horse	Prineville	90	3 0
Delintment Lake	Snow Mountain	50	5 0
East/West Intertie (New Oregon Trail)	Prineville, Big Summit	148	10 0
Snow Parks	Snow Mountain	72	4
Summit/Round Mountain	Big Summit	25	6 0
Hat/East Walk	Paulina	42	2.5
Youngs Butte	Paulina	25	2 0

Second Five Years

Project Name	District	Cost (M$)	Miles
TRAILS/SNOWPARK			
O'Neil Creek	Big Summit	71	5 0
Wind Creek	Paulina	85	5 0
Silver Creek	Snow Mountain	90	8 0
Steins Pillar Loop	Prineville	54	3.0
Silver Creek	Snow Mountain	130	18 0
Battle Ridge	Paulina	48	3 0
Ochoco Divide Interpretive	Big Summit	36	1 5
Old Summit/East-West Intertie	Paulina	83	8 0
Old Summit/East-West Intertie	Big Summit	72	15 0
Emigrant Falls	Snow Mountain	18	2.0
East Wolfe	Paulina	48	3 2
East-West Intertie (New Oregon Trail)	Prineville	120	20 0
OHV Routes	Prineville	180	15 0
OHV Routes	Big Summit	276	25 0
OHV Routes	Paulina	156	15 0
OHV Routes	Snow Mountain	108	10 0
Scissorsville Interp.	Big Summit	40	3 0
Wildflower Walk	Big Summit	22	2 0
Hwy 26 Bike Path	Big Summit	225	13 0
Allen/Walton Interp	Big Summit	65	6 5
Bandit Springs Interp	Big Summit	40	3 0

First Five Years

Project Name	District	Cost (M$)
TRAILHEAD CONSTRUCTION		
Potter Meadow	Paulina	7 0
Mud Springs	Paulina	4 0
Divide Cabin	Prineville	23 8
Boeing	Paulina	20 0
Payton	Paulina	20 0
Rock Creek	Paulina	4.0
Barnhouse	Paulina	4 0
Fry	Paulina	3 0
Wolf Mountain	Paulina	3 0
Allen Creek	Big Summit	26 0
Ochoco Divide	Big Summit	4.0
Whistler	Prineville	4 0
Rim/Back	Paulina	3 0
Cougar/Bear	Prineville	6 0
Lookout/Bush	Big Summit	3 0
Keaton	Paulina	4 0
Hammer (2)	Prineville	8 0
North Fork	Big Summit	22 0
Delintment Lake	Snow Mountain	4 0
Youngs	Paulina	4 0
Summit/Round	Big Summit	4 0
Chev Spring	Big Summit	55 0

Second Five Years

Project Name	District	Cost (M$) Miles
TRAILHEAD CONSTRUCTION		
O'Neil	Big Summit	4 0
Wind Creek	Paulina	4 0
Silver	Snow Mountain	4 0
Stein's Loop	Prineville	6 0
East Wolfe	Paulina	5 0
Miscellaneous OHV Trailheads	All	120 0
Battle Ridge	Paulina	4 0
Twin Pillars	Prineville	8 0

WINTER TRAILS

First Five Years

Project Name	District	Cost (M$)	Route Development Miles
CROSS-COUNTRY SKI			
East-West Intertie	Big Summit	13	11
Lookout Mtn Loop		8	8
Grant Meadows		8	8
Nature Creek		4	4
Canyon Creek		7	7
Ochoco Creek		16	13
Rager	Paulina	4	4
Phone Line		4	4
Tamarack		4	4
Dry Creek	Prineville	12	10
Miscellaneous	Snow Mountain	12	10

Second Five Years

Project Name	District	Cost (M$)	Route Development Miles
CROSS-COUNTRY SKI			
Carol Butte	Big Summit	2	2
Brush Creek		7	7
Crystal Creek		7	7
Snow Course	Paulina	11	9
Spanish Peak		5	5
Mauries	Prineville	18	20
Miscellaneous	Snow Mountain	12	15

First Five Years

Project Name	District	Cost (M$)	Route Development Miles
SNOWMOBILE			
Big Summit	Big Summit	19 2	33
West 42		2 0	3 5
Peterson Lava		2.0	3.5
East 42	Paulina	11	18
Little Summit Prairie		4	8
Watson Military		4.5	9
Summit		4	8
Dick's Bluff	Prineville	12	20
West 27		9	18
Miscellaneous	Snow Mountain	22	35

Second Five Years

Project Name	District	Cost (M$)	Route Development Miles
SNOWMOBILE			
Chev Spring	Big Summit	7 8	13
Old Summit		5	10
Brush Creek		2	4
Potter Meadow	Paulina	1 5	3
38 Road		2	4
3610 Route		3 5	7
12 Road		4	8
Bear		1 5	3
Maurles	Prineville	18	25
Miscellaneous	Snow Mountain	18	30

APPENDIX A10

TIMBER SALE ACTIVITY SCHEDULE

INTRODUCTION

This appendix displays how the timber outputs, as projected by the preferred alternative in the FEIS, are likely to be provided during the period from 1990 through 1994, and projected harvest by management area for the next two decades.

The following tables list the planned timber sales information and conditions current at the time of Forest Plan development If these conditions change, and as new information becomes available during implementation of the Forest Plan, the timber sale schedule may be modified.

The "small sales" (usually less than 2.0 million board feet) may change on very short notice to meet special product demands or to take advantage of salvage opportunities or for disease or insect prevention The small sales program is used to achieve a variety of special purposes such as the salvage of blow-down timber or to remove hazard trees from developed campgrounds A variety of silvicultural methods may be used depending upon the objective of the individual small sale.

Table A10-2 is derived from the Timber Sale Action Program for the Forest. Maps showing the sale areas are available for inspection at the Forest Supervisor's Office and indicated Ranger Districts.

APPENDIX A10-1

PLANNED ANNUAL TIMBER HARVEST BY MANAGEMENT AREA FOR FIRST TWO DECADES

MANAGEMENT AREA	First Decade		Second Decade
	MMCF	MMBF	MMCF
General Forest 9 - 21 & 22	17 0	103	16.7
Big Game Winter Range - 20	.5	3	1.2
Riparian - 15	2	1	.2
Visual, Recreation, and Eagle Roosting Areas 7, 11, 12, 13, 14, 16, 17, 18, 19, 23, 24, 25, 26, 27	1 3	8	.9
Total	19 0	115	19 0

APPENDIX A10-2

TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
BIG SUMMIT DISTRICT				**FISCAL YEAR 1990**				
Chuck-wagon	T14S,R20E, S2,3,4,5,9,10,11,16	22, 26, 27	267	424	8 0	0 6	0 1	1/, 20% Skyline, 80% Tractor
Lame	T15S,R21E, S1,12,13, T15S,R22E, S5,6,7,8,17,18,19,20	20, 21	370	30	4 0	0 0	0 0	1/, Tractor
Koch	T14S,R19E, S5, T13S,R19E, S21,22,27,28, 29,30,31,32 T13S,R18E, S36	21,25	416	11	2 7	0 4	0 1	1/, Tractor
Dry Porter	T13S,R22E, S26,27,28,32,33,34 T14S,R27E, S2,3,4,11	22	304	206	5 0	0 5	0 0	1/, Skyline and Tractor
Upper Al	T13S,R213, S16,17,21,22,23,26, 27,28,32,33,34,35	22, 26	300	400	10 7	0 0	0 0	1/, Skyline and Tractor
H & G	T12S,R19E, S36 T13S,R19E, S1,2,11,12,13 T13S,R20E, S6,7,8,17,18	22, 7, 25	404	111	4 2	1 5	0 1	1/, Skyline and Tractor
Halfway	T12S,R19E, S25,26,34,35,36	16	80	50	1 4	0 0	0 0	1/, Tractor
Rough	T15S,R21E, S27,28,33,34,35	21	400	0	4 0	0 0	1 0	1/, Skyline and Tractor
TOTAL			2541	1232	40 0	3 0	1 3	
BIG SUMMIT DISTRICT				**FISCAL YEAR 1991**				
Lutsey	T15S,R20E, S13,21,23,24,25,26, 27,34,35 T15S,R21E, S7,8,17,18,19,30	21, 22	391	619	5 0	0 7	0 5	1/, Skyline and Tractor
Thunder	T13,14S,R18E	20, 22, 25	800	0	6 0	0 0	2 5	1/, Skyline and Tractor
Merritt	T13,14S,R20E	22, 26, 27	541	0	8 0	2 6	1 5	1/, Tractor
Indian Butte	T13S,R20E, T13S,R21E	22, 26, 7	346	855	10 0	3 3	0 6	1/, Tractor
Arvid	T15S,R20E	21, 22	600	0	6 0	1 2	1 0	1/, Skyline and Tractor
Scotts	T13S,R21E	22, 7, 26	450	0	5 0	1 5	0 0	1/, Skyline and Tractor
TOTAL			3128	1474	40 0	9 3	6 1	

1/ Regeneration harvest in Douglas fir and white fir, and overstory removal and selection in ponderosa pine

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
BIG SUMMIT DISTRICT				**FISCAL YEAR 1992**				
Claypool	T13S,R19E	22	650	100	10 0	4.0	1 0	1/, Skyline and tractor
Deep	T14,152,R22E	20, 22, 23	400	200	5 0	1 5	0 0	1/, Skyline and Tractor
Hedgepath	T14S, R19,20E	22, 26	400	0	6 0	5 0	0 0	1/, Skyline and Tractor
Off Broad-way	T13S,R22E	22, 7	600	0	7 0	1 5	2 0	1/, Skyline and Tractor
Long Horse	T14,15S,R21E	21, 22, 23	600	800	12 0	1 0	1 5	1/, Tractor
TOTAL			2650	1100	40	13 0	4 5	
BIG SUMMIT DISRICT				**FISCAL YEAR 1993**				
Forks	T13S,R20E	22, 26	400	0	4 0	0 0	0 0	1/, Skyline and Tractor
Ross	T13S,R22E	7, 22, 26	700	500	10 0	1 5	3 3	1/, Skyline and Tractor
Sylvester	T13S,R18,19E	22	660	0	10 0	5 0	0 0	1/, Skyline and Tractor
Brush	T14,15S,R20,21E	22, 26	500	100	6 0	1 0	0 0	1/, Skyline and Tractor
Living-stone	T14,15S,R20,21E	22	300	100	4 0	0 0	0 0	1/, Skyline and Tractor
Carrol	T12,13S,R20E	7, 22, 25, 26	500	0	4 5	1 0	0 0	1/, Skyline and Tractor
TOTAL			3060	700	38 5	8 5	3 3	
BIG SUMMIT DISTRICT				**FISCAL YEAR 1994**				
Divide	T12S,R20E	22	150	0	2 0	0 0	0 0	1/, Skyline and Tractor
East Point	T13S,R21,22E	7, 22	800	0 0	12 0	4 0	0 0	1/, Skyline and Tractor
Car Keys	T14S,R22E	22, 26	200	200	4 0	0 0	8 5	1/, Tractor
Block 15	T12S,R21E	22	450	0	5 0	0 0	2 0	1/, Skyline and Tractor
Berkley	T14,15S,R21E	21, 22	350	100	3 0	0 0	0 0	1/, Tractor
Simpson	T13S,R20E	22	500	0 0	6 0	2 0	2 0	1/, Skyline and Tractor
Block 22	T15S,R21,22E	21, 22	500	200	5 0	0 0	0 0	1/, Tractor
TOTAL			3100	500	37	6 0	12 5	

1/ Regeneration harvest in Douglas-fir and white fir, and overstory removal and selection in ponderosa pine

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
PAULINA DISTRICT				**FISCAL YEAR 1990**				
Potter	T14S,R25E, S4-9,16 20,29,30 T14S,R24E, S1,12,13,14,23,24 T13S,R25E, S30-33	14, 15, 22, 26	800	50	12 0	2 5	7 5	Tractor, skyline, considera ble amount of HCC and HSH harvesting in mixed conifer stands
Rainier	T13S,R22E, S1,2,11-14 T13S,R23E, S6,7,18	7, 15, 22	500	60	10 0	9 6	0 0	Tractor, skyline, predominantly HCC and HSH harvesting in mixed conifer stands
Bottoms	T14S,R23E, S21,22,31 T14S,R24E, S17,20 T15S,R24E, S1,24	14, 20, 22, 26	171	15	1 6	0 0	0 0	Tractor harvest of encroaching conifers, most commonly ponderosa pine, to release aspen clones from conifer competition and provide KV dollars to enhance aspen resprouting and regeneration
TOTAL			1471	125	23 6	12 1	7 5	
PAULINA DISTRICT				**FISCAL YEAR 1991**				
Tower	T14S,R25E, S20,28-29,32-35 T15S,R25E, S2 5	7, 15, 22	450	200	6 0	2 0	11 5	Tractor and helicopter, approximately 1/3 HCC or HSH, 1/3 ponderosa pine uneven-aged management, 1/3 preparation cut in mixed conifer stands
A & M Spring	T13S,R25E, S36 T13S,R26E, S33 T14S,R26E, S4-9,17,18 T14S,R25E, S1,12,13	14, 15, 22, 26	550	300	7 0	1 3	4 1	Tractor and skyline overstory removal and selection management in ponderosa pine types on ridges HCC and HSH in mixed conifer types generally
Bearskull	T13S,R25E, S27,28,34,35 T14S,R25E, S1-4,9-15	14, 15, 22, 26	350	150	5 0	2 2	4 5	Tractor and skyline overstory removal and selection harvesting in pine types on ridges south and west facing slopes HCC and HSH in mixed conifer types
TOTAL			1350	650	18 0	5 5	20 1	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
PAULINA DISTRICT			**FISCAL YEAR 1992**					
Hornet	T14S,R24E, S31,32 T15S,R24E, S4-9,15-22,27,28 T15S,R23E, S1,12,13,24	12*, 14, 15, 20, 22, 26	750	350	8 0	0 0	15 5	Tractor Sale contains predominantly pondersoa pine types which will be harvested under selection, overstory removal, and commercial thin
Noble	T15S,R24E, S9-11, 13-16,22,23-27 T15S,R25S, S18	12*, 13*, 14, 15, 20, 21, 22, 26	400	350	4 00	3 0	4 0	A few HCC and HSH possible Tractor and skyline Sale contains predominantly ponderosa pine types which will be harvested under selection
DCWR	T13S,R23E T14S,R23E T14S,R24E T14S,R22E T13S,R22E	14, 15, 22	500	0 0	4 0	0 0	0 0	All tractor harvesting Harvest shelterwood overstones of various sales in the deep creek watershed
TOTAL			1650	700	16 0	3 0	19 5	

12* Eagle Roosting Areas and 13* Developed Recreation Areas - We may or may not do any harvesting within these areas during this entry cycle, but they are within the sale area and will be considered

PAULINA DISTRICT			**FISCAL YEAR 1993**					
Delore	T17S,R26E, S2-6,8-11 T16S,R26E, S14,15,20-35	14, 15, 22	750	750	6 0	1 5	8 5	Probably just tractor logging in predominantly ponderosa pine stands Silvicultural methods would include selection, overstory removal, and commercial thinning
Younger	T13S,R23E, S8-11, 15,16,17,18,20,21, 28,29	7, 14, 15, 22, 26	235	50	4 0	1 5	2 0	Tractor harvesting of mixed conifer stands which will generally be harvested by HCC or HSH methods
Robin	T15S,R25E, S17-21,28 31 T15S,R24E, S24,25	14, 15, 21, 22, 26	350	400	3 0	0 0	1 0	Mostly tractor but possibly some skyline harvesting in ponderosa pine and ponderosa and Douglas fir stands Silvicultural meth ods include selection, overstory removal, and commercial thinning
TOTAL			1200	1200	13 0	3 0	11 5	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
PAULINA DISTRICT				**FISCAL YEAR 1994**				
Keeton	T13S,R23E, S4-9,17 T13S,R22E, S1	7, 15, 22	935	50	14 0	10 5	2 0	Tractor and skyline harvest methods Mostly HCC and HSH silvicultural methods in mixed conifer
Double 8	T13S,R23E, S14,15, 21,22,23,26 29, 32-35	14, 15, 22, 26	250	70	4 0	0 5	4 5	Stands with a few overstory removal harvests at the southern boundary of the sale - probably all tractor harvesting Predominantly HCC and HSH in mixed conifer stands where firs predominate Possibly some selection and overstory removal harvesting where there are stands with sufficient larch and ponderosa pine
TOTAL			1185	120	18 0	11 0	6 5	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
PRINEVILLE DISTRICT				**FISCAL YEAR 1990**				
Lightning Bust	T12S,R17E, S13-15, 22-24	22, 14, 15	548	35	80	11	33	Regeneration and final removal Skyline and Tractor
Underdog	T12S,R19E, S1-2, 9-16, 22, 24 T12S,R19E, S17-19	22, 21, 25, 16, 14, 15	1238	130	130	64	09	Regeneration, improvement, selection and final removal Skyline and Tractor
Shotgun	T17S,R20E, S28 33	22, 14 ,15	514	80	50	0	0	Final removal, selection Tractor
Dale	T18S,R19E, S2-4, 9-11, 14-16	22, 26, 21, 14, 15	1663		32	0	0	Final Removal Tractor
Colt	T12S,R17E, S25,26,27 T12S,R18E, S30	22, 7, 14, 15	500		8	0	0	Rehabilitation and regeneration Skyline and Tractor
TOTAL			4459	245	300	75	42	
PRINEVILLE DISTRICT				**FISCAL YEAR 1991**				
Runamuck	T17S,R19E, S24,25,36 T17S,R20E, S19,30,31 T18S,R19E, S2	22, 26, 21, 14, 15	340	353	70	0	1	Selection, final removal, and regeneration Skyline and Tractor
Cayuse	T12S,R18E, S28,33 T13S,R18E, S5,6,8	20, 26, 22, 14, 15	400	250	140	98	37	Selection, final removal, and regeneration Skyline and Tractor
Shingle	T18S,R19E, S5 8	26, 22, 14, 15	350	100	50	0	0	Selection and final removal Tractor
Bopeep	T17S,R18E, S34 T18S,R18E, S2,3,4,9,10,11,14,15	22, 21, 14, 15	600	110	40	25	6	Selection, final removal, and regeneration Skyline and Tractor
TOTAL			1690	813	300	123	47	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
PRINEVILLE DISTRICT				**FISCAL YEAR 1992**				
Iron Bird	T13S,R16E, S25 T13S,R17E, S19,20,29,30,31	21, 22, 26, 14, 15	300	400	5 0	0	3	Selection, final removal, Improvement harvest. Helicopter
Rocky I	T13S,R18E, S16,20,21,22,27,28, 29,30	14, 15, 17, 20, 22, 26	400	500	14 0	5	3	Regeneration, final removal, and selection Skyline and Tractor
Trout	T12S,R18E, S1-5,8,9	14, 15, 21, 22	200	500	8 0	2	9 3	Selection, final removal Skyline and Tractor
Dutchman	T12S,R17E, S1 5,8-12 T12S,R18E, S6,7	14, 15, 21, 22	300		2,0	0	3	Commercial thinning Tractor
TOTAL			1200	1400	29 0	7	18 3	
PRINEVILLE DISTRICT				**FISCAL YEAR 1993**				
Laser	T12S,R17E, S16,17,19,20,21,28, 29,31-33 T13S,R17E, S5-7 T12S,R16E, S36	26, 21, 22, 14, 15	500	300	11 0	2	5	Regeneration, final removal, and selection Skyline and Tractor
Janzout	T12S,R17E, S25,33 36 T13S,R17E, S1,2,4,5 T12S,R18E, S31 T13S,R18E, S6	7, 14, 15, 21, 22, 26	600	300	11 0	5	7 0	Selection, regeneration, and final removal Skyline and Tractor
DJ	T14S,R17E, S6	21	100		5	1	1	Final removal Skyline and Tractor
Pup	T17S,R21E, S28-33 T17S,R20E, S25,36 T18S,R20E, S1	20, 22, 26, 14, 15	200	300	3 5	0	3	Selection, final removal, and regeneration Skyline and Tractor
TOTAL			1400	900	26 0	8	16 0	
PRINEVILLE DISTRICT				**FISCAL YEAR 1994**				
Goldilocks	T12S,R19E, S4-9,16,17,18 T12S,R18E, S1	14, 15, 21, 22	400	600	11 0	6	8 7	Selection, final removal, and regeneration Skyline and Tractor
Sylvester	T13S,R17E, S25,36 T13S,R18E, S30-32 T14S,R18E, S5,6	14, 15, 17, 20, 22, 26	300	500	9 0	4	2 5	Regeneration, final removal, and selection Skyline and Tractor
Mill	T12S,R18E, S27, 28, 33, 34 T13S,R18E, S4, 5, 8, 9, 16	14, 15, 20, 22, 26	200	400	5 0	3	4	Selection, final removal, and regeneration Skyline and Tractor
TOTAL			900	1500	25 0	13	15 2	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
SNOW MOUNTAIN DISTRICT				**FISCAL YEAR 1990**				
Tip	T19S,R25E, S25,26,35,36 T19S,R26E, S19,20,21,22,29,30,3 T20S,R25E, S1,2	13, 22, 26	1030	00	100	18	00	Tractor Shelterwood in pine and mixed conifer
Rebull	T20S,R27E, S5,6,7 T19S,R27E, S32	22, 26	150	1500	66	00	02	Tractor Selection and overstory removal
Vol	T19S,R27E, S4,6,8,9,15,16, 21,27,28	22, 26,	1800	00	44	00	00	30% Skyline, 70% Tractor Overstory removal
Top	T19S,R26E, S11,12,13,14,15,23,24	22, 26	600	00	45	00	00	Tractor Overstory removal
Button	T19S,R27E, S19,28,29,30	22, 26	400	260	50	10	25	Tractor Selection and overstory removal
Shorty	T19S,R26E, S38,32 T20S,R26E, S4,5,8,9	22	1600	00	30	00	00	Tractor Overstory removal
TOTAL			5580	1760	335	28	27	
SNOW MOUNTAIN DISTRICT				**FISCAL YEAR 1991**				
Lumsden	T21S,R27E, S14,23,24,25,26, 27,28,33,34,35,36 T22S,R27E, S1,2 T21S,R28E, S21,22,23,26,31, 32,33,34,35 T22S,R28E, S2,3,4,5,6,7,8,9,10	22, 26	800	1600	90	00	20	Tractor Overstory removal and selection cutting in pine
Hollow	T21S,R27E, S11,12,13,14,23,24,25 T21S,R28E, S6,7	22, 26	00	1000	30	00	20	Tractor Selection cutting in pine
Last Buff	T20S,R28E, S32, T21S,R28E, S3,4,5,6,7,8,9,10, 14,15,16,17,21 T22S,R27E, S13 T22S,R28E, S17,18	20, 22, 26	300	1000	80	00	20	Tractor Overstory removal and seletion in pine
Green	T21S,R28E, S17,18,19,20,29,30	22, 26,	200	900	73	20	15	Tractor Overstory removal and seletion in pine
B 52	T21S,R24E, S35,36 T22S,R24E, S11,12 T21S,R25E, S31,32 T22S,R25E, S4,5,6,7	21	80	420	30	00	00	Tractor Selection and overstory removal in pine
Mud	T19S,R25E, S1,12,13,14,22, 23,24,26,27 T19S,R26E, S5,6,7,8,18,19	21, 22, 26	20	640	30	00	00	Tractor Selection and overstory removal
TOTAL			1400	5560	333	20	75	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
SNOW MOUNTAIN DISTRICT				**FISCAL YEAR 1992**				
Dustbox	T19S,R26E, S25,26,34,35 T20S,R26E, S2,3,10,11	22, 26	300	370	4 0	0 75	0 75	Tractor Selection and overstory removal
Plumber	T20S,R26E, S13,15,16,21,22,23, 24,25,26,27,28,29, 32,33,34,35,36 T20S,R27E, S18,19,20,29,30,31	21, 22	200	600	3 0	1 0	1 5	20% Skyline, 80% Tractor Selection and overstory removal
Dairy	T20S,R25E, S32 T21S,R25E, S4,5,8,9,15,16,17,20, 21,22,28	22	35	400	2 0	0 0	0 0	Tractor Selection and overstory removal
Blacksnag	T19S,R25E, S27,33,34 T20S,R25E, S2,3,4,5,8,9,10,11,14, 15,16,17,21,22,23,27	21, 22, 26	200	700	6 0	0 5	0 75	Tractor Selection and overstory removal
Big Ridge	T22S,R27E S6,7 T22S,R26E, S1,2,11,12,13	20	150	850	5 0	3 0	0 75	Tractor Selection and overstory removal
Boundary	T18S,R26E,S25,31, 32,33,34,35 T19S,R26E, S1,2,3,4,5,6 T18S,R27E, S19,29,30,31,32 T19S,R27E, S6	21, 22, 26	500	700	6 0	0 5	4 0	Tractor Selection and overstory removal, and shelterwood
Elliot	T22S,R28E, S15,16,17,20,21,22, 23,25,26,27,28, 29,33,34,35 T23S,R28E, S1,2,3	20, 22	150	1300	5 0	0 0	0 0	Tractor Selection and overstory removal
TOTAL			1535	4920	31 0	5 75	7 75	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
SNOW MOUNTAIN DISTRICT				**FISCAL YEAR 1993**				
Gus	T21S,R27E, S1,2,11,12,13,14,24 T21S,R28E, S6,7,18	22, 26	80	420	2 0	2 0	0 3	Tractor Selection and overstory removal
Sawdust	*T21S,R27E, S31,32,33,34 T22S,R27E S2,3,4,5,6,7,8,9,10, 11,13,14,15,16*	*20, 22*	*250*	*1000*	*5 0*	*0 0*	*0 0*	*Tractor Selection and* overstory removal
Doe	T20S,R25E, S17,18,19,20,21,27,28, 29,30,31,32,33,34,35 T21S,R25E, S2,3,4,5,6	21, 22	200	650	5 0	0 0	1 0	Tractor Selection and overstory removal
Beaver Rock	T20S,R27E, S14,15,16,21,22,23, 24,25,26,27,28,29,30, 31,32,33,34,35,36 T20S,R28E, S19,29,30,31,32 T21S,R273, S3,4,5,6	22, 26	250	550	5 0	0 3	2 0	20% Skyline, 80% Tractor Selection and overstory removal
Foss	T19S,R26E, S32,33 T20S,R26E, S5,6,7,8,18,19,30 T20S,R25E, S12,13,24	22	350	1000	8 0	1 0	0 5	15% Skyline, 85% Tractor Selection and overstory removal
Boomer	T19S,R27E, S10,11,12,13,14,15, 21,22,23,24,25,26, 27,28,33,34,35,36	22, 26	400	500	5 0	1 0	3 0	15% Skyline, 85% Tractor Selection and overstory removal
Perkins	T19S,R26E, S27,28,32,33,34 T20S,R26E, S3,4,5,6,7,8,9,16,17, 18,19,20,21,29,30 T21S,R26E, S3 T20S,R25E, S1,12,13,24,25	22	70	850	5 0	1 0	1 0	10% Skyline, 90% Tractor Selection and overstory removal
TOTAL			1600	4970	35 0	5 3	7 8	

TABLE A10-2 (Continued)
TIMBER SALE ACTIVITY SCHEDULE

SALE NAME	LOCATION - ALL OR PART OF	MANAGE-MENT AREA(S)	HARVESTED AREA ACRES - EVENAGED	HARVESTED AREA ACRES - UNEVENAGED	VOLUME MMBF	ROAD MILES CONSTRUCT	ROAD MILES RECONSTRUCT	PROBABLE HARVEST METHODS
SNOW MOUNTAIN DISTRICT				**FISCAL YEAR 1994**				
Valley	T19S,R26E, S32,33 T20S,R26E, S5,6,7,8,18,19,30 T20S,R25E, S12,13,24	22, 26	100	700	30	10	15	Tractor Selection and overstory removal
Emigrant Face	T19S,R28E, S31 T20S,R27E, S1,10,11,12, 13,14,15,24 T20S,R28E, S7,18	13, 22, 26	300	400	30	15	45	70% Helicopter, 30% Tractor Selection and overstory removal
Dog Hill	T22S,R28E, S1,2,3,10,11,12,13, 14,15,23,24,25 T22S,R29E, S7,17,18,19,29,30	22, 26	00	900	40	05	10	Tractor Selection cutting
Moco	T19S,R25E, S25,26,35,36 T20S,R25E, S1,2,12 T20S,R25E, S1,2,12 T20S,R26E, S6 T19S,R26E, S19,20,21,22,23,26, 27,28,29,30,31,32	13, 22, 26	200	1200	60	10	40	15% Skyline, 85% Tractor Selection and overstory removal
Burnt Cabin	T18S,R27E, S31,32,33 T19S,R26E, S1 T19S,R27E, S3,4,5,6,7,8,9,10,11, 15,16,21,22,27,28	22, 26	550	200	60	10	40	10% Skyline, 90% Tractor Selection and overstory removal
Claw	T20S,R27E, S14,15,21,22,23,24, 25,26,27,28,35,36 T20S,R28E, S29,30,31,32	22, 26	300	700	50	15	30	20% Skyline, 80% Tractor Selection and overstory removal
Roadside	T21S,R24E, S11,12,13,14,15,22,23, 24,25,26,27,34,35,36 T21S,R25E, S7,18,19,29,30,31,32 T22S,R24E S11	20, 22	90	800	40	00	20	Tractor Selection and overstory removal
Dead Bull	T21S,R27E, S25,26,27,33,34,35,36 T21S,R28E, S31 T22S,R28E, S6 T22S,R27E, S1,2,3	20, 22	00	1000	30	00	00	Tractor Selection cutting
TOTAL			1540	5900	340	65	200	

APPENDIX A10-3

SUMMARY SCHEDULE OF TIMBER SALES

First Five Years

Project Name	Cost (M$/Yr)	Outputs/Yr
Timber Sale Program	2,266	19 5 MMCF
Program Management	452	19 5 MMCF
Firewood Program	48	6 M Cords
I & DC	46	Fixed Rate
Tree Improvement	414	Fixed Rate
Reforestation	1,200	2,000 Ac
Stand Improvement	974	5,800 Ac

Second Five Years

Project Name	Cost (M$/Yr)	Outputs/Yr
Timber Sale Program	2,150	18 5 MMCF
Program Management	428	18 5 MMCF
Firewood Program	48	6 M Cords
I & DC	46	Fixed Rate
Tree Improvement	350	Fixed Rate
Reforestation	1,788	2,980 Ac
Stand Improvement	907	5,400 Ac

APPENDIX A11

SCHEDULE OF ROAD CONSTRUCTION/RECONSTRUCTION

First Five Years

District	Project Name	Number	Cost($M)	Preconstruction Cost ($M)	Output (Miles)
Snow Mountain	Delintment Lake	FDR41	144	12	4 0
Big Summit	Slumps	FDR22	180	15	0 7
Big Summit	Shoulders #1	FDR22/42	180	12	9 0
Paulina	Rager Access	FDR42/58	559	20	6 1
Big Summit	Shoulders #2	FDR22/42	504	18	14 0
Prineville	McKay Saddle	FDR27	180	15	0 3
Prineville	Little McKay	FDR27	900	40	5 2
Prineville	Surfacing #1	FDR33	180	12	6 3
Big Summit	Canyon Creek	FDR42	924	35	13 9
Paulina	Tie Through	FDR4260	180	15	5 0
Paulina	Paulina Butte	FDR42	960	35	9 4
Prineville	Benefield	FDR3350	120	10	0 2

Second Five Years

District	Project Name	Number	Cost ($M)	Preconstruction Cost ($M)	Output (Miles)
Prineville	North Slope	FDR2725/2730	168	12	15 0
Paulina	Six Corners	FDR4260/3810/12	139	9	11 5
Prineville	Surfacing #2	FDR33	132	8	5 0
Paulina	Turnpike	FDR5870/5840	96	8	8 0
Paulina	Black Mountain	FDR30/3010	210	12	15 1
Snow Mountain	Donnelly	FDR41	462	20	7 0
Snow Mountain	Button Flat	FDR4370/4155	360	15	4 3
Prineville	Rattlepop		240	20	6 5
Big Summit	Keaton		259	20	6 5
Snow Mountain	Emigrant	FDR43	540	20	8 5
Prineville	Loop	FDR33	264	10	2 2
Prineville	Rocky Butte	FDR3300-500	120	10	0.5

APPENDIX A12

SCHEDULE OF WATERSHED IMPROVEMENT PROJECTS - LISTED BY PRIORITY

First Decade

District	Watershed Name	Cost ($M)	Output (Miles)
Snow Mountain	Nicholl/Sawmill	192	20 5
Prineville	Bear Camp	64	11 9
Prineville	Trout Creek	Complete	
Paulina	John Day Tribs	16	1.8
Paulina	Rock Creek	12	5 4
Paulina	Badger Creek	3	1 5
Paulina	Keeton	-	-
Big Summit	Bridge Creek	3	1 5
Prineville	Bear Creek	21	.6
Paulina	Deep Creek	22	1 0
Paulina	Wolf Creek	Complete	
CRNG *	Deschutes R.	Complete	
Prineville	McKay Creek	64	1 9
Snow Mountain	Silver Creek	76	5 3
Prineville	Mill Creek	2	3
Big Summit	Howard/Porter	30	4 4
Big Summit	N F Crooked River	164	6 4
Snow Mountain	Emigrant Creek	208	11 2
CRNG *	Willow Creek	Complete	
Paulina	East Beaver Creek	98	4 9
Paulina	West Beaver Creek	10	2 2
Big Summit	Marks Creek	34	8 1
Big Summit	Ochoco Creek	40	5 7
Prineville	M F Crooked River	111	10 6
Big Summit	M F Crooked River	9	1 9
Snow Mountain	Dry/Stinger	-	-
Total		1,173 6	107 1

* CRNG - Crooked River National Grassland

APPENDIX A13

SCHEDULE OF WILDERNESS IMPROVEMENT ACTIVITIES
(Trail and trailhead projects are included in Appendix A8)

First Five Years

Project	Wilderness	Cost ($M)
Final Wilderness Plan	Black Canyon	120
Remove evidence of old fire camp	Black Canyon	15
Rehabilitate old firelines	Black Canyon, Bridge Creek	20
Rehabilitate old roads	Black Canyon, Bridge Creek	45
Wilderness Brochures	All	15
Install entrance signs and trailhead information boards	All	50
Remove caches and rehabilitat camp areas	All	50
Remove watertanks, nonfunctioning fences, tables, and other nonconforming structures	Mill Creek	35

Second Five Years

Project	Wilderness	Cost ($M)
Remove Owl Creek Cabin	Black Canyon	10
Remove unnecessary fences	All	50
Make trails more challenging and primitive	Mill Creek, Black Canyon	100
Develop fire implementation plans and projects	All	60

APPENDIX A14-1

SCHEDULE OF WILDLIFE IMPROVEMENT ACTIVITIES

First Five Years

Project Name	Cost ($M/Yr)	Outputs (Ac /Yr)
Prescribed Burning, Seeding, Planting, etc	100	500

Second Five Years

Same as First Five Years

APPENDIX A14-2

ENDANGERED, THREATENED, AND SENSITIVE SPECIES SURVEY

Activity	Acres (M/Yr)	No Allot /Yr	Cost (M$/Yr)
Survey			
Timber Sale Areas	17		23
Natural Fuels Reduction	5		7
Range Allotment Plan		5	5

APPENDIX A15

SCHEDULE OF FISH HABITAT IMPROVEMENT PROJECTS- LISTED BY PRIORITY

First Five Years

District	Project Name	Cost ($M)	Output (Miles)
Snow Mountain	Nicholl/Sawmill	41	12 3
Prineville	Bear Camp	53	10 2
Prineville	Trout Creek	Complete	
Paulina	John Day Tribs	55	10.0
Paulina	Rock Creek	18	5 4
Paulina	Badger Creek	22	3 0
Paulina	Keeton	-	-
Big Summit	Bridge Creek	-	-
Prineville	Bear Creek	113	8 4
Paulina	Deep Creek	130	22 2
Paulina	Wolf Creek	Complete	
CRNG *	Deschutes R	Complete	
Prineville	McKay Creek	94	14 6
Snow Mountain	Silver Creek	116	34 5
Prineville	Mill Creek	43	5 9
Big Summit	Howard/Porter	246	35 5
Big Summit	N F. Crooked River	11	1 0
Snow Mountain	Emigrant Creek	46	13 5
CRNG *	Willow Creek	Complete	
Paulina	East Beaver Creek	38	7.2
Paulina	West Beaver Creek	45	5.3
Big Summit	Marks Creek	71	7 1
Big Summit	Ochoco Creek	39	5 4
Prineville	M F Crooked River	68	14 0
Big Summit	M F Crooked River	29	5 5
Snow Mountain	Dry/Stinger	1	25
Total		1,279	221 3

* CRNG - Crooked River National Grassland

APPENDIX A16

VIEWSHED MANAGEMENT AND IMPLEMENTATION PLAN

(Schedule listed by completion priority in first decade)

Forest Roads 42/22 Loop (Potential Scenic Byway)
Forest Road 33 (Potential Scenic Byway)
Forest Road 41
Forest Road 58

Appendix B

Special Uses

Appendix C

Threatened, Endangered, and Sensitive Species

Appendix B

Special Uses

A variety of special uses are permitted on the Forest and Grassland, such as grazing, roads, electric and telephone lines, and water impoundments.

District	CATEGORIES									Total
	100	200	300	400	500	600	700	800	900	
D-1	2	4	0	2	0	0	0	5	3	16
D-2	0	0	0	0	0	0	0	3	3	6
D-3	0	6	0	0	0	2	1	4	7	20
D-4	1	1	0	0	0	0	1	1	2	6
D-5	1	6	0	21	0	1	16	85	16	146
Total	4	17	0	23	0	3	18	98	31	194

Category 100 = Recreation
200 = Agriculture
300 = Community
400 = Industry
500 = Public Information
600 = Research, Study, Training
700 = Transportation
800 = Utilities and Communications
900 = Water

The above numbers do not include 10 to 15 permits issued each year for short-term recreational events, or 30 to 40 permits issued each year for Forest Service contractors to camp on National Forest System land.

Appendix C

Threatened, Endangered, and Sensitive Species

		Federal	State	R-6	N.F.
Sensitive Birds					
Ferruginous Hawk	*Buteo regalis*	Cat. 2		OR	S
Swainson's Hawk	*Buteo swainsoni*	Cat 2	S	OR	D
N. Bald Eagle	*Haliaeetus leucocephalus*	T	T	*/OR	D
Western Sage Grouse	*Centrocerus urophasianus*	Cat. 2		*/OR	D
Greater Sandhill Crane	*Grus canadensis tabida*		S	*/OR	D
Western Snowy Plover	*Charadrius alexandrinus nivosus*	Cat. 2	T	*/OR	S
Long-billed Curlew	*Numenius americanus*	Cat. 2		*/OR	D
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*				
Sensitive Mammals					
Preble's Shrew	*Sorex preblei*	Cat. 2		OR	S
California Wolverine	*Gulo gulo luteus*	Cat. 2	T	*/OR	D
Sensitive Fish					
Redband Trout	*Salmo* spp	Taxonomic uncertainty			D
Malheur Mottled Sculpin	*Cottus bairdi* spp	Cat. 2		OR	D
Sensitive Plants					
Brandegee Onion	*Allium brandegei*		T	OR	S
Sierra Onion	*Allium companulatum*		T	OR	D
Swamp Onion	*Allium madidum*	3c	S	*	D
Prairie Sage	*Artemisia ludoviciana* spp *estesii*	Cat. 2	T	OR	S
John Day Milk-Vetch	*Astragalus diaphanus* var *diaphanus*	Cat 2	E	OR	S
John Day Milk-Vetch	*Astragalus diaphanus* var *diurnus*	Cat. 2	E	OR	S
Deschutes Milk-Vetch	*Astragalus tegetarioides*	Cat. 2	T	OR	S
Long Bearded Sego Lily	*Calochortus longebarbatus* var. *peckii*				D
Long Bearded Sego Lily	var. *longebarbatus*	Cat. 2	T	*/OR	S
Bristle-flowered Collomia	*Collomia macrocalyx*	Cat. 2	S	OR	D
not listed	*Lupinus cusickii*	Cat. 2	T	OR	S
Henderson Ricegrass	*Oryzopsis hendersonii*		T	*/OR	D
Scapose Silene	*Silene scaposa* var *scaposa*	Cat. 2	T	OR	S

Definitions

Federal 1985 Federal Register Notice of Review
- T = Threatened
- Category 2 = Needs additional information before proposing a federal listing
- Category 3c = Deleted species; taxon more abundant and widespread than previously thought.

State: Oregon State Status Regional Forester's
- E = Endangered
- T = Threatened
- S = Sensitive

R-6 Sensitive Species List
- OR = Sensitive in Oregon
- * = Potential candidate for Regional Forester's list

N F Ochoco National Forest
- D = Determined to be present
- S = Suspected to be present

Appendix D

Travel Plan

Appendix E

Spill Incident Response Plan

Appendix D

Travel Plan

Process

Various laws, regulations, and Executive Orders recognize on-road and off-road uses as legitimate activities on national grasslands and forests.

The Transportation Planning Handbook, FSH7709.55 contains procedural direction on access and travel management. The objective in the handbook states, "... identify and document recreational opportunities by integrating off-road travel management with on-road management, under the common framework of access management."

The direction under FSM 2355, which sets objectives for recreation, states, ". . . provide off-road vehicle recreation opportunities that are in concert with the environmental setting, minimize off-road vehicle effects on the land and resources, promote public safety, and control conflicts with other uses of the National Forest System lands."

The regulation 36 CFR 219.21(d), requires that we consider the impacts of proposed recreation activities on other uses and values and the impacts of other uses and activities associated with them on recreation opportunities, activities, and quality of experience. Off-road vehicle use is specifically addressed by 36 CFR 219.21(g):

> Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted.

Executive Order No. 11644, as amended by Executive Order 11989, directs that the designation of off-road vehicle areas shall be based upon minimizing damage to soils, watersheds, vegetation, and other resources, and minimizing conflicts with other uses. The travel map development, which consists of describing how users access the Ochoco National Forest and Crooked River National Grassland, is consistent with this direction. It includes all forms of travel, including on-road and off-road.

Traffic management (on-road) and off-road vehicle standard and guidelines for all management areas were determined through an integrated interdisciplinary team approach and are found in the prescriptions in Chapter 4 for the Forest and the Grassland Plans.

Implementation

The following is representive of the action items or activities which will be scheduled and completed through implementation of the Forest and Grassland Plans:

Enforcement

Orders will be issued by the Forest Supervisor in accordance with 36 CFR 261.50.A copy of the order imposing prohibitions will be placed in the offices of the Forest Supervisor and district rangers.

The closures and restrictions(controls) covered under Title 36 CFR 261, Subpart B are applicable and are supplemental to those in 36 CFR 261, Subpart A.

Traffic and Off-Road Management

Uniform travel management direction will be developed for road design standards, road maintenance plans, traffic control devices (to include signing), closure orders, and trail design standards.

Revise the Forest and the Grassland sign plans to bring them in line with the Plans.

From the appropriate management area direction

and standard and guidelines, apply appropriate entrance information that communicates to the Forest and Grassland visitor the current conditions and purpose intended by management.

Establish priorities by management areas to insure consistent and timely application of the travel access management decisions.

Establish travel management needs during each phase of the program development and budget (PD&B) process, identifying those needs and direction specific to the situation.

Explore the potential for using the Forest and Grassland development road system to provide off-road travel opportunities. Roads temporarily closed to vehicular traffic could be used to supplement off-road vehicle opportunities.

Education and Involvement

Endorse organization of various motorcycle clubs and off-road enthusiasts to help implement this plan. This coalition could help develop, monitor, and maintain existing and new trail systems, which could minimize Forest Service cost through the use of volunteer work and partnership projects.

Initiate a program to educate employees in the technical linkage between the Plans, transportation planning, resource objectives, and travel management.

Implement the monitoring program to keep management appraised of changing needs so that methods, techniques, facilities, and settings can be managed appropriately.

Revisions

The Forest and Grassland will move towards controlling off-road vehicle use in order to minimize impacts to resources and other user groups while not necessarily restricting off-road users. The use of closed road systems, and the designation of trails and destinations, will be encouraged for those management areas without existing off-road restrictions, such as General Forest and General Forage.

Additional off-road vehicle recreation opportunity proposals will be in accordance with management area direction and standards and guidelines. All projects and activities are subject to analysis under the National Environmental Policy Act (NEPA) process before they can be implemented.

The travel map will be updated annually or as necessary to reflect these changes as well other changing conditions or new information, such as changes to the traffic management of open on-road use under the Green Dot program. If these or other situations are identified as being outside the limits of acceptable variability, appropriate amendments or other changes may be made. The amendment process, as well as monitoring and evaluation, can be found in Chapter 5 of the Forest and Grassland Plans.

The successful implementation of new off-road vehicle trails, or other changes, will be dependent upon a policy that insures that these opportunities are met through an integrated, interdisciplinary, and public approach, and that they adhere to the requirements of the Forest and Grassland Plans.

Appendix E

Spill Incident Response Plan

The Forest Spill Incident Plan establishes reporting and response procedures to be followed in the event of an accidental spill of toxic, hazardous or otherwise dangerous materials, including petroleum products

Because of the serious health and water pollution potential of many of the materials used with our varied land management activities and transported across our land, spills will be given the same emergency priority as a forest fire.

The Plan relies on the expertise of the local, state and federal agencies, and private contractors for spill containment and cleanup The Forest Service's role in a spill incident is communication and coordination. The key Forest players in a spill response are Dispatch and the Forest spill coordinator. They may request others to assist them, depending on the nature of the spill.

Spill Response

Health and Safety

Of paramount importance is the health and safety of personnel at the spill site, and of downstream water users if supplies are contaminated

When approaching any spill site, the following precautions must be taken.

Approach from the up wind direction if possible,

Keep all unauthorized people away from the spill site,

Avoid inhaling fumes, smoke, vapors and dust even if no hazardous materials are involved, and

Do not assume that gases or vapors are harmless because of lack of smell.

Identify the spilled material from a distance as soon as possible. Until the material is identified, avoid all contact including breathing fumes.

Remember that the Spill Plan is written for professionals trained and equipped for emergency responses The people at the spill site are probably not such professionals, and should not be encouraged to exceed their abilities.

Priority should be given to notifying downstream water users, especially those with domestic, fish hatchery, and irrigation supplies.

Responsibility

The party responsible for the spill should be identified as soon as possible. This party is responsible for containment and cleanup of the spill and is liable for any damages that might occur. The party is also responsible for reporting spill incidents involving toxic, hazardous or otherwise dangerous materials to the appropriate state and federal agencies. The Forest Service will also notify local, state and federal agencies of such spills to ensure that the proper agencies are promptly notified.

Spill Containment

Upon evaluating a spill incident (identification of the material, health and safety problems, and quantity), action will be taken as soon as possible to contain the material at the immediate spill site. This

is especially important if there is a potential for contaminating nearby streams, lakes, or wetlands and downstream water supplies.

Exceptions to taking any immediate containment action would be when the spill material is extremely hazardous and is beyond the ability of the agency and local contractors to handle or it cannot be adequately identified.

Spill Cleanup

All spills involving toxic or hazardous materials or other substances which could contaminate nearby streams, lakes, wetlands or downstream water supplies will be cleaned up as soon as possible.

Spills involving toxic or hazardous materials should be evaluated for having the cleanup and disposal work performed by companies that specialize in this type of work.

Responsibilities of Forest Personnel

Reporting Person

Avoid contact with spilled material.

Call Dispatch for help

Identify yourself, tell how you can be contacted, location of spill, identity & quantity of spilled material

Isolate the spill area.

Wait for additional instructions.

Dispatch

Obtain information from Reporter to fill out Spill Incident Report (See Figure E-1).

Notify Forest Spill Coordinator or the Forest Alternate Spill Coordinator.

If no one can be reached in 1 & 2 above, call OARS and follow their instructions (see Notification List).

Forest Spill Coordinator

Notify and coordinate with the appropriate local, state and federal agencies for spill scene security, containment, and cleanup.

Assure the health and safety of Forest personnel and the Public.

Inform the Forest Supervisor, District Ranger and appropriate Forest staff of spill incident status.

Notify downstream water users of spills if there is a potential for contamination of domestic, or irrigation water supplies.

Prepare initial and final spill response reports for each incident.

Notify the Regional Office of spill.

Provide Forest leadership in Spill Response planning.

Table E-1

Spill Incident Notification List

Agency	Telephone No.	Remarks
Forest Hazardous Substances Coordinator		
Work	447-9513	Call immediately.
Home	447-1882	
Oregon Accident Response System (OARS)	1-800-452-0311	Call immediately.
National Response Center	1-800-424-8802	Call immediately.
Sheriffs - Emergency Management Coordinators		Call Immediately.
Crook	911, 447-4168	
Deschutes	911, 388-0107	
Gilliam	384-2851	
Grant	575-1131	
Harney	911, 573-6156	
Hood River	386-2098	
Jefferson	475-2201	
Klamath	883-7111	
Lake	947-3308	
Sherman	565-3622	
Wasco	(509) 575-4080	
Wheeler	763-4101	
Oregon State Police	911, 1-800-452-6824	
Oregon Dept. of Environmental Quality	388-6146	
Environmental Protection Agency	(206) 442-1263	Notify for spills of inland waters.
Oregon Department of Fish & Wildlife	(206) 696-6211	Notify for spills which could contaminate surface waters
FS RO Hazardous Spill Coordinator (B Pinto)	(503) 221-2931 (FTS) 423-2931	
BLM OSO Hazmat Coordinator	(503) 231-6977,2253	

Figure E-1
Hazardous Spill Report Form

Hazardous Substances
Initial Field Report

1. Type/Description of Incident: _____

_____

2. Date of Sighting: _____

   Time: _____

3. Location(Describe - road #, name etc): _____

   Township: _____

   Range: _____

   Section: _____

   Subsection: _____

4. Hazardous Material or Substance: _____

   Label(placard): _____

   Unknown: _____

   Name: _____

   Waste No. or I.D. No.: _____

   Manufacturer: _____

   Transporter: _____

5. Name and Address of Responsible Party: _____

_____

6. Site Secured: [Yes] [No] Describe: _____

_____

7. Environmental Conditions: _____

   Terrain: _____

   Weather: _____

   Water Resources: _____

   Soil: _____

   Vegetation: _____

Appendix F

Water Quality

Appendix G

Timber Resources

Appendix F

Water Quality

Memorandum of Understanding between the U.S. Department of Agriculture, Forest Service and the Oregon Department of Environmental Quality

December 1, 1978

This document can be found at the Ochoco National Forest Supervisor's Office, in Forest Service Manual 1561.5 - Water Department (Irrigation and Flood Control). Exhibit 1.

The Memorandum of Understanding between the Oregon Department of Environmental Quality (DEQ) and the U.S. Department of Agriculture, Forest Service (USFS), delineates the responsibilities and activities to be performed by each agency pursuant to the implementation of the Oregon Statewide Water Quality Management Plan on lands administered by the USFS.

The Statewide Water Quality Management Plan has been developed to meet the requirements of state law, federal law, the Federal Water Pollution Control Act, and the Clean Water Act.

The DEQ's overriding purpose is to control pollution. The Forest Service's job is to manage public national forest lands. Under the memorandum of understanding, USFS and DEQ mutually agree to specified provisions in order to prevent duplication of effort and provide the coordination necessary to meet the implementation requirements of the Clean Water Act.

Specified provisions cover a range of areas, including: agency roles; implementation, coordination, and administration of the memorandum; and designations of control.

APPENDIX G
TIMBER RESOURCES

TABLE G-1
LAND TENTATIVELY SUITABLE FOR TIMBER PRODUCTION

Criterion	Classification	Acres
FORESTED AND NONFORESTED LANDS		
Total Forest Land	Net National Forest System Acres	844,640
Nonforested	Nonforested Land	272,080
At least 10 percent occupied by forest trees or formerly having tree cover	Total Forested Land	572,560
UNSUITABLE FORESTED LANDS		
Legislatively or Administratively Withdrawn	Wilderness	26,520
	Research Natural Areas	1,730
Capable of producing crops of industrial wood	Nonindustrial	0
Irreversible damage likely to occur	Irreversible Damage	0
Restock in 5 years	Cannot be restocked in 5 years	11,130
Adequate response information available	Adequate response information not available	0
	Total Unsuitable	39,380
SUITABLE FORESTED LAND		
Suitable for timber production	Tentatively Suitable Land	1/ 533,180
Commercial Forest land under 1980 TM plan		545,098

1/ Reduction from the 1980 TM plan due primarily to land classified as not suited because of regeneration difficulty and the Oregon Wilderness Bill of 1984

TABLE G-2
DISTRIBUTION OF TENTATIVELY SUITABLE LAND

Distribution Adjustments	Acres
Total Tentatively Suitable Forest Land	533,177
Adjustments to specific allocations by cause	
Roadless	19,530
Old Growth	18,670
Proposed Research Natural Area	1,330
Subtotal (subtracted from Total)	39,530
Land Suitable for Timber Production	493,650

TABLE G-3
DISTRIBUTION OF FORESTED LAND

	Acres	Percent
Withdrawn	28,250	5
Cannot be restocked in 5 years	11,130	2
Area allocated to other uses 1/	39,530	7
Area suitable for timber production:		
Big Game Emphasis	27,400	5
Riparian	11,510	2
Recreation and other unique Management areas	42,530	7
General Forest	412,210	72
Subtotal	493,650	86
Total Forested Land	572,560	100

1/ This includes a portion of Lookout Mountain that has no scheduled timber harvesting, but may have some harvesting in future decades

TABLE G-4
TIMBER PRODUCTIVITY CLASSIFICATION
(M Acres)

	Suitable Lands	Unsuitable Lands		
Potential Growth (Cubic Feet/Acre/Yr)		Regen Difficulty	Other 1/	Total
Less than 20	12 7	8 6	1 9	10 5
20-49	317 9	1 5	20 3	21 8
50-84	113 7	1 0	32 0	33 0
85-119	37.8	0	10 4	10 4
120-164	11 5	0	3 2	3 2
TOTAL	493 6	11 1	67 8	78 9

Less than 20 cu ft. lands were mapped as low site pine
20-49 class is essentially the ponderosa pine type
50 and higher are mixed conifer types with acres in each class in proportion to plot productivity from Forest Inventory

1/ Other includes Research Natural Areas, Semiprimitive Nonmotorized, Wilderness, Old Growth, and lands dedicated to other uses such as administrative sites

TABLE G-5
FOREST GROWTH AND MORTALITY

Comparison With Previous Plan

	Previous Plan Acres		Forest Plan Acres		Percent Change
	BF	CF	BF	CF	CF
Mature - Ponderosa Pine					
Gross growth per acre	N/A	N/A	152	26 6	
Mortality per acre	N/A	N/A	17	3 0	
Net Growth per acre	N/A	N/A	135	23.6	
Salvageable dead per acre	N/A	N/A	607	125	
Two Story - Ponderosa Pine					
Gross growth per acre	N/A	N/A	123	23 3	
Mortality per acre	N/A	N/A	14	2 5	
Net Growth per acre	N/A	N/A	109	20 8	
Salvageable dead per acre	N/A	N/A	596	109	
Immature - Ponderosa Pine					
Gross growth per acre	N/A	N/A	156	23 3	
Mortality per acre	N/A	N/A	4	0 8	
Net Growth per acre	N/A	N/A	152	22 5	
Salvageable dead per acre	N/A	N/A	81	64	
Low Site - Pine					
Gross growth per acre	N/A	N/A	84	16 3	
Mortality per acre	N/A	N/A	5	0 9	
Net Growth per acre	N/A	N/A	79	15 4	
Salvageable dead per acre	N/A	N/A	197	40	
Mature - Mixed Conifer					
Gross growth per acre	N/A	N/A	255	43 8	
Mortality per acre	N/A	N/A	81	14 9	
Net Growth per acre	N/A	N/A	174	28 9	
Salvageable dead per acre	N/A	N/A	1383	324	
Two Story - Mixed Conifer					
Gross growth per acre	N/A	N/A	243	44 4	
Mortality per acre	N/A	N/A	52	9 2	
Net Growth per acre	N/A	N/A	191	35 2	
Salvageable dead per acre	N/A	N/A	1606	319	
Immature - Mixed Conifer					
Gross growth per acre	N/A	N/A	187	36 9	
Mortality per acre	N/A	N/A	5	1 4	
Net Growth per acre	N/A	N/A	182	35 5	
Salvageable dead per acre	N/A	N/A	489	87	
Average for Forest					
Gross growth per acre	169	32A	170	30 8	-4
Mortality per acre	42	7	32	5 8	-17
Net Growth per acre	127	25	138	25 0	0
Salvageable dead per acre	125	22	870	179	
TOTAL ANNUAL NET GROWTH	MMBF 73 1	MMCF 14 5	MMBF 79 71	MMCF 4 6	+1

BF - Board Feet, CF - Cubic Feet
MMBF - Million Board Feet, MMCF - Million Cubic Feet

TABLE G-6
TIMBER ACRES BY SIZE CLASS

Timber Size Class	Previous Plan 1/	Forest Plan Acres 2/	Percent Change (%)
Mature	482,995	201,914	-58
Two-Story	64,770	273,214	+322
Immature/poles	17,504	33,124	+89
Seed/Sapling	12,582	64,305	+411
TOTAL ACRES	577,851	572,557	-1

1/ Based on 1973 Inventory.
2/ Based on 1982 Inventory updated to end of FY 1984

NOTE: Much of the increase in two-story stands is due to a change in typing to reflect the ability to manage understories from multi-age stands.

TABLE G-7
TIMBER VOLUME BY SPECIES

Timber Species	MMBF	MMCF	MMBF 1/	MMCF 1/	Percent Change-MMCF
Ponderosa pine	5755	896	4426	733	-18
Douglas-fir	808	172	825	147	-15
White fir	800	168	1154	204	+21
Lodgepole pine	56	24	21	4	-83*
Western larch	177	36	168	29	-19
Subalpine fir	10	3	8	2	-33*
Engleman spruce	23	6	46	8	+33*
Hardwoods	3	1	1	0 3	-70*
TOTAL	7632	1306	6649	1127	-14

1/ Based on 1982 Inventory Summary Net volumes 9" min DBH and 6" top adjusted to 1984

* Difference may be due to sampling error as the sample for these species is very small and sampling error high

TABLE G-8
ALLOWABLE SALE QUANTITY AND TIMBER SALE PROGRAM QUANTITY
(Annual Average For First Decade)

Harvest Method	ASQ 1/ MMCF	Nonchargeable 2/ MMCF
Regeneration Harvest·		
Clearcut	3 1	
Shelterwood and seed tree		
Seed cut	4 1	
Overstory removal	5.9	
Selection	5 2	
Intermediate harvest		
Commercial thinning	.7	
Salvage/sanitation		8
Miscellaneous products		1 1
Totals	19 0	1 9

Allowable Sale Quantity 1/	19 0 MMCF	115 MMBF 3/
Timber Sale Program Quantity	20 9 MMCF	122 MMBF 3/
Long-Term Sustained Yield Capacity	19 0	

NOTE. Allowable Sale Quantity and the Long-Term Sustained Yield Capacity stay at 19 0 for all 15 decades of the planning horizon

1/ Only includes chargeable volume from suitable lands
2/ Only includes nonchargeable volumes from suitable and/or unsuitable lands
3/ Based on Scribner Log Scale

TABLE G-9
VEGETATIVE MANAGEMENT PRACTICES
(Average Annual in First Decade from Suitable Lands)

Practice	M Acres 1/
Regeneration harvest	
Clearcut	8 7
Shelterwood and seedtree	
Seed cut	21 1
Overstory removal	53 1
Selection	62 2
Intermediate harvest	
Commercial thinning	12 5
Salvage/sanitation	Unestimated
Timber stand improvement 2/	53 0
Reforestation 3/	29 8

1/ Estimated acres (thousands) based on FORPLAN and adjusted as per documentation on 2-3 89
2/ Estimated acres that will be treated
3/ Includes natural and artificial reforestation on areas with clearcutting, shelterwood cut, or seedtree cut. But no estimate was made for reforestation acres in selection cut

Appendix H

Wilderness Plans

Appendix I

Management of Wild Horses

Appendix H

Wilderness Plans

The Ochoco National Forest has three wildernesses classified under the Oregon Wilderness Act of 1984. They are: Black Canyon - 13,400 acres, Bridge Creek - 5,400 acres, and Mill Creek - 17,400 acres (see management area map, Alternative I, or Chapter 4 maps). Legal map boundaries for the wildernesses are on file at the Forest and District headquarters responsible for administration of the area. The purpose of the plans is to:

identify the unique characteristics of the wildernesses;

identify concerns and issues related to the wildernesses and their management;

establish management objectives;

guide the allocation of the wildernesses into different opportunity, wilderness resource spectrum, (WRS) classes, and

establish standards and guidelines and area-specific management direction.

Legislative and Regulatory Requirements

The management direction for wildernesses focuses on delivery and preservation of those wilderness-related benefits specified in the Wilderness Act of 1964, the National Forest Management Act of 1976, and in the Department of Agriculture and Forest Service policy guidelines. Selected excerpts from these laws and management guidelines follow.

A.Wilderness Act of 1964

(P.L. 88-577)

"...shall be administered for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character..."(Section 2a) "...wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use." (Section 4b)

B. Department of Agriculture Regulations
(36 CFR 293)

"...In carrying out such purposes, National Forest Wilderness resources shall be managed to promote, perpetuate, and, where necessary, restore the wilderness character of the land and its specific values of solitude, physical and mental challenges, scientific study, inspiration, and primitive recreation. To that end: (a) Natural ecological succession will be allowed to operate freely to the extent feasible. (b) Wilderness will be made available for human use to the optimum extent consistent with the maintenance of primitive conditions. (c) In resolving conflicts in resource use, wilderness values will be dominant to the extent not limited by the Wilderness Act, subsequent establishing legislation, or the regulations in this part." (36 CFR 293.2)

C. National Forest Management Act of 1976
(P.L. 94-588)

"In developing, maintaining, and revising plans for units of the National Forest System pursuant to this section, the Secretary shall assure that such plans -- (1) provide for multiple use and sustained yield of the products and services obtained therefrom... and, in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness;..." (Section 6e)

D. Department of Agriculture Regulations
(36 CFR 219)

"...Provide for limiting and distributing visitor use of specific portions in accord with periodic estimates of the maximum levels of use that allow natural processes to operate fully and that do not impair the values for which wilderness areas were created..." (219.18(a))

E. Forest Service Manual
Chapter 2320 (4/86)

The manager, then, must face the paradox of wilderness as described by Congress, as seen or felt by those whose values vary, and the uses and activities permitted and prohibited in those areas by the Wilderness Act. They must solve the problem of use of the area while still keeping these parts of the natural world intact. They must:

"...Manage the wilderness resource to ensure its character and values are dominant and enduring. Its management must be consistent over time and between areas to ensure its present and future availability and enjoyment as wilderness. Manage wilderness to ensure that human influence does not impede the free play of natural forces or interfere with natural successions in the ecosystems and to ensure that each wilderness offers outstanding opportunities for solitude or a primitive and unconfined type of recreation. Manage wilderness as one resource rather than a series of separate resources."

F.Forest Service Manual

Chapter 2320.2 - Objectives

"1. Maintain and perpetuate the ... resource of wilderness as one of the multiple uses of National Forest System land.

2. Maintain wilderness in such a manner that ecosystems are relatively unaffected by human manipulation and influences so that plants and animals develop and respond to natural forces.

3. Minimize the impact of those kinds of uses and activities generally prohibited by the Wilderness Act, but specifically excepted by the Act or subsequent legislation.

4. Protect and perpetuate wilderness character and public values including, but not limited to, opportunities for scientific study, education, solitude, physical and mental challenge and stimulation, inspiration, and primitive recreation experiences.

5. Gather information and carry out research in a manner compatible with preserving the wilderness environment to increase understanding of wilderness ecology, wilderness uses, management opportunities, and visitor behavior."

G.Forest Service Manual

Chapter 2320.3 - Policy

"1. Where there are alternatives among management decisions, wilderness values shall dominate over all other considerations except where limited by the Wilderness Act, subsequent legislation, or regulations.

2. Manage the use of other resources in wilderness in a manner compatible with wilderness resource management objectives.

3. In wilderness where the establishing legislation permits resource uses and activities that are nonconforming exceptions to the definition of wilderness as described in the Wilderness Act, manage these nonconforming uses and activities in such a manner as to minimize their effect on the wilderness resource.

4. Cease uses and activities and remove existing structures not essential to the administration, protection, or management of wilderness for wilderness purposes or not provided for in the establishing legislation.

5. Because wilderness does not exist as a vacuum, consider activities on both sides of wilderness boundaries during planning and articulate management goals and the blending of diverse resources in forest plans ..Use the Recreation Opportunity Spectrum (ROS) (FSM 2310) as a tool to plan adjacent land management.

6 Manage each wilderness as a total unit and coordinate management direction when they cross other administrative boundaries.

7. Use interdisciplinary skills in planning for wilderness use and administration.

8. Gather necessary information and carry out research programs in a manner that is compatible with the preservation of the wilderness environment.

9. Whenever and wherever possible, acquire non-Federal lands located within wildernesses, as well as non-Federal lands within those areas recommended for inclusion in the system.

10. Inform wilderness visitors that they face inherent risks of adverse weather conditions, isolation, physical hazards, and lack of rapid communications, and that search and rescue may not be as rapid as expected in an urban setting, in publications and personal contacts."

Wilderness Fire Management Policy

Due to the importance of fire as a natural force in shaping local ecosystems, the Forest Service Manual direction on management of fire in these wildernesses is important to consider. The following are excerpts from the pertinent sections.

Forest Service Manual

Chapter 2324.2 - Management of Fire

2324.21 - Objectives

"1. Permit lightning caused fires to play, as nearly as possible, their natural ecological role within wilderness.

2. Reduce, to an acceptable level, the risks and consequences of wildfire within wilderness or escaping from wilderness."

2324.22 - Policy

Summarized: Natural ignitions may be allowed to burn under prescribed conditions or human ignition prescribed fire may be used when unacceptable risks exist to life and property within wilderness or to life, property, and resources outside of wilderness from use of natural ignition prescribed fire.

Until such time as management plans for prescribed fire use can be developed and approved for each wilderness, all ignitions will be considered wildfire and will continue to be suppressed using appropriate suppression strategies.

Land and Resources Management Plan Direction

Standards and guidelines for wilderness management are contained in FSM 2322.03 -- 6-25, R-6 Supp.81. The desired condition, and standards and guidelines specific to the Ochoco National Forest's wilderness are given in Chapter 4 of the Forest Plan The schedules and monitoring (Appendix A-13) are also part of the wilderness plans.

Black Canyon Wilderness

(MA-F1)

Description

Black Canyon Wilderness contains approximately 13,400 acres. Black Canyon Creek drains into the South Fork of the John Day River and falls from 6,000 feet to 2,800 feet in elevation. The Wilderness is characterized by steep sideslopes and numerous north-south ridges with rolling to flat benches on the edges. Wolf Mountain and Dry Corner are on the south side. Bearskull Mountain is on the north side.

The north facing slopes are covered with mixed conifers; the south facing slopes are predominantly ponderosa pine and juniper. Other tree species include, white-fir, Douglas-fir, western larch, lodgepole pine, alder and aspen. The mixed conifer forest type accounts for approximately half of the total forest acreage in the Wilderness

Approximately fifty to sixty percent of the total timbered land within the Wilderness boundaries is considered to be in old growth condition.

The water produced by the watershed is used by livestock, wildlife, anadromous fish, and irrigation from the John Day River. Riparian condition class is provided in the Forest Plan, Section 3.

Management Situation

Access

Black Canyon was managed as a roadless area prior to wilderness classification. There are no improved roads in the wilderness area; there is a jeep trail that commences from the south side of Humphrey's camp on Forest Road 3800 in the SW 1/4, NW 1/4, of Section 16, T.14 S., R.25 E., and ends at Owl Creek. The upper end of the road has been closed but needs further work to be obliterated. There are approximately ten roads that dead end at the Wilderness, which have been closed at the boundary.

Cultural Resources

A cultural resource survey has been conducted in the Wilderness in the burned area east of the South Prong Canyon to the South Fork of the John Day River. There are some recorded pictographs in Black Canyon that will need protection if their location becomes well known. There have been no cultural surveys conducted in Black Canyon west of South Prong Canyon (there are no known sites in the area).

The only known structure in the Wilderness is a partially constructed log cabin on Owl Creek. Management direction is to eliminate this structure.

Fire

Black Canyon averages two to four fires a year with one large fire (500 acres or greater) every 10 years under current situations. Major fires in the Wilderness will be prone to escape the boundaries. There are heavy fuels in the west end and light flashy fuels in the east half. The steep ground is unsafe for firefighters.

There are remnants of a fire camp and firelines left from the Young's Butte Fire in the late 70's.

Forage

Permitted livestock use is outlined in Table 1.

Table 1

Allotment	Permittee	Permitted Numbers	Season	Animal Months
Dry Corner	C. Leland Hall	100 Cattle	5/15-8/15	300
Bearskull/ Cottonwood	Bob and Virginia Humphreys	50 Cattle 900 Sheep	7/1-9/30	150
Wind Creek	Ronald and Rosalee Palmer	175 Cattle	6/15-9/25	595
Wind Creek	Sheep Mountain Cattle Company	200 Cattle	6/15-9/25	680

The majority of Black Canyon Wilderness is within the Bearskull-Cottonwood Allotment, but the Wilderness also overlaps into the north end of Wind Creek and Dry Corner Allotments. Very little of the Wilderness is actually grazed by livestock because of the steep terrain and heavy timber. Sheep from the Bearskull-Cottonwood Allotment make some use of the fringes of the north and west sides of the Wilderness, but are not taken down into the canyon. Cattle from the Dry Corner Allotment use the area around Lost Indian Reservoir on the fringe of the Wilderness, and cattle from the Wind Creek Allotment similarly use the area around South Prong Reservoir, Crow Bar Spring, and South Prong Troughs. There are parts of the boundary that are fenced on the north ends of the Wind Creek and Dry Corner Allotments.

Historically, the canyon bottom has received some unauthorized use, primarily from cattle coming up the creek from the South Fork and off of private land from the Sunstrum place. Since the fence between the Sunstrum Place and Black Canyon Creek has been rebuilt, that access to unauthorized cattle has been fairly well eliminated. A drift fence on the lower end of the canyon will keep cattle from coming up the canyon from the South Fork if the gate is kept closed.

Forest Health

Insects and Disease - Western spruce budworm populations have been building for years, and are epidemic in some areas of the Wilderness, where damage from defoliation is extensive. The outbreak is primarily concentrated in the mixed conifer timber types; stands containing a heavy component of fir are most susceptible. The absence of fire in these types of stands has encouraged a dramatic increase in the amount of fir in the forest understory, which has prompted the outbreak and extended the natural cycle of the spruce budworm.

Other damaging agents include mountain pine beetle, western pine beetle, Douglas-fir tussock moth, fir engraver beetles, stem decays, dwarf mistletoes, and root rots.

Minerals

No known mining activities or mineral deposits exist.

There are no known gas or oil leases.

Recreation and Wilderness Use

Visitor use is undocumented.

There are two dispersed recreation sites at Big Ford; Kelsey Springs and Owl Creek each have one site. Mud Springs, a semi-developed campground, is on the south rim outside the Wilderness where the trailhead of the South Prong trail is located. There is a dispersed recreation site at Dusty Well, where the Black Canyon trailhead is located. There are three or four sites at Humphrey Camp.

Hunting is the major use of the wilderness; big game hunting is considered to have a short-term impact each year in Black Canyon Wilderness. Other uses are fishing in Black Canyon Creek in the spring and summer, and hiking and trail riding in the spring, summer and fall. There has been no interest in outfitter/guide services, but hunter camps do exist along the boundary.

Trails - The Black Canyon Wilderness has four designated trails in the area. The following is a list of trails, the trail numbers, and the maintenance levels:

Table 2

		Miles	Maintenance Level
820	Black Canyon Trail	11.6	2
820A	Boeing Field Trail	0.5	2
820D	Payten Trail	1.4	1
821	South Prong Trail	5.4	2
Total Miles		18.9	

Trailheads and Signing - There are no trailhead developments. There are some metal trail mileage markers and some wooden trail signs.

Wilderness Boundary - The wilderness area boundary has been partially located and posted on the ground. Most of Black Canyon Wilderness is bounded by the Ochoco National Forest except for the east end. Steuber's Black Canyon Ranch borders the wilderness area for 2.75 miles, and BLM land borders the wilderness for 2 75 miles.

Specific Management Direction

Facilities - Eliminate nonconforming uses, hunter caches, and the cabin at Owl Creek.

Forage - Manage livestock grazing allotments according to their existing plans. Update allotment plans to reflect wilderness resource requirements. Maintain fences and developments according to wilderness and allotment management plans. Investigate and take action to prevent livestock trespass. Consider Mud Springs for development as a Horse Camp. In allotment planning, figure recreational stock forage needs as well as permitted livestock.

Recreation - Complete a wilderness resource spectrum (WRS) survey and inventory information on visitor use, using code-a-site methods.

Develop a "Limits of Acceptable Change" plan to serve as a monitoring guide for management of the wilderness.

Soil - Develop a plan to rehabilitate firelines and remove debris from Young's Butte Fire Camp.

Water - Have a fisheries biologist and/or Forest hydrologist inventory Black Canyon Creek to acquire baseline data and collect water baseline data.

Bridge Creek Wilderness

(MA-F2)

Description

The 5,400-acre Bridge Creek Wilderness is located in the Ochoco Mountains in Wheeler County, central Oregon.

The topography of the Wilderness is characterized by a steep dissected drainage along Bridge Creek, with rolling open meadows on the side slopes. Two high peaks, East Point and North Point, reach elevations of 6,625 feet and 6,607 feet respectively. The lowest point along the northern edge of Bridge Creek is 4,000 feet in elevation. Rolling high mountain meadows characterize the south por-

tion of the area, while dense, suppressed white fir and lodgepole pine thickets, aging 70-90 years old, characterize most of the center core of the Wilderness. The far northern section also contains old growth ponderosa pine and Douglas-fir stands. There are small pockets of mountain mahogany, alder, and juniper.

Bridge Creek and Maxwell Creek are within the Wilderness. There are also five springs: Thompson, Pisgah, Masterson, Nelson, and Maxwell springs. Maxwell Reservoir is a small, three-acre lake sometimes used for irrigation.

Management Situation

Wilderness Resource Spectrum

Although the Wilderness is small, it can be managed in two Wilderness Resource Spectrum (WRS) classes. Map A outlines the two areas, one of which will be managed to meet primitive wilderness guidelines, and the other will be managed as semiprimitive. The primitive area encompasses the core of the Wilderness and consists of 3,000 acres. The surrounding area will be managed as semiprimitive, and encompasses the areas where man's influence is evident and can not be mitigated due to pre-existing special uses such as the flume and irrigation ditch. In the semiprimitive area, outside management activities will have some influence visually and experience-wise for the wilderness visitor. This area is 2,400 acres.

Access

Primary access routes to the Wilderness are Forest Roads 2630, 2630-450, and 2360-750. These roads are maintained at a low level. An old road leads from Forest Road 2360 up to the Old Tree Lookout on North Point; although the road is blocked, it is very evident. The center is revegetating naturally but the two ruts are compacted and very visible.

There are a series of fire roads along the ridge on North Point which are evident. A logging road owned by Prineville Sawmill was built into the Wilderness in the NW 1/4 of Section 1, T.13 S., R.12 E., and has since been closed and obliterated. An old jeep trail and road enter the Wilderness on the north boundary from the 450 spur; although they are blocked, they are evident. Other roads are planned for adjacent timber sales which adjoin the Wilderness boundary.

There is private land on the north boundary of the Wilderness.

Biological Diversity

Vegetation occurs in three basic zones: 1) There are riparian zones along Bridge Creek and Maxwell Creek characterized by aspen stands interspersed with meadows dominated by grasses and forbs. 2) The north slopes of the Bridge Creek drainage are characterized by open mountain meadows with mountain mahogany and a profusion of wildflowers. 3) The remainder of the Wilderness (65 percent) is white fir and lodgepole pine stands. The stands are stagnant and dense with little floor cover or grasses. Areas of compaction may exist from cattle

trails. Recreational use has not appeared to effect any vegetation. No known threatened or endangered plants have been located in the area, however, a survey has not been undertaken.

Cultural Resources

Although the central portions of the Wilderness have not been formally surveyed for cultural resources, the northern and southern perimeters have. In Northside # 2 (Johnson, 1980) and Northpole (Bedortha, 1982) timber sale areas, both Euro-American (historic) and Native American (prehistoric) sites were found.

Mitchell Water Development (Gowan, 1985) failed to turn up notes, but resulted in a more intensive look at one of the prehistoric sites recorded by Johnson in 1980.

Historic activity in the Wilderness began in the late 1800's and centered around the water resources of Bridge Creek. Three historic sites are associated with this activity. Both Maxwell reservoir and Maxwell ditch (EA 68) were constructed by Maxwell in 1894. The water was used for irrigation on his private land holdings north of the Forest boundary. Prior to 1917, the Cole family (descendants of Maxwell) built a wagon road (EA 66) to Maxwell reservoir to gain access to the irrigation system and, presumably, to drive sheep and later cattle into the area for summer grazing. Around the turn of the century, the Forest Service began to develop the area to administer and protect resources in the area. The rest of the documented historic sites in the Wilderness are reflective of this new activity. First, the Summit Trail was built, between 1907 and 1909, to provide a travel system for Forest Rangers, stockmen, and their herds of sheep or cattle. This trail provided the main thoroughfare through the Forest and set up the first lines of communication. It runs along the southern boundary of the Wilderness and roughly corresponds to Forest Road 2630. It has been thoroughly documented by A. Gowan (1986), and has been determined eligible for nomination to the National Register of Historic Places. A trail from Pisgah Lookout to Bridge Creek, is one of the ancillary trails that tied into the Summit Trail. A series of guard stations to house the rangers and fire lookouts was established along the Summit Trail after its construction Pisgah Guard Station (no longer standing) and North Point Lookout Tree are examples of these activities. These were linked together by magnetic phone lines around 1910 and provided much quicker communication throughout the Forest. The phone lines generally followed the transportation routes and are present in the Wilderness; the line from North Point Lookout Tree to Pisgah Guard Station is an example. Additional possible historic developments dating to this period are log troughs, slat logs, fence lines and stock driveways.

Three prehistoric sites are located within or near the Wilderness area; Native American (NA) 123 and NA 124 are located just north of the Wilderness; NA 128 is located at the upper end of Bridge Creek. All of these sites are located on nearly level ground near water sources or wet meadows. All are lithic scatters and have stone tools and debris from tool manufacture. They indicate that hunting

for big game occurred in the Wilderness area. The projectile points found at these sites indicate that activity began 5000 years ago.

Facilities

There are presently no Forest Service facilities within the wilderness except range fencing and an old historic tree lookout.

Fire

Historically fire has played major role within the Wilderness. Old growth larch patches indicate fore scars. These scars show that fires occur in 100-400 year cycles, with larch ages ranging from 70-300 years old. Fire size ranges from small, 30-acre burns to 200-plus acres. It appears that fire suppression has not greatly affected much of the natural ecological cycle. Many of the timber stands are 70-100 years old, with dense thickets of lodgepole pine, white fir, and heavy fuel loading. Mt. Pisgah Lookout is located directly south of the Wilderness and is still used for fire detection purposes

Forage

Two grazing permits exist in the Wilderness. Approximately 440 acres of the Wilderness are within the Badger Allotment, of which a total of 290 acres are suitable for grazing. This allotment is located in the northwest corner of the Badger Creek pasture. The allotment is managed as eight pastures. Five of these pastures are managed on a deferred basis, and three of the pastures are in riparian areas. Of these three riparian pastures, two are managed on a two year rotation. Badger Creek pasture produces about 22 percent of the total production, or 450 animal unit months (AUM's). The pasture is utilized at alternate times of the year, for 40-60 days for approximately 220 head. The portion of the Wilderness within this pasture is small; the range condition is good.

The Elkhorn Allotment includes much of the Wilderness. Approximately 80 percent of the north pasture in this allotment is in the Wilderness. There are currently two permittees. Pat Clark is permitted to graze 50 yearlings for two months, and John Lillicrop is permitted 290 pair for 30-40 days. The allotment is under a deferred rotation grazing system; usually this pasture is utilized in the later part of the grazing season.

Forest Health

Insects and Disease - The pine bark beetle infestation is on the decline in the lodgepole pine (LP). Spruce budworm is currently infesting trees in the area. Stand exams conducted in 1979 found that about 60 percent of the white fir and lodgepole pine were infected. Recent aerial photos show that about 80 percent of the stand is affected.

Recreation and Wilderness Use

Accurate records of recreational use are not available. It is estimated that the area receives less than 100 recreation visitor days (RVD's) of use during the non-

hunting season. Hunters use the area during the day, and camp on the boundary, contributing approximately another estimated 600 RVD's of use, for a total use figure of about 700 RVD's per year. Horse use is minimal since travel through the area is difficult.

Carrying capacity estimates were made. The primitive WRS class may handle 0.6 RVD/Ac/Yr and the semiprimitive class 0.75 RVD/Ac/Yr. However many of the areas in the Wilderness are not readily accessible due to dense forest stands, and they were not considered in the carrying capacity estimates.

Table 3 shows how the carrying capacity for each WRS zone was calculated. These calculations show that the Wilderness is not used to its estimated capacity.

Table 3 Carrying Capacity Estimates by WRS Zone for Bridge Creek Wilderness

WRS Zone	Acreage	Navigable Acreage	Capacity Factor(RVD/Ac/Yr)	Calculated Capacity
Primitive	3,000	60%	0.6	1,440 RVD's
Semiprimitive	2,400	80%	0.75	980 RVD's
Total Capacity				2,420 RVD's

Four fire rings have been found in the Wilderness near North Point; fire rings have not been found elsewhere.

Hunting use in the Bridge Creek area is heavy and will continue to increase yearly. On opening day of archery season in 1987 began with 18 people counted; now (1989) approximately 20-25 people will hunt within the wilderness daily during archery season. On opening day of deer hunting season there were over 50 people hunting the area, and about 20-25 people daily during elk hunting season.

Road access into the area is blocked by snow from about mid-November to mid-June each year. Snowmobilers have been seen using the meadows inside the Wilderness just off Forest Road 2630 by Bridge Creek.

Carrol Camp is a historic camping area used by the Ochoco National Forest since it was founded in 1907. The camp is located on the mid-southern boundary of the Wilderness. It has a spring with potable water, one vault toilet and level camping places for no more than two parties. There are many dispersed hunter camps located around the periphery of the area, used primarily during the three week span of elk and deer hunting seasons.

Trails - There are no maintained trails within the Wilderness. An old 3.5 mile trail runs along the west side of Bridge Creek from the south boundary to Maxwell Reservoir. It is unsigned, has not been maintained for many years, and is difficult to find and follow in many places. The old road from Mt. Pisgah to the Old Lookout Tree on North Point is unsigned, and is now used as a trail by many

hunters and some hikers. There is also an old jeep trail maintenance road on the northern boundary that is used as hiking access into the Wilderness. An easily followed unsigned trail/road goes along the irrigation ditch, flume and pipe along Maxwell Creek and Bridge Creek.

Trailheads - There are no maintained trailheads for Bridge Creek Wilderness. The major entry route is near the wilderness sign by Bridge Creek where it crosses Forest Road 2360.

Signing - Bridge Creek Wilderness is signed with two large wilderness signs, and there are boundary signs posted about every 200 feet.

Scenic Resources

The visual quality within the Wilderness area is in a near natural state. Alterations are minor and include some old cattle fences, and the flume and irrigation ditch. Views from North Point and East Point present a vast 360 degree view of middleground and background. Present intrusions in the middleground include a few clearcuts on the northeast side of the District, but there are several timber sales planned in the areas near the Wilderness in the 1990's. Many of these clearcuts will be visible in mid- to foreground views from East Point and North Point.

The Old Summit Trail follows Forest Road 2630 for a large portion of the south Wilderness boundary. A visual resource management plan for the road has been developed.

Water Resources

The Lillicrop family has existing water rights in the Wilderness. Their permit includes maintaining an irrigation ditch, a wooden flume, reservoir and access road. It is located in T.12 S., R.21 E., Sections 27 and 34. The ditch is one and one-half miles long, 18 inches wide and 10 inches deep. The originating point for the ditch is a rubble/log dam in Bridge Creek, NE 1/4 Section 3, T.13 S., R.21 E. The wooden flume is one-fourth mile long, 14 inches wide and eight inches deep. The reservoir holds three-acre feet of water and covers one acre of land. The unimproved road is three-fourths mile long and eight feet wide. The wooden flume and some of the pipe and road are not within the Wilderness boundaries. A portion of the dam and flume are within the Wilderness. A review of this permit in 1986, revealed resource damage due to poor maintenance of the flume and ditch, including sluffing of head walls and creek erosion. The review required these problems to be corrected.

The city of Mitchell uses three springs just north of the Wilderness boundary for its water supply. Although these springs are not within the Wilderness, the citizens are concerned with any action in the Bridge Creek Wilderness that may affect their water supply (i.e. quality or quantity of water from their springs).

Fisheries - Bridge Creek is a tributary of the North Fork of the John Day River. It is a Class I stream with anadromous (steelhead) and resident rainbow trout spawning and rearing within the area. The stream is presently in good shape and

relatively unaffected by man-induced impacts with the exception of past livestock grazing in the first one-half to one mile below Pisgah springs. In the areas of higher gradient below the wet meadow (one mile south of Pisgah springs) for approximately one-half mile, livestock grazing has significantly altered the site potential and reduced stream condition to poor. When the stream drops into a deep narrow V-shaped profile, cattle grazing impacts are less, and the creek is in generally good condition down to the Wilderness boundary.

Wildlife

The Wilderness provides habitat for old growth dependent species. The area has good structural diversity with multiple canopy layers and open meadows. Edge effect is very prominent in many areas and will be increased by logging around the periphery of the Wilderness. Cover and security will become increasingly important in the Wilderness as other areas of the Forest are modified. Snags are very prominent and provide habitat for cavity dependent species.

Specific Management Direction

Forage - Currently there is no allotment plan for Elkhorn Allotment; Badger Allotment does have a current plan, which will be revised to incorporate guidelines in Forest Service Manual (FSM) 2323.2. Grazing impact on stream quality of Bridge Creek and Maxwell Creek will be monitored. An allotment management plan for Elkhorn will be completed within this planning period and incorporate wilderness grazing guidelines.

Recreation - The old road to North Point Lookout may still serve as a trail, but it will not be signed or put on the wilderness map.

If monitoring shows that recreational use is increasing and cross-country travel routes are affecting meadows and other wilderness characteristics, a trail system will be planned for the area.

Add one large wilderness sign by the fence, at the end of the old East Point road at the base of East Point.

Improve wilderness boundary signs along the Maxwell Reservoir area.

Maintain Carrol Camp as a minimally developed recreation site.

Collect better use data by constructing a registration box or installing a sensor at the information board.

Create a wilderness information board at the junction of Forest Road 2630 and the 450 spur. This will include a map of the wilderness, to be used as an education place. The untrailed character of the area will be explained, as well as safety and cross-country travel tips for the user.

Scenic Resources - The visual management plan for the Old Summit Trail along Forest Road 2630 will address removal of hazard trees along the road corridor while continuing to maintain retention objectives in the long term. Removal of hazard trees and firewood may mean that retention objectives might not be met in the short term since the present condition of the stand is very poor.

Foreground and middleground views from North Point and East Point will be addressed in timber sale environmental assessments.

Transportation - The old Forest Service road that accesses North Point Lookout will be obliterated after consultation and approval from the State Historic Preservation Office (SHPO). Proper photos and other necessary documentation will be submitted.

Any roads built adjacent to the Wilderness boundary as a result of new timber sales will be closed off when use is completed. They should be blocked within no less than one mile of the Wilderness boundary.

All roads now within the Wilderness will be blocked and revegetated. Ruts will be tilled along all old firelines, fire roads, jeep trails and logging roads. The North Point Lookout road will be analyzed for historic significance; if it is found to be insignificant, it will be obliterated.

Forest Road 2630 from the junction of Forest Road 2630-450, and also Forest Road 2630-450 on the northern boundary, will be maintainted for high clearance vehicles.

Water - The flume and irrigation ditch present some erosion problems along Bridge Creek. Permittees maintenance of permit structures will continue to be monitored. If preventable resource deterioration occurs, permittees must improve the structures within the Wilderness; in some cases bank stabilization will be needed.

Stream surveys will be conducted to determine the condition of the stream channel. Recommendations made by the State of Oregon and ODFW will also be sought within the wilderness context.

LIMITS OF ACCEPTABLE CHANGE

The following monitoring plan implements the concept of Limits of Acceptable Change. It is designed to assess human-caused impacts on the wilderness resource, and sets parameters for management actions.

TABLE 4
Limits of Accepatable Change Monitoring Guidelines
for
Bridge Creek Wilderness

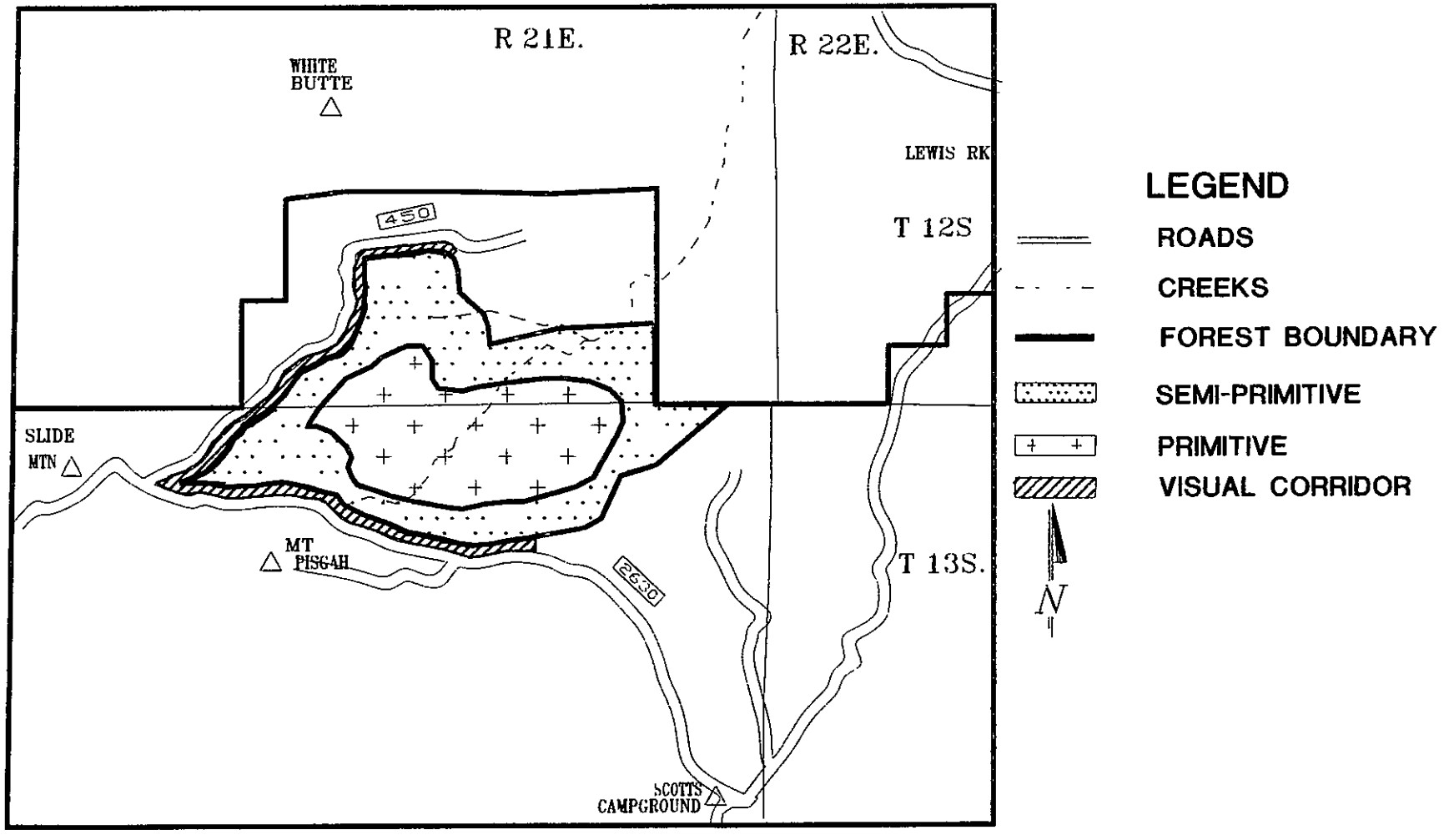
FACTOR	OPPORTUNITY CLASS	LAC INDICATOR	STANDARD	SAMPLING PROCEDURE
Air Quality	SP, P	visibility	views up to 150 miles of Mt Adams	visual inspection from North Point 3x/yr , photo benchmark
Range Condition	SP, P	% utilization of meadows & riparian areas		range condition analysis at beginning and end of grazing
Water Quality	SP, P	+/- 0 1% change in water PH	biologist to set baseline	sample Bridge Creek annually
Wildlife	SP, P	# hunting parties using wilderness	to be set by biologist	statistical counts hunting season
Campsite Solitude	SP	# camps per 500 acres	8 or less sites/500 acres, 2 or less in sight or sound of another	visual count on patrol / 3 times year
	P	# camps per 500 acres	4 or less sites/500 acres, 1 or less in sight or sound of another	visual count on patrol / 3 times year
Hiking Solitude	SP	# encounters while hiking	less than 10 per day	visual count on patrol / 3 times year
	P	# encounters while hiking	less than 7 per day	visual count on patrol / 3 times year
Party Size	SP	group size	max of 10 per group	visual count on patrol / 3 times year
	P	group size	max of 6-10 per group	visual count on patrol / 3 times year
Trail Condition	SP	evidence of trails	less than 8 mile/640 acres	visual observation of meadows, ridges and major travel routes
	P	evidence of human-made trails	none present	visual observation of meadows, ridges and major travel routes
Threatened and Endangered Species	SP, P	population trends	set by district wildlife biologist	monitored semi-annually
Recreation Use	SP	RVD's	use does not exceed 1440 RVD's	visitor registration and road counts
	P	RVD's	use does not exceed 980 RVD's	visitor registration and road counts

SP - Semiprimitive
P - Primitive

Figure H-1

BRIDGE CREEK WILDERNESS

WILDERNESS CATEGORIES



Mill Creek Wilderness

(MA-F3)

Description

Eighty-five percent of the Wilderness lies within the Mill Creek watershed, with the remainder in the Marks Creek watershed; both are tributaries of Ochoco Creek. Although generally southerly-oriented, all exposures are represented. Parts of Desolation Canyon and the west slope of Wildcat Ridge exceed 100 percent side slopes, with rock outcrops. Two-thirds of the area has slopes greater than 30 percent gradient. In sharp contrast, the meadows, prairies, and lodgepole pine thickets in the north end are nearly flat. Fifteen percent of the Wilderness is in openings, mostly barren ridge tops and some high-elevation meadows. The west half of the Wilderness is mostly high rolling hills. Elevations range from 3,725 feet at Wildcat Campground to 6,240 feet at the northeast corner of Viewpoint Lookout. The terrain varies from the rugged, rocky cliffs of Desolation Canyon to the flat meadows of Bingham Prairie. Spectacular rock outcrops are present at Twin Pillars and Whistler Point. Twin Pillars is a 200-foot tall lava tower, the remaining plug of an eroded volcano. A rhyolite ash deposit welded together to form the resistant tuff outcropping at Whistler Point.

There are 5.1 miles of Class I stream (East Fork Mill Creek); 3.9 miles of Class II streams (Belknap, Brogan, Buck, McGinnis, Reilly, Cornez, and Hamilton Creeks); 8.9 miles of Class III streams; and 10.2 miles of Class IV streams in the Wilderness.

The Wilderness has a variety of plant communities, including mixed conifer-pinegrass, white fir-twinflower, juniper-bunchgrass, ponderosa pine-wheatgrass, lodgepole pine-pinegrass, and meadow-shrub associations. Most of the forested area has a ponderosa pine overstory (greater than 200 years old) with a Douglas-fir and white fir understory (less than 100 years old).

Specimens of little grape fern (Botrychium simplex), a sensitive plant species, have been found in moist meadows within Bingham and Moccasin Prairies and Trail Meadow.

Management Situation

Access

The Wilderness is 15 miles northeast of Prineville. Access is provided by Forest Road 27 on the north and Forest Roads 33 and 3350-300 on the south. It is the most readily accessible wilderness on the Forest Road access is blocked by snow except at the southern access point from about mid-November to June. The northeast area can be accessible by skiing from an adjacent cross-country skiing trail system at Bandit Springs off Highway 26.

Cultural Resources

A cultural resource survey of the trail system has been completed and no cultural resources have been identified on the trails. Throughout portions of the Wilderness, clusters of obsidian and agate tools have been located. Subsurface sites have been found along the Mill Creek drainage, with a high probability that Native Americans camped in the area. Known historic features include early lookouts (Wildcat Mountain, Viewpoint, Whistler Point), sheep camps, and gold robber campsite.

Facilities

Nonconforming Structures - As a result of recent and past activities, many nonconforming structures still exist, including concrete water tanks, nonfunctioning fences, a shelter, obvious campsites with fire rings, rustic wooden tables, benches, bridges, and old vehicle trails.

Fire, Insects and Disease

Fuel loading varies from less than one ton per acre in meadows, to up to 45 tons per acre in decadent lodgepole pine stands. Old growth ponderosa pine stands with ground fuels and ladder fuels comprise a majority of the area. Fuel accumulation is increasing due to insect and disease and the exclusion of fire. Fire hazard is rising throughout the Wilderness, particularly in the lodgepole pine stands in the northern portions. Fire occurrence is every 15 to 30 years. The natural fires are primarily caused by lightning; one strike per year is usual.

Fire suppression has largely influenced the amount and distribution of insects and disease. Mountain pine beetle populations have just passed cycle peaks in the decadent lodgepole pine stands and are peaking in the ponderosa pine stands. Root-rot and spruce budworms are common in mixed-conifer stands, with the latter declining from peak populations. There is high likelihood of spread within the Wilderness and moderate potential for the spread of these species to outside areas.

Forage

The Wilderness lies within the Mill Creek and Bear Creek (Prineville Ranger District) and Wildcat (Big Summit Ranger District) Allotments. About 535 cow-calf pairs graze in various periods during June through September. Both allotments are under deferred-rotation grazing systems and show good livestock distribution and stable trends. Range improvements include about 10.5 miles of wire fence, five spring developments, and one stock pond. Access to, and maintenance of these improvements has traditionally been accomplished via mechanized means (with Forest Supervisor approval), or by horseback.

Minerals

Substantial deposits of agate and thundereggs are the focal points for nine unpatented mining claims. The Wilderness has been withdrawn from any mineral or energy development. Table 5 contains a list of claims.

Table 5

Name	Approximate Location
Thundereggs #1	T.12 S., R.19 E., Section 28
Bear Springs	T.12 S., R.19 E., Section 30, 31
Two Dogs	T.12 S., R.19 E., Section 30
Tamarack	T.12 S., R.19 E., Section 30
Fly Ridge	T.12 S., R.19 E., Section 30
Lavish Lady	T.12 S., R.19 E., Section 31
Smokey Blue	T.12 S., R.19 E , Section 31
Little Smokey Blue	T.12 S., R.19 E., Section 31
Sleeping Beauty	T.13 S., R.18 E., Section 10

These roads are currently authorized for mining operations: Forest Road 33-205 (1.2 miles), Forest Road 27-300 (2.3 miles), and Forest Road 27-301 (.6 mile).

Recreation and Wilderness Use

Opportunities for solitude are very high during the winter. During the main summer-use season, opportunities for solitude are moderate to high within the Wilderness interior. The opportunity for solitude is low in many areas due to roads close to or on the boundary.

Popular campsites are located primarily along the northern Wilderness boundary due to easy road access The most frequented interior camping area is at the junction of Twin Pillars and Belknap Creek Trails. Many campsites are evident immediately adjacent to the lower two miles of the Twin Pillars Trail.

Wilderness use approximates 500 to 1,000 recreation visitor-days (RVD's) per year. Most use is day-use. Minor change in the traditional types or amounts of recreational use has occurred since the Wilderness designation, however there has been increased horseback riding and hunting. Although concrete data is lacking, observations suggest use occurrence/significance is in the following order:

Hiking
Horseback Riding
Hunting
Fishing
Camping/Backpacking
Nature Study
Cross-country Skiing
Rockhounding
Gold Panning

Most recreational use focuses on the East Fork Mill Creek corridor between Wildcat Campground and Belknap Creek, and between Bingham Prairie and Twin Pillars. Users generally park or camp at Wildcat Campground (and, to a lesser extent, at dispersed sites at Whistler Spring, White Rock, or Bingham Prairie) before beginning their treks.

Horseback riders usually park and camp at Wildcat Campground, resulting in periodic congestion of people and stock on the adjacent Twin Pillars Trail.

Hunting use is moderate to heavy, with about 10 to 40 groups of two to eight regularly observed at the developed and dispersed campsites adjacent to the Wilderness.

The only recently-issued special-use permit provides for handicapped recreation along the Twin Pillars Trail near Wildcat Campground. No inquiries have been received from outfitter/guide or related organizations.

There are no encumbers or private lands within the Wilderness.

Trails - There are 18 miles of maintained trails which include two north-south routes - Twin Pillars and Wildcat Mountain Trail. There is one connector trail, the Belknap Creek Trail (three miles). Twin Pillars Trail (seven miles) covers the route from Wildcat Campground to Bingham Prairie, via Twin Pillars. Wildcat Mountain Trail (eight miles) covers the eastern ridge. Maintained trail density is about .8 trail miles per square mile. Remnants of old trails are intermittent along the East Fork Mill Creek, Desolation Canyon, and in the vicinity of Whistler Spring. There are 3.5 miles of the historic Summit Stock Driveway in the northeastern portion.

Trailheads - Four trailheads are available out of the campgrounds or dispersed sited outside of the Wilderness. Wildcat Campground and Bingham Prairie are trailheads for both ends of the Twin Pillars Trail. White Rock and Whistler Dispersed Campgrounds are trailheads for both ends of the Wildcat Mountain Trail. Parking capacity is displayed in Table 6.

Table 6

Trailhead	Single Vehicle Capacity	OR	Vehicle with Trailer Capacity
Bingham	8		4
Whistler	8		4
Wildcat	18		8
White Rock	10		5

About 16 miles of old tracks or roads also exist, with 32 access points; most of these have not been rehabilitated Nearly all of these tracks or roads are passable by motorcycles and similar single-passenger vehicles, and many by four-wheel drive vehicles. Historic use has been by mining claimants, grazing permittees, hunters, and off-road vehicle (ORV) enthusiasts. Most roads were constructed

by mining claimants or fence contractors. A "Baseline Inventory Report" summarizes road accessibility, manageability, and condition. Entrance management, i.e., blocking, has been initiated on all of these except where use is otherwise authorized, e.g., mining claims.

Signing - Boundary signs have been posted around all the trail and road access points. Trail signs are present at trailheads and junctions. Some signs display more information than specified by the FSM, and some are made of synthetic materials.

Water Resources

Riparian Condition - About 12.5 miles of stream are in acceptable riparian condition, with about seven miles in a degraded condition. Deciduous shrubs provide intermittent shading along portions of East Fork Mill Creek. Portions are devoid of adequate shade due to lack of potential and past grazing practices, although shrub density and cover is increasing in response to management change. Recreational use has been concentrated in some campsites, particularly along East Fork Mill Creek, resulting in reduced ground cover.

Wildlife and Vegetation

The Wilderness is deer summer range, and elk summer and winter range. Although below potential, much of the area is in an old growth condition and provides excellent habitat for wildlife such as pileated woodpecker and marten. The wide diversity of habitats, including the abundant riparian zones, cliffs, and forest and meadow "edges," provide for many wildlife species.

East Fork Mill and Buck Creeks support rainbow trout and are managed as put-and-take fisheries. Due to low summer/fall flows and low levels of shading and instream woody material in some areas, habitat is below potential.

Specific Management Direction

Cultural Resources - Manage the Summit Stock Driveway to retain its historical features.

Fire - Allow no more than 1,500 acres burned at Fire Intensity Level III per decade. Allow no more than 5,000 total acres burned per decade by wildfire or prescribed fire.

Use both natural and planned ignitions to re-introduce a natural fire cycle over 20 percent of the Wilderness (about 3,500 acres) each decade.

Forage - Schedule grazing use to minimize conflict with periods of heavy recreational use (especially July, August, October, and November) if physical resource protection objectives can be achieved.

Inform users when livestock are in the Wilderness to reduce conflicts.

Require the burial, removal, or disposal of any carcass that presents a potential for spreading disease, by a methods approved in advance by the District Ranger. Leave no carcass within 500 feet of any spring, pond, creek, trail, campsite, or vantage point.

Pack all salt in by horseback. Place salt at least .25 miles from vantage points, campsites, and designated trails.

Allow vegetation/litter cover change on no more than 10 percent of the Wilderness (1,740 acres) in any 10-year period.

Allow no more than a 50 percent loss of the ground cover within the general area of a fire circle and tent location. Allow no more than three percent of any campsite area to lose vegetative cover in any 10-year period.

In primitive areas, allow vegetative loss on no more than one percent of any acre. Allow four or fewer trees with exposed roots per impacted site.

In semiprimitive areas, allow vegetative loss on no more than 1.5 percent of any acre. Allow six or fewer trees with exposed roots per impacted site.

Recreation - Manage for the primitive and semiprimitive WRS.

In primitive WRS areas, provide no more than one sign with a maximum of two route indicators at a trail junction.

In semiprimitive WRS areas, provide no more than two directional signs with a maximum of two route indicators ar a trail junction.

Allow no marking of nordic trail routes.

Limit signing to directional signs at trail junctions and necessary temporary administrative signs. Provide no distance or destination signing. Provide no signing of geographic features.

Limit recreation visitor days (RVD's) to the carrying capacity of 12,690 RVD's in the primitive area during the summer use season, and 4,690 RVD's in the winter season.

Limit RVD's to the carrying capacity of 3,700 in the semiprimitive area during the summer use season, and 670 RVD's in the winter season.

Require that pets be under physical restraint. Pets can be banned for protection of wildlife and to decrease resource impacts

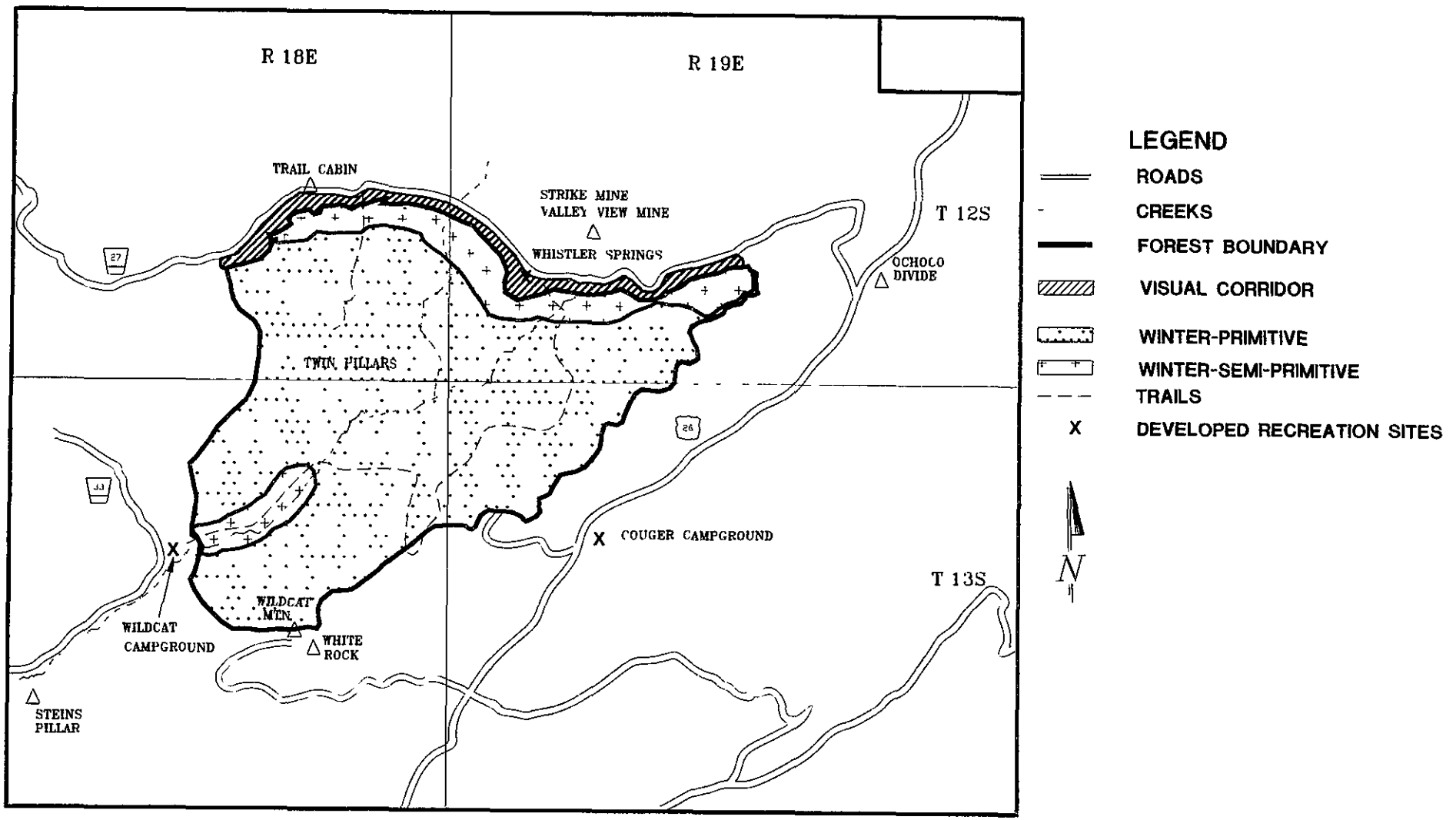
Provide information at trailheads and Forest Service offices, including resource protection information, wilderness ethics, wilderness safety, and maps.

Set up registration systems at trailheads as needed.

Avoid low Visual Absorption Capability (VAC) areas for campsites, trailheads, and trails where possible VAC is the relative ability of the land to be impacted by human activities without being adversely affected visually.

Figure H-2

MILL CREEK WILDERNESS
WILDERNESS CATEGORIES



Wilderness Plan Standards and Guidelines

Management Area Standards and Guidelines

Resource - Cultural Resources

Practice
Enhancement and Interpretation

Standard and Guideline
On-site interpretation and enhancement of cultural resources will not be done. Off-site interpretation and enhancement is permissible.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Structures

Standard and Guideline
Structures, such as old fences, that do not qualify for the National Register of Historic Places, will be removed or allowed to deteriorate naturally.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Facilities

Practice
Construction, Reconstruction and Maintenance of Administrative Buildings and Structures

Standard and Guideline
No administrative buildings or structures allowed.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Nonconforming Structures

Standard and Guideline
Remove, eliminate, or disguise all nonconforming structures. Retain existing bridges until unusable, then remove without any replacement structures.

Applicable Management Area
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Fire

Practice
Fire Suppression (P04)

Standard and Guideline
Confine and contain will be the principle suppression strategies on most natural ignition (lightning) fires. Control strategy will be invoked when lightning fires threaten to escape the Wilderness Areas or pose unacceptable risks to life or wilderness values. Use the "light hand on the land" techniques.

Suppression activities should minimize disturbances of the land surface.

Use of chainsaws, helicopters, air tankers, or pumps must be approved by the Forest Supervisor. Allow no helispot construction for initial attack.

Crawler tractors will not be used without prior approval from the Regional Forester.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Treatment of Natural Fuels (P12)

Standard and Guideline
Naturally caused ignitions may be allowed to burn if they meet conditions in an approved prescribed burn plan, and funds and necessary staffing are available.

Planned ignitions may be used within wilderness areas if that is the best way of returning fire to its natural role. This is accomplished by reducing the fuels profile to natural levels and with less risk of damaging the wilderness resource. Planned ignitions within the Wilderness are also permitted if there is no other practical and economic way to lessen the likelihood of the escape of damaging wildfire from the Wilderness.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Fuel Break Construction and Maintenance (P13, P14)

Standard and Guideline
Limited shaded fuelbreak segments may be constructed along boundaries to take advantage of logical natural terrain features aiding in the prevention of fire spread across management area boundaries. The majority of such fuel break systems will be outside of the area.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Forage

Practice
Forage Utilization

Standard and Guideline
Follow Primary Range Utilization Table in the Forest Plan.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Nonstructural Improvements

Standard and Guideline
Seeding for forage improvement prohibited.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Structural Improvements

Standard and Guideline
Maintain existing developments. New developments can be constructed only to protect the wilderness resource or to alleviate problems or conflicts, and only with the approval of the Regional Forester. Use of power equipment for maintaining range improvements will be for exceptional needs only, and approved on a case-by-case basis by the Forest Supervisor (for chainsaws, etc.), and Regional Forester for mechanized equipment (tractors, backhoes, etc.).Use native or natural appearing materials and design improvements to blend into the surrounding landscape.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Use of Motorized Equipment for Improvements and Maintenance

Standard and Guideline
Require permittees to maintain improvements with nonmotorized equipment except where requests to use motorized equipment (chainsaws, etc.) have been approved by the Forest Supervisor, or mechanized equipment (tractors, backhoes, etc.) by the Regional Forester, on a case by case basis.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Forest Health

Practice
Allowable Treatment Options for Major Pest Groups

Standard and Guideline
Insect and disease outbreaks will not be controlled unless treatment is necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the wilderness resource due to exotic pests. FSM 2324.12(1)

Management of insects and diseases in wilderness will follow direction in FSM 2324.1.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Forest Residues

Practice
Residue Management

Standard and Guideline
Manage residues through the natural processes of accumulation and decomposition (including natural fire). Activity fuel residues shall be treated to a level consistent with the immediate surroundings in the wilderness and which will protect wilderness values.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline
Reduce fuel loading to natural conditions on 20 percent of the Wilderness (about 3,500 acres) each decade when feasible.

Applicable Management Area
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Fuelwood

Practice
Commercial and Personal Gathering

Standard and Guideline
Commercial use prohibited, personal use of down material for on-site use only.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Lands

Practice
Special Use Permits

Standard and Guideline
Compatible uses, such as nondestructive research projects, may be permitted with Regional Forester approval. Land occupancy permits are prohibited. Terminate existing noncompatible permits as opportunities arise. Award outfitter guide permits only when it will meet management objectives to provide a needed wilderness opportunity.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Land Ownership and Adjustment

Standard and Guideline
Retain and acquire lands that are necessary to maintain or enhance the management emphasis of the specific areas.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Rights-of-Way Grants for Roads and Trails, Cost-Share Agreements

Standard and Guideline
Grant no rights-of-way, nor enter into cost-share agreements, except as prescribed by law.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Utility and Transport Corridors

Standard and Guideline
Exclusion Areas for utility corridors; significant barriers in which legislation exists to preclude establishment and use.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Minerals and Energy

Practice
Oil And Gas Leasing

Standard and Guideline
Issue no leases.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Locatable Minerals (Mining Claims)

Standard and Guideline
The following areas are withdrawn from mineral entry under the mining laws. Prospecting for minor recreational purposes will be allowed if conducted in a manner compatible with the wilderness environment.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness Area (except existing valid claims)

Standard and Guideline
Include reasonable measures in operating plans in order to meet management emphasis for the specific areas.

Applicable Management Area
MA-F3 Mill Creek Wilderness (existing claims)

Practice
Common Variety Minerals

Standard and Guideline
Do not develop material sources.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Recreation

Practice
Wilderness Recreation Spectrum (WRS)

Standard and Guideline
Primitive and Semiprimitive.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Developed Recreation

Standard and Guideline
Develop no interpretive, demonstration, or recreational sites.

Applicable Management Area
MA-F1 Black Canyon Wilderness.
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Dispersed Recreation

Standard and Guideline

Camp Sites
Discourage development of "permanent" dispersed campsites or facilities. Disguise, obliterate, or rehabilitate such campsites when found.

Allow no caching of camping supplies.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline
No more than two campsites will be visible or audible from any other campsite (within 500 feet).

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline

Encounters

Primitive Area, encounters per day 80 percent of the time:

7 or less
7 or less
6 or less

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline
Semiprimitive Area, encounters per day 80 percent of the time:

10 or less
12 or less

Applicable Management Area
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline

Group Size
Maximum permissible group size:

12 people
10 people
12 people *
* In Mill Creek Wilderness, "12" includes people and livestock in any combination

Applicable Management Area
MA-F3 Mill Creek Wilderness
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness

Practice
Search and Rescue

Standard and Guideline
Use of motorized vehicles for search and rescue must be approved by the Forest Supervisor.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Signing

Standard and Guideline
Use minimum natural appearing signing identifying destinations, and trail names where needed, but not mileages.

Applicable Management Area
M A-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Trails

Standard and Guideline
Emphasize these areas with a nontrailed objective.

Applicable Management Area
MA-F2 Bridge Creek Wilderness

Standard and Guideline
Coordinate trail and trailhead planning to disperse users and offer a range of challenges. Design trails to blend with landscape, and construct with native materials.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F3 Mill Creek Wilderness *
* No new trails will be developed in Mill Creek Wilderness

Standard and Guideline
No motorized or mechanized use allowed on trails.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Scenic Resources

Practice
Visual Quality Objective (VQO)

Standard and Guideline
Preservation.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Soil

Practice
Soil Conditions

Standard and Guideline
Limit displacement and erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment except at some campsites and in designated trail tread.

Locate, relocate, or close campsites to prevent excess soil erosion and compaction when necessary.

Correct areas of human-caused soil instability which contribute to resource degradation, utilizing measures compatible with the Wilderness objectives.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Timber

Practice
Scheduled Harvest

Standard and Guideline
No timber harvest allowed (including salvage).

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Transportation System

Practice
Construction and Reconstruction

Standard and Guideline
None allowed.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Operations and Maintenance

Standard and Guideline
Obliterate and revegetate all existing roads except those authorized for mining operations. Where appropriate, utilize old road system for a nonmotorized trail.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Traffic Management

Standard and Guideline
No access permitted except for authorized mining claims.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Off-Road Use

Standard and Guideline
No motorized use allowed.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Management Area Standards and Guidelines

Resource - Water

Practice
Water Quality Improvement Projects

Standard and Guideline
Use of mechanized equipment for water improvement projects will be approved by the Regional Forester on a case-by-case basis. Power equipment such as chainsaws can be used with Forest Supervisor approval on a case-by-case basis.

Construction of structural improvements can be done with approval of the Chief of the Forest Service.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline
Use of mechanized equipment for maintaining existing improvements will be approved by the Regional Forester. Power equipment such as chainsaws can be used with Forest Supervisor approval on a case-by-case basis.

Applicable Management Area
MA-F2 Bridge Creek Wilderness

Management Area Standards and Guidelines

Resource - Wildlife and Fish

Practice
Habitat Management

Standard and Guideline

General
Manipulation of habitat to sustain the value of wilderness or to perpetuate a Threatened and Endangered wildlife species may be allowed with approval of the Chief of the Forest Service.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Standard and Guideline

Cavity Nester Habitat

Strive to provide snag habitat at recommended levels (100 percent for all wilderness), while meeting the primary management emphasis for the specific area.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Practice
Species Management

Native animal species will be maintained. Allow no intentional introduction of non-native wildlife species.

Applicable Management Area
MA-F1 Black Canyon Wilderness
MA-F2 Bridge Creek Wilderness
MA-F3 Mill Creek Wilderness

Appendix I

Management of Wild Horses

Objectives

The objective of managing wild and free roaming horses on the Ochoco National Forest is to provide for their protection, management, and control in a manner consistent with the Wild and Free Roaming Horse and Burro Act of 1971 and subsequent amendments.

These horses will be managed under the authority of Public Law 92-195 (85 Stat. 649, 16 USC 1331-1340). Other laws applicable to National Forest System lands also apply to the administration of these animals. Management actions must be consistent with the intent of the Multiple Use-Sustained Yield Act of 1960 (74 Stat. 215, 16 USC 528-531).

Operations

The bands of horses within the original territory will be managed at a maximum of 60 head. When horse numbers exceed this level removal of excess horses will be required. The Forest has experienced difficulty in getting horses from this territory adopted because of their undesirable size and confirmation. In order to improve the adoptability factor over the next few years, excess animals will be selectively removed. Initially, animals to be retained in the herd will be selected on the basis of physical soundness, quality of conformation, and young breeding age. This will result in a base herd which is healthy, vigorous, and of a quality that will produce adoptable offspring.

Horses that establish new territories beyond those which they inhabited prior to December 1971 are designated excess animals in accordance with the 1971 Act. These horses will be first priority for removal, and will be captured and put up for adoption.

Excess horses removed from the territory will be disposed of through horse adoption procedures in accordance with the Interagency Agreement between the Bureau of Land Management and the Forest Service signed in December 1988.

Management will be directed toward the overall herd as a viable unit, instead of toward certain bands or individuals within the herd.

Various practices will be used in removing excess horses. Included are the use of roundups, tranquilizer darts, and catch pens. The use of aircraft will be limited to locating and inventorying animals, and in observing approved removal efforts.

Excess animals which are too old, too lame, or permanently injured may be removed using lethal doses from tranquilizer guns. Judgement will be exercised in these cases. All disposal activities will be in accordance with State Health codes.

Bibliography

BIBLIOGRAPHY

Adams, Darius M , Haynes, Richard W., "Changing Perspectives on the Outlook for Timber in the United States " *Journal of Forestry*; 1985

Advisory Council on Historic Preservation, *Treatment of Archaeological Properties - A Handbook* Part II, Section X, Washington, DC; 1980.

Aho, Paul E , "Decay of Grand Fir in the Blue Mountains of Oregon and Washington Pacific Northwest Forest and Range Experiment Station " USDA Forest Service PNW-229, Portland, OR, 1977.

Alderfer, R. B ; Robinson, R R , "Runoff from pastures in relation to grazing intensity and soil compaction " *J Am Soc Agron* 39·948-58, 1947

American Geological Institute, *Dictionary of Geological Terms*. Anchor Press· Garden City, NY, 1960

Amman, Gene D , et al , "Guidelines for Reducing Losses of Lodgepole Pine to the Mountain Pine Beetle in Unmanaged Stands in the Rocky Mountains " Intermountain Forest and Range Technical Report INT-36; 1977

Anderson, Henry W , "Sediment Deposition in Reservoirs Associated With Rural Roads, Forest Fires and Catchment Attributes." In Proc. Symp Man's effects on erosion and sedimentation UNESCO. International Association of Hydrology Science Publication 113, 1974 pp. 87-95

Anderson, Henry W , et al , "Forests and Water. Effects of Forest Management on Floods, Sedimentation, and Water Supply " USDA Forest Service General Technical Report PSW-18, 1976.

Anderson, R G , et al , "Snags," pp 60-77, in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington* Edited by J W Thomas USDA Forest Service Agriculture Handbook No 553, 1979 512 p

Anon , "Water Quality Management for National Forest System Lands in California " FSH 2509 22 Region 5, USDA Forest Service, 1985

Ashwill, Melvin, "An Exposure of Limestone at Gray Butte, Jefferson County, OR." in *Oregon Geology*, Vol 41, #7, July, 1979

Bacon, Warren R ; Dell, John "National Forest Landscape Management " Vol 2, Ch. 6, Ag. Handbook No 608, USDA Forest Service, 1985

Bailey, Robert G , "Proceedings of the Workshop on Lessons from Using FORPLAN." Washington DC, USDA Forest Service, 1986.

Baker, D L , et al , "Energy - and Nitrogen-based Estimates of Elk Winter-Range Carrying Capacity " *Journal of Wildlife Management* 46(1) 12-21, 1982

Balda, Russell; Brown, Jeffery, "Use of Nest Boxes in Ponderosa Pine Forests " Dept. Bio Sciences, N Ariz Univ, Flagstaff, AZ, 1984

Balda, Cunningham, & Gaud, "Selection and Use of Snags by Secondary Cavity-nesting Birds of the Ponderosa Pine Forest " USDA Forest Service Research Paper RM-222, 1980

Baldwin E M. *Geology of Oregon* Kendall/Hunt Publishing Co, Dubuque, Iowa, 1981

Barrett, James W , "Silviculture of Ponderosa Pine in the Pacific Northwest: The state of our knowledge " Pacific Northwest Forest and Range Experiment Station, USDA Forest Service PNW-97 Portland, OR, 1979

Barrett, James W ; et al , "Northwestern Ponderosa Pine and Associated Species " In· Burns, Russell M , tech. comp Silvicultural Systems for Major Forest Types of the United States Agriculture Handbook No 445 Washington, D C , USDA Forest Service; 1983, pp 16-18.

Barrett, James, Roth, Lewis P , "Response of Dwarf Mistletoe Infested Ponderosa Pine to Thinning " Pacific Forest and Range Experiment Station Research Paper PNW-330; 1985

Bates, Robert L , *Geology of the Industrial Rocks and Minerals*. Dover Publication, Inc, NY, 1969.

Beall, R C , "Winter habitat selection and use by a western Montana elk herd " Ph.D. Diss., Univ Mont , Missoula, 1974. 197 p

Beaulieu, John D., "Geologic Formations of Eastern Oregon." Oregon Dept of Geology and Mineral Industries Bulletin 73, 1972

Behan, Ph D., Mark J , "The Cycle of Minerals in Forest Ecosystems " In combined business meeting, Intermountain Fire Research Council and Symp , 1970

Behrens, Norm, "*Personal Communication* " *Oregon Department of Fish* and Wildlife, 1985

Bergstrom, Dorothy, "Trees Help Keep a Forest Fertile " Forest Research West, USDA Forest Service May, 1979.

Berry, J. A., "Modeling the impact of logging debris in streams " In Watershed Management ASCE - 1975. Proc Watershed Mgt Symp ; 1975, pp 676-680

Beschta, Robert L , Johnson, Michael G , "Logging, Infiltration Capacity and Surface Erodibility in Western Oregon " *Jour of For* Vol. 78 No 6; June, 1980

Blackburn, W. H , "Livestock Grazing Impacts on Watersheds " Rangelands 5(3):123-125; 1983.

Borden, John H., Doliner, Laura H , "Pest Terms. A Glossary of Forest Pest Management Terms " Center for Pest Management, Dept of Biological Sciences, Simon Fraser Univ. Burnady, B C V5A156, 1984

Bottom, D L , et al , "The Effects of Stream Alterations on Salmon and Trout Habitat in Oregon " Oregon Department of Fish and Wildlife, Portland, OR, 1985

Bowen, R G , et al , "Low-to-Intermediate-Temperature Thermal Springs and Wells in *Oregon* " *Oregon Department of Geology and Mineral Industries*, GMS-10, 1978.

Boyer, Donald E ; Dell, John D , "Fire effects on Pacific Northwest Forest Soils " USDA Forest Service, Pacific Northwest Region, Watershed Management, and Aviation and Fire Management, Portland, OR , 1980

Brody, S , *Bioenergetics and Growth* Hafner Publishing Co Inc , New York, 1945 1023 p

Brooks, H C , "Quicksilver in Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 55, 1963

Brooks, H C., "Quicksilver Deposits in Oregon " Oregon Department of Geology and Mineral Industries, Miscellaneous Paper 15, 1971.

Brooks, H C , "Ochoco National Forest Geology " Oregon Department of Geology and Mineral Industries, unpublished report, 1976

Brocks, H C, and Ramp, L , "Gold and Silver in Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 61; 1968

Brooks, H C and Ferns, M L , "Geology and Mineral Industries of the Ochoco National Forest." Excerpts from a Report in Preparation USFS unpublished report, 1968

Brown, C E. and Thayer, T P , "Geologic Map of the Canyon City Quadrangle, Northeastern Oregon " USGS Miscellaneous Geologic Investigations, Map I-447, 1.250,000; 1966

Brown, George W , Krygier, James T , "Changing water temperatures in small mountain streams " Journal of Soil & Water Conservation 22·242-244, 1967

Brown, H.E.; et al , "Opportunities for Increasing Water Yield and Other Multiple Use Values on Ponderosa Pine Forest Lands." Rocky Mountain Forest and Range Experiment Station USDA Forest Service, Research Paper RM-129. 36 p ; 1974

Bruns, Herbert, "The Economic Importance of Birds in Forests " Bird Study, Vol. 7(4): 193-208; 1960

Bryant, L. D., "Response of Livestock to Riparian Zone Inclusion " Journal of Range Management. 35(6): 11-82, 1982.

Bryant, Richard, et al., "The Effects of Yarding Operations on Archaeological Sites." Volume II. A report prepared by professional analysts for the Pacific Northwest Region, USDA, Forest Service, Portland, OR; 1982

Bull, Evelyn, "Habitat utilization of the pileated woodpecker, Blue Mountains of Oregon." Thesis, Oregon State University; 1975

Bull & Meslow, "Habitat requirements of the pileated woodpecker in northeastern Oregon " Journal of Forestry, Vol 75(6). 335-337; 1977

Bullard, W E , "Effect of Highway Construction and Maintenance on Stream Sediment Loads " USDA Miscellaneous Publication 970. Symposium 1. - Land erosion and control, 1963

Bureau of Mines, U.S Department of the Interior. "Mineral Commodity Summaries, 1987 " Bureau of Mines, 1987.

Campbell, R W, et al , "Predation by birds and ant affects aggregation of the western spruce budworm " From *The Role of the Host in the Population Dynamics*, L Safranyik editor, Pacific Forest Center of the Canadian Forest Service, Victoria, B.C.; 1983

Campbell, T.M., "Short-term Effects of Timber Harvest on Pine Marten Ecology." M.S. Thesis, Colorado State University. Fort Collins, Colorado, 71 p , 1979.

Canyon Creek Youth Conservation Corps., "Mines of the Ochoco Mountains " unpublished report, Ochoco National Forest, 1974.

Carlson, Clinton E , et al , "The Western Spruce Budworm in Northern Rocky Mountain Forests. A Review of Ecology, Past Insecticidal Treatments and Silvicultural Practices " Forest Science Laboratory, Missoula, MT, 1983.

Carlson, Clinton E ; et al , "Alternatives to Chemical Insecticides in Budworm - Susceptible Forests Western Wildlands." Forest Science Laboratory, Missoula, MT; 1983.

Central Oregonian, Jan 17 1 (col 3) "Moulding Plant County's Top Employer " 1984

Chamberlin, T. W., "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America· Timber Harvest." USDA Forest Service, General Technical Report PNW-136, 1982.

Chambers, C T , "A Second Look at Thinning The Effect of Thinning on Allowable Cut - The State Position " DNR No 17, State of Washington, January 1977.

Christner, J., "Changes in Peak Streamflows from Managed Areas of the Willamette National Forest." USDA Forest Service, Pacific NW Region

Cleary, Brian D., et al , "Regenerating Oregon's Forests A Guide for the Regeneration Forester " Oregon State University School of Forestry, Corvallis, OR, 1978

Cochran, P. H ; Seidel, K W , "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " Pacific Northwest Forest and Range Experiment Station USDA Forest Service PNW-121 Portland, OR, 1981.

Confederated Tribes of the Warm Springs Reservation, "Warm Springs Reservation Comprehensive Plan (Draft) " [Place of publication unknown]; [Date unknown] 429 p

Cole, David N , Schriner, Edward G S , "Impacts of Backcountry Recreation: Site Management and Rehabilitation--An Annotated Bibliography." USDA Intermountain Forage and Range Exp. Sta., General Technical Report INT-121, 1981

Cole, Walter E , McGregor, Mark D , "Reducing or Preventing Mountain Pine Beetle Outbreaks in Lodgepole Pine Stands by Selective Cutting." [Proceedings of IUFRO Banff Centre Sept. 1983 L. Safranyik (Editor)] Pacific Fy. Res Centre of Can Fy Service, Victoria BC, 1983

Cornish, P M ; MacKay, S M , "Effects of Wildlife and Logging on the Hydrology of Small Catchments Near Eden, N S W " In The First National Symposium on Forest Hydrology, Melbourne, Australia, 1982

Corono, Julie M.; Wilcox, William R., "Western Wood Heating Value Calculator, Colorado State Forest Service " Colorado State Univ , Fort Collins, CO, Sept 1980

Cox, D P. et al , "Mineral Deposit Models " USGS Bulletin 1693, 1987

Crawford, Hewlette S , et al , "Effects of Fire on Fauna " A state-of-knowledge review-- USDA Forest Service General Technical Report WO-6, US Government Printing Office Washington, D C , 1978, 22 p

Cromack, Jr , et al , "A Comparison of Harvesting Methods and their Impact on Soils & Environment in the Pacific Northwest " From Forest Soils & Land Use, Proc Fifth N A. For. Soils Conf.; Aug. 6-9, 1978

Crook, County of "Crook County--Prineville Area Comprehensive Plan " Prineville, OR, 1978; 209 p.

Crouch, Glenn L., "Wild Animal Damage to Forests in the United States and Canada." Pac. N.W Reg. & Expt. Sta. USDA. Olympia, WA; 1976.

Crow, James F., Kimuna; Matoo "The Measurement of Effective Population Numbers." Evaluation 17(13); 1963; pp 279-288.

Curtis, Robert O., "Growth and Yield in Uneven-Aged Stands." [Combined proceedings of two in-service workshops, Uneven-Aged Silviculture and Management in the U S] Timber Mgt. Reg. F S. USDA. Washington, D.C ; 1976.

Dasmann, et al., "Ecological Principles for Economic Development " 1973; pp 22-23

Davis, Goodwin, et al , "Snag Habitat Management: Proceedings of the Symposium." USDA Forest Service General Technical Report RM-99, 1983

Deschutes, County of "Deschutes County Year 2000 Comprehensive Plan." Bend, OR, 1979; p 272.

Dolmer, Laura H, Borden, John H. "PESTERMS· A Glossary of Forest Pest Management Terms " Center for Pest Management, Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A156; 1984.

Dolph, Robert E "How to Hazard Rate Lodgepole Pine or Second-growth Ponderosa Pine Stands and Develop Management Guidelines to Prevent Future Mountain Pine Beetle Losses." Pacific Northwest Region V.S.E S Department of Agriculture, Portland, OR, 1983

Dolph, Robert E.; Filip, Gregory M , "Forest Insect and Disease Activity on the Ochoco National Forest and Guidelines for Preventing/Reducing their Losses." Pacific Northwest Region of Forest Service, Department of Agriculture, Portland, OR; 1980.

Dolph, R. E.; Sartwell, Charles , "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine " Pacific Northwest Forest and Range Experiment Station USDA Forest Service Research Note PNW-268, 1976

Dryden, M , "Interim Cultural Resource Inventory Design for the Ochoco National Forest and Crooked River National Grassland " Working Paper edited by Thomas L Burge, Prineville, Oregon Ochoco National Forest , 1988

Dyrland, Richard D , "Resource Capability System, a User's Guide " Part VI *Basic Economic Concepts and Procedures* San Francisco, CA USDA Forest Service, Region 5, Division of Soils and Watershed Management, 1973

Dyrness, C. T.; et al., "Research Natural Area Needs in the Pacific Northwest " General Technical Report PNW-38. Portland, OR· USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, 1975; 231 p.

Edgerton, P. J ; McConnel, B. R "Diuvnal temperature regimes of logged and unlogged mixed conifer stands on elk summer range." USDA Forest Service Pacific Northwest Forest and Range Experiment Station La Grande, OR Res Note PNW-277, 1976; 6 p

Ellison, A C , "Changes in Peak Streamflow." In a letter to R-6 Forest Supervisors, March 6, 1981

Ferns, M L , "Mining Activity and Exploration in Oregon, 1988 " *Oregon Geology*, Oregon Department of Geology and Mineral Industries, Vol. 51, #2, March 1989.

Ferns, M L and Brooks, H C , "Geochemical Survey of the Western Part of the Ochoco National Forest, Crook and Wheeler Counties, OR " Oregon Department of Geology and Mineral Industries, Open-File Report 0-83-4; 1983

Ferns, M L and Huber, D F , "Mineral Resources Map of Oregon " Oregon Department of Geology and Mineral Industries, GMS-36, 1 500,000, 1984.

Filip, Gregory M , "Forest Pest Survey of the Ochillee Stand " Prineville R.D., Ochoco National Forest, Pacific Northwest Region Forest Service USDA,Portland, OR; 1983.

Fischer, et al., "Habitat management for hole-nesting birds in forests of western larch and Douglas-fir " *Journal of Forestry*, Vol. 77(8)· 480-483, 1979.

Fouch, T.D., "Petroleum Potential of Wilderness Lands in Oregon." USGS Miscellaneous Investigation Series Map I-1544; 1983.

Francis, D. D ; Schepers, J S , "Chemical Water Quality of Runoff from Grazing Land in Nebraska· I. Influence of Grazing Livestock " Journal of Environmental Quality Vol. 11 No 3; 1982, pp 351-354.

Frankel; Goheen; et al , "Effects of Management Activities and Dominant Species Type on Pest-caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests." Pacific Northwest Region Forest Service - USDA Portland, OR; 1984

Franklin, Jerry F. et al , "Ecological Characteristics of Old-Growth Douglas-fir Forests " Gen. Tech Rep PNW-118 USDA Forest Service, Pacific Northwest Region. 382 pp.; 1981

Franklin, Jerry F ; Dyrness, C T , "Natural Vegetation of Oregon and Washington General Technical Report PNW-8 " Portland, OR U S Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1973

Fredriksen, R L ; Harr, R. A , "Soil, Vegetation and Watershed Management of the Douglas-Fir Region In Forest Soils of the Douglas-fir Region " Washington State University, Pullmann, WA, 1979

Froehlich, Henry A , "Predicting Soil Compaction on Forest Land." Oregon State Univ. Forest Eng. Dept, Dec 1980.

Froehlich, H A , "Soil Compaction From Logging Equipment· Effects on Growth of Young *Ponderosa Pine." Journal of Soil & Water Conservation, pp 276 - 278; 1979*

Galbraith, A. F , "A Water Yield and Channel Stability Analysis Procedure." Kootenai National Forest, U S Forest Service, Libby, MT, 1973; 38 p

Gara, Robert I , "Insect Pests of Tree Firs in the Pacific Northwest " U. of Wash *Proceedings of the Biology and Mgmt of Tree Firs Seattle, WA; Feb 1981.*

Gardner, R B.; et al., "Road Design Guidelines for the Idaho Batholith, Based on the China Glenn Road Study " USDA Forest Service, Research Paper INT-204; 1978.

Garton, et al , "Effects of Stand Characteristics on Avian Predators of Western Spruce Budworm " From *The role of the host in the population dynamics of forest insects* L Safranyik - Editor Pacific Research Centre of the Canadian Forest Service, Victoria B C , 1983

Gebhardt, K. A.; Johnson, C W. "Predicting Sediment Yields from Sagebrush Rangelands." Agriculture Experiment Station University of Idaho, Moscow, ID; 1981.

Geist, Michael, J.; et al , Research Progress Report; 1984.

Gibbs, Carter B., "Uneven-aged Silviculture and Management? Even-aged Silviculture and Management? Definitions and Differences " [Combined Proceedings Redding, Calif. Oct 1976]. Timber Management Research, Forest Service USDA Washington, D.C.; 1976.

Glass, Jr., G. G , "The effects From Root Raking on an Upland Piedmont Loblolly Pine Site." Technical Report 56, School of For. Res. NC State U., Raleigh, NC; 1976, 44 p.

Godwin, L H, et al., "Lands Valuable for Geothermal Resources." USGS, 1 500,000; 1974.

Graham, Donald P., "A Training Aid on Dwarf Mistletoe and Its Control " Portland, OR USDA Forest Service, Pacific Northwest Region, 1967; 49 p

Grant County, "Comprehensive Plan for Grant County, Oregon, John Day, OR." 1969, 24 p.

Gray, J J , et al., "Mineral Assessment of the Southwest Quarter of the Stevenson Mountain 30- by 60-Minute Quadrangle, Jefferson and Crook Counties, Oregon " Oregon Department of Geology and Mineral Industries, Open-File Report 0-86-4; 1986.

Greene, R.C., et al , "Geologic Map of the Burns Quadrangle, Oregon." USGS Miscellaneous Geologic Investigations, Map I-680, 1.250,000, 1972.

Guenther, K ; Kucera, T , "Wildlife of the Pacific Northwest." USDA Forest Service, Pacific Northwest Region; 1978

Haase, William R., "Mitigation of Chaining Impacts to Archaeological Sites " *Journal of Range Management* 36(2). 158-160, 1983

Haines, Sr., L W., et al , "The Effect of Mechanical Site Preparation Treatments on Soil Productivity and Tree Growth," Forest Soils and Forest Land Management by Bernie E. Weinget Proc. 4th N4G. Soil Conf., Lawal, Quebec, 1975; pp 379-395

Hall, Frederick C., "Growth Basal Area A Field Method for Appraising Forest Site Potential for Stockability." Can. Fr. of Fy Res Vol 13 No. 1; 1983

Hall, Frederick C , "Fire and Vegetation in the Blue Mountains. Implications for Land Managers " Proc Annual Tall Timbers Fire Biology Conference No. 15· 155-170, 1976

Hall, Frederick C., "Plant Communities of the Blue Mountain Area in Eastern Oregon and Southeastern Washington." USDA Forest Service. Pacific NW Region-Area Guide 3-1; 1973.

Harney, County of, "Comprehensive Plan, Oregon." (Place of publication unknown), (Date unknown). 140 p.

Harr, R D., "Movement of Subsurface Water on a Steep, Forested Slope " Trans. Am. Geogphys Union 56(8).532, 1975.

Harr, R D , "Forest Practices and Streamflow in Western Oregon " Gen Tech Rep. PNW-49, 18 p. USDA Forest Service; 1976

Harr, Dennis R ; et al , "Changes in Streamflow Following Timber Harvest in Southwestern Oregon " USDA Forest Service Research Paper PNW-249, 22 p , illus. Pacific Northwest Forest and Range Experiment Station, Portland, OR; 1979.

Harvey, Alan E., et al., "Decaying Organic Materials and Soil Quality in the Inland Northwest: A Management Opportunity." Gen. Tech. Rep INT-225, USDA Forest Service, 1987.

Hayes, H. H.; et al., "Temperature Effects on Physiological Traits of White-tailed Deer." Can. J. of Ecology 53. 679-685; 1975

Helvey, J. D., "Effects of a North Central Washington Wildfire on Runoff and Sediment Production." Water Resources Bulletin, Amer. Water. Res Assn. Vol. 16 No 4; 1980; pp 627-634

Helvey, J. D.; et al., "Climate and Hydrology of the Entiat Experimental Forest Watersheds Under Virgin Forest Cover." General Technical Report PNW-42 Portland, OR. USDA Forest Service Pacific Northwest Forest and Range Experiment Station; 1976, 18 p

Henjum; et al., "Habitat Effectiveness Index Model: Elk on Blue Mountain Winter Ranges." Ore. Dept Fish and Wildlife, LaGrande, OR; 1985.

Hershey, T. J , Leege, T A , "Influence of logging on elk summer range in north-central Idaho " pp 73-80, in Proc. Elk - Logging - Roads Symposium, Univ Idaho, Moscow; 1976.

Hewlett, J D ; Doss, R., "Forests, Floods, and Erosion. A Watershed Experiment in the Southeastern Piedmont." 1984, 433 p

Hibbs, C.H., "Mayflower Claims Group (Ochoco Mining District) Preliminary Cultural Resource Evaluation and Recommended Management Direction " Unpublished report, Ochoco National Forest, 1979.

Hinschberger M.; et al , "Gros Ventre cooperative elk study final report." 1974-1979 Wyoming Game and Fish Department, Cheyenne, and USDA Forest Service; 1980, 192 p

Hodgson, Allen H., "A History of the Ochoco National Forest " USDA, Forest Service; 1913

Hopkins, et al., "Sensitive Plant and Animal Field Guide for Area IV " USDA, Forest Service, R6-ECOL pp 1-131; 1983.

Hopkins, William E , Kovalchik, Bernard L., "Plant Associations of the Crooked River National Grassland " R6 Ecol pp. 133-198. USDA Forest Service, Pacific Northwest Region; 1983

Houpt, H F , "Road and slope characteristics affecting sediment movement from logging roads " *Journal of Forestry* 57.327-332, 1959

Iverson, David C , Richard M Alston, "The Senesis of FORPLAN Region 6 Training," USDA Forest Service, IMRS; 1986.

Jackman, Siri M.; Scott, Dr. J Michael, "Literature Review of Twenty-three Selected Forest Birds of the Pacific Northwest " USDA Forest Service, Pacific Northwest Region. 382 pp ; 1975

Jefferson County, "Comprehensive Plan " Madras, OR, 1981; 210 p.

Jenson, M L and A M Bateman, *Economic Mineral Deposits*. John Wiley and Sons, NY, 1981.

Johnson, K , "Westside Coordination Meeting Notes " USDA Forest Service Memo, September 21, 1983

Justus, D.L., "Geothermal Energy in Oregon: Site Data Base and Developmental Status " US Dept. of Energy (Draft); 1979.

Keegan, Charles E. III; et al , "Changes in Production Efficiency in Montana's Forest Products Industry, 1976-1987 " Montana Business Quarterly 25(4):8-12; 1987.

Keegan, Charles E. III, Polzin, Paul, "Trends in the Wood and Paper Products Industry and Their Impact on the Economy in the Pacific Northwest " Montana Business Quarterly 25(4).2-7; 1987.

Keen, F. P., Miller, J. M , "Biology and Control of the Western Pine Beetle." USDA, March 1960.

Kelly, James W.; et al., "FORPLAN Version I: User's Guide." USDA Forest Service, Washington DC, LMP Systems Sections, 1986.

Kent, Brian M ; et al , "FORPLAN," Version I· Mathematical Programmers' Guide USDA Forest Service, Washington DC, LMP Systems Sections; 1985.

Keyser, James D ; et. al , "Editors Management Strategy for the Treatment of Lithic Scatter Sites." Studies in Cultural Resource Management No. 7 Portland, Or: USDA Forest Service. Pacific Northwest Region; 1988.

Kidd, W J.; Megahan, W F., "Effects of Logging and Logging roads on Erosion and Sediment Deposition from Steep Terrain " In Journal of Forestry, Vol 70, No 3, March 1972

Kimball, J.; Savage, F., "Diamond Fork Aquatic and Range Habitat Improvement " Ogden, Utah· USDA Forest Service, Intermountain Region; 1977, 19 p

Klock, G O.; Lopushinsky, W , "Soil Water Trends after Clearcutting in the Blue Mountains of Oregon " USDA Forest Service, PNW - 361, May 1980.

Koplin, James R , "Measuring predator impact of woodpeckers on spruce beetles " *Journal of Wildlife Management*, Vol 36(2)· 308-320, 1972

Kovalchik, Bernard L., "Preliminary Riparian Community Type Classification of Central Oregon." USDA Forest Service. Region 6 Ecology Program June 1986

Leckenby, D. A , "Elk use and availability of cover and forage habitat components in the Blue Mountains, Northeast Oregon, 1976-1982." Oregon Department of Fish and Wildlife, Report No. 14. Portland, OR; 1984

Leckenby, D A., "Management of mule deer and their habitat· applying concepts of behavior, physiology, and microclimate." West Proc Ann. Conf West Assoc State Game and Fish Comm 57. 206-217, 1977

Lewis, Robert C., "Policy Formation and Planning for Outdoor Recreation Facilities." Outdoor Recreation - Advances in Application of Economics, by Hughes and Lloyd, USDA Forest Service, General Tech. Report WO-2.

Leege, Nelson, J R., "Nutritional requirements and feed habits " Chapter 8, *Elk of North America*. Edited by J W. Thomas and D E Towell. Stackpole Books, 1982; 698 p

Likens, G E.; et al , "Effects of Forest Cutting and Herbicide Treatment on Nutrient Budgets in the Hubbard Brook Watershed Ecosystem " Ecological Management 40 24-46, 1970

"Lithic Scatter Programmatic Memorandum of Agreement," Advisory Council on Historic Preservation, USDA Forest Service (Central and Eastern Oregon Forests) and Oregon State Historic Preservation Office, 1984

Long, B ; et al., "Gros Ventre Cooperative Elk Study -Final Report, 1974-1979 " Cheyenne, Wyoming, Wyoming Game and Fish Department and USDA Forest Service; 1980, 192 p.

Loomis, John; Sorg, Cindy, "A Critical Summary of Empirical Estimates of the Values of Wildlife, Wilderness, and General Recreation Related to National Forest Regions. Rock Mountain *Forest and Range Exp. Stn , USDA Forest Service, 1982.*

Lull, Howard W.; Reifsnyder, William E , "Radiant Energy in Relation to Forests " Tech Bull. No. 1344, U S Dept Agriculture; 1965.

Lusby, G , "Hydrologic and biotic effects of grazing vs. nongrazing near Grand Junction, Colorado." *J. Range Mgmt* 23(4) 256-260, 1970.

Lynch J. A , et al., "Best Management Practices for Controlling Nonpoint-source Pollution on Forested Watershed." *Journal of Soil and Water Conservation* Vol 40, No 1; 1985; pp. 164-167.

Lyon, Jack L ; et al., "Effects of Fire on Fauna." General Technical Report WO-6 Washington, D D · USDA Forest Service, 1978; 22 p

Lyon, Jack, J , "Field Test of Elk/Timber Coordination Guidelines " USDA, Research Paper INT - 325, Ogden, UT; 1983

Lyon, L. J., Ward, A. L , "Elk and Land Management " pp 443-477, in *Elk of North America - Ecology and Management,* ed. J.W Thomas and D E. Towell; 1982; 698 p

Lyon, L J., "Habitat effectiveness for elk as influenced by roads and cover " *Journal of Forestry* 77 658-660; 1979

MacCracken, J. G , Hansen, R M , "Diets of domestic sheep and other large herbivores in south-central Colorado " *Journal of Range Management*, 34 242-243, 1981

MacMellon, C. R , "Woodpeckers as predators of the codling moth in Nova Scotia " *The Canadian Entomologist*, Vol. XCI(11) 673-680, 1959

MacMellon, C. R , "Role of woodpeckers in control of the codling moth in Nova Scotia." *The Canadian Entomologist*, Jan 1958, pp 18-22

Mackie, R. J , "Impacts of livestock grazing on wild ungulates." Trans. N Amer Wildl and Nat. Res Conf 43 462-475, [Date Unknown]

Mahan, Mike, "Economic Survey Analysis " JTPA District 10 Salem, OR, State of Oregon, Employment Division, Department of Human Resources, 1984, 120 p

Maley, T.S , "Mining Law from Location to Patent " Mineral Lands Publications, Boise, ID 1985.

Mannan, R.W , "Territory Size and Habitat Preferences of Pileated Woodpeckers in Western Oregon." OSU Corvallis Ag Exp. Stat Tech., 1982.

Manning, K J , "Reconnaissance Geologic Report on a Portion of the Western Ochoco Mountains, Ochoco National Forest, Oregon, with an Emphasis on Rockhound Deposits " Ochoco National Forest, unpublished report, 1971

Martin, R. E , "Prescribed Burning for Site Preparation in the Inland Northwest " PNW Forest and Range Exp. Station, USDA Forest Service, 1976

Martin, Robert E , "Fire history and its Role in Succession." In Means, Joseph E , ed. Forest succession and stand development research in the Northwest. Proceedings of a symposium, 1981; Corvallis, OR Forest Research Laboratory, Oregon State University; 1982.

Mason, Richard R.; et al., "Douglas-fir Tussock Moth " USDA Pacific Northwest Region Forest Service, Forest Insect & Disease Leaflet #86; 1981.

McIntire, Tim, "Forest Health Through Silviculture and Integrated Pest Management - A Strategic Plan " USDA Forest Service; 1988; 26 p.

Megahan, W., "Channel stability and channel erosion processes." In· Proceedings, workshop on scheduling timber harvest for hydrologic concerns, Portland, OR; 1979.

Meyer, Walter H., "Yield of even-aged stands of ponderosa pine." USDA Technical Bulletin No 630. Washington, D.C ; 1938

Minor, R.; et al., "Prehistory and History of the Ochoco National Forest, Central Oregon." Part I and Overview, and Part II Site Inventory. Cultural Resource Report No.3. Prineville, Oregon· Ochoco National Forest, 1987

Minore, Don "Comparative Autecological Characteristics of Northwestern Tree Species - A Literature Review." Pacific Northwest Forest and Range Experiment Station, USDA Forest Service General Technical Report, PNW 87; 1979.

Mitchell, R. G.; et al., "Thinning Lodgepole Pine Increases Tree Vigor and Resistance to Mountain Pine Beetle " Forest Service, Vol. 29 No. 1, 1983, pp 204-211.

Moehring, D. M.; et al., "Clearcutting vs Alternative Timber Harvesting Regeneration Systems· Effects on Soils and Environment of the South " 1979, pp 447-515

Moen, A. M., "Wildlife Ecology " San Francisco: W H. Freeman and Co.; 1963, 458 p

Nelson, J. R ; Thomas, Jaqck Ward, "Relationship of Elk and Other Large Herbivores in Elk and North America Ecology and Management." ed J W. Thomas and D.E. Towell. Stockpole Books, Harrisburg, PA, 1982, 698 p.

Nelson R L., Platts, W S , "Streamside and Upland Vegetation Use by Cattle." Rangelands 7(1); 1985.

Newton, V.C., "Oil and Gas Exploration in Oregon." Oregon Department of Geology and Mineral Resources, Miscellaneous Paper #6; 1965.

Obermiller, W A., "Geologic, Structural and Geochemical Features of Basaltic and Rhyolitic Volcanic Rocks of the Smith Rock/Gray Butte Area, Central Oregon " MS Thesis, Dept. of Geology, University of Oregon, Eugene, OR; 1987.

Oregon Dept. of Geology and Mineral Industries "Bibliography of the Geology and Mineral Industries " Bulletin 103, 1987

Oregon Dept of Geology and Mineral Industries "Geothermal Resources of Oregon " map, scale 1 500,000, 1982.

Oregon, State of. "Economic Development Department " County Economic Indicators, Salem, OR; 1984; 22 p.

Oregon, State of. Employment Division, Department of Human Resources. "Data for 1984 Affirmative Action Programs (Crook County)." Salem, OR; [Date unknown], 18 p.

Oregon, State of. Employment Division, Department of Human Resources "Data for 1984 Affirmative Action Program (Harney County)." Salem, OR, [Date unknown], 18 p.

Pacha, R. E., "Effects of Dispersed Recreation on Water Quality." In Interior West Watershed Management symposium, April 1980, Spokane, WA. Edited by Baumgartner, Washington State University, Pullman. p. 161-168.

Parmeter, Jr, J. R., "Forest Stand Dynamics and Ecological Factors in Relation to Dwarf Mistletoe Spread, Impact, 2nd Control Symposium on Dwarf Mistletoe Control through Forest Management." April 11-13, 1978. Berkely, CA Pacific Southwest Forest and Range Experiment Station, USDA Forest Service General Technical Report PSW - 31, 1978.

Paulson, Dale J , "Ochoco National Forest Soil Resource Inventory " USDA Forest Service, Pacific Northwest Region; 1977; 289 p

Payne, G F.; et al., "Vehicle Impacts on Northern Great Plains Range Vegetation." Journal of Range Management 36(3) 327-331; 1983.

Peck, D.L., "Geologic Map of Oregon West of the 121st Meridian " USGS Miscellaneous Investigation Series, Map I-325, 1.500,000; 1983

Pedersen, R. H., "Management and impacts of roads in relation to elk populations " Pages 169-173 in Proc Rec. Impact on Wildlands Conf , Univ Wash , Seattle, 1978.

Pedersen, Richard, Biologist "Personal Communication " USDA, Forest Service, Regional Office; 1983

Perry, C ; Overly, R , "Impacts of roads on big game distribution in portions of the Blue Mountains of Washington 1972-1973 " Washington Game Department Applied Research Section, Olympia, 1977, Bull 11. 39 p

Philipek, Frances M , "Over-Snow Logging. Analysis of Impacts to Lithic Scatters Studies in Cultural Resource Management " No 5 Pacific Northwest Region USDA, Forest Service, Portland, OR; 1985.

Phillips, C A , Roberts, R. "Documentation of Wildlife Management Requirements." USDA Forest Service Memo; June 4, 1985.

Phillips, et al , Wildlife Habitats and Species Management Relationship Program 1981

Picton, H. D , "Land use impacts on elk in the Gallatin Valley " J. Soil and Water Conserv 35(2) 93-95, 1980

Platts, W S ; Meehan, W R , "Livestock grazing and the aquatic environment." *Journal of Soil & Water Conservation* 1978, pp 274-278

Platts, William S , "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America· effects of livestock grazing " William R Meehan Ed USDA Forest Service GTR-PNW-124, 1981; pp 9-12

Power, W E , "Effects & Observations of Soil Compaction in the Salem District " USDI, BLM, Technical Note, 1974

Programmatic Memorandum of Agreement for Management of Depression-Era Administrative Structures on National Forest Lands in Oregon and Washington. USDA Forest Service, Pacific Northwest Region, Oregon and Washington State Historic Preservation Offices, and the Advisory Council on Historic Preservation, 1983.

Raphael, Martin G ; White, Marshal, "Use of Snags by cavity nesting birds in the Sierra-Nevada " Supplement to Journal of Wildlife Management, Vol. (48)10. 1-66; 1984.

Ream, Catherine H "The Effects of Fire and other Disturbances on Small Mammals and their Predators: An Annotated Bibliography." Intermountain Forest and Range Exp. Station; 1981.

Rice, R M., "A Perspective on The Cumulative Effects of Logging on Streamflow and Sedimentation In· Proceedings." Edgebrook Conference Standiford, R B., S.I. Ramacher, ed Berkely, CA; 1980.

Rice, R M ; et al., "A watershed's response to logging and roads: South Fork of Casper Creek California." 1967-1976. Research Paper PSW-146, 12 p. Southwest Forest and Range Experiment Station; 1979

Rich, L R , Thompson, J.R , "Watershed Management in Arizona's Mixed Conifer Forests The Status of Our Knowledge " Rocky Mountain Forest and Range Experiment Station USDA Forest Service Research Paper RM-130, 15 pp ; 1974.

Rimal, D. et al , "Sediment, Rock Chip and Drill Core Geochemical Analytical Data, Gray Butte Area, Crooked River National Grassland, Jefferson County, Oregon." USDI Bureau of Land Management, Oregon State Office, Portland, OR; 1987

Robison, P T. and Stensland, D H., "Geologic Map of the Smith Rock Area, Jefferson, Deschutes and Crook Counties, OR." USGS Miscellaneous Geologic Investigation Series Map I-1142, 1·48,000, 1979

Rosenthal, Donald H , Brown, Thomas C., "Comparability of Market Prices and Consumer Surplus for Resource Allocation Decisions." Journal of Forestry, pp 105-109, 1985.

Robson, Thomas P., Stanford, Richard B , "Management of the Eastside Pine Type in Northeastern California Proceedings of Symposium." June 1982 Northern California School of American Foresters. SAF 83-06, 1983

Roth, Lewis F ; et al , "Marking Ponderosa Pine to Combine Commercial Thinning and Control of Armillaria Root Rot." *Journal of Forestry*; Vol 75 No 10, Oct. 1977

Rothwell, R L , "Watershed Management Guidelines for Logging and Road Construction in Alberta " Information Report NOR-X-208. Northern Forest Research Center, Edmonton, Alberta, Canada; 1978.

Rothwell, R. L., "Erosion and Sediment Control at Road-Stream Crossings." The Forestry Chronicle 4.83; 1983, pp 62-66.

Row, Clark H , et al , "Discount Rate for Long-Term Forest Service Investments." 1981

"Runoff from pastures in relation to grazing intensity and soil compaction " *J Am Soc* Agron 39 948-58

Russell, Kenelm W , "Precommercial Thinning in Dwarf Mistletoe Control " Washington State Department of Natural Resource, Olympia, WA, [No date]

Ruttner, Franz, "Fundamentals of Limnology." 3rd University of Toronto Press; 1963, 295 p

Sartwell, Charles, Dolph, R E , "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine." Research Note PNW-268. Portland, OR: USDA Forest Service Pacific Northwest Forest and Range Experiment Station, 1976

Schmitt, Craig, L.; et al., "Effects of Management Activities and Dominant Species Type on Pest Caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests." Portland, OR USDA Forest Service, Pacific Northwest Region, 1984.

Schuster, Ervin G ; et al., "Provisions for Protecting and Enhancing Nontimber Resources in Northern Region Timber Sales." Intermountain Forest and Range Experiment Station, USDA Forest *Service, Ogden, UT; 1984*

Schwavzbart, Gideon, Schmitz, Patrick L , "Methods for Evaluating Energy Effects of Forest Management Alternatives " Volume 1 Berkeley, CA USDA - Forest Service, Management Sciences Staff, 1982

Seidel, K. W., "Natural regeneration after shelterwood cutting in a grand fir - Shasta red fir stand in central Oregon " USDA Forest Service, Research Paper PNW - 259; 1979

Seidel, K. W., Cochran, P. H , "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " General Technical Report PNW-121 Portland, OR. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1981.

Shirley, R F , "Area Recommended for a Recreation Withdrawal from Mineral Entry for all Non-Metalliferous Minerals, Including, but Not Limited to, Agate, Jasper, Thundereggs, Limb Casts and Related Minerals Under the Authority of the Act of June 25, 1918." 43 USC 141, 142 unpublished report, Ochoco National Forest, 1970.

Shirley, R F , "Mineral Report, Rockhound Areas, Ochoco National Forest, and Crooked River National Grasslands." Unpublished report, Ochoco National Forest; 1966.

Sidle, R. C , "Impacts of Forest Practices on Surface Erosion " PNW 195, 1980; pp 5-9.

Skeesick D. G., Stewart, K S., "Stream Rehabilitation Needs Associated with Timber Harvest Units and Roads " USDA Forest Service, Willamette National Forest; 1981

Skinner, Q ; et al , "Effects of summer use of a mountain watershed on bacterial water quality Journal of Environmental Quality 3(4)· 329-325, 1974.

Smith, B , "Lands Valuable for Oil and Gas " Oregon USGS Map, 1 500,000, 1976

Soule, M E , Thresholds for survival maintaining fitness and evolutionary potential " In M E Soule and B A. Wilcox (ed) *Conservation biology, an evolutionary-ecological perspective* " Sinauer Assoc , Inc , Sunderland, MA 345; 1980.

Sparrow, S D.; et al , "Effects of off-road vehicle traffic on soils and vegetation in the Denali Highway region of Alaska " Journal of Soil and Water Conservation Vol 33(1), 1978, pp 20-27.

Spitz, Jim, "Socio-Economic Overview of the Ochoco National Forest and Crooked River National Grassland " Prineville, OR, Ochoco National Forest, 1982, 137 p.

Steele, R W , Barney, R J , "Bulldozers in Fire Management Current Designs and Uses " USDA Forest Service Intermountain Forest and Range Experiment Station, Research Note INT-328; 1983

Stone, E , "The impact of timber harvest on soils and water." In Rep President's Advisory Panel on Timber and The Environment, 1973; pp 427-467.

Stoszek, Karel J., "Protection Concerns in Plantation Establishment " [Proceedings of tree planting in the inland northwest] - D. Baumgartner editor, Feb. 1976, Washington State University, Pullmen, WA; 1976.

Street, Bill, "Economic Survey Analysis, JTPA District 12." Salem, OR, State of Oregon, Employment Division, Department of Human Resources, 1985, 120 p

Street, Bill, "Economic Survey Analysis, JTPA District 14 " Salem, OR, State of Oregon, Employment Division, Department of Human Resources, 1985; 120 p.

Styskel, E. W., "Problems in snag management implementations - a case study " pp. 24-27 in Proc. Snag Habitat Mgt. Symposium USDA Forest Service Rocky Mountain Range and Experiment Station, General Technical Department RM-99. Ft Collins, CO; 1983.

Swanson, D.A , "Reconnaissance Geologic Map of the East Half of the Bend Quadrangle, Crook, Wheeler, Jefferson, Wasco and Deschutes Counties, OR." USGS Miscellaneous Investigation Map I-568, 1·250,000; 1969.

Swanston, D N., "Impact of Natural Events " In. Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America, USDA Forest Service, GTR PNW-104; 1980.

Swinney, C.M, et al., "Reconnaissance Geologic Map of the Lookout Mountain Quadrangle, Crook and Wheeler Counties, Oregon " USGS Miscellaneous Geologic Investigations, Map I-543, 1.62,500, 1968,

Teply, John, "Ochoco National Forest - Summary Tables for Timber Resource Inventory." Pacific Northwest Region F S. USDA Portland, OR; 1982.

Theisen, Peter A , "Gains and Benefits from Tree Improvement " Pacific Northwest Region USFS Department of Agriculture Tree Improvement Training Packet No. 1; Aug. 26, 1980

Thomas, Jack Ward, "Wildlife Habitats in Managed Forests The Blue Mountains of Oregon and Washington." Agriculture Handbook No 553, USDA Forest Service, 1979

Tout, Deborah S , "Mineral Potential Report." Crooked River National Grassland; 1988

Troendle, C.A.; Leaf, C F., "An Approach to Water Resources Evaluation of Non-point Silvicultural Sources " Chapter 3, Hydrology EPA 60018-80-012, 173 pp. Env. Research Lab. Athens, GA, 1980

USDA Forest Service. "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region " June 1986.

USDA Forest Service, Pacific Northwest Region. "Regional Guide for the Pacific Northwest Region." Covering Forest programs that affect the States of Oregon, Washington, and portions of California and Idaho, 1984

Utzinger, Don, M S. Graduate Student "Personal communication " Portland State University, 1985.

Volland, Leonard A , Dell, John D., "Fire Effects on Pacific Northwest Forest and Range Vegetation." USDA Forest Service, Pacific Northwest Region, Portland, OR, July 1981

Walker, G W , "Geologic Map of Oregon East of the 121st Meridian " USGS Miscellaneous Investigations Series, Map I-902, 1.500,000, 1977.

Ward, L. A , "Elk behavior in relation to multiple uses on the Medicine Bow National Forest." Proc. West Assoc State Game & Fish Comm 53:125-141; 1973.

Waters, A.C., "Reconnaissance Geologic Map of the Post Quadrangle, Crook County, Oregon " USGS Miscellaneous Geologic Investigations, Map I-542,1:62,500; 1968

Waters, A.C, and R H. Vaughan, "*Reconnaissance Geologic Map of the Eagle Rock Quadrangle,* Crook County, Oregon " USGS Miscellaneous Geologic Investigations, Map I-540, 1 62,500, 1968.

Waters, A.C, and R.H. Vaughan, "Reconnaissance Geologic Map of the Ochoco Reservoir Quadrangle, Crook County, Oregon " USGS Miscellaneous Geologic Investigations, Map I-541, 1 62,500, 1968.

Waters, A.C., "Reconnaissance Geologic Map of the Bend Quadrangle, Jefferson and Wasco Counties, OR.." USGS Miscellaneous Geologic Investigations Map I-555, 1:125,000; 1968

Webb, R. H.; et al , "Environmental Effects of Soil Property Changes with Off-Road Vehicle Use " Environmental Management Vol 2, No. 3, 1978, pp 219-233

Wert, S , Thomas, B R , "Effects of Skid Roads on Diameter, Height & Volume Growth in Douglas-Fir." Soil Sciences of America Journal, Vol 45, 1981, pp 629-632

Wessenborn, A E , "Mineral and Water Resources of Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 64, 1969

Wheeler County and the Cities of Fossil, Mitchell, and Spray Comprehensive Plan *Technical Report (Draft) Pendleton, OR, East Central Oregon Association of Counties; 1980, 260 p.*

Wick, H L.; Canutt, P. R , "Impacts on wood production." Pages 148-161 in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington.* ed J.W Thomas. USDA Forest Service Agriculture Handbook No. 553, 1979, 512 p.

Wickman, Boyd E.; et al , "Douglas-fir Tussock Moth " Forest Insect and Disease Leaflet #86. Portland, OR· USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, 1981.

Williams, H , "A Geological Map of the Bend Quadrangle, OR " Oregon Dept of Geology and Mineral Industries, Map, Scale 1.125,000, 1957

Winters, R A., "Mineral Investigation of the Deschutes Canyon, RARE II Area (No 6321), Jefferson and Deschutes Counties, OR " USDI Bureau of Land Management, Portland State Office, Portland, OR, 1983

Wollott, S T., Pullar, D M , "Changes in Soil Physical Properties under Grazed Pastures " Journal of Soil Resource, 22 342-348, 1984.

Wooldridge, D. D , "Suspended Sediment from Truck Traffic on Forest Roads, Meadow and Local Creeks " Water Quality Planning, Office of Water Programs, Department of Ecology, Olympia, WA; 1979

Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

* Term is defined in the Glossary

Acronym	Definition
"8A"	Contracts set aside for Minority Contractors
A	Alternative A
A	Acres
ACF	Acre Foot *
ACHP	Advisory Council on Historic Preservation *
ADRV	Air Quality Related Values
AFDC	Aid for Dependent Children
AIRFA	American Indian Religious Freedom Act
AMP	Allotment Management Plan
AMS	Analysis of the Management Situation *
ASQ	Allowable Sale Quantity *
ATV	All-Terrain Vehicle *
AU	Animal Unit *
AUM	Animal Unit Month *
B-MOD	B-Modified Alternative
BD	Brush Disposal
BG	Big Game Habitat (Area Management Objective) *
BLM	Bureau of Land Management
BMP	Best Management Practices *
BOR	Bureau of Reclamation
B.t.	*Bacillus thuringiensis* *
BTU	British Thermal Units
C-MOD	C-Modified Alternative
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFL	Commercial Forest Land *
CFR	Code of Federal Regulations
CMAI	Culmination of Mean Annual Increment *
CRITFC	Columbia River Inter-Tribal Fish Commission
CRNG	Crooked River National Grassland
DBH	Diameter Breast Height *
DC/SF	Deschutes Canyon/Steelhead Falls
DEIS	Draft Environmental Impact Statement *
DEP	Departure *
DEQ	Oregon Department of Environmental Quality
DF	Douglas Fir
DIB	Diameter Inside Bark
DOGAMI	Oregon Department of Geology and Mineral Industries
E-DEP	E-Departure Alternative
EA	Environmental Assessment *
EA	Euro-American (Cultural Resources)
ECA	Equivalent Clearcut Area *
EEO	Equal Employment Opportunity
EFSA	Escaped Fire Situation Analysis
EHA	Equivalent Harvest Area *
EHE	Earned Harvest Effect *
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
FDR	Forest Development Road *
FEIS	Final Environmental Impact Statement *

FIA	Forest Influence Area
FMEI	Fire Management Effectiveness Index *
FORPLAN	Forest Planning Model
FPFO	Forestry Program for Oregon *
FRES	Forest and Range Environment Study
FS	Forest Service
FS	Forest Supervisor
FSH	Forest Service Handbook
FSM	Forest Service Manual
FUD	Fishing User Days
FWS	U S Fish and Wildlife Service
FY	Fiscal Year *
HE	Habitat Effectiveness *
HEI	Habitat Effectiveness Index
HCI	Habitat Capability Index *
I	Alternative I
ICO	Issues, Concerns, and Opportunities
ID	Interdisciplinary
IDT	Interdisciplinary Team (ID Team) *
IMPLAN	Forest Service Input-Output Economic Model *
IPM	Integrated Pest Management *
K-V	Knutson - Vandenberg Act of 1924 *
KV	Kilovolt
LIDES	Local Interactive Digitizing and Editing System
LMP	Land Management Planning
LP	Lodgepole Pine
LP	Linear Programming
LRMP	Land and Resource Management Plan
LTSYC	Long Term Sustained Yield Capacity *
M	Roman Numeral for 1000 *
MA	Management Area *
MA-D1-14	Management Area-Draft Plan, Areas 1-14
MA-F1-28	Management Area-Forest Plan, Areas 1-28
MA-G1-16	Management Area-Grassland Plan, Areas 1-16
MAI	Mean Annual Increment *
MAR	Management Attainment Report
MAX	Maximum Viable Population
MBF	Thousand Board Feet *
MC	Mixed Conifer *
MCF	Thousand Cubic Feet
MIS	Management Indicator Species *
MM	Million *
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MO	Management Objective
MOA	Memorandum of Agreement *
MOU	Memorandum of Understanding
MR	Management Requirement *
MRVD	Thousand Recreation Visitor Days
MVP	Minimum Viable Population *
NA	Native American
NC	No Change Alternative
NEPA	National Environmental Policy Act *
NFCR	North Fork Crooked River
NFDRS	National Fire Danger Rating System
NFF	National Forest Fund *
NFMA	National Forest Management Act *
NFS	National Forest System Land *

NIRP	National Information Requirements Project
NWPS	National Wilderness Preservation System
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle •
ONF	Ochoco National Forest
ORV	Off-Road Vehicle *
OSWC	Oregon State Wildlife Commission (Now ODFW)
PAMARS	Program Accounting Management Attainment Reporting System
PAOT	Persons at One Time •
PL	Public Law (also P.L.)
PMOA	Programmatic Memorandum of Agreement
PNV	Present Net Value *
PNW	Pacific Northwest
PP	Ponderosa Pine
PSD	Prevention of Significant Deterioration
R	Rural (ROS Classification) *
R-6	Forest Service, Northwest Region
RAMIS	Range and Management Information System
RARE II	Roadless Area Review and Evaluation *
RIM	Recreation Information Management *
RMO	Road Management Objective
RN	Roaded Natural (ROS Classification) *
RNA	Research Natural Area *
RO	Regional Office
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum *
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974
RVD	Recreation Visitor Days *
RWS	Recreation Wilderness Spectrum *
SCORP	State-wide Comprehensive Outdoor Recreation Plan
SEV	Soil Expectation Value
SHPO	State Historic Preservation Officer (or Office) *
SIP	State Implementation Plan (for Air Quality)
SMU	Streamside Management Units
SPM	Semiprimitive motorized (ROS Classification) *
SPNM	Semiprimitive Nonmotorized (ROS Classification) *
SRI	Soil Resource Inventory *
STARS	Sale Tracking and Reporting System.
S&G	Standards and Guidelines
T&E	Threatened and Endangered Species
T/R	Area to be developed for Timber/Forage Production
TIS	Transportation Inventory System
TRP	Timber Resource Plan
TSI	Timber Stand Improvement *
TSP	Total Suspended Particulates
TSPIRS	Timber Sale Program Information Reporting System
USDA	United States Department of Agriculture
USFS	United States Forest Service
VAC	Visual Absorption Capability
VIS	Visitor Information Service
VMS	National Forest Visual Management System
VQO	Visual Quality Objective
WFUD	Wildlife/Fish User Day •
WRS	Wilderness Resource Spectrum *
WS	Wild and Scenic Designation
WSA	Wilderness Study Area
WUD	Wildlife User Day

Glossary

GLOSSARY

These definitions apply to Forest Service land management and planning. Meanings may differ when used in another context. Some definitions were shortened, paraphrased or adapted to fit local conditions. Definitions of other terms used in resource management but not included in this glossary may be found in the following publications.

* American Geological Institute; *Dictionary of Geological Terms*. Doubleday & Company Inc., New York; 1962.

* Kothman M M ; *A Glossary of Terms Used in Range Management*. Society for Range Management; 1974.

* Mifflin, Ronald W. and Hiton H. Lysons. *Glossary of Forest Engineering Terms*. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1979

* Schwarz, Charles F.; Thor, Edward C.; Elsner, Gary H. *Wildland Planning Glossary*. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, General Technical Report PSW-13; 1976

A

ACCEPTABLE RIPARIAN CONDITION - A shady, brushy riparian condition with frequent amounts of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen; the site has the potential to produce conifers and/or hardwood species Moderately gentle bank slopes containing moderate to high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas. Frequent channel scouring and deposition will largely be replaced by mossy aquatic growth on assorted sizes of tightly packed rocks.

ACRE EQUIVALENT - Used to adjust actual acres of habitat improvement or improvement structures to reflect overall habitat benefits derived It reflects the zone of influence of the habitat improvement for the target species. For example, a single water development for upland game birds has an acre equivalent of 160, whereas a single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals.

ACRE FOOT (ACF) - A unit for measuring a volume of water Quantity of water required to cover 1 acre (43,560 square feet) to a depth of 1 foot.

ACRES OF DEGRADED WATERSHED CONDITION - represents existing soil/watershed areas which are degraded and contributing to loss in site productivity and/or creating water quality deterioration when hazardous events occur The Soil/Water Restoration Inventory (1979) for the Ochoco National Forest (located at the Ranger District Offices) delineates these areas.

ACTIVITY - Actions, measures, or treatments that are undertaken that directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309 11).

ADVISORY COUNCIL ON HISTORIC PRESERVATION (ACHP) - An independent advisory body established by the National Historic Preservation Act of 1966. The mission of the Council is to advise the President and Congress on national historic preservation policies, to encourage private and public interest in historic preservation, and to review and comment on Federal undertakings that might have an effect on properties listed on or eligible for the National Register of Historic Places.

ALL-TERRAIN VEHICLE (ATV) - An abbreviation whose initials stand for All-Terrain Vehicle, which is any motorized off-highway vehicle 50 inches or less in width ATV's usually have a dry weight of 600 pounds or less, traveling on three or more low pressure tires and having a seat designed to be straddled by the operator.

AIRSHED - A geographical area that, because of topography, meteorology, and climate, shares the same air

ALLOTMENT - see Range Allotment

ALLOWABLE SALE QUANTITY (ASQ) - (Comparable to programmed allowable harvest used in previous plans). The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan This allowable sale quantity (ASQ) is usually expressed on an annual basis as the "average annual allowable sale quantity." (FSM 1900).

ALL-TERRAIN VEHICLE (ATV) - Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low pressure tires with a seat designed to be straddled by the operator Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less as recommended by the vehicle manufacturer.

ALTERNATIVE - One of several policies, plans, or projects proposed for decision making

AMENITY - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land-use planning to describe those resource properties for which market values (or noncash values) are not or cannot be established, such as hiking or scenic viewing

ANADROMOUS FISH - Those species of fish that mature in the sea and migrate into streams to spawn. Salmon, steelhead, and searun cutthroat trout are examples.

ANALYSIS AREA - An area of land (not necessarily contiguous) which for FORPLAN analysis purposes has homogeneous timber management costs and vegetative responses to timber management activities

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - A step required under the National Forest Management Act in which the Forest determines its ability to supply goods and services to meet society's demand for them

ANIMAL UNIT (AU) - An animal unit is a 1,000 pound mature cow, or its equivalent based on an average daily forage consumption of 26 pounds dry matter per day.

ANIMAL UNIT MONTH (AUM) - The amount of forage required by an animal unit for one month.

ANNUAL PROGRAMMED HARVEST - That part of the potential timber yield that is scheduled for harvest in a specific year.

APPROPRIATE SUPPRESSION RESPONSE - The kind, amount, and timing of suppression action on a wildfire which most efficiently meets fire management direction under current and expected burning conditions The action may be from prompt control to confinement (See definitions for confine, contain, and control.)

AQUEOUS - Of, relating to, or resembling water.

ARCHAEOLOGY - The scientific study of the physical characteristics of cultural resources in order to describe and explain former ways of life.

ARTERIAL ROAD - Roads comprising the basic access network for National Forest System administrative and management activities These roads serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. They provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary

travel routes. The location and standards are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service Usually they are developed and operated for long-term land and resource management purposes and constant service.

B

***Bacillus thuringiensis* (*B.t.*)** - A biological agent used to initiate insecticidal treatments of the western spruce budworm populations.

BACKGROUND - The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. (See "Foreground" and "Middleground.")

BASALT - A dark gray to black, fine-grained igneous rock.

BENCHMARK - An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints.

BENEFIT COST RATIO - An economic indicator of efficiency, computed by dividing total priced benefits by priced costs. Usually both benefits and costs are discounted so that the ratio reflects efficiency in terms of the present value of future benefits and costs.

BEST MANAGEMENT PRACTICES (BMP) - A specific activity, measure, course of action, or treatment.

BIG GAME (BG) - Those species of large mammals normally managed for sport hunting, generally elk, deer, and antelope.

BIOLOGICAL DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

BIOLOGICAL POTENTIAL - The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

BOARD FOOT - A unit of timber measurement equaling the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

*Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement, attempting to do so would underestimate the biological potential of timber producing lands and make future growth estimates impossible See cubic foot

BRECCIA - A rock made up of highly angular coarse fragments.

BROADCAST BURN - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as silvicultural treatment, or both

C

CANOPY CLOSURE - The progressive reduction of space between crowns as they spread laterally, increasing the canopy density.

CAPABILITY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as on the application of management practices, such as silviculture or protection from fire, insects, and disease.

CAPITAL INVESTMENT COST - Costs generally associated with construction such as trails, roads, and physical structures for range, recreation, and fish and wildlife. Other major functions include reforestation, timber stand improvement and prescribed burning

CAVITY - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals.

CINNABAR - A mineral (HgS) which is the principal ore of mercury

CLEARCUTTING - The harvesting in one cut of all trees on an area for the purpose of creating a new, even-aged stand The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield.

COLLECTOR ROAD - Roads that serve smaller land areas than a Forest arterial road, and usually connected to a Forest arterial or public highway. Collect traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs, as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

COMMERCIAL FOREST LAND (CFL) - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

COMMERCIAL THINNING - A cut in a stand under rotation age designed to remove excess merchantable trees. The objective is to place the growth capability of the site on the remaining leave trees.

COMMODITY - A transportable resource product with commercial value; all resource products that are articles of commerce.

COMMON VARIETY MINERAL - Saleable minerals

COMMUNITY COHESION - The degree of unity and cooperation evident in a community as it defines problems and attempts to resolve them

COMMUNITY STABILITY - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change.

COMPACTION, SOIL - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

CONCERN - A point, matter, or question raised by management that must be addressed in the planning process.

CONFINE - To limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions

CONSTANT SERVICE - A road developed and operated for continuous or annual recurrent service.

CONTAIN - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions

CONTROL - To complete the control line around a fire, any spot fires therfrom, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control line; and cool down all hot spots that are immediate threats to the contol line, until the line can reasonably be expected to hold under foreseeable conditions

CONVERSION PERIOD - A transition period during which an unregulated forest structure is converted to a regulated one When regulated, the forest will have a distribution of stand age and size classes, providing approximately equal periodic harvests

CORD - A unit of volume measurement containing 128 cubic feet of solid wood Generally a stack of round or split wood measuring 4 feet wide by 4 feet high by 8 feet long.

CORRIDOR - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries

COST EFFICIENCY - The usefulness of specified inputs (costs) to produce specified outputs (benefits) In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least cost manner Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

COVER/FORAGE RATIO - The ratio, in percent, of the amount of area in cover condition to that area in non-cover or forage condition; the criteria by which potential deer and elk use of an area is judged

COVER - Vegetation used by wildlife for protection from predators, to ameliorate conditions of weather, or in which to reproduce

CUBIC FOOT - In timber management a volume measured as a 1 foot cube of solid wood.

*Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring within a locale, region, or the nation as a whole

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - The age at which a stand of trees no longer increases in average annual growth

CULTURAL RESOURCES - The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

CULTURAL RESOURCES - Physical remains of districts, sites, structures, buildings, networks, or objects used by humans in the past. They may be historic, prehistoric, archaeological, or architectural in nature. Cultural resources are land based and are nonrenewable

CUMULATIVE EFFECTS - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

CURRENT DIRECTION - The direction contained within the following plans that has guided the recent management of the Forest and Grassland:

1. Ochoco-Crooked River Planning Unit Land Management Plan, 1979
2. Silvies-Malheur Planning Unit Land Management Plan, 1978
3. Crooked River National Grassland Land Management Plan, 1980

4. South Fork Planning Unit Land Management Plan, 1978
5. Timber Resource Plan Ochoco National Forest, 1979

D

DATA - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer forms.

DATA RECOVERY - Collection of information through any of a variety of techniques (e.g., photography, mapping, archaeological excavation) conducted for purposes of No Adverse Effect or mitigating Adverse Effect. Data collection is designed to recover representative data from a cultural resource prior to its disturbance or destruction.

DBH - *D*iameter at *b*reast *h*eight. Diameter of a tree 4 feet 6 inches above the ground.

DECISION CRITERIA - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker in identifying a preferred choice from an array of possible alternatives.

DECISION VARIABLE - A component of an alternative in which input costs, outputs and benefits are identified and used for analysis and decision making.

DEMAND - The amount of goods or services that will be consumed if offered over a given range of prices at a particular point in time.

DEMOGRAPHIC - Pertaining to the study of the characteristics of human populations, such as size, growth, density, distribution, and vital statistics.

DEPARTURE (DEP) - Timber harvest schedule which deviates from the principle of nondeclining even flow by exhibiting a planned decrease in the timber sale and harvest schedule in the future. A departure is characterized as a temporary increase over the base sale schedule without impairing the Forest's long-term sustained-yield.

DETERMINATION OF ELIGIBILITY - Formal determination by the Keeper of the National Register, Department of Interior, as to whether or not a cultural resource is eligible for listing on the National Register of Historic Places.

DETERMINATION OF EFFECT - Determination of the effect (No Effect, No Adverse Effect, Adverse Effect) a proposed undertaking will have on cultural resources listed on or eligible for the National Register of Historic Places. Requires consultation with the State Historic Preservation Officer and may require review by or consultation with the Advisory Council on Historic Preservation

DEVELOPED RECREATION - Recreation that requires facilities that, in turn, result in concentrated use of an area. Examples of recreation areas are campgrounds and ski areas, facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings

DISCOUNT RATE - The interest rate used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits to a common time basis.

DISPERSED RECREATION - A general term referring to recreation use outside a developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments

DISPERSION - To disperse the effects of timber harvest by distributing harvest units more or less uniformly throughout a drainage so that increased runoff and sediment from disturbed sites will be buffered by lower levels of runoff and sediment production from surrounding undisturbed lands

DISTRICT - See Ranger District.

DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area.

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) - The version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for review and comment. It is a formal document which must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) Guidelines, and directives of the agency responsible for the project proposal.

E

EARNED HARVEST EFFECT (EHE) - An increase in the present harvest based on the expectation of increased yields in the future resulting from management practices such as planting genetically-improved stock and thinning.

ECONOMIC EFFICIENCY - See cost efficiency.

ECOSYSTEM - The interacting system of a biological community and its nonliving environment.

EDGE - The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together. It often contains organisms from both communities as well as those restricted to the interface area. The number of species present is often greater than the surrounding communities.

EFFECTS - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in the FEIS are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

ELIGIBLE - Cultural properties that meet the criteria for listing on the National Register of Historic Places.

EMPIRICAL YIELD TABLE - A table reflecting the existing standing timber volumes today and how they would grow in the future, under various timber management regimes

ENDANGERED SPECIES - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act

ENDEMIC - A taxonomic category (e g , genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

ENDEMIC ORGANISM - A taxonomic category (e g , genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited

ENHANCE - To improve, reinforce, enrich or strengthen the existing condition, value, or beauty of a resource

ENHANCEMENT - Interpret cultural resources for the public benefit Cooperate with museums, universities, and other recognized institutions, agencies, and knowledgeable persons in planning and constructing cultural resource exhibits involving National Forest System cultural resources Coordinate these efforts with

interpretive Services people (FSM 2390). Enhancement efforts may include the full range of interpretive techniques. Because enhancement may affect the resource, comply with regulations set forth in FSM 2366 In all cases consider a determination of beneficial effect (FSM 2366 26)

ENVIRONMENT - The sum of all external conditions and influence affecting the life, development, and survival of an organism.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short- and long-term environmental effects, incorporating the physical, biological, economic, social, and environmental design arts and their interactions.

ENVIRONMENTAL ASSESSMENT (EA) - A concise public document required by the regulations implementing the National Environmental Policy Act.

EPIDEMIC - An outbreak of sudden rapid spread, growth, or development.

EPITHERMAL MINERAL DEPOSIT - A deposit formed in rocks of shallow depth from low-temperature hydrothermal solutions

EQUIVALENT CLEARCUT AREA (ECA) - That area which when harvested under any of the various silvicultural regimes produces hydrological effects similar to one acre of clearcut.

EQUIVALENT HARVEST AREA (EHA) - The same as Equivalent Clearcut Area (ECA)

EROSION - The processes whereby earthy or rocky material is worn away, loosened, dissolved and removed from any part of the earth's surface

EVAPOTRANSPIRATION - Process by which water moves from the soil to the atmosphere by evaporation from the soil or transpiration through plants

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands

EXCELLENT RIPARIAN CONDITIONS - An extremely shady and brushy riparian condition with an abundance of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen will be present, the site has the potential to produce conifer and/or hardwood species Gentle bank slopes, high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas. Channel scouring will be minimized with deposition replaced by mossy aquatic growth on assorted sizes of tightly packed rocks.

F

FAULT A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

FAWNING AREAS - areas used regularly by female deer for fawning (and maintaining fawns for their first few days or weeks); optimum fawning habitat includes low shrubs or small trees under a tree overstory of about 50-percent closure, usually located on slopes of less than 15 percent where vegetation is succulent and plentiful in June and potable water is available within 183 meters (600 feet)

FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS) - The final version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) It is a revision of the Draft Environmental Impact Statement to include public and agency responses to the

draft. It is a formal document which must meet legal requirements and is the document used as a basis for judicial decisions concerning compliance with NEPA

FIRE HAZARD REDUCTION - The treatment of fuels and residues, which reduces the potential fire's rate of spread or intensity.

FIRE MANAGEMENT EFFECTIVENESS INDEX (FMEI) - A number derived by totaling the cost of a fire protection organization and fire suppression cost with the net value change and dividing that figure by 1000 acres.

FIREWOOD - Wood, either round, split or sawn, and burned primarily for heating purposes

FISCAL YEAR (FY) - October 1st to September 30th.

FLOODPLAIN - The lowland and relatively flat areas adjoining inland and coastal waters (including debris cones and floodprone areas of offshore islands) including, at a minimum, those areas subject to a one-percent or greater chance of flooding in any given year (100-year recurrence).

FORAGE (LIVESTOCK) - All grass and grass-like plants.

FORAGE (WILDLIFE) - All browse and herbacious food that is available to wildlife for grazing.

FORBS

1. Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges) and Juncaceae (rushes) families - i e , any nongrass-like plant having little or no woody material on it.

2 A palatable, broad-leaved, flowering herb whose stem (above ground) does not become woody and persistent

FOREGROUND - A term used in scenic management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway. (See "Background" or "Middleground.")

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT OF 1974 (RPA) - An Act requiring the preparation of a program for the management of the National Forests' renewable resources and of Land and Resource Management Plans for units of the National Forest System. It also requires a continuing inventory of all forest, rangelands, and renewable resources nation-wide.

FOREST DEVELOPMENT ROADS (FDR) - Roads that are part of the Forest transportation system,which includes all existing and planned roads, as well as other special and terminal facilities designed as Forest development transportation facilities.

FOREST HEALTH - A condition where biotic and abiotic influences on the Forest (i.e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives either now or in the future

FOREST INVENTORY PLAN - A plan, based on known cultural and environmental information, that delineates areas of varying degrees of suspected cultural resource potential.

FOREST PLAN - The National Forest Land and Resource Management Plan (Forest Plan) guides all natural resource management activities and establishes management standards and guidelines for the Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management It is prepared under the implementing regulations and requirements of NFMA

FORESTRY PROGRAM FOR OREGON (FPFO) - A comprehensive forest management program developed by the State of Oregon for all forest lands in the state regardless of ownership

FOREST STANDARD - A performance criterion indicating acceptable norms or specifications that actions must meet to maintain the minimum conditions for a particular resource. This type of standard applies to all areas of the Forest regardless of the other management area direction applied

FOREST SUPERVISOR - The official responsible for administering the National Forest System lands in a Forest Service administrative unit. He or she reports to the Regional Forester

FORPLAN - *The forest planning model A linear programming software package used to analyze planning* decisions regarding land use patterns, capital investment, and timber harvest scheduling.

FUEL BREAK - A strategically located strip of land, usually 100 to 500 feet wide, that has been altered by removal of flammable vegetation so that fires burning into it can be more readily extinguished.

FUELS - Anything within the Forest that will burn. Usually live and dead woody vegetation (e.g., grass, shrubs, trees).

FUEL TREATMENT - The rearrangement or disposal of fuels to reduce the fire hazard.

G

GEOMORPHIC - Of, or pertaining to, the form of the earth, or its solid surface features.

GEOTHERMAL - Of, or pertaining to, the heat of the earth's interior.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

GOODS AND SERVICES - The various outputs, including on-site uses, produced from forest and rangeland resources.

GRAZING - Consumption of range or pasture forage by animals.

GRAZING SEASON - 1. A period of grazing to obtain optimum use of the forage resource. 2 On public lands an established period for which grazing permits are issued.

GREEN DOT SYSTEM - A seasonal vehicular management program which visually indicates travel routes open to public use; roads not identified by the green dot, and cross-country travel, are closed to public use during the designated time period

GROUND WATER - Water in a saturated zone of a geologic stratum

GROUP SELECTION - A modification of the selection system in which trees are removed in small groups at a time.

GUIDELINE - An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to a standard, which is mandatory).

H

HABITAT - The sum total of environmental conditions of a specific place occupied by a wildlife or plant species or a population of such species.

HABITAT CAPABILITY INDEX (HCI) - A process used to determine habitat capability for big game by evaluating thermal cover and road density.

HABITAT DIVERSITY INDEX - A number that indicates the relative degree of diversity in habitat forest wide

HABITAT EFFECTIVENESS (HE) - A combination of both quantity and quality of habitat, including both natural and introduced factors, which produces a specific habitat condition that either limits or generates habitat use by a wildlife species.

HARVEST CUTTING METHOD - The combination of management practices used to manipulate forest vegetation resulting in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged

HEAP LEACH - A mineral extraction process in which a solution (commonly cyanide solution) percolates through a pile (heap) of ore, dissolving the metal being extracted. The solution is collected after it percolates through the heap, and the metal is recovered from the solution. This is a common extraction process for low-grade deposits of gold, copper and silver.

HERBACEOUS - Having little or no woody tissue and persisting usually for a single growing season.

HIGH CLEARANCE VEHICLES - Motorized vehicles that can drive over minor obstacles because of their elevated frame.

HISTORIC - Refers to the period of time for which there are written records (after European contact). In Region 6, the historic era begins at roughly 1800 A.D., with the first explorers who kept journals.

HYDROLOGIC - Pertaining to the quantity, quality, and timing of water yield from forested lands.

HYDROPHOBIC - Lacking affinity for water.

HYDROTHERMAL - An adjective applied to heated or hot aqueous-rich solutions, to the process in which they are concerned, and to the rocks, ore deposits, and alteration products produced by them.

I

IGNEOUS ROCK - Rock formed by the crystallization of once molten material called lava or magma.

IMPLAN - A Forest Service input-output model that is an economic model which predicts the behavior of an economy as certain portions of the economy are altered

IMPROVED ROAD - A constructed or maintained vehicle way for the use of highway-type vehicles having more than two wheels.

INDICATOR SPECIES - A plant or animal species so highly adapted to a particular kind of environment that its mere presence is sufficient indication that specific conditions are also present. (W-W DEIS).

INTEGRATED PEST MANAGEMENT (IMP) - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

INTENSIVE FOREST MANAGEMENT - A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, pre-commercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest

INTERDISCIPLINARY TEAM - A group of individuals with different training assembled to solve a problem or perform a task.

INTERMINGLED OWNERSHIPS - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies. Because of early land grants, these lands frequently are in checkerboard ownership patterns.

INTERMITTENT SERVICE - A road developed and operated for periodic service and closed between periods of use.

INTERPRETATION - Educational activity which aims to reveal meaning and relationships of the natural and cultural environment through first-hand experience.

IRRETRIEVABLE - Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed The production lost is irretrievable, but the action is not irreversible.

IRREVERSIBLE - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods Irreversible also includes loss of future options.

ISSUE - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

J

JASPEROID - Agate, jasper, or thundereggs.

K

KNUTSON - VANDENBERG ACT OF 1924 (K-V) - An act that allows for the use of receipts for National Forest timber to reforest, to conduct stand improvement work or to perform improvement projects for other resources on the area where timber was harvested.

L

LAND ALLOCATION - The decision to use land for various resource management objectives in order to best satisfy the planning process issues, concerns, and opportunities, and meet assigned forest output targets.

LAND EXCHANGE - The conveyance of non-Federal land or interest in the land to the United States in exchange for National Forest System land or interest in the land.

LANDLINE LOCATION - Location of Forest property boundaries.

LIFESTYLE - A characteristic way of living which may be an individual variant within the cultural mainstream or may be an individual expression of a subculture

LEASABLE MINERALS - Generally include minerals such as oil, gas, oil shale, coal, potassium, sodium, phosphates, sulphur, and geothermal.

LOCAL ROADS - Local roads are usually one-lane roads constructed to serve a dominant use or resource Local roads do not access large land areas since they are more site specific than arterial and collector roads.

LOCATABLE MINERALS - These resources include gold, silver, lead, copper, and mercury, which are mined and processed for metals, and some uncommon nonmetallics.

LOGGING SYSTEMS -

Tractor Logging - A system of log transportation in which logs are pulled from the woods to a landing by means of a crawler tractor, skidder, or similar ground-based equipment.

High-Lead Logging - A system of cable logging in which the working lines are elevated at the landing area by a rigged wooden tree or portable steel spar.

Skyline Logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

Balloon Logging - A system of cable logging in which the weight of the logs is counteracted by the lift provided by a lighter-than-air balloon.

Helicopter Logging - A system of transporting logs from the woods to a landing as an external load on a helicopter.

LONG-TERM EFFECTS - Those effects which will be significant beyond the RPA planning horizon of 50 years

LONG-TERM SUSTAINED-YIELD TIMBER CAPACITY (LTSYC) - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M

M - The Roman numeral for 1000.

MBF - One thousand board feet. Lumber or timber measurement.

MM - Million

MANAGED STAND - A stand of trees in which stocking level control is applied to achieve maximum growth

MANAGED YIELD TABLE - A table showing, for a given species (or species mix) on a given site, the progressive development of a managed stand at periodic intervals covering the greater part of its useful life It usually includes average diameter, basal area, number of trees, standing volume, and harvest volumes for a specific timber management regime.

MANAGEMENT AREA (MA) - A unit of land allocated to emphasize a particular resource, based on the capability of the area.

MANAGEMENT CONCERN - An issue, problem or a condition which constrains the range of management practices identified by the Forest Service in the planning process.

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

MANAGEMENT INDICATOR SPECIES (MIS) - A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other wildlife species.

MANAGEMENT INTENSITY - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services

MANAGEMENT PRESCRIPTION - Management practices selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

MANAGEMENT REQUIREMENT (MR) - Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives. (See 36 CFR 219 27)

MARGINAL COMPONENT - The portion of the commercial forest land on which it is presently not feasible (economically or technologically) to manage for timber crops but on which it may be possible in the future.

MASS-WASTING - A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. (Dictionary of Geological Terms) Also mass movement.

MAXIMUM MODIFICATION - See "Scenic quality Objectives "

MEAN ANNUAL INCREMENT (MAI) - The total increment up to a given age divided by that age

MEMORANDUM OF AGREEMENT (MOA) - A three-party agreement (responsible Forest Service Official, State Historic Preservation Officer, Executive Director of the Advisory Council on Historic Preservation) which documents an agreed-upon plan to mitigate a proposed project's adverse effect upon cultural resources listed on or eligible for the National Register of Historic Places

METAMORPHIC ROCK - Rocks changed by heat and pressure causing recrystallization and loss of original characteristics.

MIDDLEGROUND - The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand. (See "Foreground" and "Background.")

MINERAL DEVELOPMENT - The activities and facilities associated with extracting a proven mineral deposit

MINERAL ENTRY - Filing a mining claim on public land to obtain the right to any minerals it may contain.

MINERAL EXPLORATION - The search for valuable minerals on lands open to mineral entry.

MINERAL RESERVE - That portion of a mineral resource from which a mineral commodity can be economically and legally extracted.

MINERAL RESOURCE - A concentration of naturally occurring solid, liquid, or gaseous materials in or on the Earth's crust in such a form that economic extraction of a mineral resource is currently or potentially feasible (BLM Manual 3031).

MINIMUM VIABLE POPULATION (MVP) - The low end of the viable population range

MITIGATION - To moderate the force or intensity of environmental effects. To lessen or minimize an Adverse Effect upon a cultural resource listed on or eligible for the National Register of Historic Places The two categories of mitigation most often used are project modification and data recovery.

MIXED CONIFER (MC) - A stand of coniferous trees with a mixture of species Ponderosa pine will usually make up 25 percent to 75 percent of the species composition.

MODIFICATION - See "Scenic Quality Objectives."

MONITORING - A process of collecting significant data from defined sources to identify departures or deviations from expected plan outputs.

MOUNTAIN PINE BEETLE - A small insect (1/8 - 5/8 inch) that bores into the tree's cambium and deposits its eggs Larvae emerge from the eggs and feed upon the cambiel layer and thus disrupt the tree's translocation of food Frequent attacks on the host tree result in the tree's mortality

MORTALITY - The volume of sound wood dying from natural causes during a specified period.

MULTIPLE-AGED STANDS - An intermediate form of stand structure between even-/ and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand

MULTIPLE USE - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources, and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

N

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) - An act declaring a National policy to encourage productive harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

NATIONAL FOREST FUND (NFF) - An account that includes all receipts (to the U.S. Treasury) from proclaimed National Forests for timber, grazing, land use, power, minerals, and user fees.

NATIONAL FOREST MANAGEMENT ACT (NFMA) - A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

NATIONAL FOREST SYSTEM (NFS) LAND - Federal lands that have been designated by Executive order or statute as National Forests, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands.

NATIONAL RECREATION TRAILS - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by the National Trails System Act National Recreation Trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas

NATIONAL REGISTER OF HISTORIC PLACES - A register of cultural resources of national, state, or local significance, maintained by the Department of the Interior.

NATIONAL WILD AND SCENIC RIVER SYSTEM - Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designed by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition

NET PUBLIC BENEFIT - An expression used to signify the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index

NO ACTION ALTERNATIVE (Alternative A) - The most likely condition expected to exist in the future if current management direction were to continue unchanged.

NONCOMMERCIAL SPECIES - Species that have no economic values at this time nor anticipated timber value within the near future

NONDECLINING EVEN FLOW - A policy governing the volume of timber removed from a National Forest, which states that the volume planned for removal in each succeeding decade will equal or exceed that volume planned for removal in the previous decade

NONFOREST LAND - Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

NONMARKET - (Noncash economic benefits) Products derived from National Forest resources that do not have a well-established market value, for example, wilderness, wildlife.

NONPRICED OUTPUTS - Outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs.

NONSTRUCTURAL RANGE IMPROVEMENT - Practices and treatments undertaken to improve range not involving construction of improvements (e.g., seeding, fertilizing, or prescribed burning).

O

OBJECTIVE - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

OBLITERATE - The action needed to close an unneeded road and return the land to production.

OFF-HIGHWAY TRAVEL MANAGEMENT OBJECTIVES - These objectives relate to the recreation opportunities for off-highway use on areas and trails on National Forest lands The objectives, which include off-highway travel criteria, are developed from management area direction and access management objectives.

OFF-ROAD or OFF-HIGHWAY VEHICLES (ORV's or OHV's) - Any vehicle, including ATV's, which is restricted by law from operating on public roads reserved for general motor vehicle traffic

OLD GROWTH STAND - An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage, 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

OPERATION AND MAINTENANCE COSTS - Costs associated with operating and maintaining facilities, program management, and support costs associated with management of other resources

ORE - A mineral deposit which can be extracted at a profit.

ORV CLOSURE - An administration order closing a land area to specified types of off-road vehicle travel yearlong

ORV RESTRICTION - An administrative order restricting a land area to specified types of off-road vehicle travel during specific seasons or conditions

OUTPUT - The goods, end products, or services that are purchased, consumed, or used directly by people Goods, services, products, and concerns produced by activities that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives A broad term for describing any result, product, or service that a process or activity actually produces

OVERMATURE - The stage at which a tree declines in vigor and soundness, for example, height growth has usually stopped and probability of mortality is high

OVERSTORY - The portion of trees in a forest which forms the upper most layer of foliage

OVERSTORY REMOVAL - A type of harvest which is designed to remove all of the trees in the overstory The objective is to release the acceptably stocked understory.

OVERVIEW - A report, based primarily on archival research, that organizes and summarizes cultural resource information from a particular National Forest or geographic area.

P

PACIFIC NORTHWEST REGION - A Forest Service organizational unit consisting of all the National Forests in Oregon and Washington.

PARTIAL CUT - Any cutting other than a clearcut. This may include thinning, selection shelterwood or an overstory removal.

PARTIAL RETENTION - See "Scenic Quality Objectives."

PERMITTED GRAZING - Use of a National Forest range allotment under the terms of a grazing permit

PERSONS-AT-ONE-TIME (PAOT) - The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate the capacity of an area or facility to support peak usage within established user density standards and without degradation to biophysical resources.

PHYSIOGRAPHIC - Pertaining to physical geography.

PHYSIOGRAPHIC PROVINCE - Region of similar structure and climate that has had a unified geomorphic cycle.

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions.

PLANNING PERIOD - Generally one decade. The time interval within the planning horizon that is used to show incremental changes to yields, costs, effects, and benefits.

PLANNING RECORDS - A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

PLANT ASSOCIATION - Climax plant community type

PLANT COMMUNITIES - A homogeneous unit in respect to the number and relationship of plants in the tree, shrub, and ground cover strata

POTENTIAL YIELD - The maximum, perpetual, sustained-yield harvest attainable through intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment

PRECOMMERCIAL THINNING - The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

PREHISTORIC - Relating to the period of time before written records (prior to European contact). In Region 6, before 1800 A.D., or before the advent of written records

PRESCRIBED BURNING - Use of fire in forest management for hazard reduction and vegetative manipulation.

PRESCRIBED FIRE - A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester.

PRESENT NET VALUE (PNV) - The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area

PRESERVATION - See "Scenic Quality Objectives."

PRIMARY CAVITY EXCAVATOR - An animal that excavates a cavity in wood for nesting or roosting.

PRIME FARMLAND - All land which qualifies for rating as Class I or as Class II in the U.S Soil Conservation Service land use capability classification

PRIMITIVE ROADS - Roads constructed with no regard for grade control or designed drainage, sometimes by merely repeated driving over an area. These roads are single lane, usually with native surfacing and sometimes passable with 4-wheel drive vehicles only, especially in wet weather

PROGRAMMED ALLOWABLE HARVEST - That part of the potential yield scheduled for harvest in a specific year. It is based on demand, funding, management needs and multiple use considerations and, as a consequence, may vary over time.

PUMICE - A volcanic glass full of cavities and very light in weight.

PYROCLASTIC ROCK - A rock consisting of unreworked solid material explosively or aerially ejected from a volcanic vent

PUBLIC ISSUE - A subject or question of widespread public interest relating to management of National Forest System.

PUBLIC PARTICIPATION - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

PURCHASER CREDIT - Credit earned by the purchaser of a National Forest timber sale by construction of contract-specified roads. Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed.

R

RANGE ALLOTMENT - A designated area available for livestock grazing upon which a specified number, kind of livestock and season of use may be grazed under a term grazing permit. The basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service

RANGE CONDITION - The state or health of the range vegetation and soil to produce a stable biotic community based on the composition, density, and vigor of the vegetation and the physical characteristics of the soil Condition is expressed as satisfactory or unsatisfactory

RANGE IMPROVEMENT - Any structure or nonstructural improvement to facilitate management of rangelands or livestock.

RANGELAND - Land where the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for livestock grazing and browsing.

RANGE MANAGEMENT - The art and science of planning and directing range use to obtain sustained maximum animal production, consistent with perpetuation of the natural resource

RANGER DISTRICT - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

RARE II - See Roadless Area Review and Evaluation II.

REAL DOLLAR VALUE - A monetary value which compensates for the effects of inflation.

RECONSTRUCTION - Road or trail construction activities which take place on an existing road or trail and raise the standard of the road or trail This can include relocation of the facility in a completely new location

RECREATION CAPACITY - The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience of the biophysical resources

RECREATION INFORMATION MANAGEMENT (RIM) - A computer oriented system for the organization and management of information concerning recreation use, occupancy, and management of National Forest land

RECREATION OPPORTUNITY SPECTRUM (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. *Primitive* - Area is characterized by an essentially unmodified natural environment of fairly large size Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.

2. *Semiprimitive Nonmotorized* (SPNM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size Interaction between users is low, but there is often evidence of other uses The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis Use of such roads is restricted to minimize impacts on recreational experience opportunities.

3 *Semiprimitive Motorized* (SPM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted

4. *Roaded Natural* (RN) - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities

5. *Rural* (R) - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily

evident, and the interaction between users is often moderate to high A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities Moderate user densities are present away from developed sites Facilities for intensified motorized use and parking are available.

6 *Urban* - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site Large numbers of users can be expected both on site and in nearby areas Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site

RECREATION VISITOR DAY (RVD) - A measure of recreational use of an area. One recreation visitor day consists of 12 hours of recreation use of a site or area Recreation visitor days are used as a recreation production or output capacity measure.

RECREATION WILDERNESS SPECTRUM (RWS) - This is associated with the recreation opportunity spectrum (ROS), a system used to classify or differentiate areas within wilderness to provide for a variety of management possibilities and wilderness opportunities The objective of all classifications is to provide wilderness opportunities but to different degrees, from pristine to the semiprimitive transition

REFORESTATION - The natural or artificial restocking of an area usually to produce timber and other wood products, but also to protect watersheds, prevent soil erosion, and improve wildlife, recreation and other natural resources Natural reforestation includes site preparation to reduce competing vegetation and provide a mineral seed bed for seed provided by seed trees Artificial reforestation is the planting of seedlings, cuttings or seeds by hand or mechanical means and may include site preparation

REGENERATION CUT - The removal of trees intended for the purpose of assisting regeneration already present or to make regeneration of the stand possible.

REGION - The standard administrative unit of the Forest Service administered by a Regional Forester.

REGIONAL FORESTER - The official responsible for administering a single Region and preparing a Regional Guide.

REGIONAL GUIDE - The plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given region It also disaggregates the RPA objectives assigned to the Region and to the Forest within that region

REGULATIONS - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

REHABILITATION - Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.

RESEARCH NATURAL AREAS (RNA's) - An area set aside by the Forest Service to preserve a representative sample of an ecological community; primarily for scientific and educational purposes Commercial exploitation is not allowed and general public use is discouraged.

RESOURCE - An aspect of human environment which renders possible or facilitates the satisfaction of human wants and the attainment of social objectives.

RESOURCE VALUES - The tangible and intangible worth of forest resources

RESPONSIBLE LINE OFFICER - The Forest Service employee who has the authority to select and/or carry out a specific planning action.

RESTORATION - The long-term placement of land back into its natural condition or state of productivity

RETENTION - A scenic quality objective which means human activities are not evident to the casual forest visitor.

REVEGETATION - The re-establishment and development of a plant cover. This may take place naturally *through the reproductive processes of the existing flora or artificially through the direct action of man* - reforestation or range reseeding.

RIGHT-OF-WAY - The right to pass through another person's land as obtained by condemnation or purchase

RIM - See Recreation Information Management.

RIPARIAN AREAS - The riparian ecosystem (area) is that land, next to water, where plants that are dependent on a perpetual source of water occur Riparian sites include fluvial surfaces such as streambanks, active channel shelves, active floodplains, and overflow channels.

RIPRAP - A structure built of broken rock or other material used for protecting exposed soil from erosion along stream channels or road ditches.

ROAD DENSITY - The number of road miles per square mile of land area

ROADLESS AREA - An area of undeveloped Federal land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use

ROADLESS AREA REVIEW AND EVALUATION (RARE II) - A comprehensive process directed by the Secretary of Agriculture to identify roadless and undeveloped land areas in the National Forest system and to determine their uses for either wilderness or other resource management and development and to determine areas that would require further planning to make such a decision.

ROADLESS ISLANDS - A roadless area that is surrounded by permanent waters, or that is markedly distinguished from surrounding lands by topographical or ecological factors such as precipices, canyons, thickets, or swamps.

ROAD MANAGEMENT OBJECTIVES - Road management objectives establish the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria

ROS - See Recreation Opportunity Spectrum.

ROTATION AGE - The age of a stand when regeneration harvest occurs.

RPA - Forest and Rangeland Renewable Resources Planning Act of 1974.

ROCKHOUND - An amateur rock and mineral collector.

RVD - See Recreation Visitor Day.

S

SALEABLE MINERALS - Saleable minerals include common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. In general, these minerals are of wide-spread occurrence and are of relatively low unit value. They are generally used for construction materials and for road building purposes Saleable minerals, which have some property giving them distinct and special value, remain locatable. Before a deposit can be sold, a determination of "common variety" must be made by minerals staff and legal counsel

SALVAGE HARVEST - Removal of dead or dying trees resulting from insect and disease epidemics or wildfire.

SANITATION HARVEST - Removal of dead or dying trees to prevent spread of insects or disease

SAWTIMBER - Trees that will yield logs suitable in size and quality for the production of dimension lumber

SCENIC QUALITY OBJECTIVES - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape

1 *Preservation* - Ecological change only.

2. *Retention* - Human activities are not evident to the casual Forest visitor

3. *Partial Retention* - Human activity may be evident, but must remain subordinate to the characteristic landscape.

4 *Modification* - Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture It should appear as a natural occurrence when viewed in foreground or middleground

5 *Maximum Modification* - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

SCENIC RESOURCE - The composite of basic terrain, geologic features, water features, vegetative patterns, and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors

SCOPING - Determination of the significant issues to be addressed in an EIS.

SEDIMENT - Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

SEDIMENTARY ROCK - A rock made up of sediment

SEED CUT - Removal of mature trees near rotation age in a shelterwood harvest to permanently open the stand and prepare the site for regeneration from the seed trees left for that purpose.

SEEDLING/SAPLING - A forest successional stage in which trees less than five inches in diameter are the predominant vegetation.

SELECTION CUTTING - The annual or periodic removal of trees (particularly the mature), individually or in small groups from an uneven-aged forest to achieve the balance among diameter classes needed for sustained yields, and in order to realize the yield, and establish a new crop of irregular constitution NOTE: The improvement of the Forest is a primary consideration.

SELECTION SYSTEM - A silviculture system in which trees in an uneven-aged stand are removed individually, here and there, from a large area each year in order to achieve a balance among diameter classes needed for sustained yield by selection cutting - ideally over a whole forest or working circle, but from practical considerations almost always over the annual coupes of cutting series, regeneration mainly natural and crop ideally all-aged.

SENSITIVE SPECIES - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations Those species that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists.

SERAL - A plant and animal community which is transitional in stage of succession, being either short- or long-term. If left alone, the seral stage will pass, and another plant and animal community will replace it.

SHELTERWOOD HARVEST - Silvicultural system used to harvest mature trees at rotation age in a series of preparatory, seed and removal cuts designed to regenerate a new even-aged crop under the shelter of the old crop.

SHORT-TERM EFFECTS - For timber management planning, those effects which will not be significant beyond the RPA planning horizon of 50 years; for DEQ water quality, short-term effects are defined as two days or less. Generally, short-term effects are within the planning period.

SIGNIFICANT - Meeting the criteria for inclusion on the National Register of Historic Places (same as eligible)

SILVICULTURAL SYSTEM - A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

SILVICULTURE - The science and art of growing and tending crops of forest trees to attain the desired level of marketable and unmarketable products

SITE INDEX - A measure of the relative productive capacity of an area for growing wood. Measurement of site index is based on height of the dominant trees in a stand at a given age

SITE PREPARATION - Removing unwanted vegetation and debris from a site and preparing the soil before reforestation.

SITE PRODUCTIVITY - Production capability of specific areas of land

SKYLINE LOGGING - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

SLASH - Debris left after logging, pruning, thinning, or brush cutting, and large accumulations of debris resulting from windstorms It includes logs, bark, branches, and stumps

SMOLT HABITAT CAPABILITY INDEX (SHCI) - Smolt refers to the life history stage of anadromous salmonids in which physiological changes are taking place to adapt them for ocean survival and they are either migrating or will shortly migrate seaward. The three levels associated with this index are:

1. Existing SHC - The number of smolt being produced at the present time with existing escapement levels in existing freshwater habitat

2. Potential SHC - The number of smolt that are capable of being produced assuming there is sufficient adult escapement to fully seed existing freshwater habitat

3. Potential SHC with Full Enhancement - The number of smolt that are capable of being produced, assuming sufficient capital investments have been made to maximize the freshwater habitats and there is sufficient adult escapement to fully seed the existing and enhanced habitat

SNAG - A nonliving standing tree. The interior of the snag may be sound or rotted

SNAG LEVEL - The number of snags per unit of area by d.b.h. class selected as a management goal, the level is predicted on the theoretical number of snags per unit of area by diameter class needed to support nesting populations of woodpeckers at a selected density

SOCIOECONOMIC - Pertaining to, or signifying the combination or interaction of, social and economic factors.

SOIL EROSION - The detachment and movement of soil from the land surface by wind, water, or gravity.

SOIL COMPACTION - Increase in soil bulk density.

SOIL PRODUCTIVITY - The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

SOIL RESOURCE INVENTORY (SRI) - An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

SPECIAL COMPONENT - The portion of the commercial forest land that needs special treatment of the timber resource to achieve other resource objectives (e.g., old growth, streamside protection, or visual corridors).

SPECIAL USE PERMITS - Permits and granting of easements (excluding road permits and highway easements) authorizing the occupancy and use of land.

STAND - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

STANDARD - Performance criteria indicating acceptable norms or specifications that actions must meet. A principle requiring a specific level of attainment, a rule to measure against.

STANDARD COMPONENT - The portion of the commercial forest land on which crops of industrial wood can be grown and harvested with adequate protection of the forest resources under the usual provisions of the timber sale contract.

STATE HISTORIC PRESERVATION OFFICER (SHPO) - An official appointed by the Governor of each State to direct implementation of the National Historic Preservation Act of 1966 and subsequent regulations and Executive Order. Responsibilities include: State-wide cultural resource inventory, development of a State Historic Preservation Plan, review of National Register of Historic Places nominations, administration of Federal historic preservation grants, and review of Federal undertakings which might affect cultural resources listed on or eligible for the National Register of Historic Places.

STOCKING - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

STOCKING LEVEL CONTROL - The process of maintaining the desirable number of trees to achieve optimum growth and management.

STREAMFLOW - The discharge of water from a watershed that occurs in a natural stream channel.

STRUCTURAL RANGE IMPROVEMENT - Improvement requiring construction or installation to improve the range, facilitate management, or control distribution and movement of livestock.

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

SUITABLE TIMBER LAND - Forested lands that are available for timber management because they have not been withdrawn because of Law or Regulation, where irreversible damage would not occur, and where regeneration can be assured.

SUMMER RANGE - A portion of the total range on which big game animals normally find food and cover during summer months.

SUNK FUNDS - Monies already invested.

SUPPRESSION - The action of extinguishing or confining a fire.

SUSTAINED YIELD - The achievement and maintenance in perpetuity of a periodic output of the renewable resources without impairment of the productivity of the land.

T

TARGETS - Objectives assigned to the Forest by the Regional Plan.

TECTONIC - Of, pertaining to, or designating the rock structure and external forms resulting from the deformation of the earth's crust.

TEMPORARY ROADS - Temporary roads are low-level roads constructed for a single purpose and short-term use. Once use of the road has been completed, it is obliterated, and the land it occupied is returned to production.

THERMAL COVER - Cover used by animals to lessen the effects of weather; for elk the types of cover are:

Summer Range - A stand of coniferous trees at least 40 feet tall with an average crown closure of 40 percent or more.

Winter Range - A stand of coniferous trees 10 feet or more tall with an average crown closure of 40 percent or more.

THINNING - The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may be done at two different stages:

1. *Commercial thinning* - Removing trees that have reached sufficient size to be manufactured into a product.

2. *Precommercial thinning* - Removing trees that are too small to make a merchantable product.

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species.

THRESHOLD - The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

TIERING - Refers to the coverage of general matters in broad environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basin wide program statements or ultimately site-specified statements), incorporating by reference the general discussions and concentrating solely on the issues specific to the statement in question.

TIMBER - A general term for the major woody growth of vegetation in a forest area.

TIMBER CLASSIFICATION - Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1. *Nonforest* - Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

2. *Forest* - Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

3 *Suitable* - Land to be managed for timber production on a regulated basis

4. *Unsuitable* - Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process.

5. *Commercial Forest* - Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn

TIMBER PRODUCTION - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use The term "timber production" does not include production of fuelwood.

TIMBER SALE PROGRAM QUANTITY - This includes all volume expected to be offered for sale This includes "green" material, salvage, firewood and miscellaneous products. This is used to measure attainment of RPA budgeted target.

TIMBER STAND IMPROVEMENT (TSI) - Management activities conducted in an immature stand to accelerate diameter growth and improve the form of the trees that remain

TOLERANCE - The ability of a tree to grow satisfactorily in the shade of, and in competition with, other trees.

TONS OF SUSPENDED PARTICULATES - A measure of the amount of solid material contributed to the airshed by smoke.

TRAILHEAD - The parking, signing, and other facilities available at the terminus of a trail.

TRAIL VEHICLE - Vehicles designed for trail use that are 40 inches wide or less, such as bicycles, snowmobiles, trail bikes, trail scooters, and all-terrain vehicles.

TRANSITORY RANGE - Land that is suitable for grazing use of a nonenduring or temporary nature over a period of time For example, on particular disturbed lands, grass may remain in the area for a period of time before being replaced by trees or shrubs not suitable for forage.

TRANSPORTATION SYSTEM - All existing and planned roads and trails needed to access the Forest.

TUFF - A rock formed of compacted volcanic fragments, generally smaller than 4mm in diameter.

U

UNDERSTORY VEGETATION - Grass, small trees, shrubs, and other plants found beneath the overstory (the trees comprising the forest).

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection

UNIT PLANS - Land management plans prepared for multiple use management of land and resources on portions(units) of the National Forests, which do not necessarily fully incorporate NFMA requirements "Units" do not always follow National Forest boundaries and, in some cases, include parts of two or more National Forests.

UNPLANNED IGNITION - A fire started at random by either natural or human causes, or a deliberate incendiary fire

UNREGULATED - Timber land not managed on a sustained yield basis, such as administrative sites, campgrounds, and experimental forests.

UTILITY AND TRANSMISSION CORRIDOR - A strip of land designated for the transportation of energy, commodities, and communications by railroad, State highway, electrical power transmission (69 KV or above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use. Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.

UTILIZATION STANDARDS - Standards guiding the use and removal of timber, which is measured in terms of diameter at breast height (d b.h.), top diameter inside the bark (top d i b), and percent "soundness" of the wood.

V

VIABLE POPULATION - The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

VIEWSHED - The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

W

WATERSHED - The area that contributes water to a drainage or stream.

WETLANDS - Areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990).

WILD AND SCENIC RIVERS - Those rivers or sections of rivers designated as such by congressional actions under the 1968 Wild and Scenic Rivers Act, as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. *Wild River Areas* - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America

2. *Scenic River Areas* - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads

3. *Recreational River Areas* - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

WILDERNESS - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

WILDERNESS ACT - Establishes a National Wilderness Preservation System to be composed of Federally-owned areas designated by Congress, administered for use and enjoyment as Wilderness, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as Wilderness.

WILDERNESS RESOURCE SPECTRUM (WRS) - Classification used to further divide a wilderness into zones based on degrees of primitiveness. Areas of the Ochoco Wilderness will be managed under two classes of the WRS system:

1. *Primitive* - characterized by an essentially unmodified environment. Concentration of users is low and evidence of human use is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls

2. *Semiprimitive* - characterized by a predominately unmodified natural environment of moderate size. The concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimuM on-site controls and restrictions may be present, but are subtle

WILDFIRE - Any wildland fire that is not a prescribed fire. All wildfires require suppression.

WILDLIFE - All nondomesticated mammals, birds, reptiles, and amphibians living in a natural environment, including both game species and nongame species. Animals or their progeny, which once were domesticated but escaped captivity and are running wild (i.e., feral animals), such as horses, burros, and hogs, are not considered wildlife.

WILDLIFE AND FISH USER DAY (WFUD) - One WFUD consists of 12 hours of recreation that is the result of fish or wildlife.

WILDLIFE HABITAT DIVERSITY - The distribution and abundance of different plant and animal communities and species within a specific area.

WINTER RANGE - A range, usually at lower elevation, used by big game during the winter months; usually smaller and better-defined than summer ranges

WITHDRAWAL - The withholding of an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area.

WORKING GROUP - Comprises those parts of a forest that have generally the same growth potential and management opportunities.

Y

YARDING - The moving of logs from the stump where cut to a central concentration area or landing.

Z

ZONE OF INFLUENCE - The geographic area where most, but not all, of the direct social and economic effects of the Forest and Grassland's management occur

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Land and Resource Management Plan

Part 2

Crooked River National Grassland

Caring for the Land...

Land and Resource Management Plan

Preface

Crooked River National Grassland

August 1989

The Crooked River National Forest Land and Resource Management Plan (Grassland Plan) was prepared in compliance with 36 CFR 219, based on the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act of 1976, and in compliance with 40 CFR 1500 based on the National Environmental Policy Act of 1969.

Because the Plan is a major Federal action significantly affecting the quality of the human environment, an environmental impact statement (EIS) was prepared The Plan provides direction for implementing the preferred alternative selected in the EIS.

If any particular provision of this Grassland Plan, or the application of the action to any person or circumstance, is found to be invalid, the remainder of the Forest Plan and the application of that provision to other persons or circumstances shall not be affected.

Additional information about the Plan is available from:

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CROOKED RIVER NATIONAL GRASSLAND PLAN
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Chapter 1

Grassland Plan Introduction

Chapter 1

Grassland Plan Introduction

Purpose

The Land and Resource Management Plan guides natural resource management activities and establishes management standards and guidelines for the Crooked River National Grassland. It describes resource management practices, levels of resource production and management, and availability and suitability of lands for resource management.

National grasslands are a permanent part of the National Forest System, administered under the provisions and purposes of the Bankhead-Jones Farm Tenant Act (see Appendix G). The rules and regu-



lations applicable to national forests as set forth in Title 36, Code of Federal Regulations, also apply to national grasslands (see 36 CFR 213, Appendix C).

The Grassland Plan:

establishes Grassland-wide multiple use goals and objectives;

establishes Grassland-wide standards and guidelines applying to future conditions;

establishes management area direction including management area prescriptions and standards and guidelines applying to future management activities in that management area; and establishes monitoring and evaluation requirements.

The Grassland Plan embodies the provisions of the National Forest Management Act of 1976, the implementing regulations, and other guiding documents. Land use determinations, prescriptions, and standards and guidelines constitute statements of the plan's management direction. However, the projected outputs, services, and rates of implementation are dependent on the annual budget.

This Plan will guide Forest Service programs on the Crooked River National Grassland beginning in fiscal year 1990 (Oct. 1, 1989). It will ordinarily be revised on a ten-year cycle, but at least every 15 years. The Plan may be amended or revised at any time if the Forest Supervisor determines that conditions in the area covered by the Plan have changed significantly, or if project level environmental analysis demonstrates the need to make a change.

Relationship of the Grassland Plan to Other Documents

Relationship to the Environmental Impact Statement and the Record of Decision

This Grassland Plan sets forth the direction for managing the land and resources of the Crooked River National Grassland. The Plan results from extensive analysis and considerations addressed in the Environmental Impact Statement (EIS), and Record of Decision (ROD). The planning process and the analysis procedures used to develop these plans are described in the EIS The EIS also describes other alternatives considered in the planning process.

Specific activities and projects will be planned and implemented to carry out the direction in this Plan. Environmental analysis will be performed on these specific projects. This subsequent environmental analysis will be tiered to the Plan and Environmental Impact Statement.

Relationship to the Regional Guide

The Regional Guide for the Pacific Northwest Region, as amended December 8, 1988, provides direction for National Forest Plans, and in turn, can be used also for National Grassland Plans. It includes standards and guidelines addressing the major issues and management concerns considered at the Regional level, to facilitate planning.

1. National	Resource Planning Act Assessment and Program.
2. Regional	Regional guide.
3. Forest	National forest Land and Resources Management Plans (Forest Plans) for National Forest System lands. Tiered to Regional guide
4. Project	Site or projects specific plans, generally at ranger district level. Tiered to Forest Plan.

Relationship to Special Area Plans

The Crooked River National Grassland includes several "special areas." The plans for these include: Cove Palisades State Park Management Plan, Haystack Reservoir Recreation Management Plan, Rimrock Springs Wildlife Area Management Plan, and Gray Butte Electronic Site Plan. The regulations guiding the development of Forest Plans state that "if, in a particular case, special area authorities require the preparation of a separate special area plan, the direction in any such plan may be incorporated without modification in plans prepared under this subpart" (36 CFR 219.2(b)). Direction for incorporation and implementation of these plans can be found in Chapter 5, Implementation of the Grassland Plan.

Relationship to Other Plans

This Grassland Plan serves as the single land management plan for the Crooked River National Grassland. All other land management plans are replaced or superseded by the direction in this plan or will be made consistent with it; see Chapter 5 and the appendix for a listing of existing plans that this Grassland Plan supersedes.

Plan Structure

The Grassland Plan is composed of five chapters, a glossary, and appendices. Chapter 1 introduces the general purpose and structure of the Grassland Plan, explains how the plan relates to the environmental impact statement, and provides a brief description of the Grassland. Chapter 2 summarizes the supply and demand conditions for significant market and nonmarket goods and services on the Grassland. Chapter 3 discusses how the plan responds to the major issues identified during the planning process.

Chapter 4 is the heart of the Grassland Plan. It sets the management direction for the Grassland for the next 10 to 15 years. It presents goals, objectives, and desired future conditions directing resource management on the Grassland. Desired future condition sections describe what the Grassland should look like after implementation of the management direction. Chapter 4 also presents prescriptions for each of the 16 management areas, Grassland-wide standards and guidelines, and management area standards and guidelines. Grassland-wide standards and guidelines state the constraints within which all practices are to be carried out in implementing the Grassland Plan.

Chapter 5 explains the methods for implementing the management direction, monitoring and evaluating implementation activities, and keeping the plan current in light of changing conditions or other findings. The Appendices provide the detailed and supplemental information needed to explain portions of the plan. An index is provided to assist readers in locating subjects of interest.

Grassland Description

The Crooked River National Grassland is located in central Oregon, entirely within Jefferson County (see Vicinity Map, Figure 1-1). Of 173,629 acres encompassed by the Grassland boundary, 111,379 acres (1987 figures) are under Forest Service administration. Other lands are privately owned or under the administration of the BLM, State of Oregon, or Jefferson County.

The Grassland is traversed north-to-south by State Highways 26 and 97. West of Highway 97, the country is a high plateau interrupted by the steep canyons of the Deschutes River and its tributaries. East of Highway 97, the terrain is rolling hills and buttes. Elevations range from 2,241 feet at Madras to 5,108 feet atop Gray Butte. Steep canyons border the major drainages, including the Deschutes and Crooked Rivers, and Squaw and Willow Creeks

The Grassland lies within two subbasins of the Deschutes River drainage system: the Middle Deschutes River and Lower Crooked River.

It is believed that the Grassland was originally a grassland vegetated with bluebunch wheatgrass and Idaho fescue, and some sagebrush, rabbitbrush, bitterbrush and juniper. Because much of the area was cultivated and the native vegetation removed during the homesteading era, it is difficult to determine the original vegetation patterns.

The climate of the Grassland is typical for central Oregon. The annual precipitation averages 10.5 inches, but higher elevations may receive 19 inches or more per year. High intensity rainstorms are likely to occur during spring and summer months. The growing season averages 100 days. Temperatures are moderate throughout the year. Coldest temperatures are recorded in December and January; warmest temperatures are recorded in June, July, and August. Temperatures may fluctuate greatly between day and night, and frost can occur any day of the year. Humidity is usually low. (Hopkins and Kovalchik, 1983.)

The area was first homesteaded in the 1880's and eventually 700 homesteads were established. But by the 1930's, inadequate rainfall and poor economic conditions had caused the farms to fail and homesteaders to abandon their lands. By 1935, Federal Land Banks and private mortgage banks had taken over 35 percent of the homesteads in foreclosures. The Federal Government then began to buy the land back from the remaining homesteaders under the authority of the Resettlement Administration and Bankhead-Jones Farm Tenant Act.

Management of the land was transferred from the Soil Conservation Service to the Forest Service in 1954. Originally known as the Central Oregon Land Utilization Project, the name was changed to the Crooked River National Grassland in 1960. Management direction states that "the National Grassland shall be administered under sound and progressive principles of land conservation and multiple use .." (36 CFR 213).

During the late 1930's and early 1940's, many acres were seeded to provide ground cover and improve the bare ground situation that had resulted from plowing the land and attempting to raise grain. Treated lands (approximately 63,000 acres) were planted to either crested wheatgrass or beardless wheatgrass. The native bluebunch wheatgrass proved impossible to restore. In the 1960's, many acres were reseeded and sprayed with herbicides to control shrubs. In the 1970's, reseeding was phased out and fire was introduced as a management tool. This management method continues today.

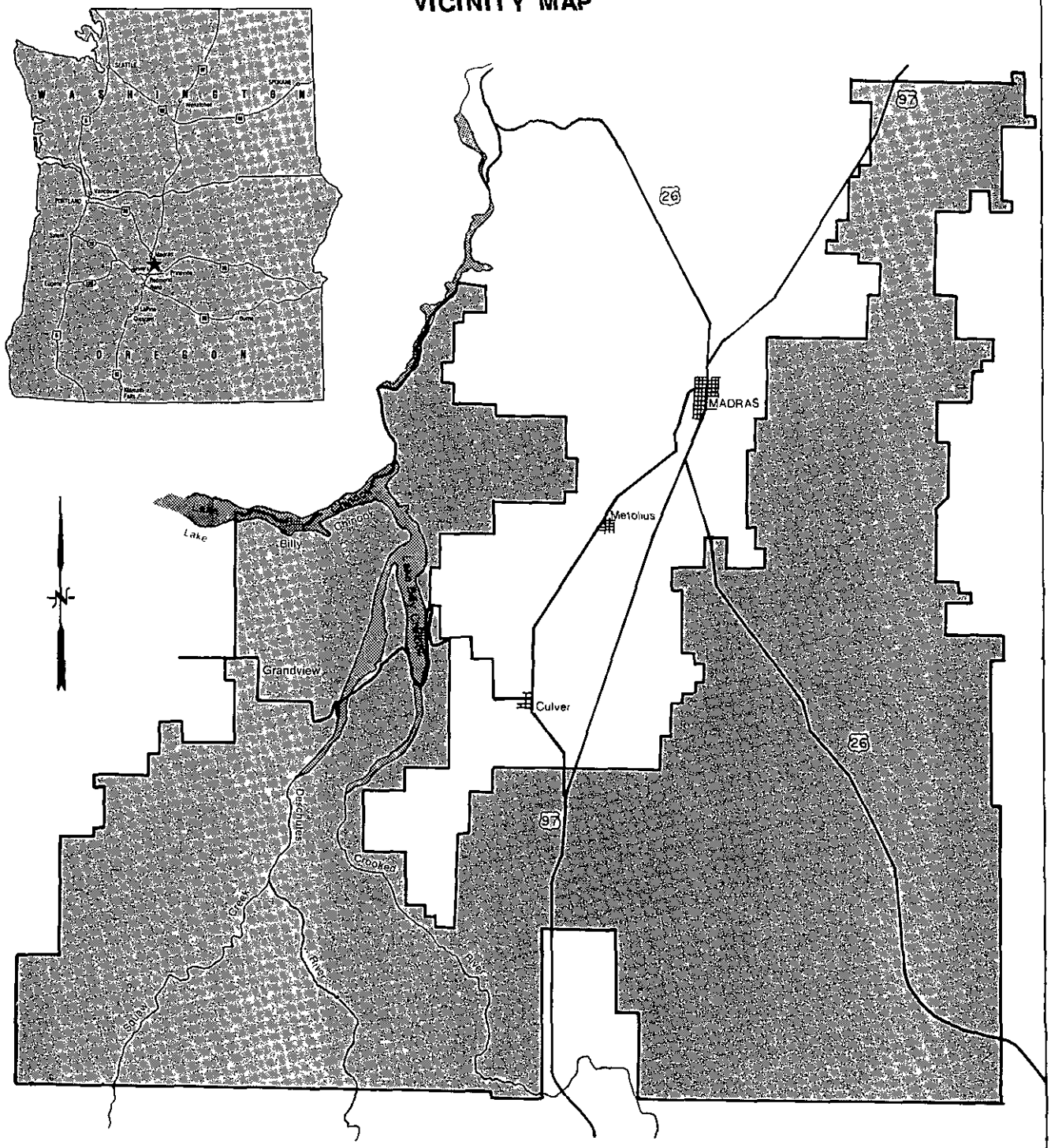
The Crooked River National Grassland is administered as a Ranger District of the Ochoco National Forest and is the only National Grassland in the Forest Service Pacific Northwest Region (Region 6). There are 19 National Grasslands nationwide.

The Grassland is managed to promote the development of grassland agriculture and sustained yield management of the forage, fish and wildlife, timber, water, and recreation resources and to demonstrate sound and practical principles of land use. Since the beginning of the land utilization projects in the 1930's, improving range management and the forage resource has been a major goal.

Figure 1-1

CROOKED RIVER NATIONAL GRASSLAND

VICINITY MAP



Chapter 2

Summary of the Analysis of the Management Situation

Chapter 2

Summary of the Analysis of the Management Situation

Introduction

This chapter summarizes the supply and demand situation for the key market and nonmarket goods and services associated with the Grassland. Included is a summary containing:

resource supply and demand conditions for the Resources Planning Act (RPA) periods,

production levels attainable under both the current management direction (Alternative A) and the Grassland Plan;

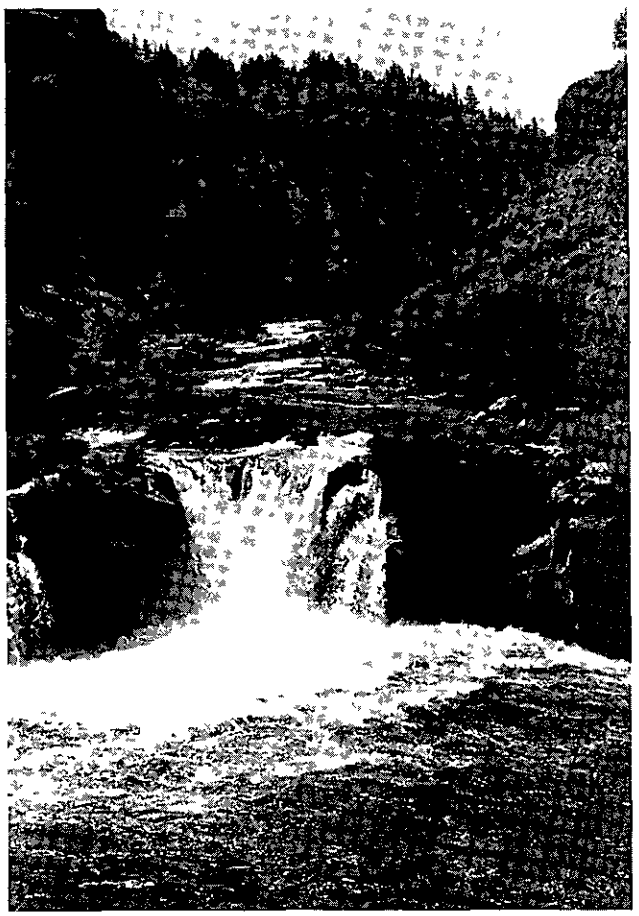
and a list of information that would be desirable to have prior to the preparation of the next Crooked River National Grassland Land and Resource Management Plan.

Resource and Economic Potentials

Benchmarks were developed to help define the resource and economic potentials of the Grassland, and the range of outputs from which alternatives could be developed.

Most of the benchmarks were developed to explore the potential of the Grassland to produce the maximum of a particular issue-related resource; e.g. range, recreation, or big game. Two benchmarks were developed to determine the mix of resources that produced the maximum present net value (PNV) of the Grassland - one using market values only and the other using market and assigned values. Market priced outputs include: minerals, livestock, grazing, and developed recreation. Outputs with assigned values are dispersed recreation, including and fish and wildlife use. (See Appendix B of the FEIS for dollar values)

One benchmark estimates the minimum costs to retain the Grassland in Federal ownership with no outputs of goods and services other than those that would occur incidentally, such as dispersed recreation.



While benchmarks must be realistic, they could not serve as alternatives because they do not address the issues, concerns, or opportunities (ICO's). Rather, they were used to define the minimum and maximum parameters within which alternatives might be developed.

All benchmarks and alternatives were required to meet management requirements (Regional Direction 1920, 11/10/83). The major Management Requirements (MR's) addressed are: soil and water conservation, and riparian areas

Resource Description and Supply/Demand Projections for Selected Resources

Introduction

Following is a brief discussion of the current situation of each of the major Grassland resources (see FEIS Chapter 3 for more detailed discussions), and the anticipated supply and demand for goods and services associated with these resources. The supply figures were developed from the benchmarks and independent estimates. Demand figures were estimated independently and the source is included in Table 2-1. Economists consider "demand" to be a schedule of quantities of an output that users are willing to consume within a price range, at a given time, and under certain conditions of sale. The term "demand," as used in this section, identifies a certain level of consumption at a particular point in time. Although demand estimates are projected over several decades, long-term projections are expected to be less accurate than those for the near future.

Forage

Current Situation:

The Grassland, through the Grazing Agreement with the Gray Butte Grazing Association, administers 20 grazing allotments under permit to 29 permittees. 21,252 animal unit months (AUM's) are permitted. The permittees have their base ranch operations in the three-county area of Jefferson, Deschutes, and Crook Counties. Due to the extended drought, animals have been sent home early over the last few seasons due to lack of forage. Actual use has been about 17,000 AUM's.

Supply:

The main limiting factor affecting the amount of utilizable forage by domestic livestock is the type of vegetation currently occupying the Grassland. Due to past agricultural and grazing practices and the exclusion of fire, many acres formerly occupied by bluebunch wheatgrass and Idaho fescue have been replaced by brush species and juniper.

With an intensive and aggressive program using prescribed fire and seeding, the supply of forage could be increased to support 29,000 AUM's.

Demand:

Ranchers regard the Grassland as desirable summer range because of the high quality of forage and easy access As a result, allotments have been fully occupied for many years. When an allotment becomes available, it is usually filled, indicating a constant demand for available forage. In addition, there is interest in increasing livestock numbers and the season of use.

The demand figures in Table 2-1 are proportioned from the Forest Service 1980 RPA Program, and reflect the Grassland's apportioned share of the national demand for forage.

Fuelwood

Current Situation:

The Grassland provides about 300 cords of personal use fuelwood per year. Fuelwood from the Grassland is regarded as desirable by some due to the species (juniper), proximity to towns, and easy terrain.

Supply:

The Grassland has the potential to supply up to 12,500 cords of fuelwood per year. This level could significantly affect other resource objectives such as wildlife habitat.

Demand:

No demand projections are made. It is assumed that there is in fact some demand for fuelwood from the Grassland, but most use would be displaced onto the Forest if the Grassland was made unavailable for personal use fuelwood.

Minerals and Energy

Current Situation:

Oil, natural gas, diatomite, and cinnabar are the known or expected mineral and energy resources on the Grassland.

There are approximately 7,200 acres under lease for oil and gas, mostly located in the southeast quadrant of the Grassland near the old field headquarters. One well drilled in the 1960's was abandoned when it proved dry, and there was additional interest in drilling in the late 1970's. There are no geothermal leases on the Grassland.

Supply:

All of the Grassland is classified as available for and potentially favorable for the discovery of geothermal energy sources. All of the Grassland is available for oil and gas exploration and development, and approximately 66,000 acres are considered perspectively valuable.

Approximately 22,000 acres are classified as having moderate potential for gold, silver, and mercury, and approximately 12,000 acres are classified as having moderate potential for diatomite. However, very little exploration has been done on the Grassland, and it is likely that further exploration will result in much of this land being reclassified as having low potential.

Demand:

The demand for oil, gas, gold, and mercury is directly related to international production and price. An increase in the price of any of these commodities will result in increased exploration on the Grassland, and the discovery of a valuable deposit may result in the production of the commodity. The largest number of acres ever leased for oil and gas on the Grassland was 17,000 acres in the early 1980's. There is no known demand for direct heat applications of geothermal energy on the Grassland. The demand for mineral materials is generated by the construction, reconstruction, and maintenance of roads on and near the Grassland. Approximately 250,000 cubic yards of mineral material will be produced on the Grassland each decade.

Recreation

Current Situation:

The Crooked River National Grassland is an untapped area that provides a variety of recreational opportunities. The local communities of Madras, Redmond, Culver, Prineville, and Bend, as well as those living in and adjacent to the Grassland have utilized this area for camping, fishing, hunting, pleasure driving, all-terrain vehicle (ATV) use, photography associated with old homesteads and canyon beauty, and organized group activities such as dog trials and horse endurance racing.

Roughly 100,000 recreation visitor days (RVD's) occur on the National Grassland, of which 90 percent is dispersed use. The area literally comes alive during the two weekends of deer hunting season, much of which is day hunting from local communi-

ties. This accounts for roughly 10 percent of dispersed use, and it is intense for a short period of time.

Supply:

Developed recreation capacity at Haystack Reservoir is not sufficient to handle the existing use when considering the area administered by the Bureau of Reclamation (BOR). The Grassland portion by itself can handle existing and projected use of the facility, but in consideration of all users of the reservoir and a cooperative effort to manage all users with the BOR, the facilities will need to be modified and expanded. The joint development management plan will guide the development of facilities on both the Grassland and BOR administered lands.

Demand:

Overall recreation demand is correlated with the population increase of approximately one percent per year. Demand for recreational vehicle camping, hiking, and interpretation is increasing at a higher rate than many other recreational activities. Hiking demand is highest in the semiprimitive natural setting. The latest information in the State-wide Comprehensive Outdoor Recreation Plan (SCORP) indicates that although more use actually occurs in roaded modified settings, the predominant preference is for primitive and semiprimitive nonmotorized settings. Demand for fishing in the Deschutes Canyon and general dispersed camping in the canyon bottoms are estimated to increase more rapidly as people become aware of this unique area.

Social and Economic

Current Situation:

The Grassland generated receipts primarily from grazing fees, special use permit fees, firewood sales, and mineral leases. Up to seventy percent of the gross grazing fees are retained by the Gray Butte Grazing Association for administrative costs and the Conservation Practices program. The remaining thirty percent of grazing fees is combined with all other receipts. Of this total, twenty-five percent goes to the county, and seventy-five percent goes to the U.S. Treasury. Currently Grassland supported jobs are a minor component of the local counties' economic base.

Supply:

The ability of the Grassland to influence jobs and payment to counties is limited. Only the amount of livestock grazing and amount of acres leased for minerals have any impact.

Demand:

The demand for outputs which influence the economic parameters (displayed in Table 2-1) is expected to increase somewhat in the future.

Wildlife and Fish

Current Situation:

The Grassland provides habitat for approximately 200 species of birds, 80 species of reptiles, amphibians, and mammals, and 20 species of fish.

Key big game habitats include: mule deer winter range, and antelope winter range.

Riparian areas support the largest diversity of wildlife. Most of them have seen heavy impacts from livestock in the past. However, most of the structural work and management changes have been done to aid their restoration and they are on the road to recovery. Quail are a popular game bird that are present on the Grassland in limited numbers. It is expected that they will increase as the riparian habitat continues to improve and other habitat work is done.

Haystack Reservoir, Lake Billy Chinook, Deschutes River, Crooked River and Squaw Creek are the primary fish habitats on the Grassland and support a wide variety of warm water and cold water fish. Willow Creek also supports a fish population. Angling in Willow Creek has been closed by the Oregon Department of Fish and Wildlife. Fish numbers are being monitored and used as an indicator of riparian habitat recovery. Populations are increasing and

TABLE 2-1
RESOURCE SUPPLY AND DEMAND PROJECTIONS

Resource/ Activity	Unit of Measure	Decade				
		1st Decade	2nd Decade	3rd Decade	4th Deacde	5th Decade
FORAGE	Thousand AUM s					
Supply						
Current Direction		21 3	21 3	21 3	21 3	21 3
Maximum Potential		29	29	29	29	29
Grassland Plan		18	19	19	19	19
Demand		22.5	22 5	22 5	22 5	22 5
FUELWOOD	Cords					
Supply						
Current Direction		300	300	300	300	300
Maximum Potential		12500	12500	12500	12500	12500
Grassland Plan		400	400	400	400	400
MINERALS						
Oil & Gas	Thousand Acres					
Supply						
Current Direction		7 2	17	17	17	17
Maximum Potential		7 2	93	93	93	93
Grassland Plan		7 2	17	17	17	17
Demand		7 2	17	17	17	17
Geothermal	Thousand Acres					
Supply						
Current Direction		0	0	0	0	0
Maximum Potential		174	174	174	174	174
Grassland Plan		0	0	0	0	0
Demand		0	0	0	0	0
Nonenergy Minerals	Thousand Acres					
Supply						
Current Direction		0	1	3	3	3
Maximum Potential		0	1	3	3	3
Grassland Plan		0	1	3	3	3
Demand		0	1	3	3	3
RECREATION						
Developed Recreation	MRVD's					
Supply						
Current Direction		28 8	28 8	28 8	28 8	28 8
Maximum Potential		28 8	28 8	28 8	28 8	28 8
Grassland Plan		28 8	28 8	28 8	28 8	28 8
Demand		13 7	15 4	16 7	18 3	19 9
Roaded Natural and Rural Supply	MRVD's					
Supply						
Current Direction		37 8	37 8	37 8	37 8	37 8
Maximum Potential		37 8	37 8	37 8	37 8	37 8
Grassland Plan		37 8	37.8	37 8	37 8	37 8
Demand		111 4	122 6	132 4	143 3	155 2
Semiprimitive Motorized	MRVD s					
Supply						
Current Direction		0	0	0	0	0
Maximum Potential		0	0	0	0	0
Grassland Plan		0	0	0	0	0
Demand		1 2	1 3	1 3	1 5	1 6
Semiprimitive Nonmotorized	MRVD's					
Supply						
Current Direction		2 6	2.6	2 6	2.6	2 6
Maximum Potential		3 2	3 2	3 2	3 2	3 2
Grassland Plan		3 2	3 2	3 2	3 2	3 2
Demand		2 0	2.1	3 0	4 0	6 0

Resource/ Activity	Unit of Measure	1st Decade	2nd Decade	3rd Decade	4th Deacde	5th Decade
Fishing	MRVD's					
Supply						
Current Direction		23 1	24 9	27 0	29 4	32 2
Maximum Potential		23 2	26 3	28 4	30 8	33 6
Grassland Plan		23 2	26 3	28 4	30 8	33 6
Demand		23 5	26 3	28 4	30 8	33 6
Hunting	MRVD's					
Supply						
Current Direction		5 7	5 6	5 2	5 3	5 3
Maximum Potential		5 7	5 6	6 2	6 2	6 2
Grassland Plan		5 7	5 6	5 4	5 4	5 4
Demand		Unknown	Unknown	Unknown	Unknown	Unknown
ECONOMIC AND SOCIAL	Change in Jobs from Current Situation					
Supply						
Current Direction		9	N/A	N/A	N/A	N/A
Maximum Potential		10	N/A	N/A	N/A	N/A
Grassland Plan		9	N/A	N/A	N/A	N/A
PAYMENT TO COUNTIES	MM$					
Supply						
Current Direction		03	03	03	03	03
Maximum Potential		03	03	03	03	03
Grassland Plan		03	03	03	03	03
WILDLIFE						
Deer Winter Range Carrying Capacity	Thousand of Wintering Animals					
Supply						
Current Direction		4.3	3 2	2 2	2.2	2 2
Maximum Potential		4.3	3 2	2 2	2 2	2.2
Grassland Plan		4 3	3 2	2 2	2 2	2 2
Antelope Winter Range Carrying Capacity	Hundreds of Wintering Animals					
Supply						
Current Direction		1 6	1 6	1 6	1 6	1 6
Maximum Potential		3 5	3 5	3 5	3 5	3 5
Grassland Plan		3 5	3 5	3 5	3 5	3 5

NOTE Current Direction is the No Action alternative which is Alternative A.

AUM's - Animal Unit Months
MRVD s - Thousand Recreation Visitor Days
MM$ - Million Dollars

spreading in the creek as riparian conditions and resulting fish habitat are improved.

Many other species of wildlife make their homes in the great diversity of habitats available on the Grassland, some of which include· cavity nesting birds in the old growth juniper stands, raptors nesting on the cliffs of the Crooked and Deschutes Rivers, and the Ord's kangaroo rat in the sagebrush communities.

Supply:

The wintering deer population on the Grassland is estimated at 4,300. The habitat can support a larger population with an adjustment in cover/forage ratios which is planned to be done on the Grassland. However, intermingled private lands may be developed as homesites which will decrease overall habitat capability. It is estimated that by the third decade, wintering deer numbers will be 2,200, which will carry through the planning horizon of five decades.

The wintering antelope population on the Grassland is about 160 head. They are expected to increase up to a potential number of 350 head.

Demand:

The primary demand for wildlife on the Grassland is for populations of deer and antelope large enough to be hunted. Hunting license sales are expected to grow two percent annually between 1986 and 1995, and one percent annually thereafter.

Although the demand for hunting opportunities is expected to increase in the future, big game population levels are ultimately limited by the capacity of the environment to support them. Control through hunting is a means of regulating big game populations at levels compatible with their habitat capacity The authority for establishing hunting seasons and regulating populations rests with the State.

Information Needs

This section lists the information, inventory, and research needs that have been identified for the Grassland. Gaps in data or scientific knowledge that would be desirable to fill prior to preparation of the next land and resource management plan are recognized. Organization and development of these needs is based on the biological, physical, and social ecosystems which are the foundation for the planning process.

This ecosystem perspective has been used to develop a comprehensive framework for identifying and organizing information, inventory, and research needs. This framework is intended to encourage integrated research approaches that address interdisciplinary needs rather than traditional functional approaches. The ecosystem approach should meet planning needs, as well as help the public understand information needs.

Of the many ecosystems found in wildlands, several were identified as having particular current importance in Grassland planning. Juniper old growth, riparian/aquatic, and upper slope ecosystems are examples of areas where more information would be desirable to test present planning assumptions as plans are implemented. Human visitors in the Grassland are an integral part of these ecosystems. People's needs and expectations concerning the Grassland should be considered in land and resource planning.

Information needed to address these concerns fall into six general categories: interactions and processes, long-term productivity, cumulative effects, management strategies and techniques, social and economic analysis, and wildland/community relations.

Interactions/Processess

This category includes information leading to a better understanding of interactions of ecosystems, and the physical, biological, social, and political processes that influence these ecosystems.

Clarify the relationships between recreational settings, use, and opportunities, and other resource uses.

Understand the relationships between old growth juniper characteristics and ecological and visual diversity, associated plant and wildlife species, and the maintenance of natural gene pools.

Determine the response of management indicator species to patterns of habitat created by management and natural succession.

Develop an understanding of ecosystem response to global atmospheric warming.

Evaluate the roles of disturbance processes in the maintenance and succession of natural systems.

Develop an understanding of atmospheric dispersion and deposition processes.

Determine the mechanisms of plant and animal dependence on fire.

Improve knowledge of the distribution and habitat requirements of wildlife associated with juniper old growth forests.

Long-Term Productivity

This section includes studies leading to a better understanding of ecosystem needs in order to maintain various aspects of long-term productivity.

Determine the effects of removing various levels of biomass on soil productivity.

Identify the current productivity levels of resources such as wildlife, forage, and fish habitat to establish baseline levels of productivity.

Establish baseline information on nutrient levels and distribution in soils and vegetation for major soil groups.

Assess the magnitude of change in vegetative growth rates in a carbon-enriched atmosphere.

Understand the role of fire in the nutrient cycles that maintain long-term productivity.

Cummulative Effects

This section includes studies to examine the cumulative effects of naturally occurring and human-induced activities on various aspects of selected ecosystems and resources.

Understand the cumulative effects of various management practices on resource outputs.

Identify the effects of changing habitat patterns on selected management indicator species.

Evaluate the effects of fire exclusion on the structure and function of ecosystems.

Determine the effects of human disturbance and livestock competition on wildlife species.

Management Strategies and Techniques

Assess the relationship of human presence in recreation areas and wilderness on habitat use by wildlife.

Assess the results of stream rehabilitation projects on fish population dynamics, public perception of landscape and recreation quality, stream quality, stream hydrology, etc.

Predict the changes in air quality that will result from alternative management strategies.

Evaluate decision processes that can compare market and nonmarket benefits.

Improve the efficacy of fire use for vegetation management and as an alternative to herbicide use.

Develop and refine monitoring techniques, including:

- Techniques used to assess habitat conditions and trends.
- Methods of assessing population density and reproductive success.
- Procedures for using habitat information to make inferences about populations.

Cost-effective sampling designs that provide information about both habitats and populations with appropriate reliability.

Review the utility of the ecological indicator species concept as a framework for wildlife planning, and investigate alternatives.

Social and Economic Analysis

Additional studies are needed to increase our understanding of the economic and social effects of many planned wildland activities.

Determine the costs and benefits of the grazing program to the local agricultural community.

Improve knowledge of mineral resource potential on the Grassland.

Wildland-Community Relations

The relations and interactions between wildlands and the human communities within and around them need to be better understood.

Understand the effects of prescribed fires on nearby communities.

Determine potential effects of increased human densities in and near national forests on recreational use, fire management, water quality, wildlife, cultural resource protection, etc., and develop strategies to respond to these relationships.

Chapter 3

Response to Issues, Concerns, and Opportunities

Chapter 3

Response to Issues, Concerns, and Opportunities

Overview

The Ochoco National Forest and Crooked River National Grassland initiated the public involvement process in 1980 to prepare for the Draft Plan and Environmental Impact Statement (EIS). There has been a major effort throughout the process to capture and incorporate public and agency ideas so that the Final Crooked River National Grassland Plan can be responsive to concerns and new information. This has been a continuing effort. The Plan is intended to be dynamic in its ability to respond to new ideas, issues or information as circumstances may require.

Issues Display and Discussion in the Final EIS

Appendix A in the FEIS details how the issues were originally developed and how they evolved. The public comments on the DEIS, and the Forest responses to those comments are discussed in Appendix I of the FEIS. The comments received on the Draft Plan and EIS did result in changes in the final documents. A number of the issues were modified and new issues added.

In the Draft Plan, National Grassland management and direction was overshadowed by the National Forest. In response to public comments, a separate plan was developed for the Grassland.

A discussion of the changes in issues from the Draft to the Final and how the Plan will address the issues follows.

Issue #1, Timber Supply and Forest Management, is not an issue on the Grassland. There is no programmed harvest of timber on the Grassland in this Plan.

Issue #2, Social and Economic Wants and Needs of Local Communities, continued to receive attention. Some comments noted the importance of grazing on local economies. These respondents expressed concern over the negative effect that reductions in grazing would have on Jefferson County.

As noted in the discussion under Issue #3, livestock grazing will increase over time. The local ranching community will continue to benefit from a dependable supply of forage.

Local communities are dependent on forest-related jobs and income, and payments to counties in lieu of taxes. As a result, economics is the major factor in measuring the social and economic effect the Plan will have on these communities.

Using computer models (described in FEIS Appendix B), the economic effects of the Plans[1] for the first decade were estimated.

Income	Increase $1.737 million
Employment	Increase 124 jobs
Payments to counties, average annual	$4.9 million

Payments to counties will increase to $5.6 million in the second decade and then decrease to $5.4 million by the end of the fifth decade.

Issue #3, Livestock Grazing or Grazing Allotments, remained a major issue for the management of Grassland. In the public comments on the Draft, concern was expressed over the impact of grazing on riparian

[1]These figures include the Ochoco National Forest.

areas and big game habitat. Many felt livestock grazing numbers could not be increased while simultaneously improving riparian conditions.

Spring, summer, and fall pasture will continue to be provided for livestock. The present supply of 17,000 AUM's for livestock will continue to be provided through the first decade, increasing to 18,000 AUM's in the second decade and 19,000 AUM's in the third decade and after. Forage productivity will be increased through structural and nonstructural range improvements including seeding, burning, fencing, and development and maintenance of water sources. Special attention will be given to the needs of wintering wildlife in the deer and antelope winter range areas.

Issue #4, Riparian Area Management, received additional interest during the public comment period for the Draft. As noted in the discussion for Issue #3, concern was expressed over the proposed increases in grazing numbers and how this might prevent the Grassland from improving riparian conditions.

The goal is to bring all riparian on the Grassland into "excellent" condition. Approximately 90 percent of the riparian improvement work has been completed, and the remaining 10 percent will be completed in the first decade. However, it will take many years before all riparian areas have attained their full biological potential.

Specific practices will include more intensive management practices (e.g., exclusion, high intensity-short duration grazing, and riparian pastures) and range improvements (e.g., fences and water developments). Range allotment plans will include forage utilization levels needed to meet brush and hardwood protection or riparian improvement needs.

Issue #5, Transportation System, generated 1000 comments on the DEIS. Some commented that too many roads are constructed and that road standards are too high. These respondents expressed concern over the cost of road construction and maintenance. Support was voiced for the physical closure of roads to protect water quality and sensitive areas. Both temporary and permanent road closures were recommended to protect wildlife habitat. This is different from the comments made at the first public meetings, which opposed the closure of areas to access by motorized equipment. This view was expressed in comments stressing the need for roads to provide recreational access for the elderly and handicapped.

A travel plan for the Forest will address road management concerns and will complement the objectives of the various management areas on the Forest and Grassland. Wildlife habitat effectiveness objectives will be partially met through road restrictions and closures. The number of miles of roads maintained open for public travel on the Forest will decrease nominally in the future as a result of these road restrictions and closures for big game habitat protection, erosion control, and public safety.

In the first decade 4 miles of road will be maintained for passenger car travel, and 446 miles will be maintained for high clearance vehicles. By the fifth decade, 4 miles will be maintained for passenger cars, and 305 miles for high clearance vehicles.

Roads will be closed to protect soil and water, prevent disturbance of big game, and limit investment loss. In the first decade, 15 miles of roads will be closed. In the fifth decade, 25 miles will be closed. Closures may be seasonal or year long.

Issue #6, Big Game Habitat, was second only to timber in the number of public comments on the draft. While most comments addressed elk, which do not occur on the Grassland, comments were also received regarding deer and antelope. The public supported the management of big game winter range and the management of road systems to attain habitat effectiveness.

Management areas have been established to provide for wintering deer and antelope. Winter range will be provided to support 350 antelope. Deer winter range will support 4300 head in the near future, then drop steadily as private lands are developed and winter range effectiveness decreases, leveling off at about 2200 head.

Issue #7, Roadless Areas and Wilderness Study Areas, generated the third highest number of comments on the DEIS. Some of these comments addressed Deschutes Canyon. There was strong sentiment for the retention of existing roadless areas by some, while others objected to the single-use designation as precluding other uses. Some respondents recommended that roadless area management reflect a compromise between natural values and commodity production.

None of the Deschutes Canyon-Steelhead Falls Wilderness Study Area is being recommended for wilderness designation at this time. The primary reason for this is that most of the land within the study area is open country with evidence of human use in the form of roads and structures. The area within the Deschutes and Squaw Creek canyons possessing more rugged scenic characteristics is too small to be effectively administered as a wilderness. In addition, parts of this area have been classified under the Wild and Scenic River Act, and will receive protection under that law. Details of this recommendation are included in Appendix C of the FEIS.

Squaw Creek and the area surrounding it will be managed for nonmotorized recreation and to protect its natural features. The Deschutes and Crooked Rivers will continue to be managed to protect their natural characteristics. Both have been added to the Wild and Scenic River System. Squaw Creek has had an elgibility determination made for Wild and Scenic River designation. (See FEIS Appendix H.)

Issue #8, Scenic or Visual Resources, continued to receive public interest, although only a few comments concerned the Grassland. Some comments supported increased emphasis on visual resources, while others supported less emphasis.

Power lines visually dominate the landscape in parts of the Grassland. Existing power line corridors have been identified. While additions may be made to existing corridors, no new corridors will be developed.

The Crooked River Recreation Management Area (720 acres), Deschutes River Scenic Corridor Management Area (650 acres), and the Lake Billy Chinook View Management Area (560 acres) will be managed to maintain scenic quality.

Issue #9, Old Growth Forest, generated over 1000 comments on the DEIS. Some respondents noted the need to retain some old growth juniper habitat.

For juniper old growth dependent species, 740 acres of habitat will be dedicated in addition to the stands of juniper that may exist at any time elsewhere on the Grassland.

Issue #10, Fuelwood Supply, also generated over 1000 comments on the DEIS. The comments supported the continuation of fuelwood supplies into the future.

This Plan will continue to make firewood available in a manner consistent with other resource objectives and environmental constraints. Approximately 400 cords will be available annually between 1990 and 2000.

Between 1984 and 1989, the annual demand for firewood on the Forest and Grassland has been less than 6,000 cords. Even coupled with the Forest's supply, it appears that demand will exceed supply.

Issue #11, Snag Dependent Wildlife - Cavity Nesters, is not an issue on the Grassland. Some suitable cavity nester habitat does occur in juniper old growth stands.

Issue #12, Winter Sports, is not an issue on the Grassland because the traditional winter recreation use that this issue deals with does not occur on the Grassland.

New Issues

Public involvement, including comments on the DEIS, has resulted in the Forest adding four new issues to the twelve developed for the DEIS. Two of the issues are extensions of previous issues where it became evident that special attention would be appropriate in the FEIS to capture public concerns and allow full assessment of the issue in the development, analysis and selection of a final alternative for the Forest and Grassland Plans.

Anadromous Fish: Anadromous fish is not an issue on the Grassland, because the Round Butte Dam prevents the fish from entering the rivers on the Grassland.

Historic Trail Preservation - Summit Trail: Because the Summit Trail does not cross the Grassland, this is not a Grassland issue.

Off-Road Vehicle (ORV) Use: This issue emerged during the issue/Final Plan validation phase. Most respondents desired a reduction in ORV use on the Grassland. Some favored a total ban on ORV's, while others felt use should be prohibited in sensitive areas. This issue is best described as a social issue. Off-road vehicle owners like to pursue fun through the use of their ORV. Others find ORV's offensive and oppose the use of them on the Grassland. Much of the distaste seems to surround the noise levels, the displacement of wildlife, trespass onto closed areas and private land and the impacts they make on scenery. Off-road vehicle users feel that the Grassland has enough nonmotorized opportunities, and that motorized recreation opportunities are lacking.

A managed system of trails for off-highway vehicles will be provided at the Trails Crossing (Henderson Flat) area and other designated trails identified on the Travel Plan Map.

Round Mountain: Because Round Mountain is on the National Forest, it is not a Grassland issue.

Chapter 4

Grassland Management Direction

Section 1

Grassland Management Goals, Objectives, and Desired Future Condition

Chapter 4

Grassland Management Direction

Section 1

Grassland Management Goals, Objectives, and Desired Future Condition

Management goals provide broad direction for the management of the Grassland. Specific direction, based on the goals, is provided in the General Standards and Guidelines and Management Area Standards and Guidelines, Section 3.

Primary goals for the Grassland are:

> Administer the National Grassland under sound and progressive principles of land conservation and multiple use, and promote the development of grassland agriculture and sustained-yield management of the forage, fish and wildlife, timber, water, and recreational resources.
>
> Manage the National Grassland resources to maintain and improve soil and vegetative cover, demonstrate sound and practical principles of land use, and exert a favorable influence for securing sound land conservation practices on associated private lands.

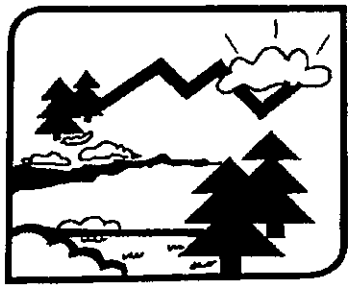
Objectives represent projected outputs which are estimates of the levels of goods and services anticipated when the Plan is fully implemented. Table 4-1, p. 4-20, displays the expected outputs of key resources on the Grassland, expressed in terms of average annual outputs per decade for the next five decades. The outputs shown are projections developed by resource specialists based on available inventory data and assumptions, and are subject to the annual budget and other elements of uncertainty inherent in predicting future events.

Desired future conditions summarize the anticipated physical changes that are likely to occur as a result of carrying out planned management practices. These descriptions are provided at ten years, and fifty years and beyond for the Grassland.

The information presented in this section provides goals, objectives, and desired future conditions for the key Grassland resources. Resources are presented in alphabetical order. They are:

AIR QUALITY
BIOLOGICAL DIVERSITY
CULTURAL RESOURCES
FACILITIES
FIRE
FORAGE AND LIVESTOCK USE
FUELWOOD
LANDS
MINERALS AND ENERGY
OLD GROWTH JUNIPER
RECREATION
SCENIC RESOURCES
SOCIAL AND ECONOMIC
SOIL
TRANSPORTATION SYSTEM
WATER
WILDLIFE AND FISH

Air Quality



Goal(s)

Maintain air quality at a level adequate for the protection and use of the Crooked River National Grassland resources, which meets or exceeds applicable Federal and State standards and regulations (Clean Air Act, as amended, and Oregon State Implementation Plan for Protection of Visibility in Class I Areas).

Objectives

Use the best available technology and management techniques to minimize smoke production from prescribed burning activities. Table 4-1, p. 4-20, shows the estimate of total suspended particulates (TSP) generated in smoke from both natural and activity residue treatments.

Desired Future Condition

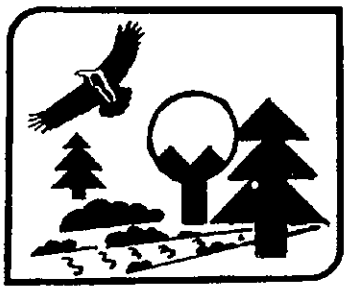
In Ten Years

Air quality will be maintained or improved due to increasingly stringent State restrictions on burning. However, air quality will continue to be influenced by smoke and other pollutants produced outside the Grassland, e.g. local agricultural field burns, and slash treatment from neighboring forest lands.

Fifty Years and Beyond

Air quality should be much improved through a variety of regulatory and burning technologies. Much of the desired vegetation mosaic will be in place (more grass and forbs, less juniper and sage) which translates into fewer smoke emissions from the continuing maintenance burning envisioned.

Biological Diversity



Goal(s)

Maintain native, historic, and desirable introduced plant and animal species and communities, including those that may be threatened, endangered, or sensitive.

Maintain or enhance ecosystem functions to provide for long-term productivity of resources and biological communities.

Objectives

Provide for all seral stages of terrestrial and aquatic plant associations existing and/or desirable for the Grassland with a distribution that is ecologically sound, and ensure continued reproduction of the species. For the Crooked River National Grassland, the following diversity elements serve as objectives for defining biological diversity for both plants and animals. Values are displayed as totals, rather than as average annual outputs.

Desired Future Condition

In Ten Years

Biological diversity of plant and animal communities and species will be different in ten years.

Riparian areas, which serve as critical habitat for more than 75 percent of the Grassland's wildlife species, will be improved over today's conditions, as a result of specific management actions.

Dedicated old growth juniper areas will be providing a habitat niche that has shrunk as other areas have been managed for optimum deer habitat and livestock forage production.

All plant communities will be present as no planned activities are intensive to the point that they would result in a change from one plant community to another. Vegetation conditions will be improving on areas that are presently in less than good condition.

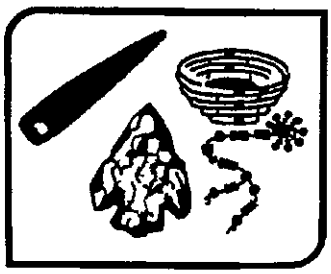
Fifty Years and Beyond

Riparian areas will all be in excellent condition and will contain a large variety of plant communities.

Dedicated old growth juniper areas will be providing a habitat niche that has shrunk as other areas have been managed for optimum deer habitat and livestock forage production.

All areas will be in good vegetative condition.

Cultural Resources



Goal(s)

Locate, evaluate, protect, and mitigate if necessary, significant historic and archaeological sites. Enhance selected sites for public enjoyment, education and interpretation. Conduct cultural resource planning and preservation with public involvement from American Indian Tribes, historical societies, local interest and professional groups. Promote opportunities for research, traditional Native American cultural practices, writing and photography.

Objectives

Complete "broad area" cultural resource inventories and documentation prior to ground-disturbing activities on the Grassland (e.g. range improvements, water developments, pipeline or powerline installations, or road construction projects). Identify Native American traditional food and religious use areas in Compliance with Public Law 95-341 (American Indian Religious Freedom Act) and the Treaty of 1855, with the assistance of the Warm Springs Confederated Tribes. Site enhancement and protection, and National Register nominations will be accomplished through the NEPA process and be funded by specific projects or the Regional cultural resource capital investment process.

Site Enhancement and Interpretation

A comprehensive interpretative plan for the Grassland and its historic, cultural, and prehistoric resources will be implemented. Selected sites and classes of sites (thematics) will be enhanced and interpreted. A minimum of four sites or thematic classes will be interpreted per decade, gradually increasing during the five decades. Local citizens, interest groups, American Indian Tribes, and professional organizations will be involved in both comprehensive planning and specific site enhancement and interpretation.

National Register Nomination

An integral part of recording sites will be the application of the eligibility criteria for inclusion in the National Register of Historic Places. Determinations of Eligibility and Nominations will be treated thematically where possible to facilitate the treatment of groups, classes and districts of similar cultural resource sites. For example, the history of the Grassland and it's associated homestead sites will be examined for their potential as a historic district. A determination of effect will be made for all listed or eligible sites prior to the implementation of associated projects. Nominations will generally be done on thematic classes or districts of historic or prehistoric sites.

See Table 4-1, p.4-20, for outputs by decade for Cultural Resources.

Desired Future Condition

In Ten Years

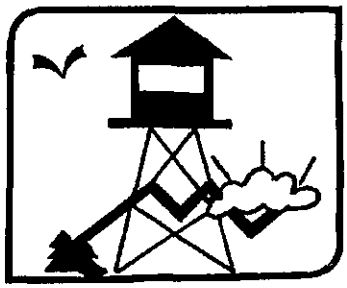
The "Interim Cultural Resource Inventory Design" will have been implemented and 11,000 acres will have been surveyed. Sufficient inventory data will be available to modify the Inventory Design to conditions specific to the Grassland. Thematic Determinations of Eligibility for classes of historic and prehistoric sites will have been conducted. Management plans and allocations for site and thematic site classes will have been implemented through the NEPA process with public involvement by local citizens, interest groups, Indian Tribes, the State Historic Preservation Office and the Advisory Council on Historic Preservation. Traditional Native American use of sites and areas will be recognized and considered during land and resource management activities. Site enhancement and interpretation will have been performed on specific sites and thematic classes. Stabilization of threatened cultural resource sites will have been performed within or adjacent to existing public recreation and use areas.

Fifty Years and Beyond

Cultural resources will be managed as part of a state-wide strategy in coordination with the State Historic Preservation Office and other Federal and State agencies. Cultural resource surveys will have been completed on 25,000 acres (25 percent of the Grassland). The accumulated knowledge of historic, cultural

and prehistoric site types and implementation of management plans and allocation strategies for cultural resource will reduce the need to inventory certain portions of the Grassland. Enhancement and Interpretation will dominate the program. Local citizens, groups and professional organizations will be involved in site preservation and interpretation. Native Americans will make greater use of the Grassland for traditional food gathering and religious practices; they will be involved in the management and treatment of prehistoric sites and burials, and the Grassland in general.

Facilities



Goal(s)

Plan, construct, maintain, and manage Grassland facilities to provide maximum economy, investment protection, user safety, and resource protection.

Objectives

Facilities consists of administrative sites located on the Grassland. There are campgrounds, day use areas such as Rimrock Springs Wildlife Management Area, and the Grassland field headquarters. Table 4-1, p. 4-20, shows future facilities construction and improvements as total numbers by decade.

Desired Future Condition

In Ten Years

Grassland facilities will be attractive to users and reflect favorably on the Forest Service. Marginal facilities will have been removed or upgraded based on need and planned life expectancy. Historic values of the facilities at the Grassland field headquarters will be emphasized in the ongoing maintenance.

In Fifty Years and Beyond

No drastic changes in location or design of Grassland facilities are predicted, even though some changes may occur as a result of an aging population.

Any reconstruction work done at Grassland field headquarters will conform to historic construction type.

Fire



Goal(s)

Control wildfire aggressively, particularly in urban-Grassland interface areas, and in a cost-effective manner (minimize suppression cost plus loss).

Provide for the ecologically sound use of prescribed fire as a cost-effective management tool for achieving other resource management objectives.

Objectives

Wildfire Management

Provide a cost-efficient fire management organization as determined by the National Fire Management Analysis System. The Wildfire Effectiveness Index figures shown in Table 4-1, p. 4-20, represent average annual program cost plus wildfire loss per thousand acres protected.

Prescribed Burning

Reduce wildfire intensities to support a cost-efficient fire protection organization.

Emulate the natural role of fire in maintaining environmental diversity and site productivity, and in maintaining or improving wildlife and range habitat.

Table 4-1 provides estimates of average prescribed fire acres. It is anticipated that there may be large variations above and below these averages in any one year due to variations in available burning conditions, funding, and personnel.

Desired Future Condition

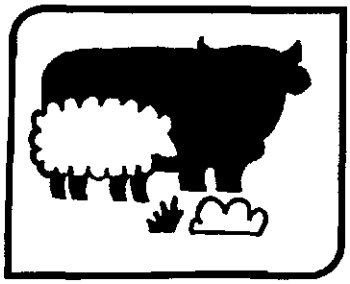
In Ten Years

The natural role of fire in the Grassland ecosystem will be emulated by a mix of prescribed fire, natural fire, and other management techniques.

Fifty Years and Beyond

The natural role of fire in the Grassland ecosystem will continue to be emulated by a fully integrated program of prescribed fire and other management techniques. Increasing values at risk on intermixed private lands will continue to increase the need for fuel hazard management at the interface with Grassland areas and continued cooperation with wildland/urban fire control agencies.

Forage and Livestock Use



Goal(s)

Provide forage for wildlife and domestic livestock in a manner consistent with other resource objectives and environmental constraints, while maintaining or improving ecological condition and plant community stability. Use livestock as a tool for improvement of vegetation, soils, and watersheds.

Objectives

Present permitted use by domestic livestock is 22,000 Animal Unit Months (AUM's). The average actual use by domestic livestock is 17,000 AUM's. The difference between permitted use and actual use is due to forage utilization standards being met before the end of the grazing season on many allotments, and livestock being removed from the Grassland prior to the completion of the permitted season.

By implementing more intensive livestock management systems and improving forage production by increasing the prescribed burning program, it is projected that actual use by livestock will increase to 18,000 AUM's per year during the first decade, and 19,000 AUM's per year during the second decade and thereafter. (See Table 4-1, p. 4-20,)

Desired Future Condition

In Ten Years

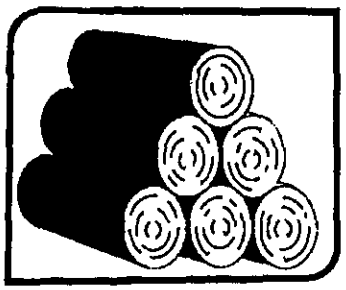
Forage conditions are intended to improve as allotment management plans and intensive management systems are implemented, and range improvements are constructed or reconstructed. Forage for domestic livestock, deer, and antelope will be improved on approximately 3,000 acres per year by burning or cutting juniper and burning sagebrush.

Fifty Years and Beyond

Forage conditions will have been improved to their full potential given other resource considerations. All allotment management plans will have been updated several times and intensive range management practices will have been in place for years. Few new range improvements will be required and the range improvement program will consist of reconstructing existing improvements as they wear out. New management techniques and practices will be implemented.

The number of grazing allotments will most likely decrease, but productivity will be up about 10 percent due to intensive management practices and improved forage conditions. Burning and cutting to control juniper, and burning to control sagebrush, will be ongoing range improvement practices involving about 3,000 acres per year.

Fuelwood



Goal(s)

Provide fuelwood for personal and commercial use in a manner consistent with other resource objectives and environmental constraints.

Objectives

Fuelwood will be provided as a side benefit of clearing juniper for wildlife habitat and forage enhancement practices. Current and expected output is about 400 cords per year. (See Table 4-1, p. 4-20.)

Desired Future Condition

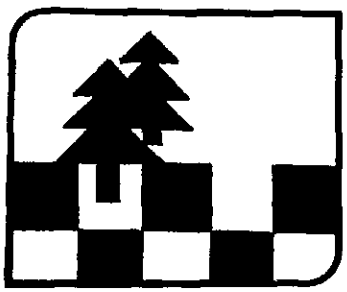
In Ten Years

Fuelwood outputs will continue to be about 400 cords per year and it will be a by product of juniper removal for forage and wildlife habitat enhancement.

In Fifty Years and Beyond

Fuelwood outputs will continue to be about 400 cords per year but the material will be smaller as optimum cover/forage ratios are obtained and available material starts coming from re-treated areas.

Lands



Goal(s)

Permit special land uses that have been evaluated in relationship to land management objectives, are harmonious with other resource objectives and environmental considerations, and that are in the public interest.

Achieve a pattern of landownership that best supports resource goals, improves the efficiency of resource management, and demonstrates effective Grassland management.

Objectives

Issue and administer special use permits in a manner consistent with management area direction (See Table 4-1, p. 4-20, for special use outputs by decade.)

Desired Future Condition

In Ten Years

The demand for special use permits, both recreational and nonrecreational, will increase. There will be no new utility corridors, but additional lines may be added to existing corridors. The National Recreation Strategy will result in additional permits for recreational facilities and activities.

There will be some accomplishment toward land exchange goals. Research Natural Areas (RNA's) will be withdrawn from mineral entry. Property boundaries will be surveyed, marked, and posted. Encroachments will be eliminated. Rights-of-way for trail access will be acquired.

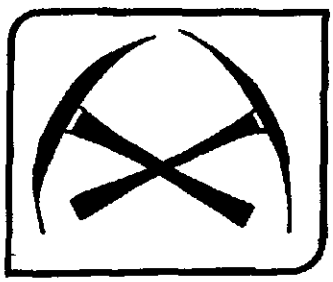
The lease agreement with the State for National Forest System lands within Cove Palisades State Park will be continued. Lands not needed for Grassland purposes within the Park may be traded to the State. The Island RNA will be retained in Grassland ownership.

Fifty Years and Beyond

The demand for special use permits will continue to increase. The number of transmission lines within existing utility corridors is expected to increase.

Moderate progress will have been made toward accomplishing the desired land ownership. All of the property boundaries will have been surveyed, marked, and posted to Forest Service standards and maintained regularly. Grassland ownership within the Cove State Park may have been transferred to the State. The power withdrawals in excess of existing reservoir pool requirements along the Crooked and Deschutes Rivers will have been revoked and authority transferred to the Grassland or State.

Minerals and Energy



Mineral potential is discussed in detail in Appendix I.

Goal(s)

Provide for and facilitate the exploration, development, and production of mineral resources on the Grassland in coordination with other resource objectives, environmental considerations, and mining and leasing laws.

Objectives

Oil and Gas

The Grassland will respond to demands for oil and gas leases. In 1980, 17,000 acres were under lease; 7,200 acres are presently (1989) under lease. On the Grassland, 93,000 acres (includes all ownerships) are classified as being potentially valuable for oil and gas. This is assumed to be the maximum acreage that might be leased. Domestic demand for oil and gas leasing is directly related to international production and prices. Increases in the cost of imported oil and increased turmoil in the Middle East can trigger increased domestic production. These factors may cause an increase in leasing on the Grassland sometime in the next five decades. Changes in the international situation, changes in technology, or the depletion of Grassland oil and gas deposits may then result in the decline in the acres leased.

Geothermal

The Oregon Department of Geology and Mineral Industries (DOGAMI) has classified the entire Grassland as "favorable for the discovery at shallow depth (less than 1,000 meters) of thermal water of sufficient temperature for direct heat applications." However, approximately three-quarters of the state is given this classification, and DOGAMI states, "it is probable that only small areas of this region are truly underlaid by such thermal water." For the purposes of this Plan, it is assumed that the geothermal exploration during the next five decades will be concentrated in those areas where it is now occurring, and the Grassland will not issue any geothermal leases.

Nonenergy Minerals

Approximately 22,000 acres are classified as having moderate potential for gold, silver, and mercury, and approximately 12,000 acres are classified as having moderate potential for diatomite. However, very little exploration has been done on the Grassland, and it is likely that further exploration will result in much of this land being reclassified as having low potential.

Common Variety Minerals

The aggregate mined on Grassland land is mostly used to surface State and county roads. The demand for this material is expected to remain constant over the next five decades. See Table 4-1, p. 4-20.

Desired Future Condition

In Ten Years

Mining activity is not expected to change from the present low level of activity unless a valuable deposit is discovered. If oil and gas shortages develop nationally, seismic exploration activities could occur on the Grassland. An overall materials source management plan will be developed and a comprehensive

development plan written for each active or proposed source. All sources will be rehabilitated when depleted or closed. Most common variety material is used for road maintenance or reconstruction by local government agencies, and the demand for common variety materials will remain the same.

Fifty Years and Beyond

Interest in oil and gas leasing and exploration is expected to increase. Common variety minerals sources will be developed and rehabilitated in accordance with a materials source management plan.

Old Growth Juniper



Goal(s)

Provide stands of old growth juniper on the Grassland for wildlife habitat, ecosystem diversity and aesthetic diversity.

Objectives

Manage the 15 designated old growth juniper stands spaced approximately five miles apart so that the unique habitat niches they provide will be available for the wildlife species that use them.

Desired Future Condition

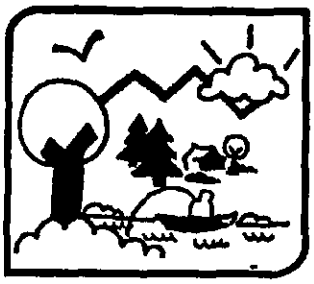
In Ten Years

Designated old growth juniper sites will be providing habitat niches and diversity while other areas will have various percentages of the juniper treated for wildlife habitat and range improvement objectives.

Fifty Years and Beyond

Designated old growth juniper sites will be continuing to provide habitat niches and diversity.

Recreation



Goal(s)

Emphasize the National Recreation Strategy.

Provide for a variety of recreational experiences in grassland, high desert, canyon, and riparian environments in a manner consistent with other resource objectives and environmental constraints.

Protect unique natural and recreational features.

Objectives

Manage, improve, modernize, and expand developed recreation sites based on use and needs.

Provide for a wide variety of recreational opportunities.

Desired Future Condition

In Ten Years

A variety of recreational opportunities will be provided. Existing campgrounds and boat ramps will be maintained and additional camping and boating facilities will be constructed at Haystack Reservoir.

The special values associated with existing and potential Wild and Scenic Rivers will be protected and enhanced. Opportunities for semiprimitive nonmotorized recreation will be provided in the Deschutes Canyon and Squaw Creek areas. Trailheads will be developed; rights-of-way and lands will be acquired to provide better public access for this area.

Off-road vehicles (ORV's) are expected to become increasingly popular. ORV use will be accommodated on designated routes on the Grassland. Staging areas, camp areas, and routes offering a variety of challenges will be identified on the Grassland.

Fifty Years and Beyond

Recreational use of all types is likely to increase, requiring new strategies for managing and distributing use.

Scenic Resources



Goal(s)

Participate in the "National Forest Scenic Byways" program, through nomination of special Grassland roads that exhibit exceptional qualities and meet national selection criteria.

Provide natural appearing scenery along major travel ways, at developed and dispersed recreation sites, and in management areas where recreation is emphasized.

Integrate visual quality management into all resource activities which have potential effects on scenery.

Objectives

Table 4-1, p. 4-20, lists the acres projected for scenic resources by Visual Quality Objective (VQO). See Standards and Guidelines, Section 3, this chapter, for listing of VQO's by Management Area.

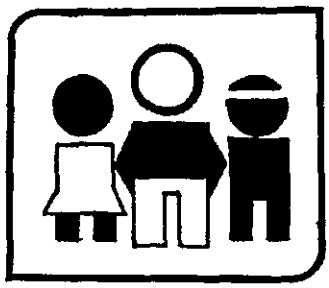
Desired Future Condition

In Ten Years, Fifty Years and Beyond

Juniper areas will be a mosaic of juniper and openings as a result of wildlife cover and forage manipulations.

Powerlines and other above ground facilities will continue to dominate the landscape within the utility corridors.

Social and Economic



Goal(s)

Manage the Grassland to lend support to the social and economic viability of local communities, as well as to the Nation as a whole.

Provide equal opportunities to people regardless of race, color, creed, sex, marital status, age, handicap, religion, or national origin.

Maximize net public benefits (36 CFR 219.3).

Objectives

The Grassland will continue to generate receipts primarily from grazing fees, special use permit fees, firewood sales, and mineral leases. Up to seventy percent of the gross grazing fees are retained by the Gray Butte Grazing Association to cover administrative costs and the Conservation Practices program. The remaining thirty percent of grazing fees is combined with all other receipts. Of this total, twenty-five percent goes to the county and seventy-five percent goes to the U.S. Treasury. The county also receives an average of about $20,000 worth of mineral materials for roads per year at no cost.

Desired Future Conditions

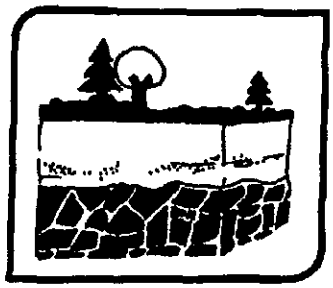
In Ten Years

The management of Grassland resources will be accomplished in an economically efficient manner. Investments in resource management will take into account site productivity, product value and marginal rates of return. Resources with market value (e.g. special uses, minerals, and grazing) which contribute to county receipts and the local economy, will experience increasing competition with nonmarket resources, (e.g. unroaded recreation, wildlife habitat, and unspoiled scenery). Urban population values and demands for the latter values from the National Grassland will increasingly conflict with local utilitarian views and lifestyles. The Forest Service, caught in this conflicting dichotomy, will continue to seek a balance of use options, and to form public partnerships.

Fifty Years And Beyond

The dichotomy and competition for resources, and the purposes of the National Grassland, will be politically and legislatively addressed, and the questions of today resolved, although new issues will arise. Greater uniformity and clarity will exist in how publics view the National Grassland, its purpose, and its management. The present method of payment to counties, which encourages conflict, will be changed to something other than that requiring local governments to emphasize resource extraction from the National Grassland in order to maximize county receipts.

Soil



Goal(s)

Manage soil to maintain, restore, or improve its natural productive potential.

Objectives

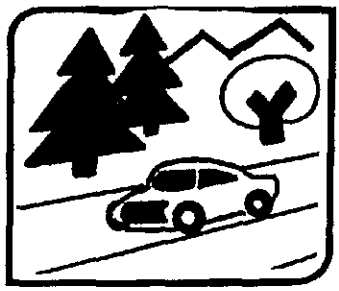
Land disturbing management activities such as road-building, grazing, and certain recreational uses have a potential for dramatic decreases in soil productivity if not managed or mitigated correctly. The objective of the Crooked River National Grassland is to prevent or correct soil damage in all activity areas that result in productivity loss on lands dedicated to plant and water production. (See Table 4-1, p. 4-20,)

Desired Future Conditon

In Ten Years and Beyond

Soil productivity will be conserved; areas where productivity has been impaired will be rehabilitated through management activities.

Transportation System



Goal(s)

Plan, design, operate, and maintain a safe and economical transportation system that provides efficient access for the movement of people and materials involved in the use and protection of Grassland resources.

Objectives

The miles of road open and maintained on the Grassland will decline over time as the Forest Service assumes ownership of 78 miles of public usage roads, no longer maintains other public usage roads, and inactivates and revegetates roads identified as having no current or future use for resource management. Initially, 15 miles of development roads will be closed seasonally or yearlong, increasing to 25 miles by the fifth decade. Four miles of road will be maintained for passenger vehicles, while the remaining miles (446 miles initially, and 305 miles by the fifth decade) of development roads will be maintained only for high clearance vehicles.

Desired Future Condition

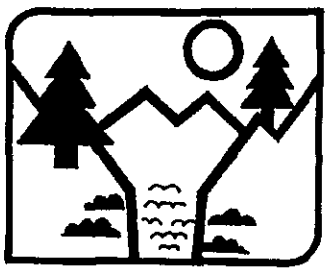
In Ten Years

State highways and County roads will continue to provide the principal access to the Grassland. The Forest Service will assume ownership and management of over 78 miles of public usage roads while other public usage roads on the Grassland will no longer be maintained by the Forest Service. Approximately 50 miles of roads identified as having no current or future use for resource management will have been inactivated and revegetated. Fifteen miles of Grassland development roads will be closed seasonally or yearlong. Most of the other 450 miles of Grassland development roads will be maintained only for high clearance vehicles.

Fifty Years and Beyond

Some of the primary, high-use county roads providing access to the Grasslands will have improved surfaces. Roads totaling 181 miles will have been closed and revegetated, and 25 miles will be closed seasonally or yearlong - a 36 percent increase in seasonal and yearlong closures over existing conditions. The other 310 miles of roads will be open only to high clearance vehicles.

Water



Goal(s)

Maintain or improve water quality, quantity, and timing of run-off.

Comply with the objectives of the "Clean Water Act" and Oregon State water quality standards.

Provide water of a consistently high quality to users and dependent resources.

Objectives

Maintenance or improvement of water quality will be achieved through proper management of riparian areas and uplands. See Table 4-1, p. 4-20, for acres of riparian improvement by decade.

Desired Future Condition

In Ten Years

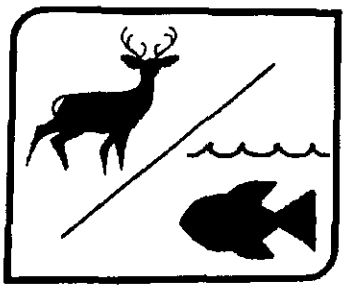
Work to restore riparian areas will have been completed, but not all riparian areas will have had time to recover to full biological potential. Many streams that

presently flow only seasonally will flow year-round. The potential for overland flows and delivery of sediment to streams from upland areas will have been reduced by construction of structural improvements (namely fences to exclude livestock and the development of dispersed water sources) and adjustments in grazing systems. Water quality will be maintained or improved to meet state standards for temperature and turbidity.

In Fifty Years and Beyond

All riparian areas will be in excellent condition. Where the potential exists, stream channels will be narrow and deep with overhanging banks. Deciduous vegetation will shade 80 percent of the surface of perennial streams, lowering water temperatures and improving fish habitat. Fish populations will be ten or more times the present population due to excellent stream and riparian area conditions.

Wildlife and Fish



Goal(s)

Identify existing populations of any threatened, endangered, or sensitive species, and maintain or improve their habitats.

Provide, manage, and improve fish and wildlife habitats to maintain viable populations of existing native and desired non-native vertebrate species, including threatened, endangered, and sensitive species.

Objectives

Wintering Antelope Population

There are currently about 160 head of antelope wintering on the Grassland, considerably more than noted in the unit plan (1979), which predicted that antelope numbers would stabilize at 70 to 75 head. It is now believed that the wintering herd will continue to increase to a maximum of about 200 to 350 head, or to the point where neighboring private land damage complaints require the Oregon Department of Fish and Wildlife (ODFW) to limit further population growth. Antelope wintering habitat will be managed for the maximum number.

Wintering Deer Population

Deer populations are expected to remain at current levels in the near future, but drop dramatically in later decades as private land on the winter range is developed for homesites. The present deer population on the winter range is about

4,300. Habitat on the Grassland will continue to be improved to provide the optimum cover/forage ratios. However, at the same time, private land within and adjacent to the Grassland, that is also part of the winter range, is expected to be developed into home sites, reducing its ability to support deer. If the Grassland can acquire the private land, deer numbers may be maintained at the higher levels.

Desired Future Condition

In Ten Years

The wintering antelope population is expected to increase until it reaches the carrying capacity of the range at 200 to 350 head. The summering population is expected to remain at 40 to 50 animals.

Wintering deer populations are expected to remain at existing levels (in spite of development on private lands within the winter range) due to improved habitat on the Grassland. Habitat enhancement work will include: managing juniper to attain a 40 to 60 cover-to-forage ratio, prescribing fire appplications on winter ranges, and improving riparian areas.

Populations of animal species, including upland game birds, doves, bluebirds and other songbirds, small mammals, reptiles, and amphibians, are expected to increase substantially as vegetation conditions in riparian areas and elsewhere improve, and as brush planted for winter cover and hiding cover matures.

Fish populations will increase dramatically as riparian areas improve in condition.

Fifty Years and Beyond

Antelope populations should be about the same on the Grassland summer range as they were after the first decade. Winter range numbers should also be about the same or less, depending on what happens on the summer ranges off the Grassland.

Deer populations are predicted to drop over the next 50 years. The Grassland portion of the winter range should be producing habitat at its potential due to habitat improvement work. Since a large portion is within private holdings, changes in the management of these lands are predicted, and natural succession will adversely affect the mule deer carrying capacity. Private land acquisition combined with habitat improvements should result in a fairly stable deer herd.

It is estimated that fish populations will be ten or more times the present population due to excellent stream and riparian area conditions.

TABLE 4-1
PROPOSED AVERAGE ANNUAL OUTPUTS, BY DECADE

		DECADE				
Resource/Activity	Unit of Measure	1st	2nd	3rd	4th	5th
AIR QUALITY						
Total Suspended Particulates	M Tons	0 35	0 31	0 27	0 23	0 19
CULTURAL RESOURCES						
Sites Documented	Properties	50	40	40	30	20
Enhanced/Interpreted	Properties	4	5	5	6	6
Nat'l Rgeister Nomination		2	2	2	2	2
FIRE						
Fire Management Efficiency Index	$/M Ac protected	715	715	715	715	715
Prescribed Fire	M Acres	3	3	3	3	3
LIVESTOCK USE	M AUM's/Yr	18	19	19	19	19
FUELWOOD	Cords	400	400	400	400	400
LANDS						
Special Use Permits	Permits	130	140	150	150	150
MINERALS AND ENERGY						
Oil and Gas	M Ac Leased	7 2	17	17	17	17
Geothermal	Ac Leased	0	0	0	0	0
Nonenergy (Gold, Mercury, Silver, Diatomite)	M Ac Leased	1	2	3	3	3
Common Variety (Gravel, Cinders, etc)	M Cu Yds	220	220	220	220	220
RECREATION						
Developed Sites	M/RVD's	67	81	81	81	81
Dispersed Sites	M/RVD's	158	158	158	158	158
Off Road Motorized	M/RVD's	2	2	2	2	2
Roadless Potential	M/RVD's	2	2	2	2	2
RIPARIAN IMPROVEMENT	Acres	125	0	0	0	0
SOCIAL AND ECONOMIC						
Returns to Government	M$	36	36	36	36	36
Payments to Counties	M$	12	12	12	12	12
SOIL						
Soil Loss (erosion)	Tons/Ac/Yr	045	045	045	045	045
TRANSPORTATION SYSTEM						
F S Roads						
Open and Maintained	Miles	465	440	405	360	334
Passenger Car Use						
Open and Maintained	Miles	4	4	4	4	4
High Clearance Use						
Open and Maintained	Miles	446	411	376	341	305
Prohibited	Miles	15	25	25	25	25
WILDLIFE (Big Game)						
Wintering Antelope Population	#	350	350	350	350	350
Wintering Deer Population	#	4300	3200	2200	2200	2200

Chapter 4

Grassland Management Direction

Section 2

Management Area Prescriptions

Chapter 4

Section 2

Management Area Prescriptions

A management area is composed of lands with similar capabilities managed under a common prescription. The lands may or may not be contiguous.

All areas of the Grassland are managed under the Grassland-wide standards and guidelines (Chapter 4, Section 3) and broader multiple use principles directed by laws, regulations, and policies.

Management area locations are displayed on the Alternative I Map (Figure 4-16, pg. 4-57). Individual maps for each management area are located at the end of this section of Chapter 4.

Modifying Management Areas or Prescriptions

The appropriate setting for each management area is determined by the management goals, objectives, desired conditions, and suitability of the area to achieve these conditions. When a project would result in conditions that do not meet these criterion, the need to modify the management area allocation should be addressed (see Chapter 5, Implementation of the Grassland Plan). Evaluation of factors including activity extent, duration of impact, season of operation, sight or sound impacts, or feasibility of rehabilitation would be necessary. Cumulative modifications of prescriptions should not exceed those described in Chapter 5, Implementation of the Grassland Plan, such modifications will be the exception, rather than the rule.

During implementation, it may be discovered that a management area boundary was inaccurately or inappropriately mapped In such a case procedures for adjusting boundaries will also follow direction in Chapter 5, Implementation of the Grassland Plan (Amendment and Revision Process). Final boundary adjustments will be documented and integrated into the Grassland data base by the initiating party.

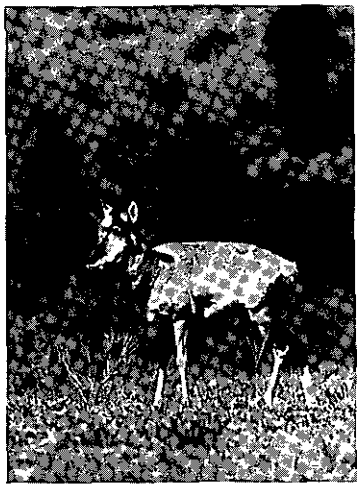
TABLE 4-2
CROOKED RIVER NATIONAL GRASSLAND MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	Acres	% Total	Resource Emphasis
MA-G1 Antelope Winter Range	22700	20	Wildlife
MA-G2 Metolius Deer Winter Range	12740	11	Wildlife
MA-G3 General Forage	59440	53	Range
MA-G4 Research Natural Areas	110	<1	Research
MA-G5 Juniper Old Growth	740	1	Wildlife
MA-G6 Crooked River Recreation Area	720	1	Wild/Scenic River
MA-G7 Deschutes River Scenic Corridor	650	1	Wild/Scenic River
MA-G8 Squaw Creek	7840	7	Recreation/Wildlife
MA-G9 Riparian	2110	2	Riparian
MA-G10 Rimrock Springs Wildlife Area	430	<1	Wildlife
MA-G11 Haystack Reservoir	150	<1	Recreation
MA-G12 Cove Palisades State Park	2690	2	Recreation
MA-G13 Lake Billy Chinook View Area	560	1	Visuals
MA-G14 Dispersed Recreation	90	<1	Recreation
MA-G15 Gray Butte Electronic Site	80	<1	Facilities
MA-G16 Utility Corridors	460	<1	Facilities
TOTAL GRASSLAND ACRES	111510	100	

MA-G1 Antelope Winter Range

22,700 Acres



Description

The Antelope Winter Range Management Area is located between Prineville and Madras in the vicinity of Boyce Corral, the Grassland field headquarters and Scales Corral. This management area is generally open country with some scattered patches of juniper.

Emphasis

Manage for optimum winter range conditions for antelope in conjunction with the Oregon Department of Fish and Wildlife.

Desired Condition

The antelope winter range will generally consist of open grassland with shrub heights at or below 24 inches, but definitely not over 30 inches in height.

Fences will be built with lower wires elevated for easy passage by antelope.

The area will have an abundance of fall greenup left for antelope winter use.

MA-G2 Metolius Deer Winter Range

12,740 Acres

Description

The Metolius deer winter range is located in the lower desert area west of the Deschutes River on the National Grassland, the Sisters Ranger District of the Deschutes National Forest, and on private and BLM lands. Of the total acreage of the Metolius winter range, 12,740 acres are located on the National Grassland.

Present permitted grazing use of the winter range is by two bands of sheep and one cattle allotment.



Emphasis

Manage for big game winter range habitat.

Produce high quality deer winter range habitat to support Oregon Department of Fish and Wildlife management objectives for the wintering deer population. Manage for 60/40 forage/cover ratio and a healthy, vigorous shrub overstory.

Desired Condition

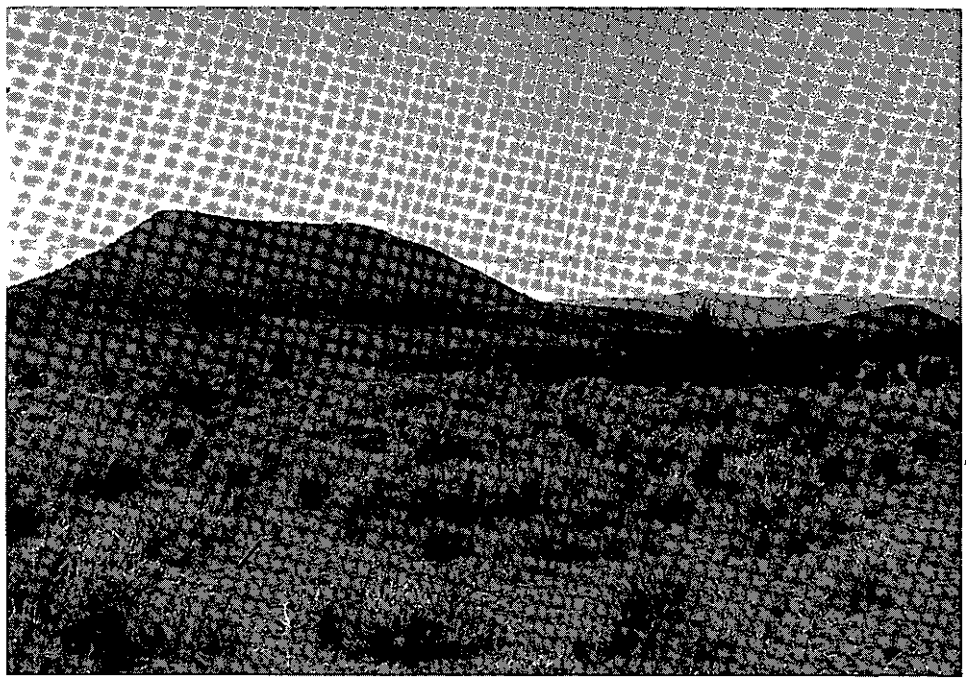
The forage/cover ratio will be at the optimum level of 60/40 where ever that is possible and will be well distributed. A vigorous shrub component will be present. Private land will either not be developed or will have been acquired by the National Grassland

Livestock will be used as a management tool to maintain winter deer forage in a highly palatable and nutritious condition.

Roads will be managed to reduce harassment and stress on wildlife.

MA-G3 General Forage

59,440 Acres



Description

The General Forage Management Area consists of those parts of the Grassland not allocated to other management areas. It is located primarily in the east and north portions of the Grassland. This area consists of different combinations of juniper, sagebrush and bunchgrass communities.

Emphasis

Manage for forage production and utilization in a manner consistent with general standards and guidelines for other resources.

Desired Condition

The management area will contain the natural composition and cover values of native grasses, sedges, forbs and palatable shrubs. Undesirable forage plants, such as sagebrush and juniper, that decrease range productivity will be managed using the tools of fire and livestock to reduce their competition while keeping with multiple use of objectives. Proper stocking levels and distribution of livestock will be employed to effectively utilize forage production without adversely affecting plant communities over time.

Some crested wheatgrass pastures will be used as early season pastures, and as such will be managed to maintain the crested wheatgrass.

Other crested wheatgrass pastures will be proceeding through natural succession to re-establish native plant species.

Aspen clones will be regenerating and noxious weeds will be declining or absent.

Range improvements will be in place to facilitate livestock distribution and effective use of forage.

MA-G4 Research Natural Areas

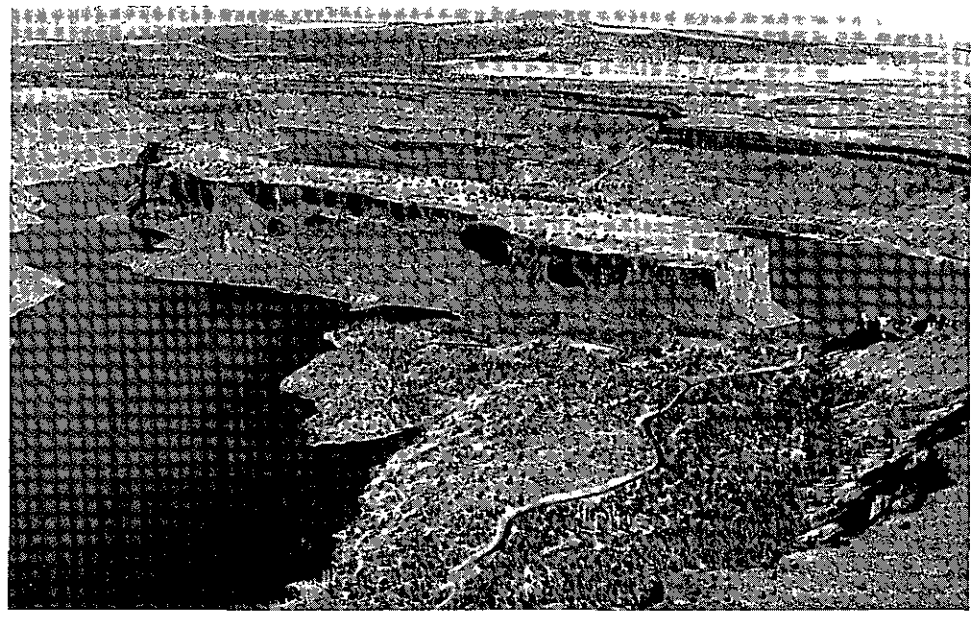
110 Acres

Description

Two Research Natural Areas (RNA's) are located on the National Grassland: Haystack Butte and Island.

The Haystack Butte RNA is located on an isolated butte 11 miles south of Madras. The RNA is potentially 84 acres: 58 acres of National Grassland and 26 acres of private land.

The Island RNA, 215 acres (162 acres BLM and 53 acres National Grassland), is located on an isolated butte on the north end of the peninsula between the Deschutes and Crooked River arms of Lake Billy Chinook.



Each RNA represents several plant communities in the juniper/shrub/steppe zone as follows:

Island
(Flat)

1.Western juniper/big sagebrush/bluebunch wheatgrass-Idaho fescue

2.Western juniper/big sagebrush/bitterbrush/bluebunch wheatgrass-Idaho fescue

Haystack Butte
(Top)

1.Western juniper/big sagebrush/bluebunch wheatgrass-Idaho fescue

2.Western juniper/big sagebrush/bluebunch wheatgrass-Idaho fescue, biscuits

(Steep north side slopes)

3.Western juniper/big sagebrush/bluebunch wheatgrass-Idaho fescue

(Steep south side slopes)

4.Western juniper/big sagebrush-rock spirea/bluebunch wheatgrass- arrowleaf balsamroot

Emphasis

Allow natural processes to occur for research purposes and education. These processes will provide baselines against which other activities may be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for both plant and animal species.

Desired Condition

Natural conditions will be observed. Any management activities within the RNA will be directed at maintaining the natural conditions of the area; these human-caused changes to the ecosystem will not be readily evident. Continuing baseline studies may be occasionally visible in terms of equipment, instruments, and related activities.

Fire occurrence will be evident where natural lightning and human-caused fire starts occur.

There is a high probability that grazing will not be evident, but this is still to be determined through the official designation (RNA) process.

MA-G5 Juniper Old Growth

740 Acres



Description

The Juniper Old Growth Management Area consists of selected juniper stands suitable for providing old growth habitat conditions for specific wildlife species. These stands do not meet the criteria defined in the Regional guide, FEIS, 1984. Selected stands are at least 40 acres, and distributed not more than five miles apart. Where suitable stands are not available, capable areas have been selected and will be managed to allow the stands to grow toward old growth habitat conditions. Fifteen stands have been selected on the Grassland.

Emphasis

Provide habitat for wildlife species that prefer a habitat niche provided in old growth juniper stands. The common flicker is the management indicator species.

Desired Condition

Stands will be at least 40 acres in size dispersed not more than five miles apart. Trees will be large with hollow centers, and have broad, irregular-shaped crowns or spike tops. Most of the large trees, both live and dead, will support lichen growth. Trees will contain cavities from either bole splits and/or limbs that have broken away from the tree bole. Some younger trees will be present along with various grasses, forbs, and shrubs. Major management activities and roads will generally not be evident. Fire occurrence will be evident where natural lightning and human-caused starts occur. Grazing by livestock, as well as by big game wildlife species will occur. Existing range improvements will be maintained and new improvements allowed if they are compatible with the primary objectives of the management area.

MA-G6 Crooked River Recreation Area

720 Acres



Description

The Crooked River Recreation Area includes a one-half mile wide corridor encompassing the Crooked River canyon between the southern Grassland boundary and Lake Billy Chinook. Of 9.3 miles of free-flowing river within the Grassland boundary, 4.1 miles are in private ownership, 3.2 miles are administered by the Bureau of Land Management, and 2.0 miles are administered by the Forest Service. Private lands, both housing developments and farms, are included in the corridor along the canyon rim.

The canyon is rocky and steep and offers spectacular views from the rim. There are numerous natural and geologic features such as springs, rock pillars and columns, eagle nest rocks, waterfalls, and rapids along the river. The canyon becomes deeper as the river flows northward.

The Crooked River has been designated by Congress under the Omnibus Oregon Wild and Scenic Rivers Bill to be an addition to the National Wild and Scenic River System as a recreational river. The BLM is the lead agency for developing a management plan for the river.

Emphasis

Management will maintain the appearance of a natural landscape to enhance and protect recreational and scenic values. Further planning for this management area will be forthcoming, as required by the Omnibus Oregon Wild and Scenic Rivers Act of 1988.

Desired Condition

This steep canyon will remain relatively pristine, but evidence of ranching and subdivision housing will be observable along the canyon rim. The river will remain free flowing, and accessible (to some extent) to the rim only.

Access up and down the river will remain very difficult by foot due to cliffs, talus slides, and vegetative thickets. Canoeing, rafting, and kayaking will continue at low to moderate levels.

MA-G7 Deschutes River Scenic Corridor

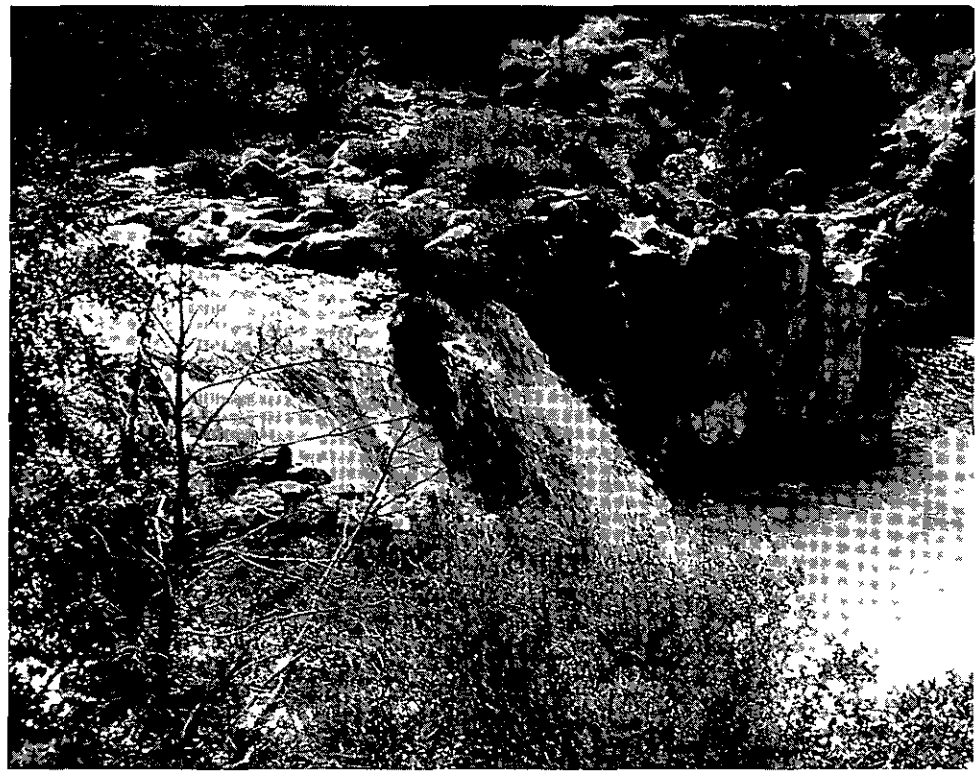
650 Acres

Description

The Deschutes River Scenic Corridor includes a one-half mile wide corridor encompassing the Deschutes River canyon between the southern Grassland boundary and Lake Billy Chinook. Of a total of 3,087 acres, 2,076 acres are administered by the Bureau of Land Management and 655 acres are administered by the National Grassland. Private lands, both housing developments and farms, are included in the corridor along the canyon rim.

The canyon is rocky and steep; it offers spectacular views, such as the Geneva Overlook on the west rim where one can view 735 feet down the canyon to the river. There are numerous natural and geologic features such as the weeping wall springs, rock pillars and columns, eagle nest rocks, and waterfalls and rapids along the river. The canyon becomes deeper as the river flows northward.

This section of the Deschutes River has been designated by Congress under the Omnibus Oregon Wild and Scenic Rivers Bill for addition to the National Wild and Scenic River System as a scenic corridor. The BLM is the lead agency for developing a management plan for the river.



Emphasis

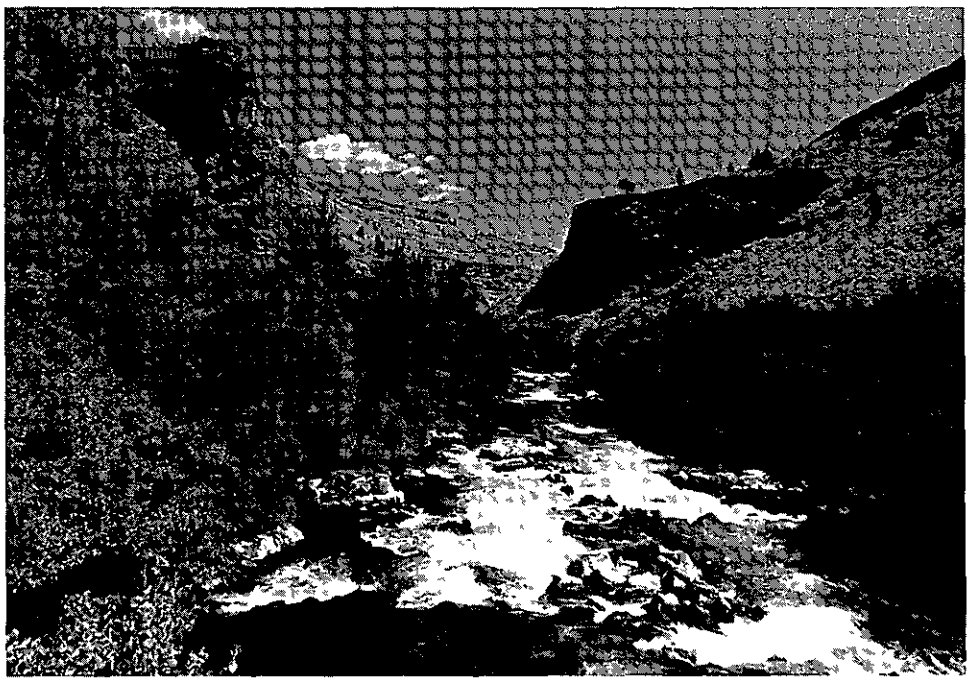
Manage for scenic quality and natural appearance of the landscape.

Desired Condition

This area will remain pristine and the river will remain free flowing. Access in the corridor will be over user-maintained trails offering opportunities to explore more primitive canyon experiences. Motor vehicle access in the corridor will be limited to existing routes within the Crooked River Ranch subdivision including access to the BLM Steelhead Falls area. Except for existing minor intrusions from private lands (houses on the rim at Crooked River Ranch and the pump house on the west side) the area will appear natural and rugged.

MA-G8 Squaw Creek

7,840 Acres, 6,470 acres in semiprimitive recreation and 1,370 acres in proposed "scenic river."



Description

Located in the southwestern corner of the Grassland, the Squaw Creek Management Area includes the sage and juniper plateaus surrounding the narrow canyon formed by Squaw Creek. Squaw Creek itself, a tributary of the Deschutes River, is an oasis in this otherwise dry land. The occasional ponderosa pine and

abundant riparian vegetation growing along the stream contrasts with the surrounding desert vegetation; the canyon walls offer interesting geologic formations and color. The main access to the area is provided by Forest Road 6360, which divides the area from east-to-west. The area where Road 6360 fords Squaw Creek is a popular area for dispersed camping.

A 7.5 river mile (creek) segment, one-half mile wide, from the Grassland boundary to its confluence with the Deschutes River, has been identified as suitable for recommendation as a "scenic river" under the Wild and Scenic River System. This river segment includes portions of two parcels of private land which are undeveloped except for improved road access to the canyon rim.

Emphasis

Provide opportunities for semiprimitive nonmotorized recreation in a pristine canyon setting, while protecting and enhancing the deer winter range habitat and fisheries. A 1,370-acre corridor along the creek will be managed for its scenic quality as a "scenic river."

Desired Condition

Semiprimitive Nonmotorized Recreation

Except for the one access of Forest Road 6360, which fords Squaw Creek at a dispersed campsite, the area will be void of motor vehicles. It will offer unique canyon hiking, bird watching, and fishing opportunities. User trails will continue to be the main access into the canyon areas. The vegetation will continue to be lush along the creek, providing excellent riparian habitat.

Recreational use and livestock grazing will occur, but the area will appear natural. Wildlife and fish species indigenous to the area will continue to exist at levels consistent with the available habitat. Fire occurrence will be evident where prescribed fire and wildfire from natural and human-caused starts occur.

Proposed Scenic River Corridor

Preserve the natural and scenic qualities of the river (creek) corridor. The canyon area within this corridor will remain pristine and offer remote recreational opportunities. Livestock grazing will not be allowed in the river corridor.

MA-G9 Riparian

Description

Riparian zones include land adjacent to water, and are identified by the presence of terrestrial vegetation that requires or tolerates large amounts of free or unbound water. These sites include wet areas around springs and seeps as well as streambanks and active floodplains Major riparian areas include: Willow Creek, Mud Springs Creek, Squaw Creek, Deschutes River, Crooked River, and Lone Pine, Skull Hollow, Windom, Rodman and Lithgo drainages.



Emphasis

Maintain riparian habitat, including streambank stability and fish habitat capability, at existing levels where the desired condition is met. On sites where the desired condition is not met, take steps necessary to bring riparian condition to its ecological potential. Activities that will result in a deterioration of water quality in perennial and fish bearing streams will not be allowed. Range allotment plans will reflect forage utilization levels necessary to meet brush and hardwood protection or enhancement needs.

Desired Condition

Riparian areas will exhibit a low, but apparent levels of management. Vegetation may or may not appear manipulated, depending on the condition of the stream. An abundance of wildlife species should be evident as a result of restrictions on management activities and level of habitat provided. Due to management restrictions and the low risk associated with these areas, the signs of natural or man-caused fire will be infrequent.

For management purposes, a special protection area (100 feet from the edge of perennial bodies of water) will be apparent.

Roads not planned for future use, through and across riparian areas, will be obliterated and re-vegetated to a natural or near natural condition.

Within the limits of ecological potential, a shady, brushy condition with a canopy of alder, willow, aspen, or other deciduous vegetation will exist.

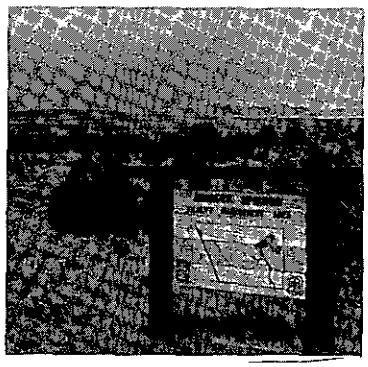
Where coniferous evergreens are a natural component of the ecosystem, a variety of size classes will exist to perpetuate the supply of shade and woody debris over time. Sites unable to support a canopy of deciduous or evergreen species will be characterized by vigorous stands of forbs, grasses, and grass-like riparian species.

Bank slopes containing high plant densities, thick root masses, embedded angular boulders, and old logs will also characterize these areas. Extensive scouring of streambanks will be an uncommon occurrence as will soil deposition outside the norm for the individual stream system. Streambeds will be commonly covered by native aquatic growth on assorted sizes of rocks and boulders.

Where cobble and gravel bars are prominent, they will become covered by sandy loam soils as riparian vegetation filters and traps stream sediments. As stream banks are re-built and cutbanks stabilized, a narrower, deeper channel will gradually develop.

MA-G10 Rimrock Springs Wildlife Area

430 Acres



Description

Rimrock Springs is a state-designated wildlife management area located 17 miles north of Prineville and 10 miles south of Madras on Highway 26 near the old Grassland field headquarters. The 450-acre area includes ponds and marshes that were developed cooperatively with the State (see Appendix J) and private groups. A short loop trail provides access to two wildlife viewing platforms. The old field headquarters and winter pastures for government horses are also included in the management area.

Emphasis

Provide unique habitat (wetlands, ponds, springs) within the juniper-sagebrush steppe characteristic of central Oregon's high desert. Provide for nonconsumptive (viewing, photography) wildlife uses in a natural setting. Improve present habitat conditions and promote habitat diversity.

Desired Condition

Wildlife will be available for viewing and photography. A barrier-free (handicapped access) interpretive trail and a brochure will be used by the general public and as an outdoor education tool for schools. Barrier-free toilet facilities will be available at the trailhead. Interpretation of unique cultural resources will preserve early history of the area. Prescribed fire will be used to improve habitat.

MA-G11 Haystack Reservoir

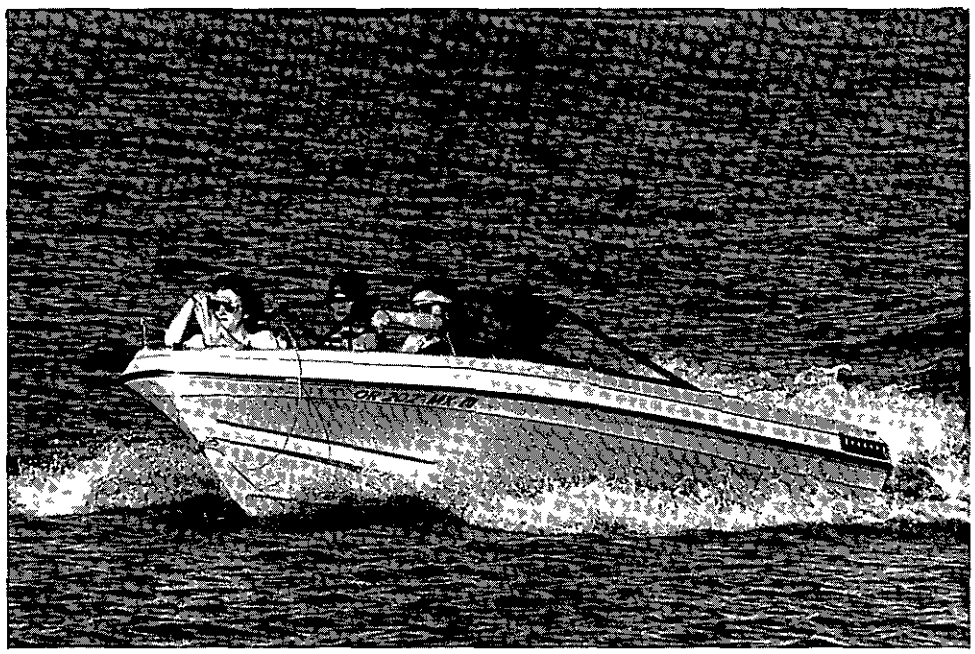
150 Acres

Description

Haystack Reservoir, located in the southcentral portion of the Grassland between Highways 26 and 97, is an irrigation regulating reservoir developed by the Bureau of Reclamation (BOR) and operated the by the North Unit Irrigation District. The reservoir has a capacity of 6,000 acre feet of water and surface area of 233 acres. The Haystack Reservoir Management Area includes the shoreline around the lake that is in public ownership.

Haystack Reservoir is a popular location for fishing, swimming, water skiing and other types of water-oriented recreation. Picnicking, sightseeing, and bird watching are also popular activities. Boat launching, camping, and picnicking facilities developed and operated by the Forest Service are located on the east shore of the reservoir (Haystack Lake Campground).

Under the guidance of a recreation management plan developed in 1986 (see Appendix L), work is under way through a partnership with the BOR, State Marine Board, and the Forest Service to develop the south, west, and north shores of the reservoir (BOR land) to provide a variety of additional boating, camping, and picnicking facilities. These facilities will be managed by the Forest Service. Other partnerships include cooperation with the Oregon Department of Fish and Wildlife and adjacent land owners who participate in cooperative wildlife and fisheries projects related to the reservoir and adjacent lands. The southeast corner of the lake has been set aside as wildlife habitat.



Emphasis

Provide a system of quality facilities that are safe and environmentally sound. Continue to emphasize camping, picnicking, boating, fishing, and swimming.

Desired Condition

Partnerships will help provide for the needs of recreational users. Bureau of Reclamation (BOR) lands around the reservoir will have been acquired by the Grassland to simplify management of the area (BOR would retain ownership and management of the dam). New and upgraded facilities will provide for barrier-free opportunities.

MA-G12 Cove Palisades State Park

2690 Acres

Description

Cove Palisades State Park is a developed recreation complex, including campgrounds, boat ramps, swimming beaches, and picnic grounds. It is located on the Deschutes and Crooked River arms of Lake Billy Chinook within the boundaries of the Crooked River National Grassland.

Land ownership within the park is a mix of State and Federal lands totaling 7,000 acres, as follows:[1]

State land	1,434 acres
Leased from USDA (National Grassland)	2,695
Leased from BLM	1,170
Lake Billy Chinook	1,700

A 50-year cooperative agreement, between the United States Department of Agriculture (USDA) and the State of Oregon, leasing lands under USDA administration located within the park boundary to the State, will expire April 19, 1990. However, the agreement will automatically be renewed unless written notice is given by either party not less than 90 days prior to its termination. See Appendix K.

[1] From the Cove Palisades State Park Master Plan, State of Oregon Department of Transportation, 1981.

Development and operation of recreational facilities within the park has been the responsibility of the State. The Forest Service maintains control over minerals and fire management.

Emphasis

Manage for developed campgrounds and water related recreational activities.

Desired Condition

National Grassland ownership within the park boundary will be consolidated with park ownership to support a highly developed recreation experience under park management.



MA-G13 Lake Billy Chinook View Area

560 Acres



Description

This management area is the view area that can be seen from Lake Billy Chinook outside the Cove Palisades State Park and within the boundary of the Crooked River National Grassland.

Emphasis

Maintain the natural appearing characteristics of the viewshed from Lake Billy Chinook, where management activities are not evident, or they are visually subordinated to the surrounding landscape.

Desired Condition

The view area will be an undeveloped, natural appearing landscape with scenic qualities.

MA-G14 Dispersed Recreation

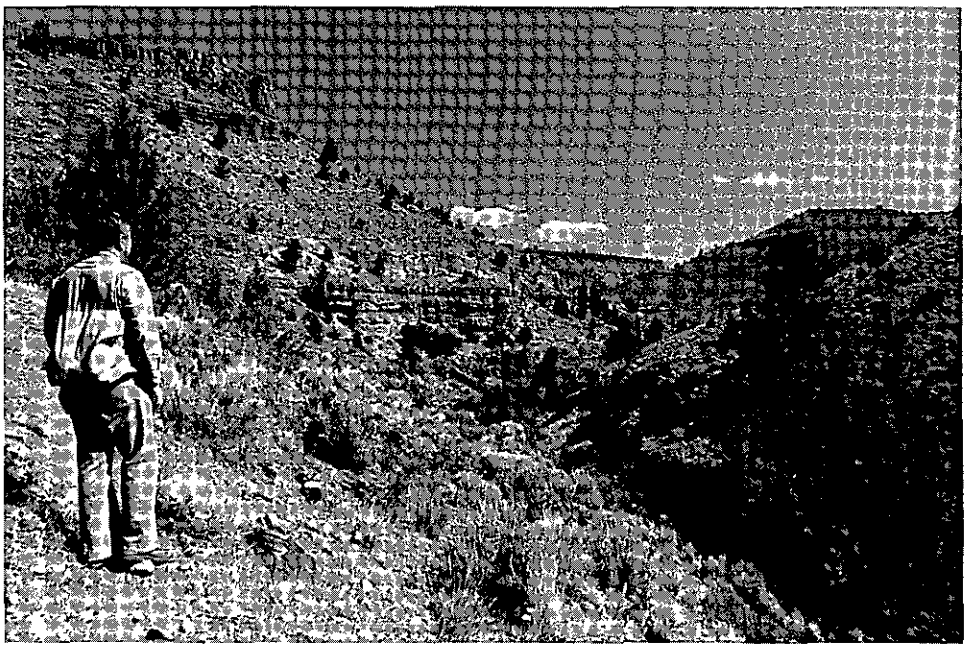
90 Acres

Description

This prescription applies to dispersed recreation sites located throughout the Grassland These sites generally occur along roads, and many are concentrated near riparian areas and stream courses. The prescription applies to the actual site and the influence area immediately around it.

Emphasis

Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.



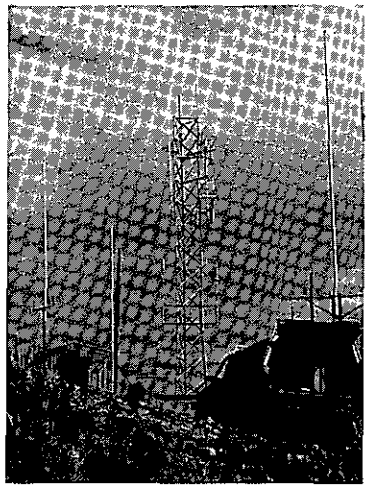
Desired Condition

Dispersed sites will exhibit a natural appearance, although management activities may be highly visible nearby. Primitive, user-constructed structures or facilities, consistent with the sites use, may be seen. Sites will be managed so that users tend to feel relatively isolated from the sights and sounds of civilization. A strategy will be developed that encourages individuals or groups to "find their own place."

Livestock grazing may be evident but the successful application of allotment management requirements will also be evident.

MA-G15 Gray Butte Electronic Site

80 Acres



Description

Gray Butte is a designated electronic site for radio and television relay stations. It is located 15 miles south of Madras, 11 miles northeast of Redmond, and 15 miles northwest of Prineville. Gray Butte's elevation is 5,108 feet above sea level, and it rises approximately 2,300 feet in elevation above the surrounding area. The top of the butte contains approximately 5,400 square feet, on which there are presently three buildings and two towers. Access to the site is by Forest Road 5720-080. This road was constructed by permittees in 1967 and is not open to the general public. Use of the site by the permitees has increased steadily during recent years.

Emphasis

Manage the Gray Butte Electronic Site low-power-output electronic equipment and transmitters which do not exceed 150 watts.

Desired Condition

Gray Butte Electronic Site will have three buildings and three towers. The access road will be gated and closed to the general public under a CFR closure. The site will meet partial retention and will continue to provide a public service to central Oregon.

MA-G16 Utility Corridors

460 Acres

Description

This management area includes electric transmission lines, natural gas transmission lines, and railroads crossing the Grassland that have been identified and designated as corridors. These linear features are presently in use or proposed for the transport of gas, oil, water, or electricity.

Emphasis

Accommodate energy-transmission facilities.

Desired Condition

This prescription recognizes the need to establish a regional corridor system in the Western United States, as identified by industry in the "Western Regional Corridor Study" (1986). This system would accommodate growth in energy transmission facilities in a planned way, minimizing adverse environmental impacts while allowing logical and efficient development of energy transmission systems.

All development is in existing corridors. Exclusion and avoidance areas are identified. Design and management has made optimum use of lands allocated to power facilities.



Figure 4-1

ANTELOPE WINTER RANGE (MA-G1)

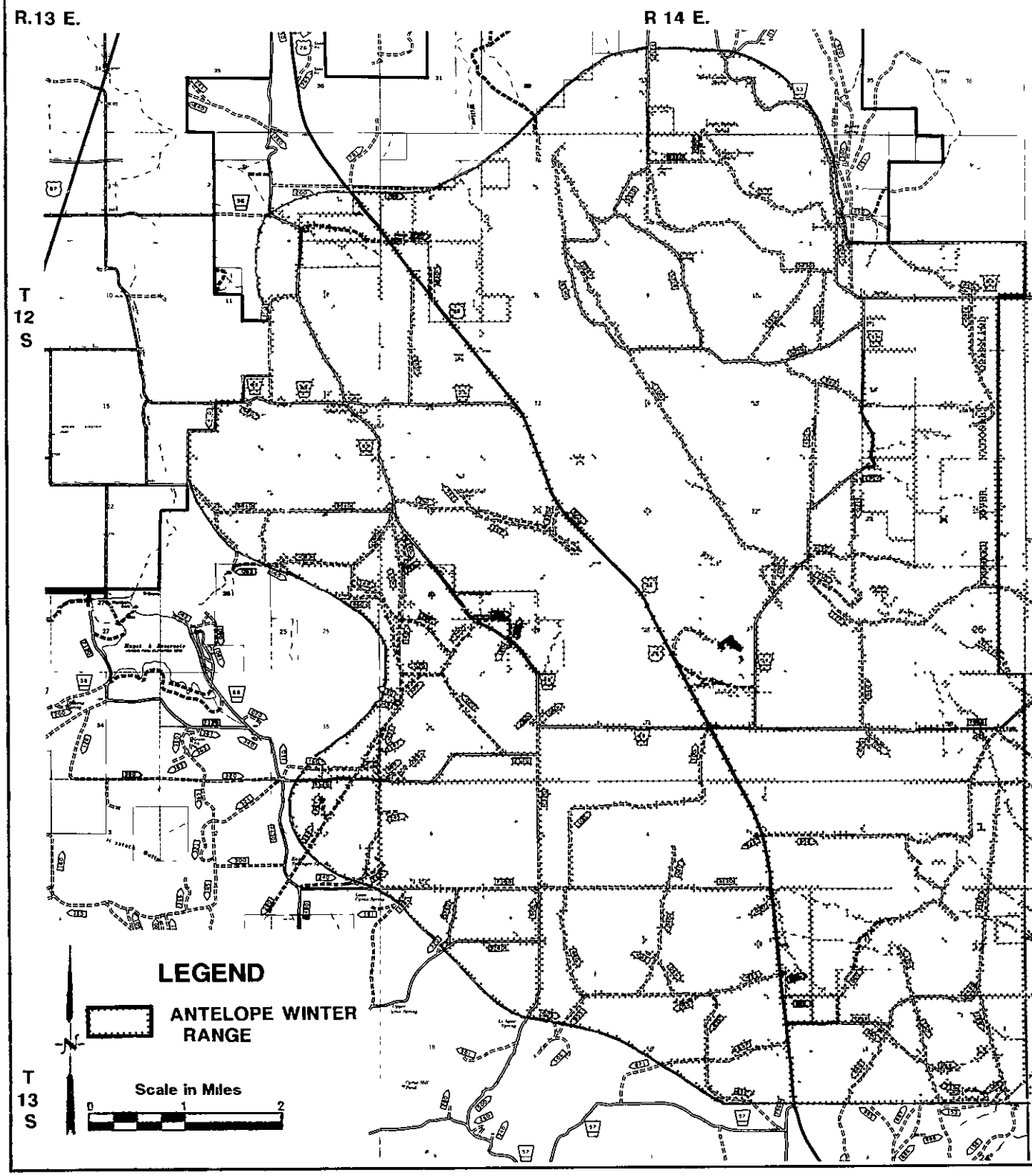


Figure 4-2

METOLIUS DEER WINTER RANGE (MA-G2)

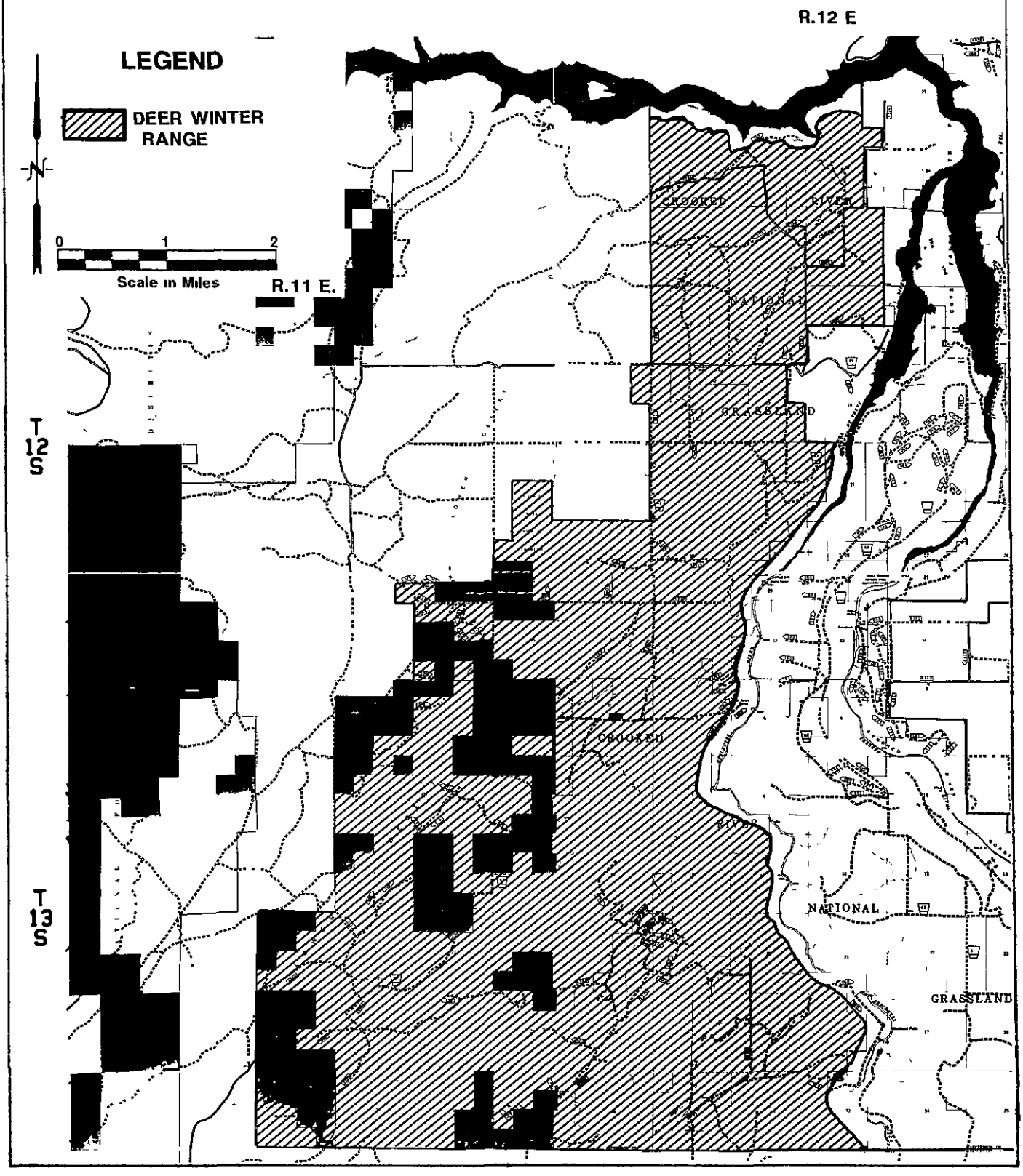


Figure 4-3

GENERAL FORAGE (MA-G3)

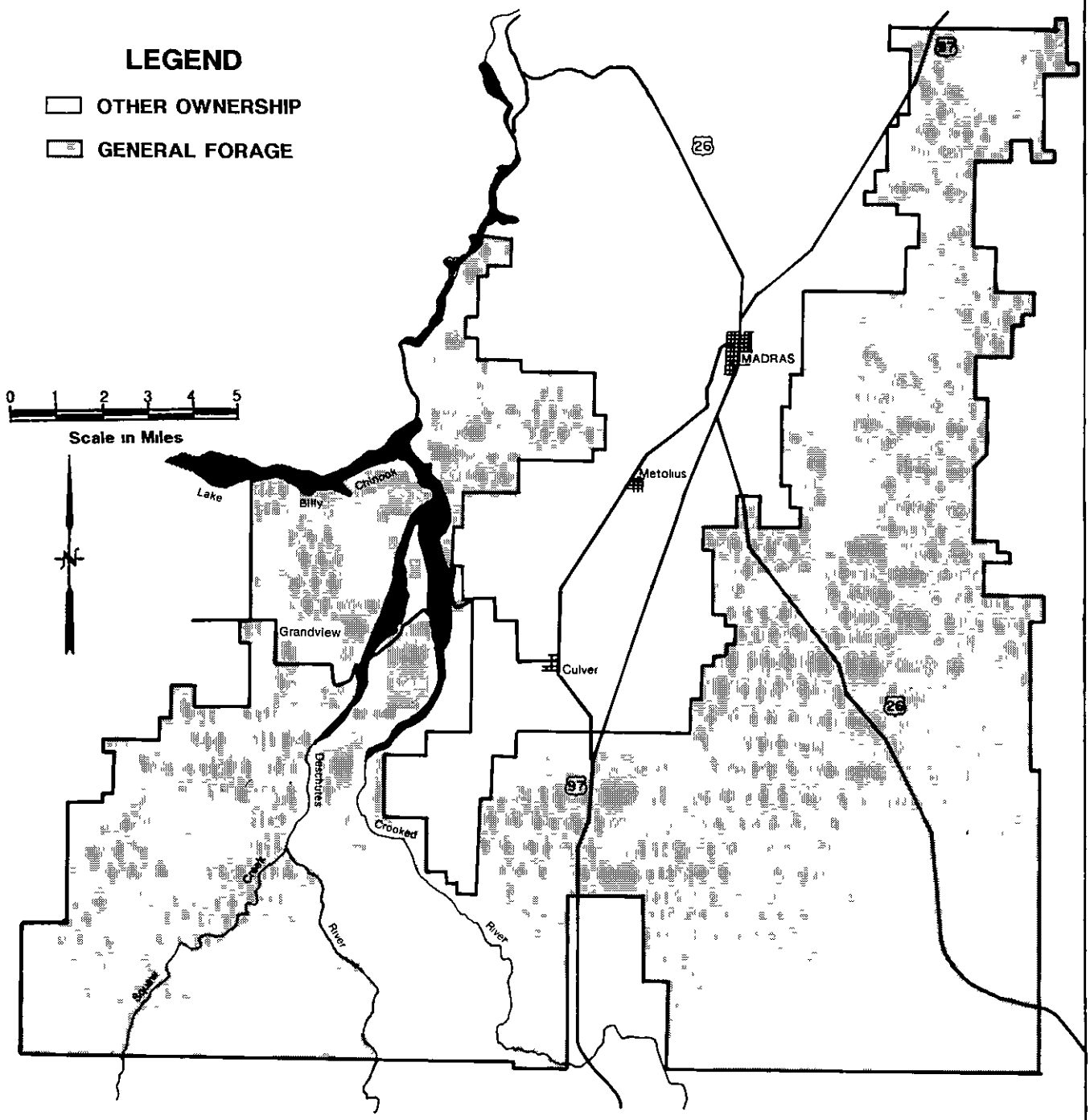


Figure 4-4

RESEARCH NATURAL AREA - ISLAND (MA-G4)

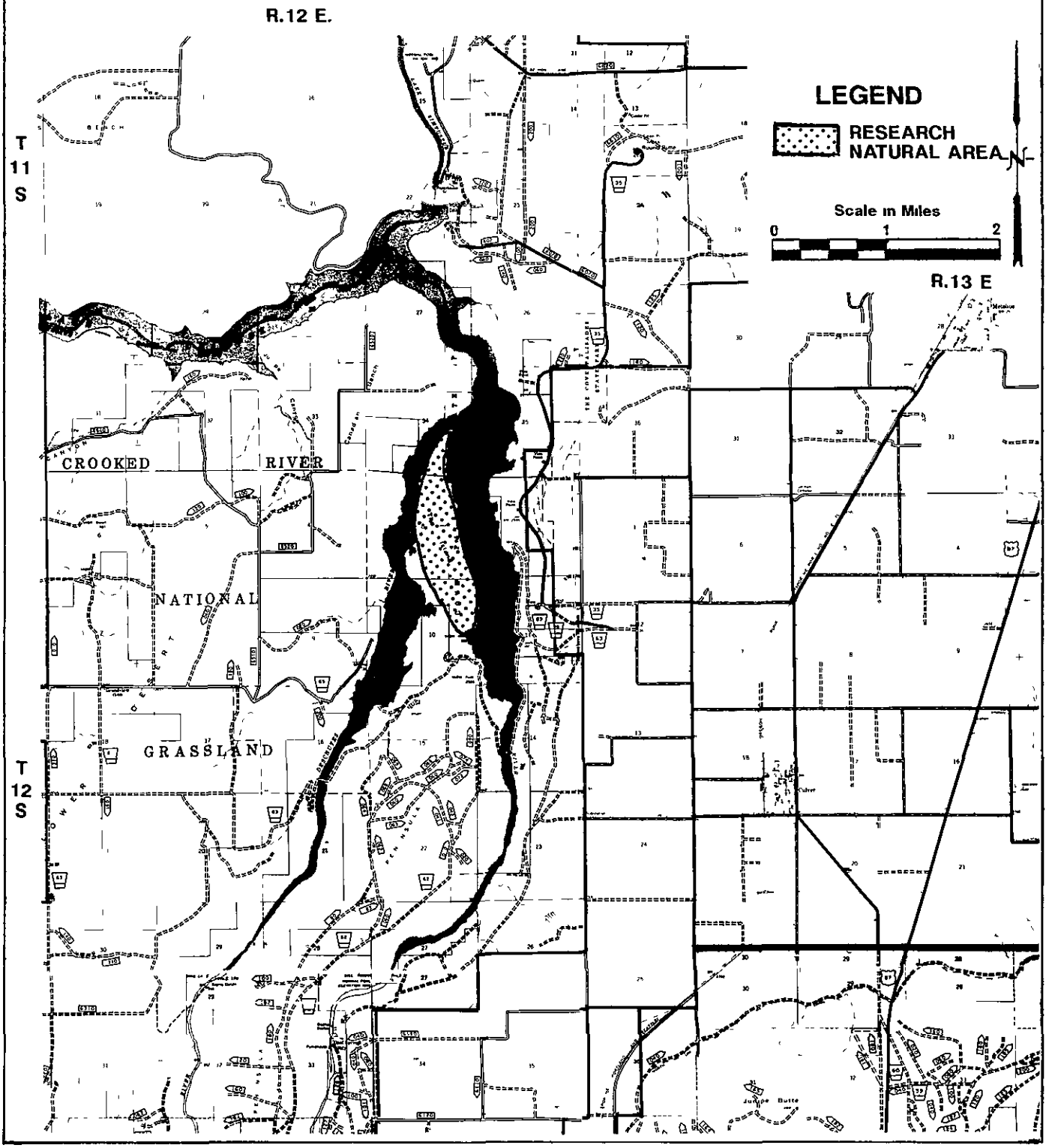


Figure 4-5

RESEARCH NATURAL AREA - HAYSTACK (MA-G4)

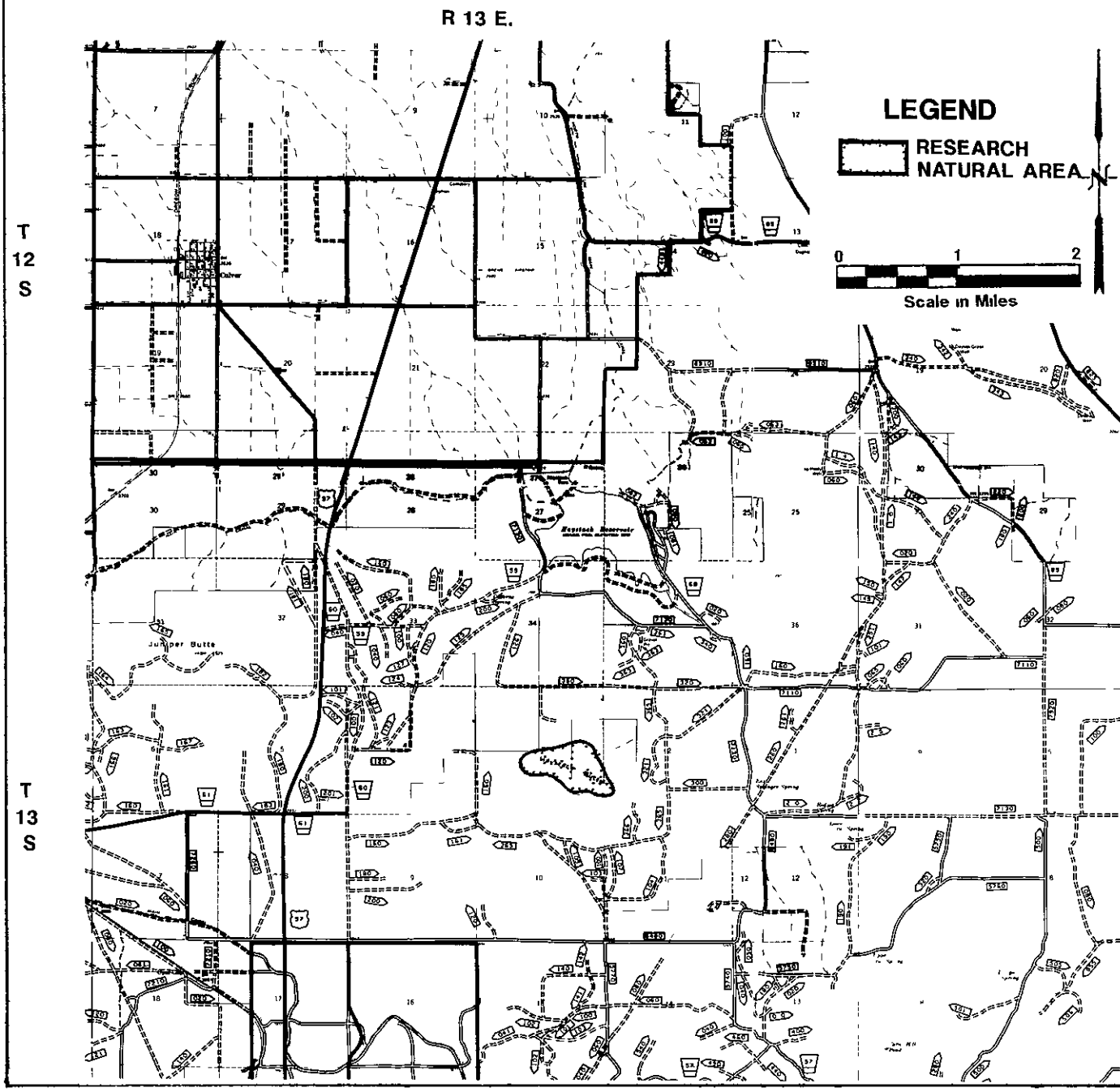


Figure 4-6

JUNIPER OLD GROWTH (MA-G5)

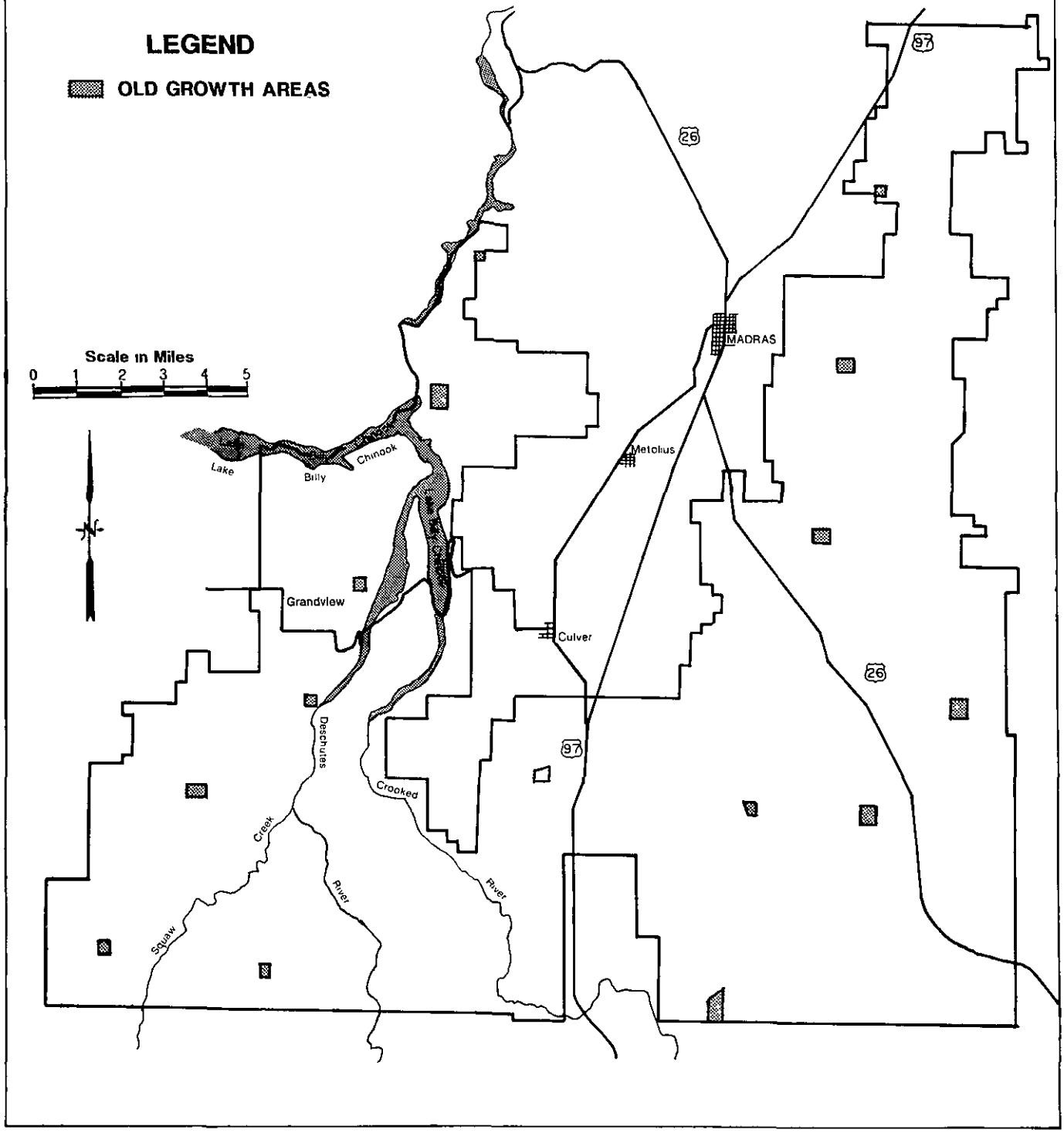


Figure 4-7

CROOKED RIVER RECREATION RIVER (MA-G6)
DESCHUTES RIVER SCENIC CORRIDOR (MA-G7)

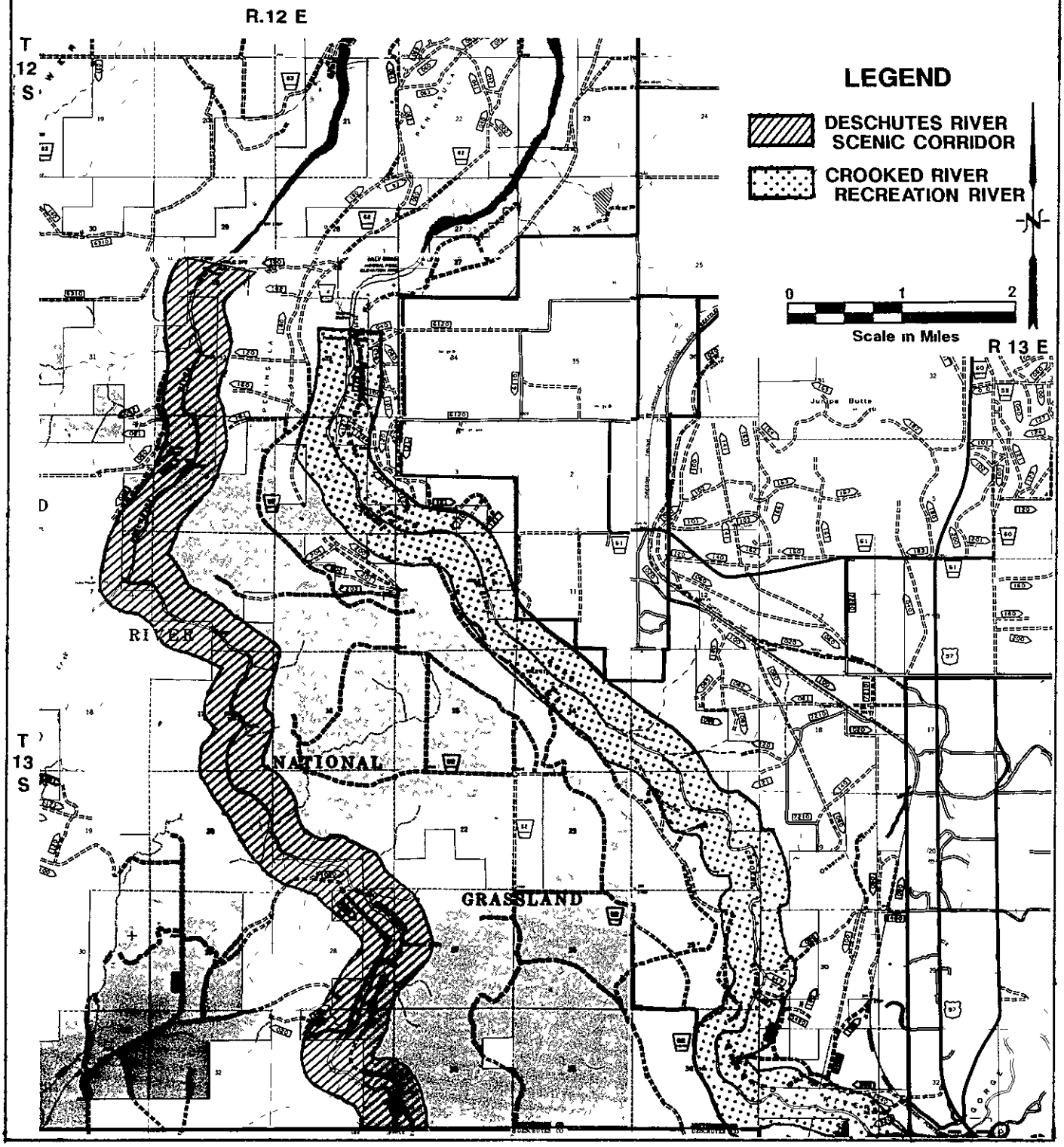


Figure 4-8

SQUAW CREEK MANAGEMENT AREA (MA-G8)

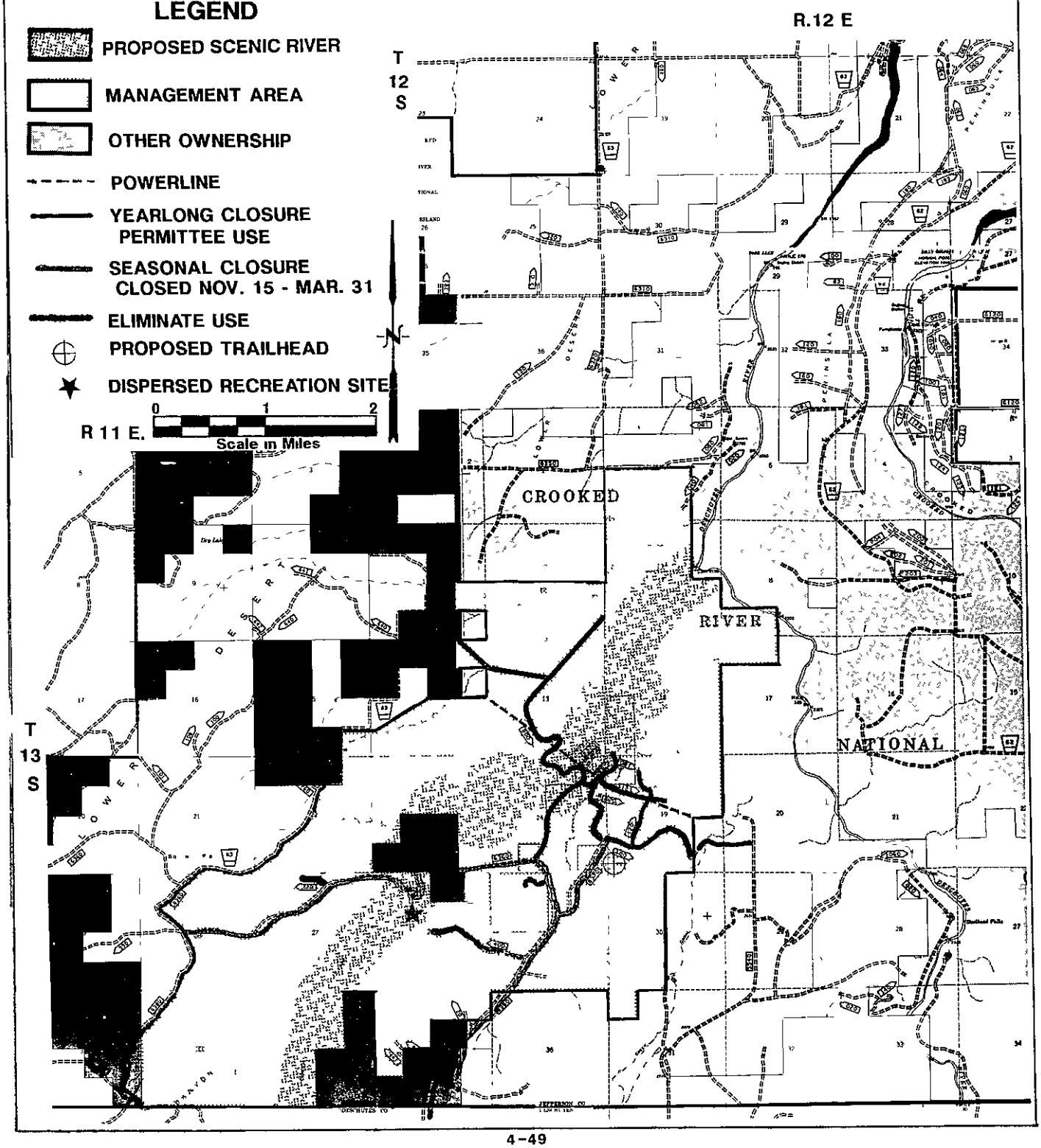


Figure 4-9

RIPARIAN MANAGMENT AREA (MA-G9)

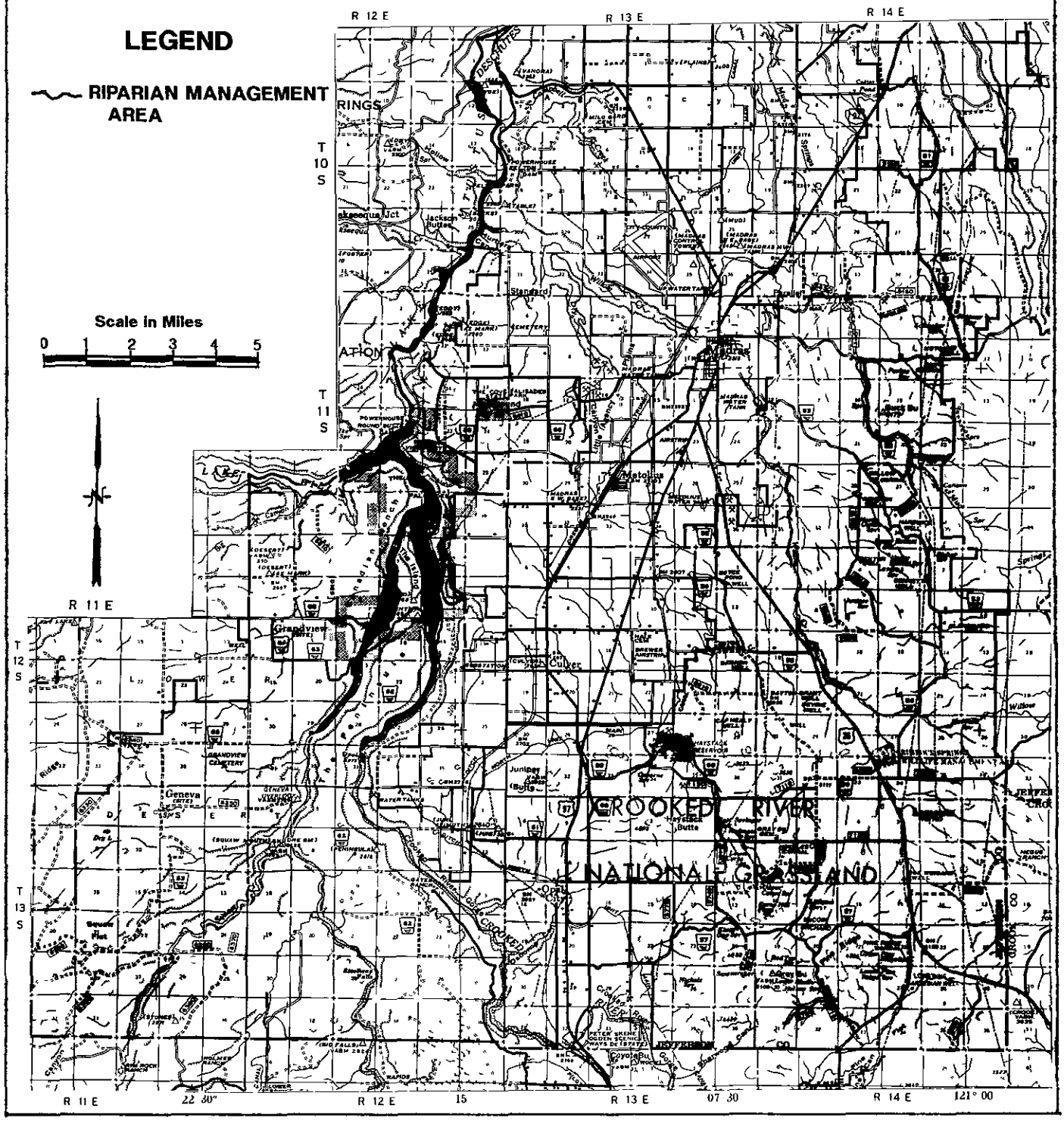


Figure 4-10

RIMROCK SPRINGS WILDLIFE MANAGEMENT AREA (MA-G10)

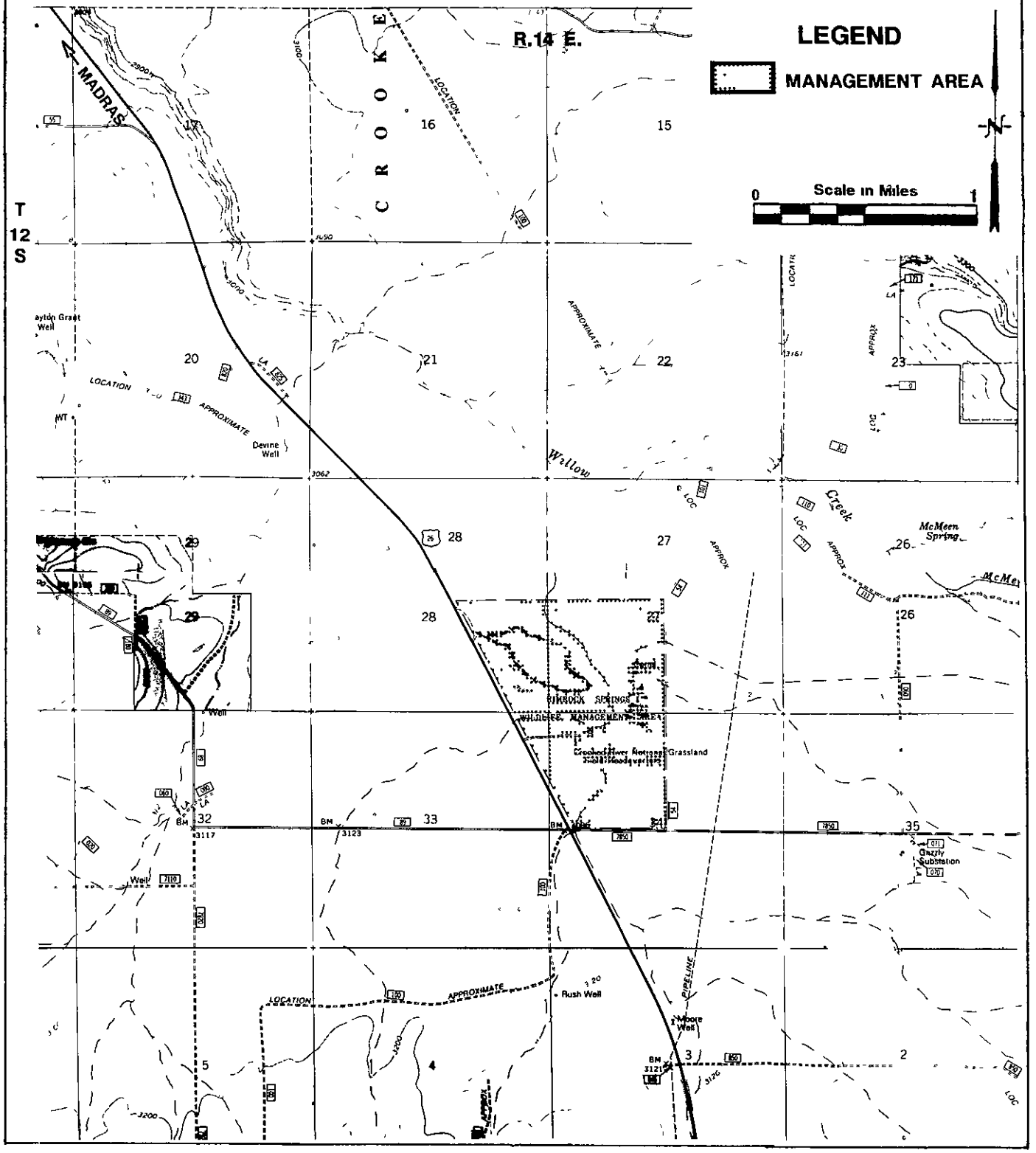


Figure 4-11

HAYSTACK RESERVOIR AREA (MA-G11)

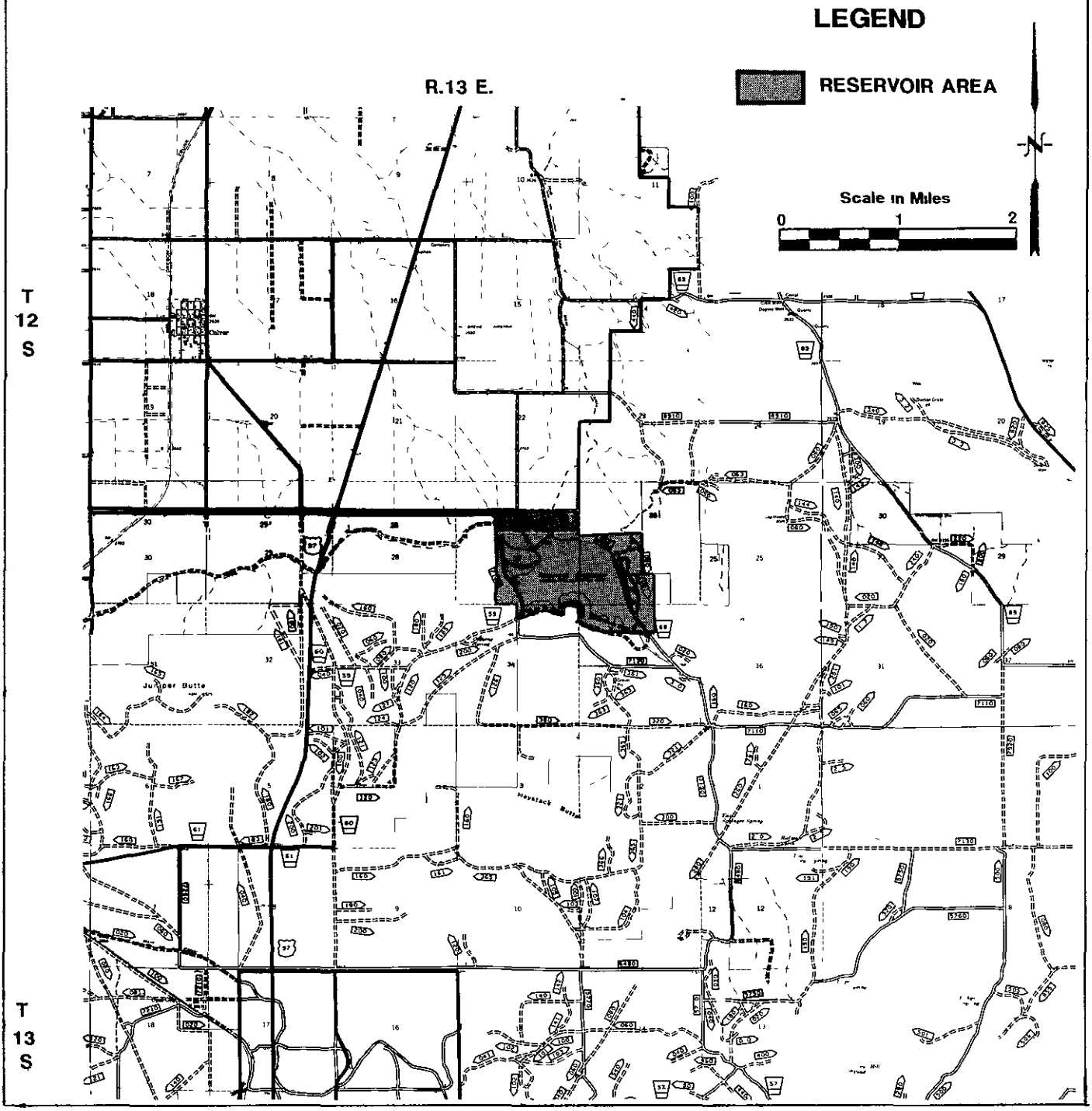


Figure 4-12

COVE PALISADES STATE PARK (MA-12)

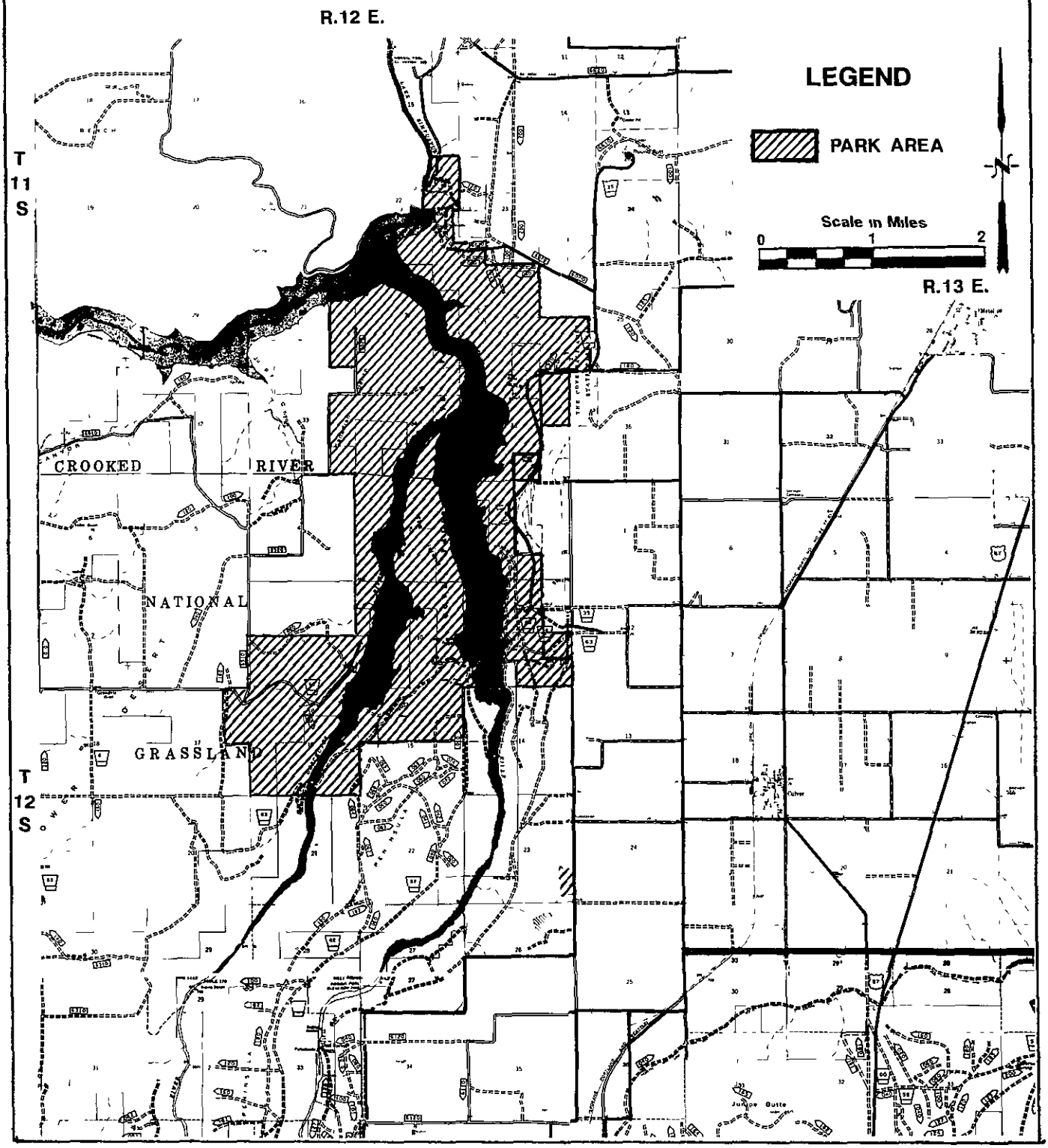


Figure 4-13

LAKE BILLY CHINOOK VIEW AREA (MA-G13)

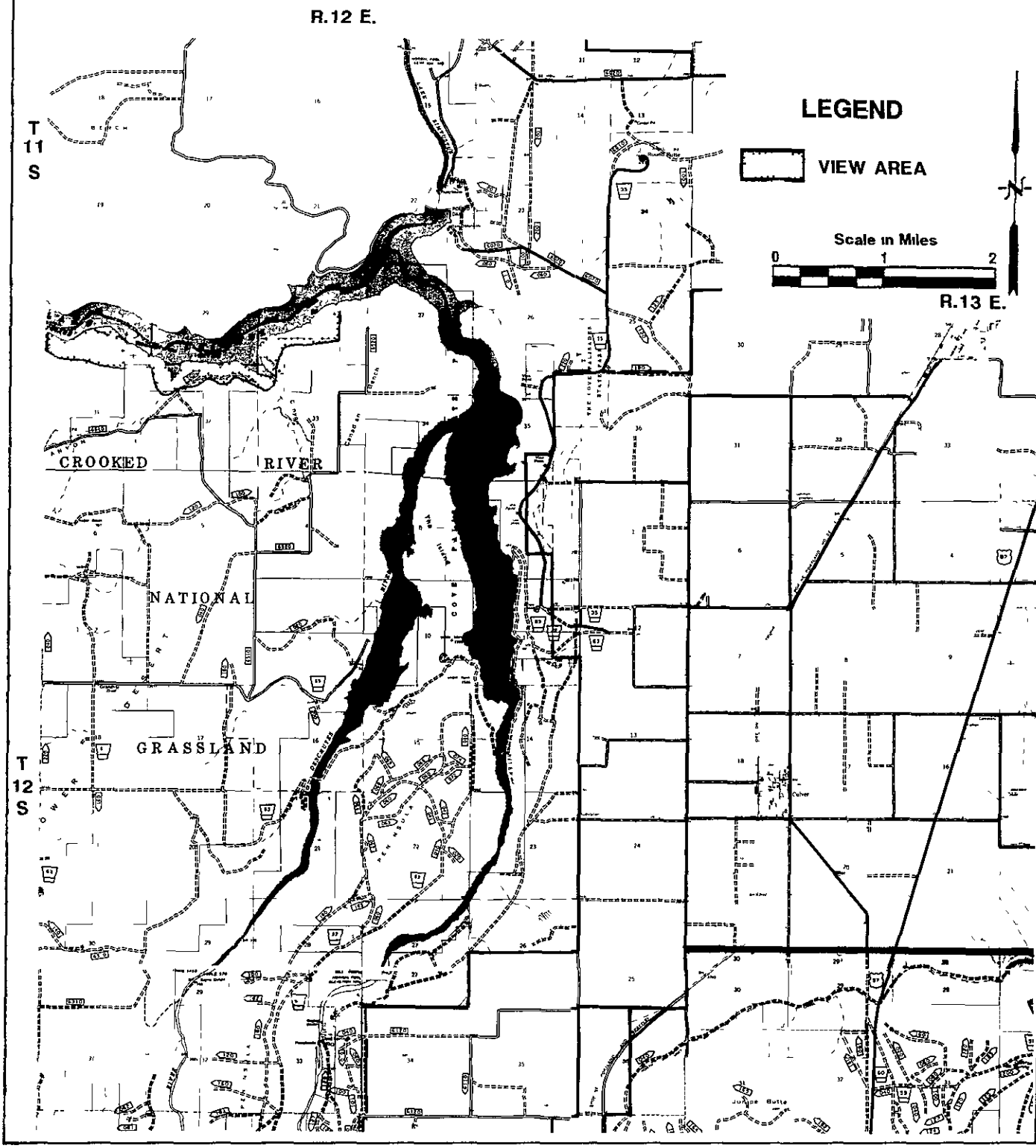


Figure 4-14

DISPERSED RECREATION (MA-G14)

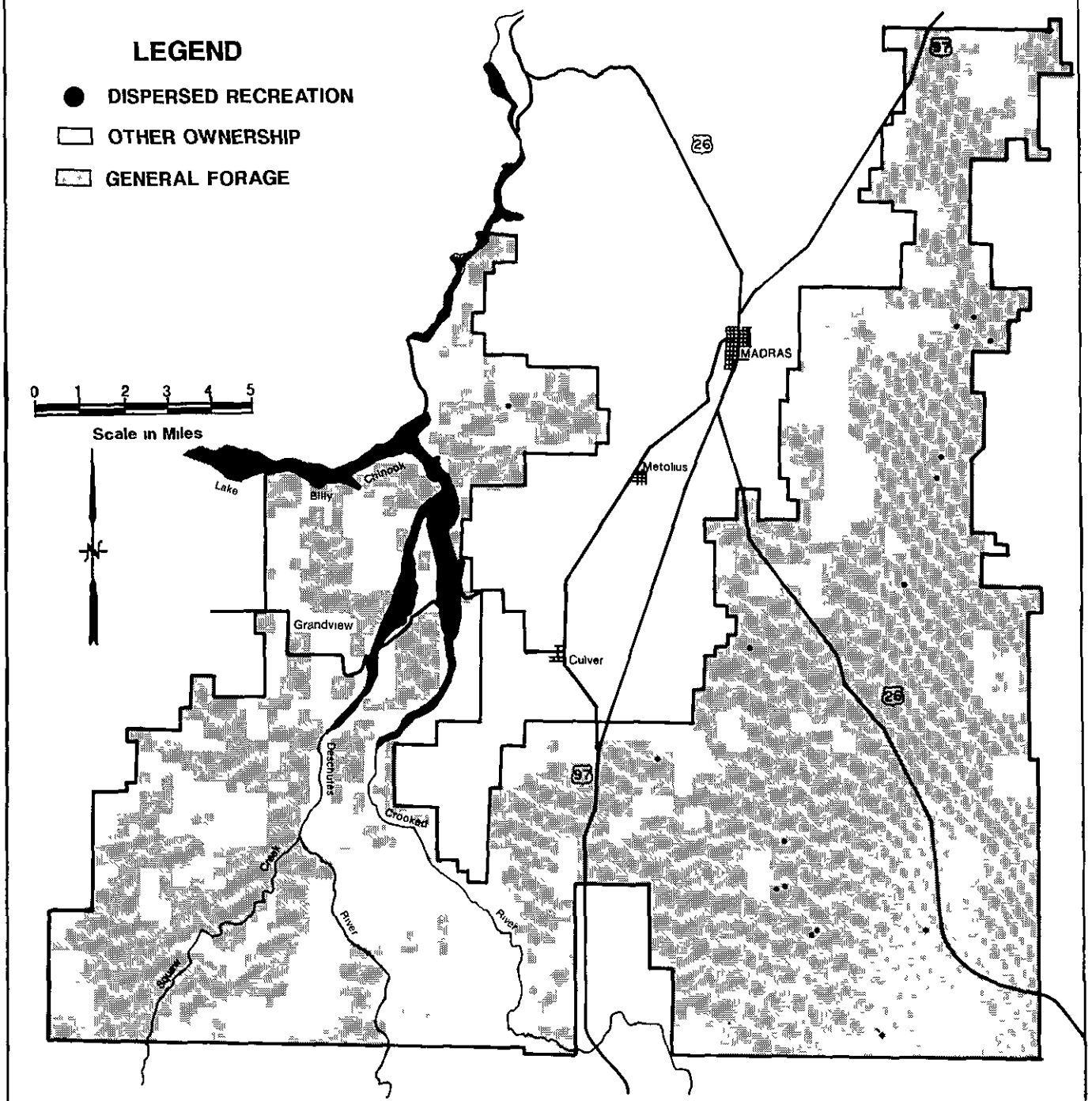


Figure 4-15

GRAY BUTTE ELECTRONIC SITE (MA-G15)
UTILITY CORRIDORS (MA-G16)

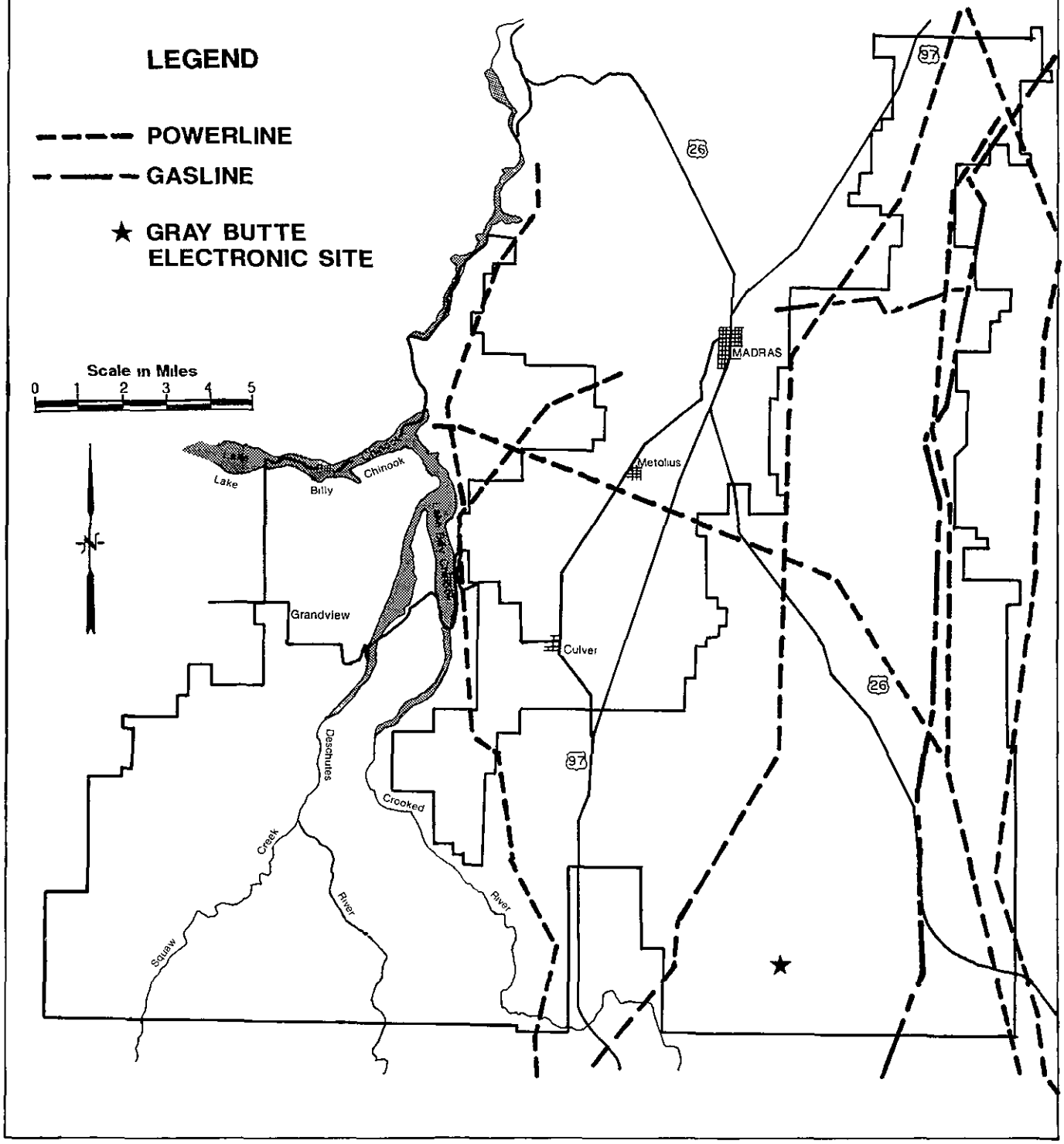
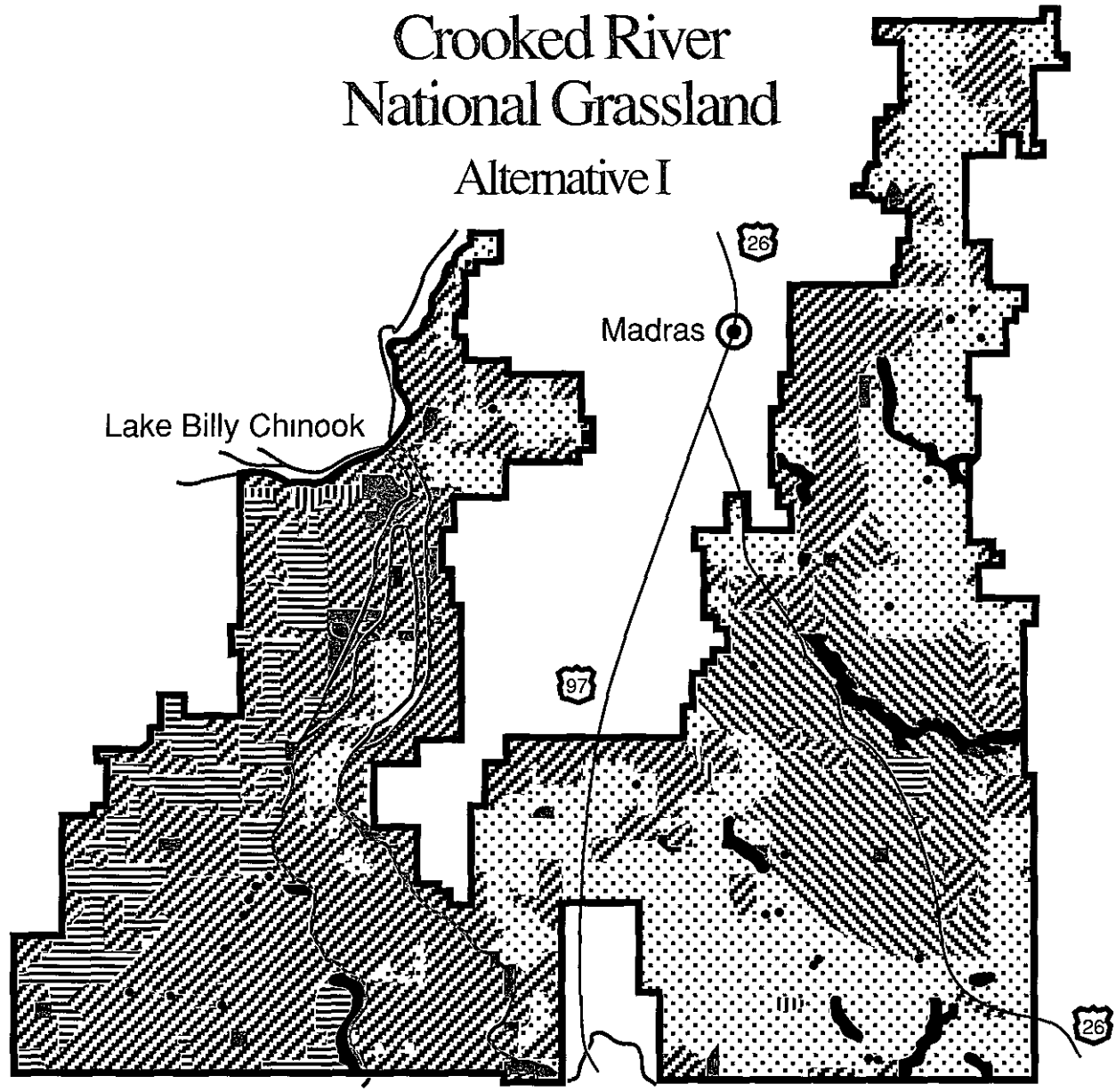


Figure 4-16

Crooked River National Grassland

Alternative I



Legend

- Antelope Winter Range
- Deer Winter Range
- General Forage
- Research Natural Area
- Juniper Old Growth
- Crooked River Recreation River Corridor
- Deschutes Scenic River Corridor
- Squaw Creek
- Riparian (not to scale)
- Rimrock Spring Wildlife
- Haystack Reservoir
- Cove Palisades State Park
- Lake Billy Chinook View
- Dispersed Recreation
- Gray Butte Electronic Site
- Other Ownership

N

0 2 4

1/4" = 1 Mile

Chapter 4

Grassland Management Direction

Section 3

Grassland-Wide and Management Area Standards and Guidelines

Chapter 4

Section 3

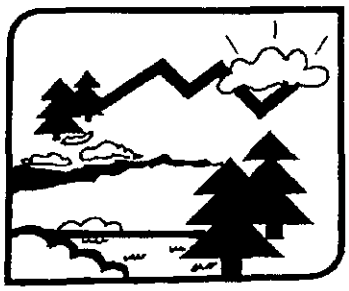
Grassland-Wide and Management Area Standards and Guidelines

Standards and guidelines state the bounds or constraints within which all management practices are to be carried out in achieving the planned goals, objectives and desired future condition. They are intended to supplement, but do not replace, policy direction found in Forest Service Manuals and Handbooks and the Regional Guide for the Pacific Northwest Region. They also must comply with applicable State and Federal laws and regulations.

Grassland-wide and management area standards and guidelines are grouped together by resource (or functional area), so that the user will have the total management direction available in one package.The general standards and guidelines apply to all areas on the Crooked River National Grassland. Management area standards and guidelines are site specific; they must be in compliance with Grassland-wide standards and guidelines, as well as higher order policy, regulation, and law.

Some resource direction is only applicable on a Grassland-wide basis, and does not vary by management area. Therefore, no management area standards and guidelines are presented for the following resources: Air Quality, Biological Diversity, and Social and Economic.

Air Quality



Grassland-Wide Standards and Guidelines

Maintain air quality on the Grassland at a level which meets or exceeds applicable Federal and State standards and regulations. Comply with regulations of the Clean Air Act, as amended, and coordinate activities with the Oregon State Department of Environmental Quality and the Oregon State Department of Forestry.

Demonstrate reasonable progress in reducing total suspended particulate (TSP) emissions from prescribed burning. Monitor particulate emissions originating from Grassland activities as outlined in Chapter 5, Implementation of the Grassland Plan.

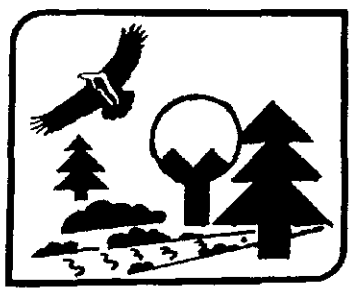
Conduct prescribed burning in accordance with State smoke management plans

Follow Regional standards and guidelines for smoke emissions as stated in the Regional Vegetation Management Final Environmental Impact Statement.

Use the best available predictive methods and models, and most cost-efficient technologies to minimize the impact of prescribed burning on the Grassland and adjacent lands.

Protect the Grassland air resources against pollution sources outside the Grassland boundaries through application of the Prevention of Significant Deterioration (PSD) regulations contained in the Clean Air Act. Take appropriate action to contact the Oregon State Department of Environmental Quality when outside air pollution sources (chiefly those originating on a regular seasonal basis from the Madras basin and Willamette Valley) exceed Grassland standards.

Biological Diversity



Grassland-Wide Standards and Guidelines

Research Natural Areas (RNA's), featuring unique community types, are to be maintained and protected from influences which detract from their purposes. Monitor vegetation to insure that all major vegetative types and unique plant communities are preserved for future knowledge and gene pool diversity.

Identify and manage unique ecological situations through the Grassland implementation and monitoring process. Examples of these include: eagle roosting, representative examples of old growth juniper, aspen clones, river canyons, and riparian areas.

Maintain soil productivity through management practices which reduce erosion, and through the application of guidelines that limit use of heavy equipment.

Protect fragile sites such as shallow soil areas (scablands) and natural meadows.

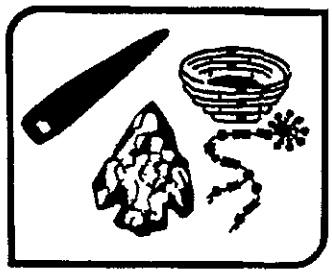
Incorporate and design habitat-specific species requirements--such as those for cavity excavators--into guidelines and prescriptions for individual projects.

Monitor plant communities/associations to determine conditions and trends. Encourage recovery or prevent deterioration where activities may be leading to poor conditions; downward trends, the displacement of native plants or plant communities by unusuallyweedy, annual, or noxious vegetation; or where cover is untypically low for the particular plant associations (see Hall, 1973; Hopkins and Kovalchik, 1983). Manage aspen stands to produce a vigorous population

Limit the frequency of underburning of plant communities to the natural fire cycle, or less frequently, until research is completed on ecological effects of burning.



Cultural Resources



Grassland-Wide Standards and Guidelines

Update the existing Cultural Resource Overview each decade to incorporate all known cultural resource information on each District. The Overview will provide a framework for evaluating cultural resources located through survey efforts, will assist in the development of a Forest Inventory Plan approved by the Oregon State Historic Preservation Office (SHPO), and will help to identify opportunities for site interpretation.

Conduct cultural resource surveys (inventories) in advance of all ground-disturbing actions. Both project and non-project areas will be surveyed during the earliest stages of the planning (NEPA) process; this will be accomplished through the implementation of the Interim Inventory Design (Dyrden, 1988) or Forest Inventory Plan (when formally approved) Submit project Cultural Resource Reports for SHPO review and Section 106 (National Historic Preservation Act, as amended) compliance prior to issuance of the Decision Notice and Environmental Assessment or Environmental Impact Statement.

Evaluate cultural resource properties located during inventory to determine their eligibility to the National Register of Historic Places. This will be accomplished through the Lithic Scatter Programmatic Memorandum of Agreement (PMOA), individual site and thematic Determinations of Eligibility.

Develop contexts and themes from which to evaluate all classes of sites through thematic Determinations of Eligibility. Develop management plans, Memorandums of Agreement (MOA's), and PMOA's in cooperation with the State Historic Preservation Office, the Advisory Council on Historic Preservation, and other interested publics (Native Americans, local historical societies, groups and professional organizations) to facilitate cultural resource treatment and future management.

Document, through the NEPA process, the results of cultural resource surveys for all proposed ground-disturbing projects (federal, federally-funded or permitted) or projects determined to have an effect upon cultural resource sites or values.

Prepare a Determination of Effect for all projects and submit for Oregon SHPO review and consultation (i.e. No Effect, No Adverse Effect, or Adverse Effect).

Mitigate adverse effects to eligible and significant sites under consultation with the Oregon SHPO, Advisory Council on Historic Preservation, and interested publics. In ranked order of preference , the following treatment options will be considered:

1. Avoidance through project design modification or abandonment (No Effect).

2. Combination of project modification and scientific data recovery under an

approved data recovery plan (No Adverse Effect or Mitigation of Adverse Effect).

3. Data recovery and analysis such that cultural resource values are protected and preserved in forms useful to various scientific, government, ethnic and local groups (Mitigation of Adverse Effect).

Cultural resource sites, districts and thematic classes of such will be nominated to the National Register of Historic Places. Schedule nominations incrementally until the Forest-wide inventory of cultural resources is completed. Protect significant sites from degradation due to public use or natural deterioration. Protection methods may include, but are not limited to, scientific study and collection, the use of fences or barriers, prudent use of signs, site stabilization, closure orders, site monitoring, area patrolling, and restriction of access to site locational information as provided for under the provisions of the Freedom of Information Act.

Interpret and enhance selected sites for the education and enjoyment of the general public. A priority will be given to sites within or adjacent to public use areas, and which are being degraded through natural or human impacts. Produce scientifically accurate and culturally sensitive displays, brochures, posters, tours, lectures, etc. Support the distribution of scientific reports, monographs, video tapes, and books for the benefit of interested members of the public. Promote public-private partnerships which will benefit Forest visitors through enhancing and interpreting sites.

Burial Sites

Treat historic or prehistoric burial remains as follows:

Evaluate the site to determine if the skeletal material is human and to what time period or ethnic group it may be ascribed.

Contact local authorities, Native American Tribal Group(s), other ethnic groups and County Historical Societies where appropriate.

For Native American burials, reinter in-place with involvement by the appropriate representatives of a federally recognized Tribe or Native American group. Project planning for management activities in the site vicinity shall consider burial location in planning decisions, and if necessary, modify implementation to avoid direct and indirect impacts to the burial site.

Where reinterment in-place is not feasible or prudent, alternative locations for reinterment will be reviewed and selected in consultation with the appropriate Indian Tribal representatives. In situations where a direct link cannot be made to an existing Federally recognized Tribe, this consultation shall take place with the nearest tribe or confederation.

Religious Freedom

Meet all requirements of the American Indian Religious Freedom Act (AIRFA). This law makes it the policy of the Federal government "to protect and preserve for American Indians their inherent right of freedom to believe, express, and

exercise [their] traditional religions." This protection includes, but is not limited to, access to sites, use and possession of sacred objects, and the enactment of ceremonies and traditional rites. Related activities include the gathering and processing of plants for food, medicinal, or craft uses, and the construction of sweat lodges, or "vision quest" structures.

AIRFA addresses the religious freedom of all Native Americans without regard for Federal tribal recognition, but does not convey exclusive use of areas or free use of Forest products. While considering access to properties or sites within its boundaries, the Forest will examine other potential or existing uses and activities. Publicly owned properties, sites, objects of antiquity, etc. remain the property of the United States government. Activities which may effect such properties, sites, or objects are subject to existing laws, regulations and treaties.

Treaty Rights

Honor the rights reserved by the Confederated Tribes of Warm Springs Indians for lands ceded to the Federal Government through the Treaty of 1855.

On the ceded lands, the Tribes have the right to take fish in streams running through and bordering the Reservation and at all other usual and accustomed stations in common with the citizens of the United States.

The right of hunting, gathering roots and berries, and pasturing stock on unclaimed lands in common with citizens was also secured within the ceded lands.

Management Area Standards and Guidelines

Resource - Cultural Resources

Practice
Enhancement and Interpretation

Standard and Guideline
On-site interpretation and enhancement of cultural resources will not be done. Off-site interpretation and enhancement is permissible.

Applicable Management Area
MA-G5 Juniper Old Growth
MA-G15 Gray Butte Electronic Site
MA-G16 Utility Corridors

Standard and Guideline
Enhancement and interpretation of cultural resources will not be emphasized.

Significant cultural resource sites and features may be enhanced and interpreted if the action does not detract from the management area objectives.

Applicable Management Area

MA-G4 Research Natural Areas
MA-G8 Squaw Creek
MA-G11 Haystack Reservoir
MA-G12 Cove Palisades State Park

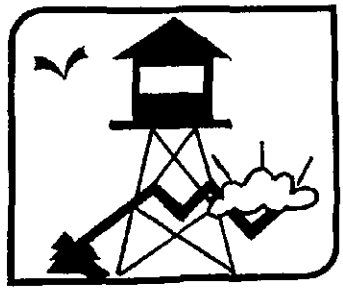
Standard and Guideline

Selectively enhance and interpret cultural resources, with priority on identifying sites that will complement the management emphasis of the specific areas.

Applicable Management Area

MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G3 General Forage
MA-G6 Crooked River Recreation River Area
MA-G7 Deschutes River Scenic Corridor
MA-G9 Riparian Areas
MA-G10 Rimrock Springs Wildlife Area
MA-G13 Lake Billy Chinook View Area
MA-G14 Dispersed Recreation

Facilities



Grassland-Wide Standards and Guidelines

Plan, develop, maintain, and operate buildings, utility systems and related facilities for safe use, support of Grassland resource programs, and cost effectiveness. Historic buildings will be managed in accordance with the Programmatic Memorandum of Agreement (PMOA) for Depression-Era Administrative Buildings.

Insure that the construction of new buildings or additions to existing buildings and utility systems complies with approved site development plans.

Provide and manage administrative facilities sufficient to accomplish land and resource management and protection objectives of the Grassland. Prepare an administrative site development plan for the Grassland field headquarters. Recognize that the field headquarters is eligible for the National Register of Historic Places. Clear proposed improvements through the State Historic Preservation Office (SHPO). Consider long-term development and maintenance costs in planning of facilities.



Management Area Standards and Guidelines

Resource - Facilities

Practice
Construction, Reconstruction and Maintenance of Administrative Buildings and Structures

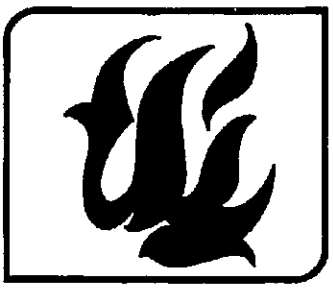
Standard and Guideline
No administrative buildings or structures allowed.

Applicable Management Area
MA-G5 Juniper Old Growth
MA-G4 Research Natural Areas

Standard and Guideline
Allow no administrative facilities within floodplains unless no feasible alternative sites exist (Executive Order 11988).

Applicable Management Area
MA-G9 Riparian

Fire



Grassland-Wide Standards and Guidelines

Fire Management

Planning

Use the National Fire Management Analysis System to determine the most cost-efficient fire protection organization. Reevaluate organization as conditions change and better information is developed. Due to the nature of intermixed land ownerships, including a number of wildland subdivisions, interagency cooperation must be considered in the planning process.

Prevention

Monitor current and recent fire reports to target specific risks. Coordinate activities through the Central Oregon Fire Prevention Cooperative (or its equivalent).

Detection

Periodically review the mix of aerial and ground detection activities to maintain the most cost-effective combination.

Initial Attack

Apply aggressive suppression action to wildfires that threaten life, private property, public safety, improvements, or investments.

Where wildfires do not threaten to exceed acceptable sizes and intensities, apply the lowest cost suppression option

If a wildfire escapes initial action and threatens to exceed established limits, prepare an escaped fire situation analysis. Weigh the cost of suppression against the resource potential losses. Suppression costs should be commensurate with the values threatened.

Secondary Attack Forces

Provide equipment and training for Forest Service employees outside of the fire management organization to assist in initial attack.

Fuel Treatments

Burn excess residues from management activities or natural events only after an interdisciplinary team evaluation of site needs and appropriate utilization efforts have been considered. The Ochoco National Forest Residue Management Plan, 3/89, will be used as a guide for identifying site-specific treatment selections.

Prescribed Fire

All planned prescribed fires will have prescriptions approved by the appropriate line officer.

Unplanned ignitions may be used as prescribed fire if: 1) a prescribed fire plan has been prepared and approved, 2) the fire is burning within prescription, and 3) there are enough personnel and equipment available to provide the staffing necessary to carry out the existing prescribed fire plan.

Conduct prescribed burns within existing Federal and State regulations affecting the timing, duration, and dispersal of emissions. Coordination with adjacent local smoke management groups and local agency offices will be required.

Construct water diversions on firelines in hilly or steep terrain to drain water into areas with sufficient vegetation or other protection to avoid erosion.

Provide for a protective strip of undisturbed surface between the prescribed burn area and perennial water courses, considering local topographic, vegetation, and soil characteristics.

Avoid intense prescribed fires on soils that are highly erodible and/or are subject to the development of hydrophobic (nonwettable) conditions.

Fuelbreaks

Use existing transportation and topographic features as much as possible for planned fuel breaks.

Use fuelbreaks only where risk analysis indicates this to be the most economically viable alternative treatment, and where doing so meets the objectives of management are a prescriptions, listed in Section 2, this chapter.

Piling and Burning

Locate piles outside of the normal high water flow area of natural and man-made drainages or water courses.

Burn slash piles located within mapped floodplains within one year after piling.

Remove slash created within the normal high water zone of a stream, unless needed for soil protection purposes.

Slash will not be piled on scablands unless there is no other feasible location, i.e. under circumstances dictated by topography (see Soils Standards and Guidelines).

Chipping, Burning, Lopping, and Scattering

Dispose of material so it will not reach stream courses.

Disperse material over a wide area when practical.

Management Area Standards and Guidelines

Resource - Fire

Practice
Suppression

Standard and Guideline
Use appropriate suppression strategy (confine, contain, control) identified in the economic efficiency analysis for each preattack block.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G3 General Forage

Standard and Guideline
Maximum acceptable wildfire acres at Fire Intensity Level III is 5,000 acres per decade.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Control all wildfires except on Island Research Natural Area.

Applicable Management Area
MA-G12 Cove Palisades State Park

Standard and Guideline
Minimize physical disturbances. Confine, contain, or control fires utilizing confine or contain strategies whenever possible.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G13 View Area Lake Billy Chinook
MA-G14 Dispersed Recreation

Standard and Guideline
Control all wildfires.

Applicable Management Area
MA-G11 Haystack Reservoir
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Minimize acreage affected by wildfire. Suppress fires using the tactical strategy of control. Minimize damage from suppression activities.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Use appropriate suppression strategy (confine, contain, control) identified in the economic efficiency analysis with due regard for prescribed fire plans for the area.

Maximum acceptable wildfire acreage per decade at Fire Intensity Level III is 500 acres.

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Permit no suppression of natural fires on the Island RNA. Suppress natural fires on Haystack Butte only if facilities or resources outside the RNA are threatened.

Use only water as a retardant.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Confine, contain, or control all wildfires with due regard for prescribed fire plans (see Wildlife).

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Limit mechanical suppression activities to avoid excessive disturbance to riparian zones to avoid disturbing soil or vegetation Contain or control fires.

Maximum acceptable wildfire acreage at Fire Intensity Level III is the same as surrounding management areas.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Allow prescribed burning when feasible. Completely dispose of slash. The minimum acceptable suppression response is "contain" at all Fire Intensity Levels.

Applicable Management Area
MA-G16 Utility Corridors

Practice
Prevention

Standard and Guideline
Encourage the State of Oregon to post appropriate fire prevention information. Inform visitors about fire prevention and regulations.

Applicable Management Area
MA-G12 Cove Palisades State Park

Practice
Prescribed Fire

Standard and Guideline
Use no prescribed fire.

Applicable Management Area
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Normally, utilize manual and mechanical methods of fire hazard reduction. Prescribed fire may be used under limited circumstances.

Applicable Management Area
MA-G11 Haystack Reservoir
MA-G14 Dispersed Recreation

Standard and Guideline
Use prescribed fire only to reduce fuel load if natural fuels accumulate to a level likely to result in a catastrophic fire.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Use prescribed fire to maintain the naturalness of the area, provide scenic diversity, and vegetative management.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek (includes proposed "scenic river" segment)

Standard and Guideline
Allow the use of managed or naturally occurring fire as needed to perpetuate the plant community the RNA is meant to represent.

Where prescribed fire is used to perpetuate a plant community, it should mimic a natural fire but be managed prudently to avoid catastrophe.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Allow fuels to accumulate at natural rates unless they threaten the objectives of the management area.

Applicable Management Area
MA-G4 Research Natural Areas
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor

Standard and Guideline
On firelines constructed in hilly or steep terrain, install water diversions to drain water into areas with vegetation or other protection sufficient to avoid erosion.

Where possible, provide for a protective strip of undisturbed surface between the prescribed burn area and perennial water courses, considering local topographic, vegetation, and soil characteristics.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Use prescribed fire periodically to improve big game winter habitat and reduce fuel conditions on a periodic basis.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G8 Squaw Creek

Standard and Guideline
May be used to meet visual management objectives.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G13 Lake Billy Chinook View Area

Practice
Fuel Break Construction and Maintenance

Standard and Guideline
Maintain fuel breaks only where risk analysis shows them to be economically feasible.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Construct and maintain no fuel breaks.

Applicable Management Area
MA-G5 Juniper Old Growth
MA-G9 Riparian

Standard and Guideline
Maintain fuel breaks only where they do not conflict with wildlife goals, especially with regard to thermal cover.

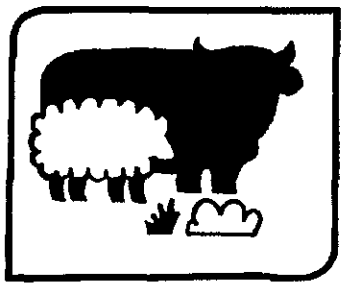
Applicable Management Area
MA-G2 Metolius Deer Winter Range

Practice
Treatment of Natural Fuels

Standard and Guideline
Emphasize protecting cover needs.

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Forage and Livestock Use



Grassland-Wide Standards and Guidelines

Unsatisfactory Condition Identification and Improvement

Identify lands in unsatisfactory condition. Develop allotment management plans with specific objectives for these lands on a priority basis under a schedule established by the Forest Supervisor. These objectives will define desired future conditions based on existing and potential values for all resources. Include in allotment management plans: (1) a schedule for improvement; (2) activities needed to meet forage objectives; and (3) an economic efficiency analysis.

Forage Utilization

Utilization tables have been developed for "Primary Range" (Table 4-3) and "Riparian" (Table 4-4). In addition, special seasonal restrictions (for fall green-up) have been directed for individual management areas.

Administration and Grazing Systems

Administer lands available and suitable for domestic livestock grazing according to the grazing agreement with the Gray Butte Grazing Association.

Utilize intensive grazing management systems where feasible.

Develop, revise, and maintain allotment management plans to incorporate Grassland Plan direction

Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity.

Encourage demonstration projects when they are compatible with other standards and guidelines.



Management Area Standards and Guidelines

Resource - Forage

Practice
Utilization

Standard and Guideline
Reserve fall greenup for antelope. Plan forage management to meet this objective in individual Allotment Management Plans.

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Allow no livestock grazing.

Applicable Management Area
MA-G12 Cove Palisades State Park
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor

Standard and Guideline
Continue to keep campground closed to livestock grazing.

Applicable Management Area
MA-G11 Haystack Reservoir

Standard and Guideline
Maintain early season livestock use.

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Permit no grazing of domestic livestock within the RNA unless needed to maintain a specific vegetative type.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Use periodic high intensity grazing as a tool to maintain the desired vegetative communities and habitat types.

Maintain pastures for Forest Service horses.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
See Table 4-4.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Allow no livestock grazing within lower Squaw Creek canyon (the 1,370 acre segment propsed for Wild and Scenic River designation). Utilize grazing systems that protect and complement the deer winter range and riparian areas.

Applicable Management Area
MA-G8 Squaw Creek

Practice
Nonstructural Improvements

Standard and Guideline
Allow mechanical and nonmechanical treatments that are compatible with the primary objectives of the management area. Manage to keep shrub species (primarily big sagebrush) at or below 24 inches in height, and definitely not over 30 inches in height.

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Allow mechanical and nonmechanical treatments.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Permit only nonstructural improvements that are compatible with the primary objectives of the management area.

Applicable Management Area
MA-G5 Juniper Old Growth
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Use prescribed fire or controlled livestock grazing to maintain productive vegetation.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Manage vegetation to decrease bare soil areas.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
See adjacent management areas (except for prescribed burning).

Applicable Management Area
MA-G16 Utility Corridors

Practice
Structural Improvements



Standard and Guideline
Maintain existing improvements where they are not in conflict with the primary objectives of the management area.

Construct additional improvements where they will aid in improved livestock management.

Guidelines for constructing or reconstructing fences:

(1) Topwire: Not more than 40 inches above the ground. Bottom wire: Smooth wire at least 18 inches above the ground.

(2) Use white-topped fence posts.

After the livestock are off the Grassland in the fall, leave gates open to facilitate antelope passage (except where needed for road management objectives).

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Maintain existing developments. Construct additional water developments to improve forage availability where project level analysis shows these developments to be cost-efficient. Design and locate improvements to disperse livestock away from riparian areas and alleviate other resource problems. Priority projects will be those with the highest present net value that reduce resource problems.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Maintain existing improvements. Permit new improvements only when they are compatible with the primary objectives of the management area.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Maintain existing developments where they are not in conflict with the desired future condition of the management area.

Construct additional developments as needed to aid in livestock distribution and facilitate using domestic livestock as a management tool to improve the palatability and availability of winter deer forage.

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Construct and maintain fences needed to exclude livestock.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Maintain existing fences and corrals.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Allow developments that meet the desired condition as follows:

Locate improvements to disperse livestock away from riparian areas.

Construct water developments to better distribute livestock.

Fence corridors to exclude livestock.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Only those structural improvements compatible with Wild and Scenic Rivers Rivers management objectives will be allowed

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek (Proposed 1,370-acre "scenic river" segement)

Practice
Allotment Management Plans

Standard and Guideline
Identify action needed to meet riparian objectives within a specific time frame. Set objectives for key parameters, such as stream surface shade, streambank stability, and shrub cover. The process is described in *Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington,* (1979).

Applicable Management Area
MA-G9 Riparian

TABLE 4-3
PRIMARY RANGE (Except Riparian)

Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) 2/					
	Forested Communities		Grassland Communities		Shrubland Communities	
Range Resource Mgmt. Level	Sat	Unsat.	Sat.	Unsat.	Sat.	Unsat.
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40	0-30	50	0-30	40	0-25
C - Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water developments.	45	0-35	55	0-35	45	0-30
D - Livestock managed to optimize forage production and utilization. Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	55	0-40	50	0-35

1/ Incorporate into annual operating plans and allotment management plans Allotment management plans may include utilization standards that are either higher or lower when associated with intensive grazing systems and specific management objectives that meet other resource objectives

2/ Utilization based on percent by weight of total annual forage production removed for grass, grasslike, and forbs, and percent of current years growth removed for shrubs See example in riparian table for shrubs.

• For satisfactory and unsatisfactory condition see Glossary in FEIS

TABLE 4-4
RIPARIAN FORAGE UTILIZATION

Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) By Existing Range Condition			
	Grassland Communities 2/		Shrubland Communities 3/	
Range Resource Management Level	Sat. *	Unsat. *	Sat.	Unsat.
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40	0-30	30	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plan vigor include fencing and water development.	45	0-35	40	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	50	0-35

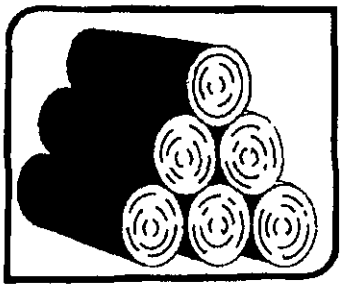
1/ This will be incorporated in annual operating plans and Allotment Management Plans Allotment Management Plans may include utilization standards which are either higher or lower than associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources Includes cumulative annual use by big game livestock

2/ Utilization based on percent of total annual forage production removed by weight

3/ Utilization based on percent of the current years growth removed Example measure length of current years growth of browsed and unbrowsed leaders and determine incidence of use Calculate percent of current years growth removed

* For satisfactory and unsatisfactory condition see Glossary in FEIS

Fuelwood



Grassland-Wide Standards and Guidelines

Allow fuelwood cutting primarily to meet other resource objectives.

Permit fuelwood removal only in designated areas.

Sign wildlife trees (which are not to be cut) near roadsides or other areas accessible to firewood cutters.

Allow only juniper to be cut unless otherwise designated.

Allow no firewood cutting in designated old growth juniper areas.

Consider soil moisture, productivity, and compaction when managing fuelwood areas.

Management Area Standards and Guidelines

Resource - Fuelwood

Practice
Commercial and Personal Gathering

Standard and Guideline
Allow no fuelwood gathering.

Applicable Management Area
MA-G4 Research Natural Areas
MA-G5 Juniper Old Growth
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Allow fuelwood gathering for on-site use only.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G11 Haystack Reservoir Area
MA-G13 Lake Billy Chinook View Area
MA-G12 Cove Palisades State Park
MA-G14 Dispersed Recreation

Standard and Guideline
Fuelwood cutting areas will only be provided where used as a tool to provide a proper cover/forage ratio for optimum big game winter range.

Do not allow fuelwood cutting when deer are concentrated on the winter range.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Allow no firewood cutting or removal of vegetation, except for approved research related activities.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Designate no fuelwood areas.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

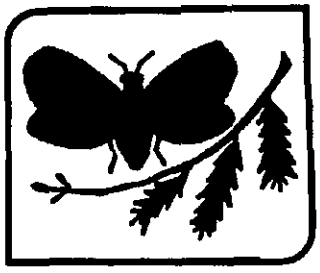
Standard and Guideline
See adjacent management areas.

Applicable Management Area
MA-G16 Utility Corridors

Standard and Guideline
Firewood gathering subject to permit regulations only.

Applicable Management Area
MA-G3 General Forage

Grassland Health



Grassland-Wide Standards and Guidelines

Use Integrated Pest Management (IPM) strategies to manage pests within the constraints of laws and regulations, and meet Grassland management objectives. IPM strategies include manual, mechanical, cultural, biological, chemical, prescribed fire, and regulatory means. Select strategy through the environmental analysis process, and in compliance with the Regional Vegetation Management Environmental Impact Statement, 1988.

Coordinate strategies with the Agricultural Pest Health Inspection Service (APHIS) when proposing major control projects.

Pesticide application, if used, will conform with EPA regulations, label restrictions, and the Regional Environmental Impact Statement on chemical applications.

Management Area Standards and Guidelines

Grassland Health

Practice
Insects & Disease

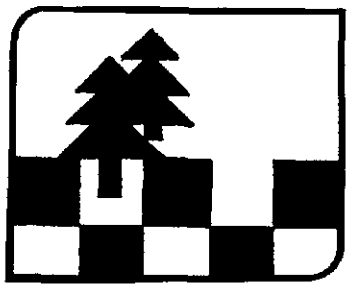
Standard and Guideline

Take no action to control insects, disease or noxious weeds unless the outbreak drastically alters the natural ecological processes within the RNA.

Applicable Management Area

MA-G4 Research Natural Areas

Lands



Grassland -Wide Standards and Guidelines

Utility Corridors

Existing state highways, electric transmission lines, natural gas transmission lines, canals, and railroads have been identified and designated as utility corridors. Avoidance areas are identified and corridor widths set (see Utility Corridor and Electronic Site Map, Figure 4-1). Allow no exclusion areas and no windows. Additional facilities will be confined within the existing corridors whenever feasible. Upgrading of present facilities will be considered prior to adding facilities.

Designation of corridors does not imply entitlement of use and environmental analysis must precede occupancy on a project-specific basis. Whenever possible, utility rights-of-way will be designated to allow joint use of the right-of-way.

Identify and approve additional utility corridors only after site specific environmental analysis has been done (including analyzing the alternative of moving energy through existing corridors). Coordinate analysis with other Forests and land management agencies. Determine the lead agency and develop a study plan prior to the start of any analysis. Analysis will be done in accordance with the environmenatal analysis process and with procedures set forth in the Regional Guide. The Grassland Plan will be amended to include additional corridors approved through this process.

Determine the compatibility of each alternative with the management areas affected. If a route is not compatible with the management area direction and other alternatives are not feasible, amend the plan through the NEPA process.

Electronic Sites

Manage Gray Butte in accordance with the site plan being developed, Forest service Manual 2728, and Forest Service handbooks (see Utility Corridor and Electronic Site Map, Figure 4-1). Allow no additional electronic sites on the Grassland.

Allow no development or expansion of electronic uses on Buck Butte, Juniper Butte, or Round Butte.

Other Uses

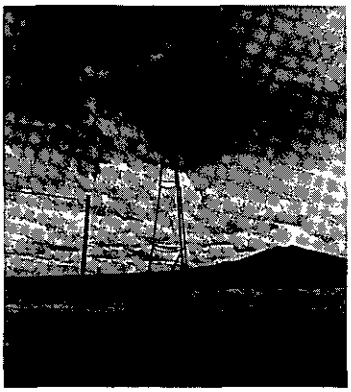
Review applications for other uses through the NEPA process.

Issue new special use permits though a prospectus process when a competitive interest has been identified.

Recreational Special Uses

Issue recreational special use permits only after a public need has been demonstrated that applies to a significant number of the recreating public. This policy may not include business opportunities.

The experience provided through the permit must be compatible with the Recreational Opportunity Spectrum (ROS) classification of the management area.



Limit the number of special use permits for a specific use, to the extent possible, in order to minimize administrative costs and to create economic conditions that provide a high quality public service.

Minimize the impact of special use permits on other users through the operating plans.

Land Ownership

Acquire and dispose of lands in accordance with the Land Ownership Map and Plan (see Appendix B).

Survey and mark property boundaries to prevent encroachments, protect present corners or references where the possibility of disturbance exists, and assist in administration of the Grassland.

Identify and resolve encroachments as they are identified.

Management Area Standards and Guidelines

Resource - Lands

Practice
Land Ownership and Adjustment

Standard and Guideline
Acquire lands as needed (see Category 2 of the Grassland Ownership Plan, Appendix E).

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Cooperate with the State in defining an optimum ownership pattern and lease terms.

Applicable Management Area
MA-G12 Cove Palisades State Park

Standard and Guideline
Acquire private inholdings (see Land Ownership Map and Plan, Appendix B). Seek transfer of Bureau of Reclamation (BOR) lands to the Forest Service.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G13 View Area

Standard and Guideline
Retain and acquire all lands in National Forest System ownership (see Land Ownership Map and Plan, Appendix B). Seek transfer of Recclamation (BOR) lands to the Forest Service.

Applicable Management Area
MA-G11 Haystack Reservoir

Standard and Guideline
Retain old growth lands unless they are small isolated blocks surrounded by privately owned lands (see Land Ownership Map and Plan, Appendix B).

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Acquire lands that support wildlife management goals. Lands in this management are in Category 2 (see Land Ownership Map, Appendix B).

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Retain all lands, and acquire inholdings (see Land Ownership Map and Plan, Appendix B).

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Retain all lands.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Retain or acquire lands except for small, isolated blocks surrounded by privately owned lands (see Land Ownership Map).

Applicable Management Area
MA-G9 Riparian

Practice
Special Uses

Standard and Guideline
Grant no special use permits that would have a direct and adverse effect.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek (proposed "scenic river" segment)

Standard and Guideline
Only allow minimal, temporary or semipermanent research facilities and installments.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Allow only special use permits for activities that are consistent with the visual management objectives for the area.

Applicable Management Area
MA-G13 Lake Billy Chinook View Area

Practice
Rights-of-Way

Standard and Guideline
Grant no rights-of-way.

Applicable Management Area
MA-G4 Research Natural Areas
MA-G5 Juniper Old Growth
MA-G10 Rimrock Springs

Standard and Guideline
Grant rights-of-way only where there are no alternate routes.

Applicable Management Area
MA-G2 Metolius Deer Winter Range
MA-G9 Riparian

Standard and Guideline
Establish no exclusion areas on the Grassland. Avoidance areas include Squaw Creek, Haystack RNA, Island RNA, Rimrock Springs, and Antelope Winter Range (see individual management area prescriptions).

Corridor widths are 1,000 feet for each existing corridor. Confine additional facilities to existing corridors. Require present facilities to be upgraded before allowing new facilities.

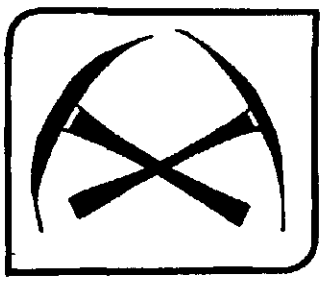
Designation of corridors does not imply entitlement of use. Evaluate application for use on a project-by-project basis.

Where possible, encourage joint use of the rights-of-way.

Additional utility rights-of-way or corridors may be identified and approved subject to site-specific environmental analysis.

Applicable Management Area
MA-G16 Utility Corridors

Minerals and Energy



Grassland-Wide Standards and Guidelines

Require that operating plans and permits include reclamation plans describing final management objectives for areas disturbed during mining operations. Insure that reclamation plans include reasonable and practical procedures and timeframes for accomplishing the objectives. Base reclamation bonds on actual reclamation costs formulated using appropriate technical and other resource input.

Notify lessees of impending Forest Service actions that may affect their claims or leases. Reasonable effort should be made to protect mine workings from disturbance as a result of Forest Service activities.

Nonenergy Minerals

Lands administered under the Bankhead-Jones Act are not open to mining claim location. However, leases for nonenergy (hardrock) mineral exploration and development may be issued on acquired lands when the mineral estate is owned by the Federal Government

Mineral Leases

Evaluate surface-use plans of operations through the environmental analysis and documentation process.

Common Variety Minerals

Use existing sources instead of developing new sources; exceptions include:

when existing sources are unable to economically supply the quantity and quality of material needed,

when conflicts with other resource uses are found to be unacceptable.

Cinder, hardrock, and gravel sources which are available for use during the planning period are designated on the Material Source Map (on file at the Ochoco National Forest Supervisor's Office).

On lands acquired under the authority of the Bankhead-Jones Act, common variety materials may be disposed of only to public agencies, and only for public purposes.

Proposals for capital investments and improvements on structures, which may occur on known material source deposits, should be analyzed within the context of management direction within this Plan. Do not unnecessarily reduce options for future removal of materials by making significant investments on sources when equally viable options exist in other areas.

Allow no occupancy or other surface disturbance on slopes in excess of 30 percent without written permission.

Allow no occupancy of surface disturbance in the vicinity of eagle, hawk, or owl nesting sites as specified in Wildlife and Fish Standards and Guidelines. Specified distances may be modified when specifically approved.

Require all semipermanent and permanent facilities to be painted or camouflaged in order to maintain aesthetic value.

Rockhounding

Rockhounding (hunting and collecting rocks and minerals as a hobby) on land under Forest Service jurisdiction and where the Forest Service holds the mineral estate does not require a permit if: the land is open to mineral entry; the activity does not conflict with existing rights, and specimens are used for personal, noncommercial use (FSM 2861). Activities involving other than casual removal of small amounts of material with minimal surface disturbance are provided for under the mining or leasing laws or Materials Act.

Management Standard and Guidelines

Resource - Minerals and Energy

Practice
Leasing and Common Variety Minerals

Standard and Guideline
Allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to antelope on the winter range. This limitation does not apply to maintenance and operation of producing wells.

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Close and rehabilitate the existing rock source due to low demand and unsuitable material.

Applicable Management Area
MA-G12 Cove Palisades State Park

Standard and Guideline
Allow no use, occupancy, or surface disturbance within the river corridor.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek (proposed "scenic river" segment)

Standard and Guideline
Allow no occupancy or other surface disturbance.

Common mineral material sources should not be inventoried or developed.

Applicable Management Area
MA-G4 Research Natural Areas
MA-G5 Juniper Old Growth
MA-G9 Riparian
MA-10 Rimrock Springs Wildlife Area
MA-G11 Haystack Reservoir
MA-G12 Cove Palisades State Park
MA-G13 Lake Billy Chinook View Area
MA-G15 Gray Butte Electronic Site

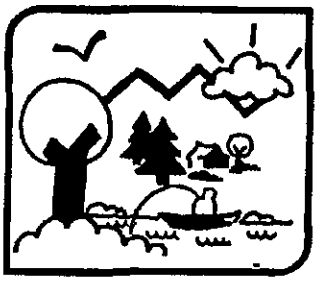
Standard and Guideline
Allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to deer on the winter range. This limitation does not apply to maintenance and operation of producing wells.

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Allow no occupancy or other surface disturbance within Squaw Creek canyon. Elsewhere, allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to deer on the winter range. This limitation does not apply to maintenance and operation of producing wells.

Applicable Management Area
MA-G8 Squaw Creek (proposed "scenic river" segment)

Recreation



Grassland-Wide Standards and Guidelines

General

Recreational activities will be managed to prevent site deterioration within riparian areas.

Developed Sites

Prepare site plans prior to rehabilitation, expansion, or construction projects.

See specific management area standards and guidelines for Haystack Reservoir and Rimrock Springs Wildlife Area.

Dispersed Recreation

Provide a variety of dispersed recreational opportunities.

Provide facilities needed to protect public health and safety, e.g. portable toilets and campfire rings.

Off-Road Vehicles (ORV'S)

Provide opportunities for ORV's on roads that are closed to full-sized vehicles and on other designated trails.

In compliance with the Travel Plan (Appendix D), close roads, trails, and areas, as needed, to protect soil, watershed, wildlife, riparian areas, or nonmotorized recreation.

Special Interest Areas

Protect the outstanding values of the designated and potential Wild and Scenic Rivers corridors.

Identify and protect special natural features, e g., natural springs, rock formations, weeping walls, petroglyphs, cultural and historic districts.

Trails

Identify and provide a trail system to provide for a variety of uses, such as hiking, horseback riding, endurance horseback riding, mountain bicycling, ATV's, motorcycling, and for the needs of the handicapped.

Construct and maintain the trail system to standards suitable for type and amounts of use Maintain trails to prevent resource damage, protect the investment in the system, and provide for user safety.

Allow horses and hikers on most trails. Limit use or implement other techniques as needed to prevent or reduce erosion.

Encourage partnerships or volunteers to maintain or construct trails.

Management Area Standards and Guidelines

Resource - Recreation

Practice
Recreational Opportunity Spectrum (ROS)

Standard and Guideline
Rural.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G11 Haystack Reservoir

Standard and Guideline
Semiprimitive nonmotorized.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G10 Rimrock Springs Wildlife Area
MA-G13 Lake Billy Chinook View Area
MA-G14 Dispersed Recreation

Standard and Guideline
Roaded Natural or Rural.

Applicable Management Area
MA-G3 General Forage
MA-G2 Metolius Deer Winter Range
MA-G14 Dispersed Recreation

Standard and Guideline
Semiprimitive nonmotorized, except for Road 6360 corridor.

Applicable Management Area
MA-G8 Squaw Creek

Practice
Dispersed

Standard and Guideline
Protect the natural environment in and around dispersed camp sites.

Do not encourage dispersed recreational use during the time antelope or mule deer are concentrated on the winter range.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G14 Dispersed Recreation

Standard and Guideline
Manage for Roaded Modified/Roaded Natural recreational opportunities. Protect natural setting in and around dispersed sites.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Manage to protect the naturalness of the areas. Use of the areas for nonmotorized recreation is acceptable.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Discourage recreational activities and uses, including overnight camping, and pack and saddle stock use.

Applicable Management Area
MA-G4 Research Natural Areas
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Day use only. Allow no overnight camping.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Allow recreational uses that are compatible with utility corridors. These areas will provide roaded, modified recreational opportunities.

Applicable Management Area
MA-G16 Utility Corridors

Practice
Developed

Standard and Guideline
Encourage and support State program of providing high quality developed recreational facilities.

Applicable Management Area
MA-G12 Cove Palisades State Park

Standard and Guideline
Allow no developments.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Develop no sites in riparian areas.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Develop trailheads at road closure points on Road 6360, Geneva overlook, and along Roads 63 and 6380.

Applicable Management Area
MA-G8 Squaw Creek

Practice
Facilities

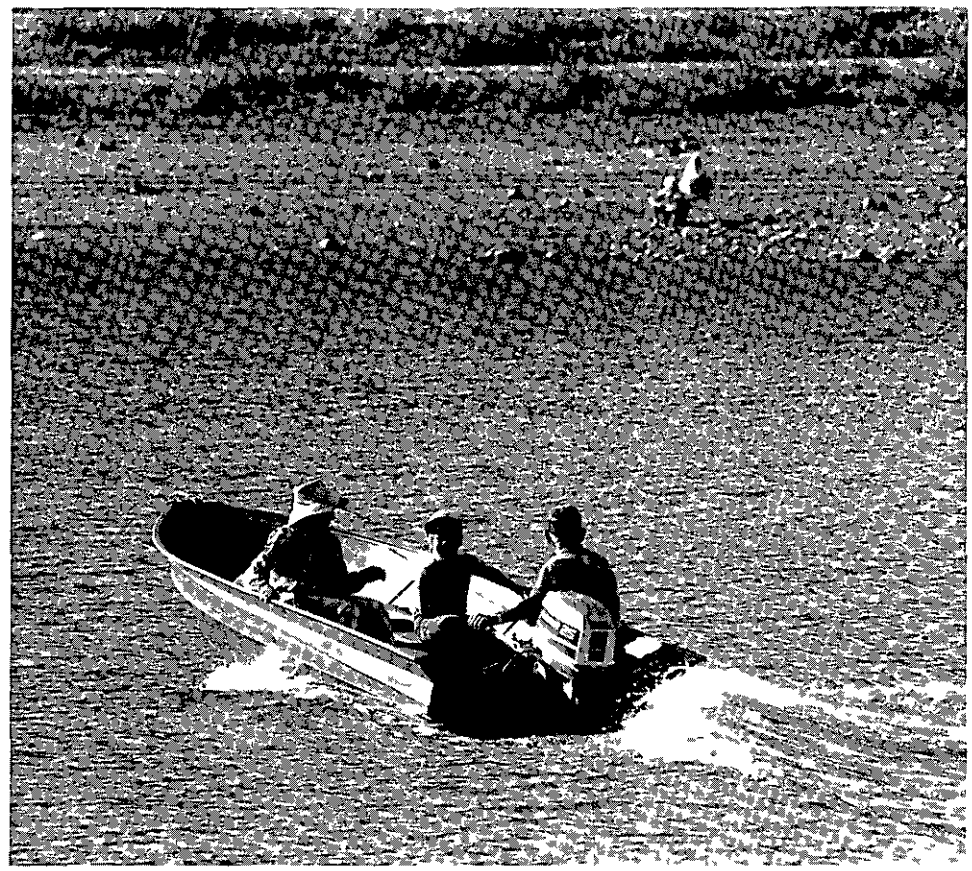
Standard and Guideline
Develop facilities to meet user demand in line with the carrying capacity of the area.

Provide for boating, camping, picnicking, swimming and fishing uses.

Applicable Management Area
MA-G11 Haystack Reservoir

Standard and Guideline
Develop no interpretive or demonstration facilities.

Applicable Management Area
MA-G4 Research Natural Areas



Standard and Guideline
Develop facilities such as staging areas for ORV users, horse camps, and trailheads to meet user demand, but not exceed the carrying capacity of the area.

Allow overnight camping at designated areas.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G3 General Forage

Practice
Interpretation

Standard and Guideline
Pursue opportunities for interpreting natural resources, resource management, historical points of interest, scenic views of the Cascades, etc. This may include such things as on-site facilities, interpretive trails, or self-guided motor tours.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G3 General Forage
MA-G11 Haystack Reservoir

Standard and Guideline
Avoid publicity that would attract the public to the areas.

Applicable Management Area
MA-G4 Research Natural Areas

Practice
Trails

Standard and Guideline
Utilize the existing paths into the canyon as trails, and improve these trails as necessary to protect soil and watershed.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G13 Lake Billy Chinook View Area

Standard and Guideline
Provide trailhead facilities as needed to support a coordinated trail system connecting the Grassland, the Ochoco National Forest, and other areas of central Oregon.

Applicable Management Area
MA-G11 Haystack Reservoir

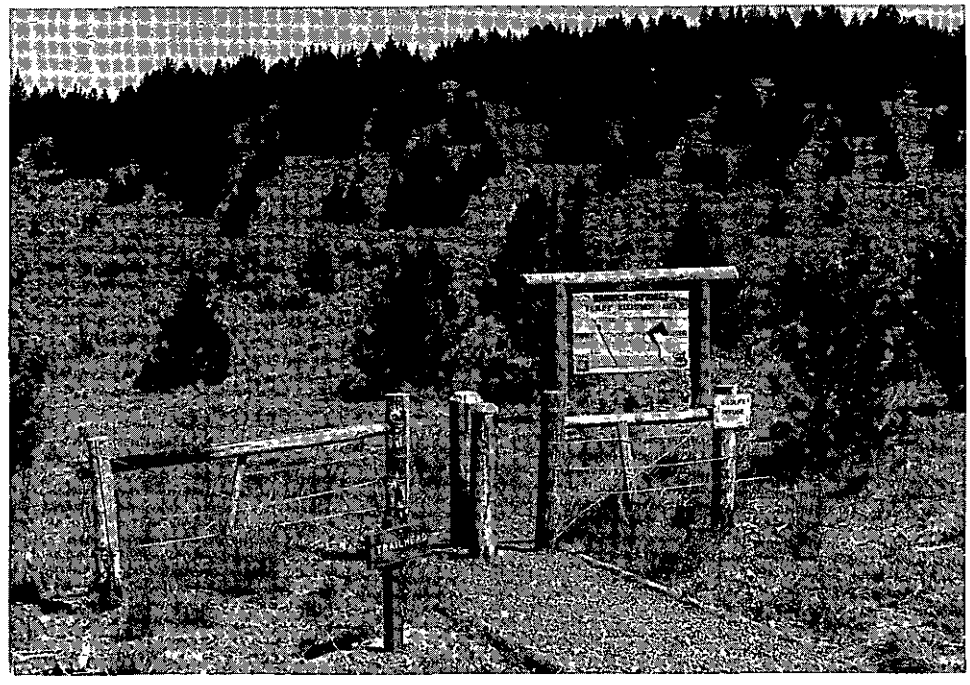
Standard and Guideline
Allow existing trails to remain as long as the RNA objectives are not compromised.

Construct no new trails unless needed for research purposes.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Maintain and improve the existing trail to provide for wheelchair access. Expand the trail system as needed to enhance other recreational and interpretive opportunities.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area



Standard and Guideline
Relocate trails to avoid wet areas.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Construct & maintain trails to standards suitable for type and amount of use. Maintain trails to prevent resource damage and provide for user safety. Emphasize reconstruction of existing trails rather than construction of new trails.

Develop multiple use trails whenever possible. Encourage use of volunteers to assist with trail construction and maintenance.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G3 General Forage

Practice
Off-Road Vehicles (ORV's)

Standard and Guideline
No motorized use allowed.

Applicable Management Area
MA-G4 Research Natural Area
MA-G5 Juniper Old Growth
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek

Standard and Guideline
Encourage ORV's on designated routes where such use will not conflict with other resources. Legally close ORV routes to standard vehicle traffic. Allow no cross-country travel, including snowmobiles, except for administrative and permittee purposes (such as maintaining range improvements or firefighting). Rehabilitate user-developed trails and areas. Utilize seasonal closures on certain designated routes. Discourage play areas.

ORV Trails: Provide designated trails which offer scenic vistas, resource interpretation, challenging terrain and a variety of difficulty levels and experiences. Trail layout and design will be done in a manner to protect the resources. Install cattleguards at locations where trails cross a fenceline. Utilize topography, fences and buffers to isolate users from private lands and mitigate existing problems.

Applicable Management Area
MA-G3 General Forage
MA-G14 Dispersed Recreation

Standard and Guideline
Motorized use restricted to designated routes.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
No motorized use from Nov. 15 - March 31 Motorized use restricted to designated routes April 1 -Nov. 14.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range
MA-G11 Haystack Reservoir
MA-G13 Lake Billy Chinook View Area

Standard and Guideline
Allow no vehicles off roads, except for permittee or administrative purposes.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Scenic Resources



Grassland-Wide Standards and Guidelines

Manage for the visual quality objectives (VQO's) listed for each management area.

Where natural catastrophes such as large wildfires, insect epidemics, or windthrows occur, management activities may differ from stated visual quality objectives.

In areas of the Grassland managed for a Visual Quality Objective of "modification" or "maximum modification," be sensitive to the needs of the viewing public. Use cost-effective visual management techniques while meeting the emphasis of the management area. Examples of these techniques may include the construction of facilities, roads, and other physical structures with native materials, where possible.

Management Area Standards and Guidelines

Resource - Scenic Resources

Practice
Visual Quality Objectives (VQO's)

Standard and Guideline
Modification. Design vegetation manipulation projects for winter range habitat improvement to conform in size, shape and color to the natural terrain, to the degree practicable.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Retention.

Applicable Management Area
MA-G5 Juniper Old Growth
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G8 Squaw Creek
MA-G10 Rimrock Springs Wildlife Area
MA-G11 Haystack Reservoir
MA-G12 Cove Palisades State Park
MA-G13 Lake Billy Chinook View Area
MA-G14 Dispersed Recreation

Standard and Guideline
Maximum modification.

Applicable Management Area
MA-G3 General Forage
MA-G16 Utility Corridors

Standard and Guideline
Preservation (unless otherwise approved as part of a research proposal).

Applicable Management Area
MA-G4 Research Natural Areas

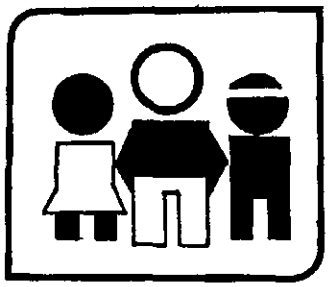
Standard and Guideline
Modification.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Partial Retention.

Applicable Management Area
MA-G15 Gray Butte Electronic Site

Social and Economic



Grassland-Wide Standards and Guidelines

Human Resources

Minimize social, cultural, and administrative barriers to legitimate uses of the Grassland within the legal authority of the agency.

Maintain and implement an affirmative action plan.

Consider needs of the handicapped in the design of facilities and in other possible ways.

Conduct compliance reviews as required by the Title VI of the Civil Rights Act of 1964.

Inform the general public, including minorities and the underprivileged, of benefits they are eligible to receive from Grassland programs. Use techniques and the media best suited to increase awareness and participation.

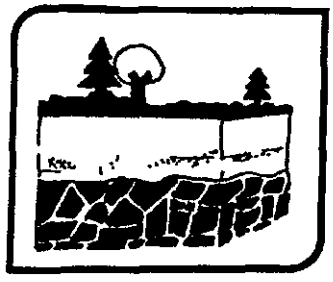
Protect and preserve, for American Indians, access to and use of traditional sites, the possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. Coordinate location and protection of these areas with representatives of the Confederated Tribes of the Warm Springs Indian Reservation. Consider the plans and policies of other Federal, State, local, and American Indian tribal governments in plan implementation.

Native American Rights

Consider and provide for the ceded land rights (treaty rights) of the Warm Springs Confederated Tribes in all Grassland related management activities.

Coordinate resource activities with the designated representatives of the Confederated Tribes of the Warm Springs Indian Reservation.

Soil



Grassland-Wide Standards and Guidelines

Address the potential for soil displacement, compaction, mass wasting, and surface soil erosion in project environmental analyses. Develop alternative management practices and mitigating measures when activities are likely to cause displacement, compaction, mass wasting, erosion, or long-term productivity losses.

Include provisions in contracts and permits to protect soils and soil productivity.

Surface Soil Erosion

Land management activities will be planned to achieve effective ground cover as defined by the following classes:

Soil Resource Inventory Erosion Hazard Class	Minimum % Effective Ground Cover First Year	Second Year
Low	20-30	30-40
Moderate	30-40	40-50
Severe	50-60	60-75
Very Severe	60-75	75-90

Effective ground cover is defined as the basal area of perennial vegetation, plus litter and coarse fragments (greater than 2mm sizes), including tree crowns and shrubs that are in direct contact with the ground. Exceptions may occur where specific projects meet erosion control objectives without meeting the ground cover objectives stated above.

Recognize the sensitivity of certain areas and their potential to be adversely affected by management activities, and plan accordingly to minimize those effects. These sensitive areas include: riparian areas; wet meadows; springs, scablands and sensitive, threatened or endangered species habitat.

Scablands

Scablands are recognized as among the most fragile ecosystems on the Crooked River National Grassland. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. This is a result of their

having very shallow soils which are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible. For this reason, all management activities will be analyzed as to their affect on scablands prior to implementation. Use *Plant Associations of the Crooked River National Grassland,* Hopkins and Kovalchi, 1983, to identify scabland plant communities.

Other standards and guidelines for scablands are specific to certain types of activities, such as livestock grazing and road building, and are listed under those sections.

Management Area Standards and Guidelines

Resource - Soil

Practice
Soil Conditions

Standard and Guideline
Develop soil rehabilitation plans. Implement in the event of soil disturbing activities such as fire suppression.

Applicable Management Area
MA-G4 Research Natural Areas

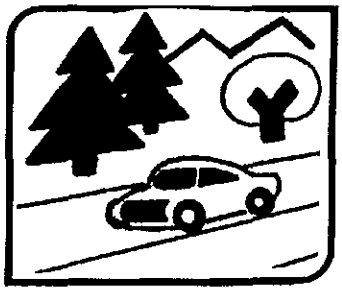
Standard and Guideline
Maintain 90 percent of the area in an acceptably productive condition.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Limit erosion to a rate that approximates natural processes. Soil compaction should not exceed limits that prevent plant establishment.

Applicable Management Area
MA-G5 Juniper Old Growth

Transportation System



Grassland-Wide Standards and Guidelines

Planning

Plan transportation systems to support resource activities in the management areas, and to serve multiple resource needs rather than individual project proposals.

Roads and trails will be at the lowest density, which meets long-term resource needs. Where existing roads or trails are impacting water quality, steps will be taken to mitigate the problem.

Construct the planned transportation system to the required standards in order to meet the needs of the planned resource activities of the area. This standard will be such that repeated reconstruction to upgrade any given section of the system will be minimized during the planning period.

Update the Grassland Road Management Plan annually to identify development, traffic management, and maintenance priorities. Prepare and maintain road management objectives (RMO's) for proposed and existing system roads, and identify roads not needed for future maintenance.

Coordinate with Jefferson County on management of their roads to complement Grassland uses.

Identify public usage roads in the Road Management Plan that require Forest Service jurisdiction to meet resource objectives.

Update the Grassland sign plan annually to reflect revisions in the Travel Plan (Appendix D).

Traffic Management

Manage traffic as needed to control access due to structural limitations of the road, safety, or constraints imposed by resource (coordination), such as those to meet wildlife needs or off-road vehicle (ORV) travel management needs.

Restrict traffic to a level that is compatible with the existing condition of a road if the road does not exist at an adequate and safe standard for the traffic expected to use it.

The adequacy and safety of the transportation system will conform to the Forest Service Manual and Handbooks

Utilize the full range of strategies for managing traffic, including prohibiting use on a seasonal or yearlong basis to eliminating all standard vehicle use for more than one year.

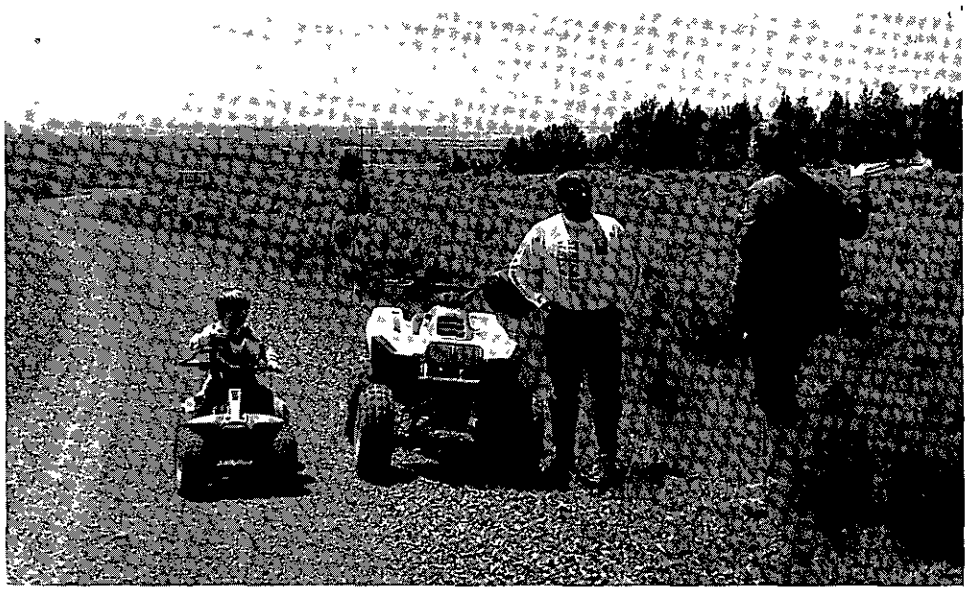
Allow ORV use only on roads where all standard vehicle use has been eliminated or on roads which have no current or planned future use where appropriate with other resources.

Sign traffic control devices (such as locked gates) to let users know why use is prohibited and for what period of time.

Recreation

Encourage ORV use only on roads where all standard vehicle use has been eliminated, or on roads which have no current or planned future use, where appropriate with other resources.

Reconstruct, operate and maintain access routes to developed sites, permitting low clearance (passenger car) traffic. However, public use may be seasonally discouraged, or restricted.



Prevent investment loss and resource damage during wet periods of the year by graveling local road access to historical dispersed recreation sites. Road access management strategies to the dispersed sites will generally be "accept" or "encourage" use by dispersed recreationists.

Construction and Reconstruction

Design, construct, and reconstruct roads according to standards based on the following criteria: resource management objectives, environmental constraints, safety, physical environmental factors, traffic requirements, traffic service levels, vehicle characteristics, road users, and economics.

Do not construct roads through the length of a riparian area. Roads crossing a riparian area will not alter stream or groundwater flow characteristics to a degree which will impact the riparian characteristics.

Design and maintain road drainage, to the extent possible, to eliminate any influx of sediment road runoff directly into stream channels.

Manage road construction activities to minimize the amount of unprotected soil surfaces when heavy rain or heavy surface runoff are most likely to occur.

Ensure that erosion control measures are completed prior to times of year when heavy rain or heavy runoff are normally expected.

Whenever practical, locate roads on areas with the lowest erosion hazard.

Ensure that temporary culverts or bridges are used where stream bottoms or banks would otherwise be damaged, and that these temporary structures are removed after use.

Roads which pass through high water table areas should be constructed in a manner which does not alter the flow characteristics of the groundwater.

Stream Crossings

Design and construct the transportation system to minimize the numbers of stream crossings.

Locate stream crossings and the approach alignment to minimize stream damage.

Protect bridge approach fills with riprap or wing walls.

Ensure adequate sizing of culverts or bridges to accommodate anticipated high streamflows and to allow fish passage.

Schedule stream crossing construction during low streamflow and/or outside fish spawning periods.

Do not permit stream crossings that will change floodplain or streamflow characteristics.

Maintain existing riparian communities both upstream and downstream from the crossing.

Visuals

Include parking areas and view points in road plans and designs where appropriate.

Locate material stockpiles out of site of the main travel route.

Meet visual objectives for the management area when locating, entering, or closing gravel pits or barrow areas.

Avoid locating roads in the visual foreground other than at junctions. Design roads to fit the topography, minimizing cuts and fills. Roads should not dominate the natural pattern of line, form or color.

Design and construct necessary road closures in visual management areas to blend with the natural characteristics of the landscape.

Road Operations and Maintenance

Operate and maintain all roads within available financing according to maintenance levels established in Road Management objectives and standards defined as follows:

Minimum Maintenance Level	Use
Obliterated	No current or future use (36 CFR 261.5)
1 (Closed)	No current use, planned future use
2	High clearance vehicles
3,4,5	Low clearance vehicles

If funding is inadequate to maintain some roads at the intended maintenance level, maintain roads at a lower maintenance level, such as high clearance access (Level 2) to a closed level (Level 1).

Stabilize and re-establish vegetation on obliterated roads.

Ensure that necessary road and trail maintenance is performed on all runoff control and drainage structures (dips and culverts).

Provide for additional maintenance of road drainage and crossing structures during periods when unusual runoff is expected.

Ensure that appropriate traffic management is established to prevent the creation of pollution-generating conditions, such as deep wheel tracks in roads during wet weather.

Management Area Standards and Guidelines

Resource - Transportation Planning

Practice
Construction and Reconstruction

Standard and Guideline
Allow no road construction unless there are no reasonable alternatives. When essential, allow construction or reconstruction only between July 15 and January 31 to protect wildlife values (such as nesting).

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Construct no new trails or roads unless they enhance RNA values, and only with the permission of the PNW director.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Construct no roads along the length of riparian system areas. Do not allow roads that cross riparian areas to alter stream or groundwater flow characteristics to a degree that will impact the riparian characteristics.

Design, construct, and maintain road drainage to eliminate the runoff of sediment into riparian areas.

Where existing roads are impacting water quality, mitigate the problem.

Design and construct the transportation system to minimize the number of stream crossings.

Protect bridge approach fills with riprap or wing walls.

Install culverts or bridges that are adequate to accommodate high stream flows, and designed to allow fish passage.

Accomplish stream crossing work only during periods of low stream flow, and when fish are not spawning.

Applicable Management Area
MA-G9 Riparian

Practice
Operations and Maintenance

Standard and Guideline
Generally, maintain roads for high clearance vehicles (Level 2). County roads are generally maintained for low clearance vehicles.

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Generally, maintain roads for low clearance vehicles (Level 3, 4, 5). However, some roads may be maintained only for high clearance (Level 2).

Applicable Management Area
MA-G3 General Forage
MA-G14 Dispersed Recreation

Standard and Guideline
Close all roads in the management area to public use year-round, allowing only administrative and permittee use.

Applicable Management Area
MA-G6 Crooked River Recreation Area
MA-G7 Deschutes River Scenic Corridor
MA-G15 Gray Butte Electronic Site

Standard and Guideline
Maintain roads for low clearance vehicles (Level 3).

Applicable Management Area
MA-G11 Haystack Reservoir

Standard and Guideline
Generally, maintain roads for high clearance vehicles (Level 2).

Applicable Management Area
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Maintain trailhead for passenger car traffic.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Manage road construction activities and complete erosion control measures to prevent runoff from unprotected soil surfaces when heavy rains are expected.

Ensure that erosion control measures are completed prior to times of year when heavy rain or runoff are normally expected.

Whenever practical, locate roads in areas with the lowest erosion hazard.

Where roads cross streams, use temporary culverts or bridges in places where stream bottoms or banks would likely be damaged. Remove these temporary structures when no longer needed.

Maintain runoff control structures annually.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
Transportation systems needed to support the installation and maintenance of structures associated with utility corridors is generally done by utility company.

Applicable Management Area
MA-G16 Utility Corridors

Standard and Guideline
Maintain existing roads and allow no further development. (The present ford on Road 6360 will be maintained at the present development level).

Applicable Management Area
MA-G8 Squaw Creek
MA-G13 Lake Billy Chinook View Area

Practice
Traffic Management

Standard and Guideline
Control access as needed to enhance big game winter range and support other resource objectives (see Travel Plan, Appendix D).

Applicable Management Are
MA-G1 Antelope Winter Range
MA-G2 Metolius Deer Winter Range

Standard and Guideline
Tranportation within the park boundary is the responsibility of the State.

Applicable Management Area
MA-G12 Cove Palisades State Park

Standard and Guideline
Close roads seasonally in specific areas: deer hunting season, September 20 - October 20; protection of soil and water for winter closure, December 1 - March 30.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Control access to protect old growth habitat (see Travel Plan, Appendix D).

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Allow only administrative and permittee traffic.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

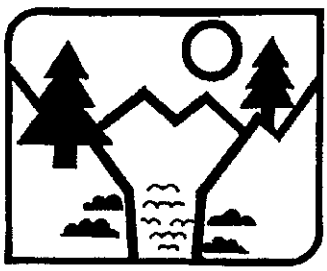
Standard and Guideline
Close Road 6360 seasonally to protect deer winter range.

Close all other roads in the management area to public use year-round, allowing only administrative and permittee use.

During the period that Road 6360 is open, keep Road 6370 open to a trailhead to Alder Spring that is to be constructed.

Applicable Management Area
MA-G8 Squaw Creek

Water



Grassland-Wide Standards and Guidelines

Meet or exceed water quality standards for waters of the State (Oregon Administrative Rules, Chapter 340-41) through application of Best Management Practices (BMP's). The key beneficial uses that BMP's are designed to protect are fish and water for domestic use (see FEIS Appendix G).

Use the existing process to implement the State Water Quality Management Plan on lands administered by the Forest Service (including the National Grassland) as described in a Memorandum of Understanding (MOU) between the Oregon Department of Agriculture and the Forest Service (2/79), and "Attachment A" referred to in this MOU (Implementation for Water Quality Planning on National Forest lands in the Pacific Northwest 12/78, Appendix F).

The following standards and guidelines apply to all management areas where water resources exist, and where management activities have potential for degradation of water quality.

Water Quality

Meet State standards for temperature, turbidity, and waste discharge.

Temperature

The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this can not be attained, 100 percent of the potential for shade is the standard.

Shade requirements may be reduced in cases where management is necessary to sustain a thrifty (fast growing) community of shade providing species over time (e.g., in the case of local infestation or disease, or for managing for future shade in a decadent stand), but activities may not result in an increase in temperatures above the limits specified.

Deschutes River, Crooked River, Squaw Creek and Associated Tributaries

Existing temperatures at or above 58° F. will not be increased.

Temperatures at or below 56° F. may be raised a maximum of 2° F.

Where stream temperatures exceed 58° F., management activities will include objectives for reducing temperatures to levels that will improve fish habitat capability.

Turbidity

Cutbanks should not exceed an average of 20 percent for any given stream drainage.

Allow no more than 10 percent cumulative increase in stream turbidity. Short-term deviations from this standard to accommodate emergency or other legitimate activities will comply with state requirements for notification and approval.

Waste Disposal

Dispose of waste effluents (e.g. fuels, solvents, and pesticides) in a manner that will prevent contamination of surface or subsurface water.

Project Planning

Allow no management activities in and around Class III streams that contribute to the deterioration of water quality below standards set for downstream Class I and II streams. Some short-term temperature and/or turbidity increases may be allowed, providing the standards for Class I and II streams continue to be met. Consider the potential for cumulative impacts.

Develop specific objectives for the management of riparian areas through the NEPA process for all projects that could impact water quality. Include in the environmental assessment:

Stream classification.

Site specific topographic, soil, channel, and vegetation characteristics.

Water quality standards and goals.

Fisheries habitat.

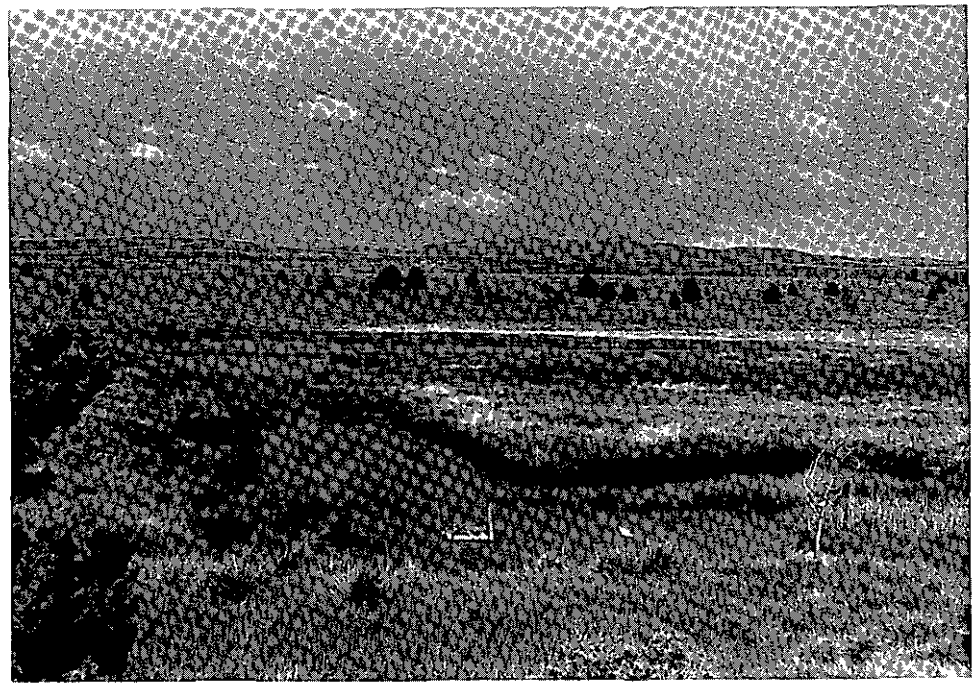
Analysis of the cumulative effects of individual management activities.

The opportunities management activities present in correcting existing problems within a drainage.

Other resource objectives, as appropriate.

Highest priorities for treatment are existing areas where water quality is being adversely impacted.

Give preferential consideration to riparian-dependent resources over other resources in case of unresolvable conflicts.



Floodplains

Consider the presence of potential (Executive Order 11988) inventoried floodplain within the project area in project environmental assessments.

Do not locate major structures, roads, or other facilities within floodplains unless no feasible alternative sites exist outside floodplains.

Allow projects causing short-term impacts on floodplain values only if specific mitigation measures designed to minimize the impacts are documented in the project environmental analysis. Restore natural floodplain characteristics after the activity has ceased.

Wetlands

Discuss the presence of potential impacts to riparian areas in all project-level environmental assessments.

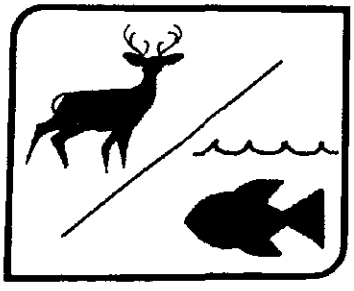
Vegetation and ground cover requirements:

Where site potential and topographic factors permit, manage riparian areas to provide the shade necessary to meet stream temperature goals.

Maintain upper streambanks in a stable condition along at least 80 percent of the length of a stream.

Retain at least 80 percent of the potential ground cover in grass-forb riparian communities. Also, retain at least 80 percent of the potential tree or shrub cover in riparian areas dominated by trees or shrubs. In riparian areas with mixed layers, the cover requirement may be met by taking credit for the effective cover provided by all vegetative layers of the riparian community including shrubs, tree understories, and the dominant overstory. Consider the mitigating effect of stream size and orientation as well as surrounding topography when determining the amount of cover that may be removed.

Wildlife and Fish



Grassland Standards and Guidelines

Management Indicator Species

General

Determine if a species' use of habitat is incidental or essential. If it is determined to be essential habitat (e.g. roosting sites), protect it from adverse modification through curtailment of conflicting activities, modification of activities, seasonal restriction of activities, or avoidance of the area For bald eagles, consult with the

Endangered Species Branch of the Fish and Wildlife Service on proposed actions that may affect the species.

For newly discovered habitat, evaluate through the environmental analysis process to determine if habitat is essential. If so, amend the Plan to reflect this situation.

Close areas to vehicles during hunting season in cooperation with the Oregon Department of Fish and Wildlife.

Common Flicker (Old Growth Juniper)

On juniper dominated lands, maintain old growth juniper habitat comprising 40 acre units (may be composed of scattered stands as small as five acres in size located no more than 1/8 mile apart), generally no more than 5 miles apart.

Rainbow Trout

Provide habitat by managing as required in the Riparian management area prescription.

Threatened, Endangered, and Sensitive Wildlife Species

Cooperate with State and Federal fish and wildlife agencies in developing recovery plans for threatened or endangered wildlife species. Recovery plans take precedence over other management direction.

Consult with the U.S. Fish and Wildlife Service when conflicts between project activities and habitat needs cannot be resolved, or when uncertainty exists.

Maintain inventories of essential or critical wildlife habitats including their locations and distribution.

Inventory and protect sensitive plant species and their habitat(s). Possible taxa found on the Grassland are: Astragalus howellii (not confirmed), Collomia macrocalyx, and Oryzopsis hendersonii.

Incorporate plant association information (Hall, 1973, Hopkins and Kovalchik, 1983) and management implications into project design.

Maintain contacts with Federal, State, and other agencies, groups, and individuals concerned with the management of threatened, endangered, and sensitive plant and animal species. Consult with the Oregon Department of Fish and Wildlife, Oregon Natural Heritage Data Base and U.S. Fish and Wildlife Service for technical assistance in developing species management guides and in determining viable population levels.

Review location records, available habitat, and other information during environmental analysis of each project activity to determine whether known or suspected locations of sensitive plant species or their habitat occur.

Document findings when no suitable habitat or reported locations of sensitive plants are identified, and no further investigation will be required.

Perform a field reconnaissance when suitable habitats or reported locations are suspected to occur in the area of influence of the project, to more precisely verify the presence, abundance, and distribution of the sensitive species. If the search is conducted during a season of the year when positive identification is probable, and no listed species are found, document this fact and no further investigation will be needed.

Determine actual distribution and current status of listed plant species if they are found in the project influence area. Informal consultation with the Endangered Species Branch of the Fish and Wildlife Service will be initiated if the species is Federally listed. Curtail or modify the proposed project if it would jeopardize the existence of the species.

Spell out identified safeguards in the environmental analysis and project plan; project personnel will be fully responsible for being aware of and implementing these safeguards. Supervisors of the activity must assure that actions which jeopardize the listed species do not occur.

Defer actions which may affect habitat for Federally listed endangered or threatened species, if they can not be avoided, until a formal consultation with the Endangered Species Branch of the Fish and Wildlife Service is completed to determine a course of action.

Possibly conduct a full botanical investigation of the species involved in cases where other high values or uses would be foregone if the proposed activity were modified or deferred. Develop management guidelines that will make possible an assessment of the significance of the specific population involved. Determine an appropriate course of action based on these findings and consultation with appropriate state and federal agencies.

Coordinate with the Native Plant Society of Oregon to exchange information on local plant distributions and status.

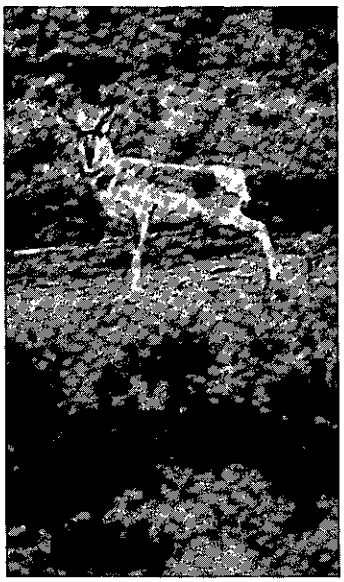
Other Species

Mule Deer

Manage mule deer winter range to attain a 40/60 cover/forage ratio. Thermal cover units should generally be larger than 20 acres.

Provide forage sufficient to maintain current State management objectives for mule deer.

Manage the transportation system to provide optimum habitat effectiveness. Utilize permanent and seasonal closures as needed during the hunting season and on the winter range to achieve this standard (see Travel Plan, Appendix D).



Antelope

Allow antelope populations on the Grassland to increase until either significant resource conflicts or private land damage occurs. Estimated carrying capacity for wintering antelope is 300-350 animals. The Oregon Department of Fish and Wildlife is the lead agency in controlling animal numbers.

Raptors

Protect active raptor (bird of prey) nests from human disturbances until nesting, feeding, and fledgling are completed. Provide protection of nest sites and nesting habitat sufficient for the species involved.

Bald and Golden Eagles

Protect nesting sites and roosting sites used in conjunction with nesting sites, as prescribed in the "Act for Protection of Bald and Golden Eagles" (ref. title 50 CFR, USC 668-668d).

Nesting Sites

Eagle nesting territories are divided into primary and secondary management zones.

Primary

The boundary of the primary zone shall not be less than 20 chains from the nest.

Human activities should be controlled during the critical period. The critical period is the time between arrival of adults at the nest site and three weeks after the fledgling of any young. The critical period will usually fall between March 1 and August 15.

Secondary

The purpose of this zone is to further minimize disturbance.

The size of the secondary zone will be determined by local topography and resulting visibility from the nest. It shall lie outside the primary zone and be approximately circular with a minimum boundary of 40 chains from the nest.

Human activities into the secondary zone should be restricted during the critical period.

Roosting

Within 1/2 mile (40 chains) of existing nests, save three to five old growth trees for potential roost and perch trees during the breeding season.

Hawks and Owls, Except Prairie Falcons

Nesting Sites
Nesting areas are divided into primary and secondary zones.

Primary
The boundary of the primary zone should not be less than 5 chains (330 ft.). The management objective for this zone will be to maintain the present habitat characteristics.

The critical period, during which human activities should be restricted, will usually fall between March 1 and August 1.

Secondary
The boundary of the secondary zone should be an additional five chain radius beyond the primary zone (total 10 chain radius). In this secondary zone, modified treatments will be required. "Modified" means intermediate between that required in the primary zone and that normally prescribed outside of the whole protection zone.

The critical period is the same as for primary zone "Hawks" above.

Prairie Falcons

Carefully evaluate activities having the potential to alter or disturb cliffs, talus, or cave habitats.

Nesting Sites

Primary
The boundary of the primary zone should not be less than five chains (330 ft.). Maintain the present habitat characteristics.

Restrict human activities during the critical period, usually March 1 to August 1.

Secondary
The boundary of this zone should be an additional 15 chains beyond the primary zone. The management direction for this zone will be a modified treatment, and full treatment beyond the secondary zone.

Critical period: March 1 to August 1.

Species Associated with Dead and Downed Logs

Down dead log requirements for wildlife are expected to be met through attrition of standing snags as they fall.

Species Associated with Various Plant Communities and Successional Stages

Provide diversity by maintaining representative portions of all native plant associations and various successional stages represented in an area through time

Species Associated with Springs and Bogs

Identify and evaluate seeps, springs, bogs, other small (less than 10 acre) wet areas, and any other unique habitat on a project level basis, while providing appropriate protection.

Introduced Species

Evaluate proposals for introducing wildlife through the NEPA process. Coordinate with the Oregon Department of Fish and Wildlife.

Management Area Standards and Guidelines

Resource - Wildlife and Fish

Practice
Habitat Management

Standard and Guideline
Manage to provide optimum habitat for antelope use on winter range.

Work toward a minimum of 50% vegetative ground cover comprised of 40-60% grasses, 10-30% forbs, and 5-20% shrubs.

Maintain shrub species (primarily big sagebrush) at or below 24 inches in height by prescribed fire or mechanical means.

Refer to *Wildlife Habitats in Managed Rangelands, The Great Basin of Southeastern Oregon.*

Applicable Management Area
MA-G1 Antelope Winter Range

Standard and Guideline
Manage the area north of the Hay Creek road at a 20/80 cover/forage ratio by maintaining the present cover patches. The rest of the General Forage Management Area will be managed at a 40/60 cover/forage ratio.

The 40 percent cover component will have a range of juniper canopy cover from 15 percent to 30 percent, and will continue to be manipulated to maintain the target cover/forage ratio over time.

Cover areas will not be allowed to deteriorate to the point of poor range condition or unhealthy watershed condition.

Applicable Management Area
MA-G3 General Forage

Standard and Guideline
Provide old growth juniper stands of 40 acres minimum size distributed a maximum of five miles apart. The majority of the trees should be large with hollow centers.

Applicable Management Area
MA-G5 Juniper Old Growth

Standard and Guideline
Manage to provide optimum habitat for deer use on winter range.

Manage 40 percent of the total area in cover. Maximum distance from cover to any point in a forage area should not exceed 400 feet.

Treat isolated cover-producing lands to produce the best balance of cover over time when the general area inherently has a low cover production potential.

Give top priority to providing high quality forage, by fall greenup, for deer.

Applicable Management Area
MA-G2 Metolius Deer Winter Range
MA-G8 Squaw Creek

Standard and Guideline
Allow no exotic species to be introduced.

Permit the reintroduction of former native species if not in conflict with other objectives of the RNA.

Control of excessive animal populations may be considered where such populations threaten the RNA objectives.

Applicable Management Area
MA-G4 Research Natural Areas

Standard and Guideline
Manage for wetland related species.

Use prescribed fire or controlled livestock grazing to maintain productive habitat.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area

Standard and Guideline
Manage habitat for maximum populations of brook and rainbow trout where that potential exists.

Manage riparian vegetation to provide cover for upland game birds.

Applicable Management Area
MA-G9 Riparian

Standard and Guideline
See standards and guidelines for adjacent management areas.

Applicable Management Area
MA-G16 Utility Corridors
MA-G14 Dispersed Recreation

Habitat Improvement

Standard and Guideline
Permit habitat improvements that are compatible with the primary objectives of the management area.

Applicable Management Area
MA-G1 Antelope Winter Range
MA-G4 Research Natural Areas
MA-G5 Juniper Old Growth

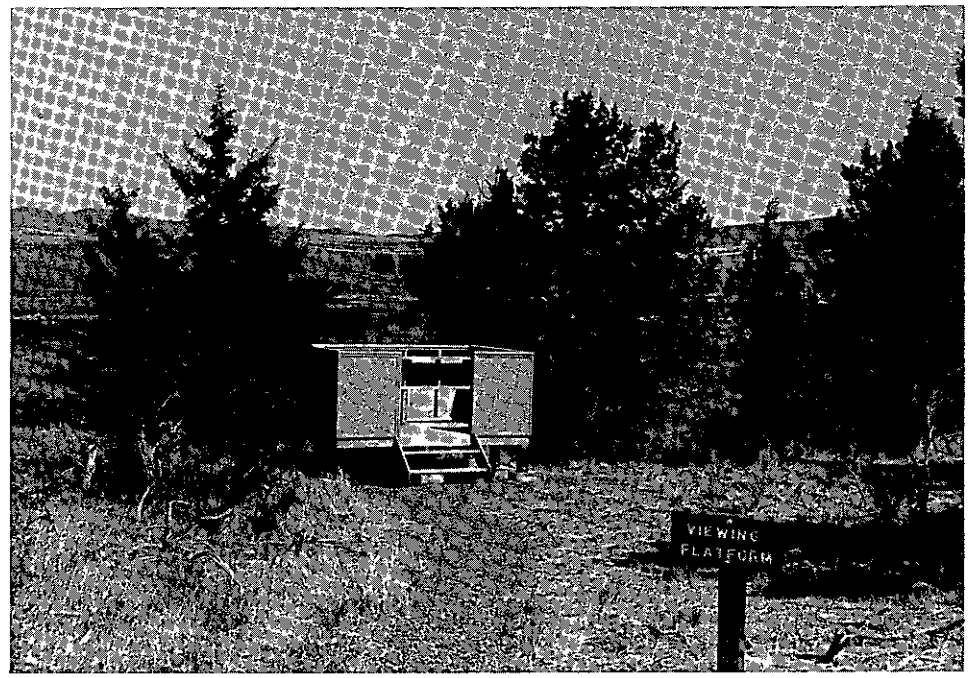
Standard and Guideline
In areas of extensive juniper encroachment, remove juniper in irregular-shaped blocks to work toward an optimum 40/60 cover/forage ratio.

Permit other habitat improvements that are compatible with the primary objectives of the management area.

Applicable Management Area
MA-G2 Metolius Deer Winter Range
MA-G3 General Forage
MA-G8 Squaw Creek

Standard and Guideline
Use habitat improvements to achieve the desired future condition of the area.

Applicable Management Area
MA-G10 Rimrock Springs Wildlife Area



Standard and Guideline
See standards and guidelines for adjacent management areas (except for prescribed burning).

Applicable Management Area
MA-G16 Utility Corridors
MA-G14 Dispersed Recreation

TABLE 4-5

CROSS-REFERENCE TABLE

	MANAGEMENT AREA							
Resource Area	MA-G1	MA-G2	MA-G3	MA-G4	MA-G5	MA-G6	MA-G7	MA-G8
Cultural Resources	65	65	65	65	64	65	65	65
Facilities				66	66			
Fire	69, 73	70, 73, 74	69, 73	70, 72	70, 72, 73	69, 72, 73	69, 72, 73	69, 72, 73
Forage	75, 77, 79	76, 77 79	77, 79	76, 80	77	76, 80	76, 80	77, 80
Fuelwood	84	84	84	83	83	84	84	84
Grassland Health				85				
Lands	87	88, 90		85, 88-90	88, 90	89	89	89
Minerals & Energy	92	93		93	93	93	93	93
Recreation	95, 96, 99, 101-102	95, 96, 99-102	95, 96, 99-102	96, 98 99-101	96, 97, 101	95, 99, 101	95, 99, 101	95, 97, 99, 101
Scenic Resources	103	103	104	104	104	104	104	104
Soil				107	107			
Transportation System	112, 114	113, 114	113, 115	112	112, 115	113	113	114, 115
Wildlife & Fish	123, 125	123, 125	123, 125	123, 125	123, 125			123, 125

	MANAGEMENT AREA							
Resource Area	MA-G9	MA-G10	MA-G11	MA-G12	MA-G13	MA-G14	MA-G15	MA-G16
Cultural Resources	65	65	65	65	65	65	64	64
Facilities	66							
Fire	71, 73	70	70, 72	69, 71	69, 73	69, 72	70-71	71
Forage	76, 78, 80	76-77, 80	76	76				78
Fuelwood		84	84	84	84	84	83	84
Grassland Health								
Lands	89, 90	89, 90	88	88	88, 89		89	90
Minerals & Energy	93	93	93	92, 93	93		93	
Recreation	97, 101-102	95-96, 100, 102	95, 98, 99-102	97	95, 99, 102	95-96, 102	96	97
Scenic Resources	104	104	104	104	104	104	104	104
Soil	107							
Transportation System	112, 114	113, 115	113	114	114	113	113	113 114
Wildlife & Fish	125	123, 126 125-126				125-126		

NOTE. The Grassland-wide standards and guidelines for Air Quality, Biological Diversity, Old Growth, and Social and Economic resources apply to all management areas as appropriate with no management area standards and guidelines This table will assist the reader in locating the applicable standards and guidelines for each management area by referencing the applicable pages (only the page number suffix is listed, all are preceded by a 4-)

Chapter 5

Implementation of the Grassland Plan

Chapter 5

Implementation

Introduction

This chapter explains how management of the Crooked River National Grassland will move from the current direction and situation into Alternative I. Implementation can be influenced by previous management activities and objectives, project analysis, budget, monitoring and evaluation, and when necessary, the required amendment process.

Implementation will require a transition from an existing management program with a "pre-allocated" budget and accomplishment targets to a new management program, represented by Alternative I, with budget, goals, and objectives based on identified issues and concerns. The Plan establishes the management direction for the Crooked River National Grassland for the next 10 to 15 years. In doing so, it conforms to existing laws, regulations, and policies, including those found in the Forest Service Manual and Handbooks, and the Regional Guide

Project Scheduling

An initial schedule of proposed projects is contained in the appendices of this document. These activities represent possible projects and time frames from which annual work programs (dependent on approved funding) are developed. The listing of projects and schedules for a ten year period are maintained by unit managers. Listings will routinely change as projects are implemented or are removed from the lists for other reasons, and as new projects take their place. Projects are implemented in response to public demand, planned outputs and the annual budgeting process.

Budget Proposals

Multiyear budget proposals that identify funding needed to implement the scheduled outputs will be developed. Upon approval of a final budget for the Grassland the annual program of work is finalized and carried out. The annual program is an incremental implementation of the management direction in this Plan. Outputs and activities in individual years may vary from those shown in the Management Objectives (Chapter 4, Section 1) and schedules (Appendix A), depending on actual budget, but will progress toward the desired future condition.

The rate of progress is dependent to a large extent upon funding to support activities needed to achieve plan objectives. Table 5-1 compares the projected funding level that will be required to implement Alternative I to funding levels received by the Grassland from 1985 to 1989.

Environmental Analysis

Projects and activities are subject to analysis under the National Environmental Policy Act (NEPA) process before they can be implemented. Depending on expected environmental consequences, a categorical exclusion, environmental assessment, or environmental impact statement may be prepared. All documents, including categorical exclusions, will be available for public review.

TABLE 5-1
HISTORY OF CROOKED TIVER NATIONAL GRASSLAND BUDGET 1985-1988 COMPARED TO ESTIMATED PLAN BUDGET (IN $1000)

Resource	85	86	87	87	Est Plan Budget 1/
Fire Management	50	43	47	57	79
Range	67	58	56	57	154
Timber	6	6	6	6	10
Recreation	26	21	38	37	233 2/
Minerals	3	3	4	4	10
Wildlife	11	9	34	34	24
Watershed	7	5	7	7	26
Real Estate Management	6	4	17	21	38
Building Maintenance	1	1	1	1	2
Brush Disposal	2	2	2	2	3
General Administration	61	70	70	70	75
Totals	240	222	282	296	654

1/ Implementation will begin in fiscal year 1990 The program budget for fiscal year 1992 scheduled for completion in late 1989 will be the first to reflect the final plan Budget levels requested during the draft planning period will be amended to support out final document

2/ Includes $200,000 in Recreation Construction.

Monitoring and Evaluation

Monitoring is the means of measuring and evaluating the effectiveness of the Grassland Plan implementation. Monitoring provides quantitative and qualitative information on the progress and results. It is a means to determine how well assumptions used in preparing the Plan reflect actual conditions, how well objectives of the Plan are being met, and the appropriateness of the management standards and guidelines. Monitoring may lead to changes in management practices, or provide a basis for minor adjustments, amendment, or possible revision of the Plan.

Monitoring is intended to help keep the Grassland Plan dynamic and responsive to changes. When a situation is identified as being outside the limits of acceptable variability, appropriate amendment, revision, or other changes may be made. Monitoring and evaluation have a distinctly different purpose and scope. Monitoring consists of gathering data, observations, and information. During evaluation, the data and information are analyzed and interpreted. This process provides information necessary to determine if planned conditions or results are being attained and are within the intent of the Plan, and if not, why.

It will provide information to help determine, for example:

whether laws, regulations, and policies are being followed, including those found in the Regional Guide, Plan standards and guidelines, the Forest Service Manual and Handbooks;

whether the Grassland Plan responsively addresses the issues, concerns, and opportunities in a publicly acceptable manner;

whether management prescriptions are producing the predicted or desired environmental results,

if costs of implementing the Plan are within projected limits;

if projected outputs are being produced,

whether there are new issues and concerns not adequately addressed by the Plan.

There are a number of monitoring systems currently in place to comply with administrative and legal responsibilities. Examples include MAR, PAMARS, RAMIS, TSPIRS, STARS, NIRP, etc. Additional examples may be found in Forest Service Handbook 1309.14 Forms and Reports.

Grassland Plan monitoring does not replace or substitute these systems, but rather complements them by addressing specific issues and concerns identified through the planning process and providing additional information for evaluating the effectiveness of the Plan.

Table 5-3 outlines monitoring actions, including a number of ongoing monitoring items that will help evaluate how implementation is progressing. Following the decision matrix in Figure 5-1, evaluation of the monitoring data will lead to decisions of the following types:

1. Continue practice, no change necessary.
2. Refer the problem to the appropriate Forest officer for corrective action.
3. Modify the management practice through Plan amendments.
4. Modify land designations through Plan amendments.
5. Revise output schedules.
6. Revise unit output costs.
7. Revise the Plan.

The first step in monitoring will be comparing the Plan to the annual budget received by the Grassland. This will include a review of Grassland capabilities to implement the prescriptions in the Plan, cost comparisons and output levels. Variances beyond a threshold of 10 percent will be presented to the Ochoco National Forest Management Team for decision. Resolution may be accomplished through allocation adjustments, requests for change to the Regional Office or other adjustments or amendments. Figure 5-2 shows schematically how the process proceeds.

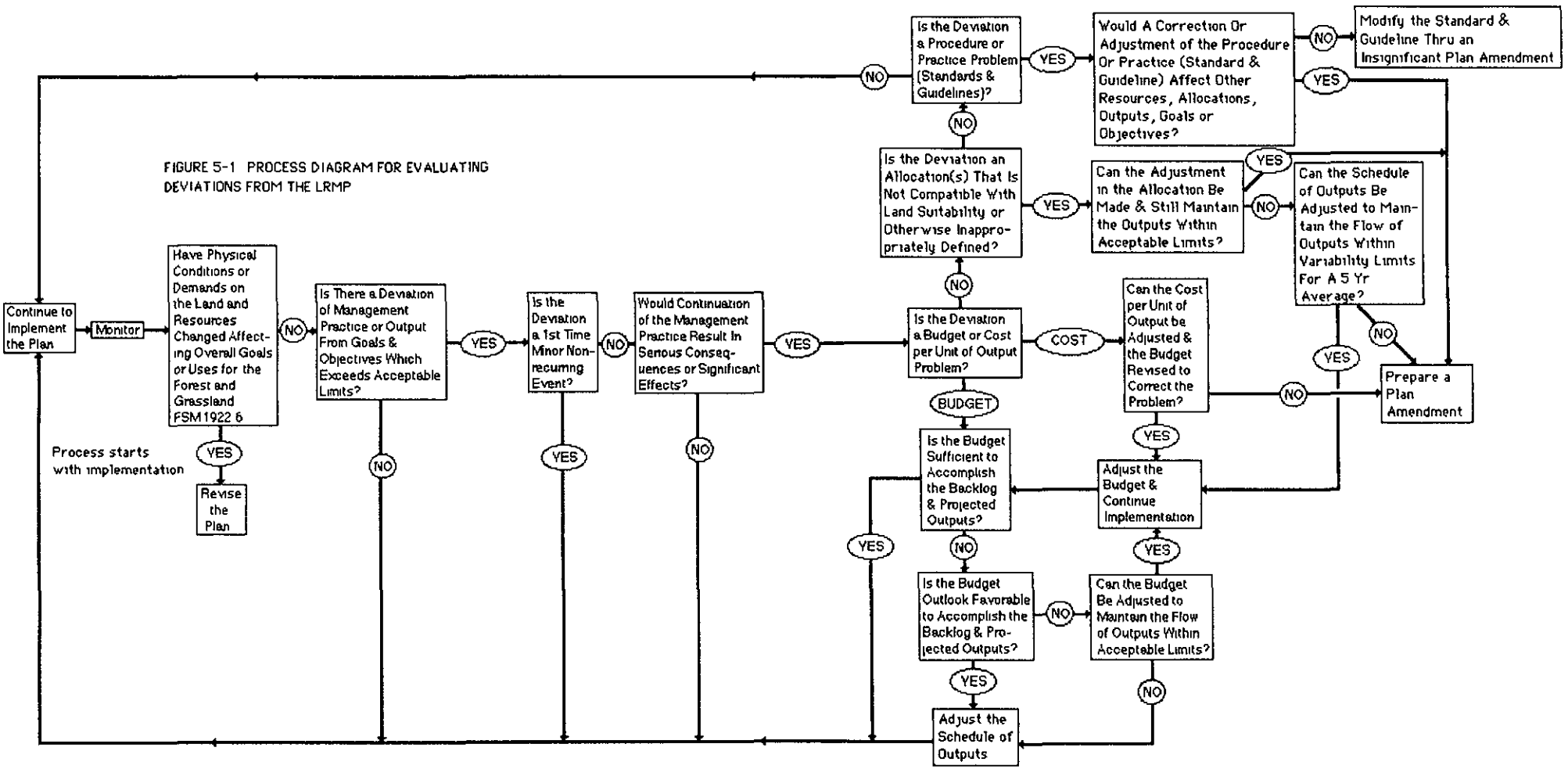
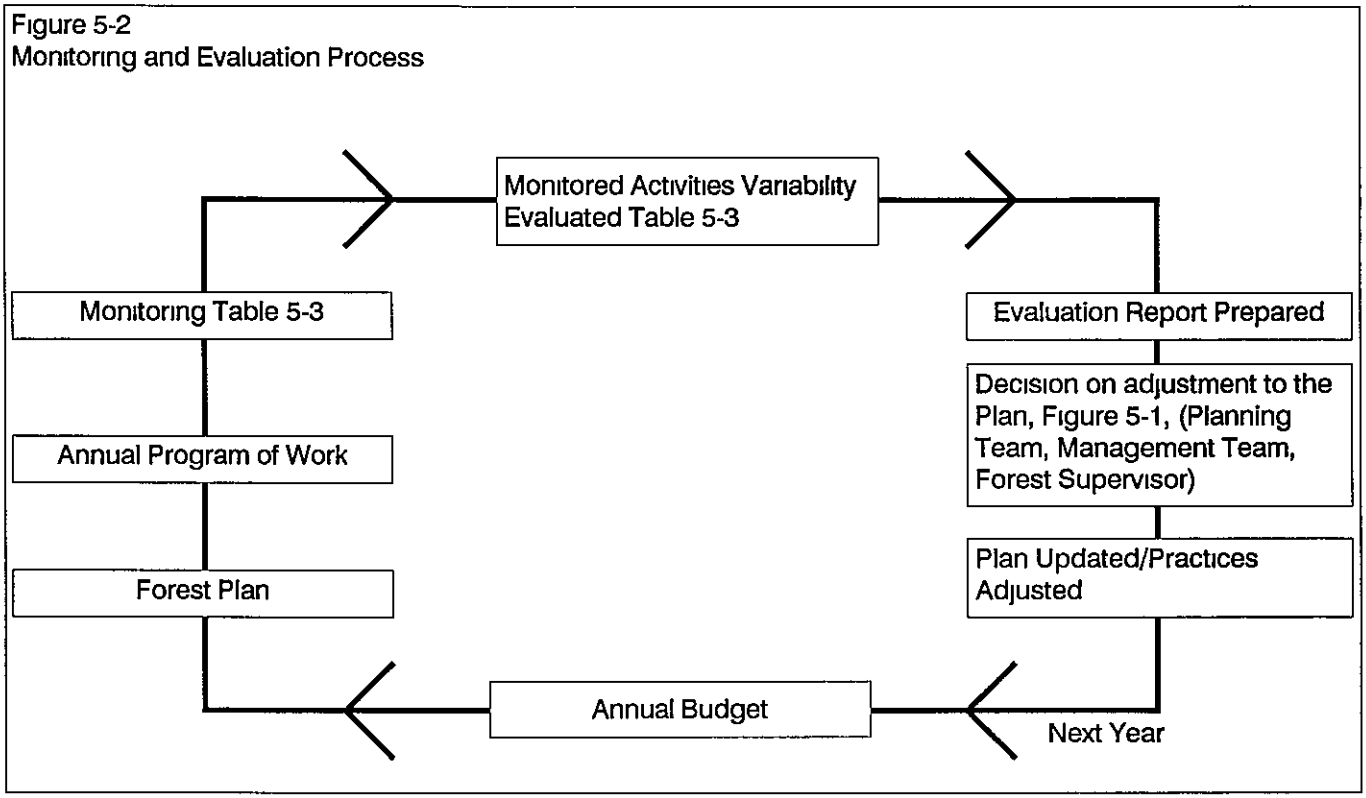


FIGURE 5-1 PROCESS DIAGRAM FOR EVALUATING DEVIATIONS FROM THE LRMP

Figure 5-2
Monitoring and Evaluation Process



Amendment and Revision Process

The Grassland Plan incorporates legal mandates, professional judgement and the public's stated concerns into a future vision of the Grassland. It charts a path for getting there by developing management goals and objectives and translating them into management direction in the the form of standards and guidelines for management areas on the Grassland National Grassland planning is a dynamic process, and the products -- Grassland Plans -- are similarly dynamic. Grassland Plans can and should be modified if conditions warrant. As management goals are applied on the ground or as new information is learned about resources, the Plan's goals and objectives, or activities the goals generate, may no longer be appropriate. In such instances, activities may be tailored to fit the resource, or planning objectives as stated in the Plan may be amended. Plans do not apply direction in site-specific management activities. It would be unrealistic and wrong to try to identify, analyze and schedule the myriad projects or activities that occur on a National Grassland. Instead, this type of site-specific planning occurs at the project-level planning stage, such as allotment management planning.

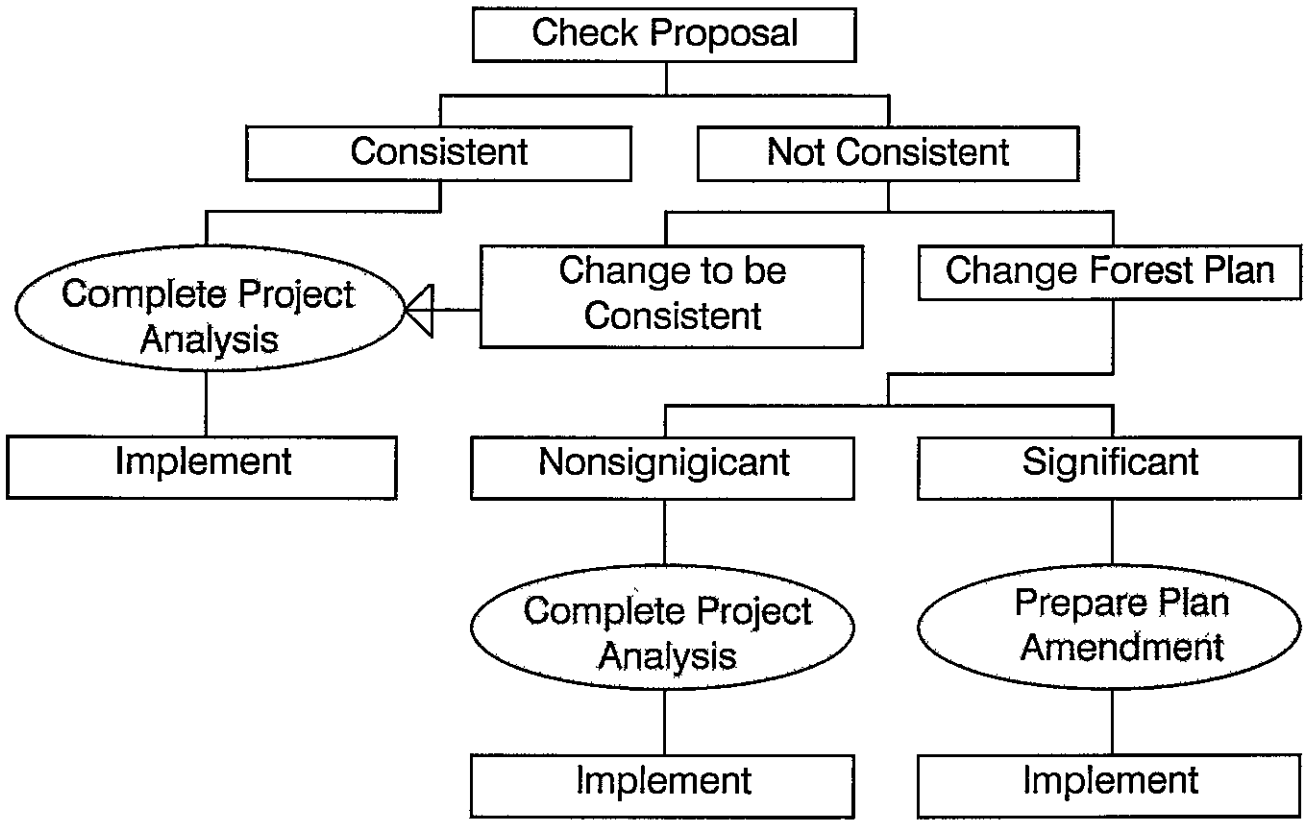
This Grassland Plan may be changed either by an amendment or a revision. Such changes may come about as a result of the monitoring process or project analysis (Figure 5-2). An amendment may become necessary as a result of different situations. They can include:

recommendations of the Interdisciplinary Team based on their review of monitoring results;

the determination that an existing or proposed permit, contract, cooperative agreement, or other instrument authorizing occupancy and use is not consistent with the Grassland Plan, but should be approved, based on project level analysis;

changes in proposed implementation schedules needed to reflect differences between funding levels assumed in the plan and funds actually appropriated,

Figure 5-3
Amendment Process and Dynamic Nature of the Plan



changes necessitated by resolution of administrative appeals;

changes to correct planning errors;

changes made necessary by altered physical, social, or economic conditions.

Based on an analysis of the objectives, guidelines, and other aspects of the Grassland Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change to the Plan. If the change is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a plan. If the change is determined not to be significant, the Forest Supervisor may implement the amendment after appropriate public notice and compliance with NEPA (see Figure 5-3).

The Regional Forester will approve significant amendments, and the Forest Supervisor will approve "not significant" amendments. The determination of significance will be documented in a decision notice and would be appealable under 36 CFR 217.

With respect to revision, the NFMA requires revision of the Grassland Plan at least every 15 years. However, it may be revised sooner if physical conditions or demands on the land and resources have changed sufficiently to affect overall goals or uses for the entire Grassland. If a revision becomes necessary, the procedures described in 36 CFR 219.12 will be followed. The Chief, however, must approve the scheduling of such revision.

Consistency with Other Instruments

This Grassland Plan serves as the single land management plan for the Crooked River National Grassland. All other land and resource management plans are replaced by the direction in this Plan; a list of plans revised, superseded, or updated by this Plan are shown in Table 5-2.

All outstanding and future permits, contracts, cooperative agreements and other instruments for occupancy and use of lands will comply with direction in the Grassland Plan as soon as practicable, subject to the valid existing rights of the parties involved. This will occur generally within three years of the date of implementation of this Plan.

Recreation

All leases and Memoranda of Understanding between the Ochoco N.F. and the State of Oregon, Bureau of Reclamation, or other agencies, will be consistent with Grassland Plan direction at the first reissuance of said leases and Memoranda following plan implementation.

Wildlife and Fish

Within two years after implementation, habitat survey schedules and habitat improvement project schedules will be prepared for a five-year period.

Range

Existing Allotment Management Plans and Grazing Permits will be in compliance with Grassland Plan direction on the first update or reissuance following Plan Implementation.

In implementing the Grassland Plan, any necessary adjustments between existing permitted livestock numbers and plan direction will be made by evaluating management direction for allotments, and determining if a change in management intensity for the allotment is necessary. Factors influencing this decision will include permit status, condition of improvements, funds available, priority needs on other allotments, and ability to meet standards and guidelines in this Plan.

Lands

All development and management plans for facilities will be consistent with Plan direction as soon as practicable, subject to valid existing rights of outstanding permits, contracts, and cooperative agreements.

Minerals

New mineral leases, permits, contracts, and operating plans will be evaluated for consistency with the Grassland Plan as they are received or proposed. Existing permits and operating plans will be reviewed for consistency with Plan standards and guidelines. Modifications of these permits will be required only when authorized by law or regulation. Operating plans may be modified on a case-by-case basis if over-riding resource considerations are present.

Since the Forest Service has no authority to modify stipulations attached to existing mineral leases, modification will be recommended to the proper agency when found necessary.

TABLE 5-2
REVISED OR SUPERSEDED PLANNING DOCUMENTS

PLAN/AGREEMENT TITLE	SUPERSEDED	UPDATE/REVISE 1/	PREPARE
1980 Agreement with Gray Butte Grazing Association		X	
Gray Butte Electronic Site Plan		X	
Metolius Winter Range Coordinated Resource Management Plan		X	
1980 Crooked River National Grassland Unit Plan	X		
Minerals Material Source Plan		X	
Transportation Plan		X	
Fire Management Plan(s)		X	
Fuelwood Plan		X	
Special Use Permits		X	
Memoranda of Understanding		X	
Coop Agreements		X	
Allotment Management Plans		X	
Land Adjustment Plan		X	
Recreation Development Plans		X	
Statewide Comprehensive Wildlife Plan		X	
1977 Off-Road Vehicle Plan	X		
Facilities Management Plans		X	
Wild and Scenic River Plans			X
Forest and District Multiple Use Plans	X		

1/ These existing plans will be examined and updated or revised as necessary to be brought in conformance with the Forest Plan, or simply incorporated into the Forest Plan if no change is needed

TABLE 5-3

MONITORING ACTIONS

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
MONITORING DIRECTLY RELATED TO ISSUES AND CONCERNS									
RESOURCES									
FACILITIES, ROADS Transportation System Management.	Open road density Operation, construction, and reconstruction of arterial, collector, and local roads as related to objectives established in the Forest Plan road standards	Miles of open road per square mile by traffic service and maintenance levels	Departure from Forest Plan estimates	H/H	Compare road mileage with Management Area Objectives	Forest Engineer and District Ranger	Annually, with 5 year report	GIS 1/, Annual Accomplishment Report, Project files	$5,000
FISHERIES Habitat capability and productivity, species and size composition (rainbow and brook trout)	Determine if habitat meets management objectives	1) sedimentation (% imbededness), 2) temperature (F), 3) channel morphology (cross sectional area), 4) riparian community composition, 5) large woody material (number of pieces), 6) smolt numbers	Loss in habitat capability, objectives not being met.	H/M	1) Bucket or ocular (hoop) 2/, 2) hydrothermograph, 3) cross section and pool riffle ratio 3/, 4) line transects, 5) riparian plant community survey (photo points) and 6) electrofishing or trapping	District Ranger, Fisheries Biologist & wildlife biologist	1) June thru Sept., 2) winter & summer daily, 3) every 3 yrs on selected streams, 4) every 3 years on selected streams, 5) 5% of streams annually and 6) every 3 yrs on selected streams	GIS 2600 Files	$7,000
RANGE AUM's output.	Comparison of produced vs planned outputs	Animal Unit Months	10% below targeted Animal Unit Months for the Forest.	H/H	Annual Use Report	Range Staff	Annually for first 3 years, every 3 years thereafter	Report file	$500
Utilization of forage	Determine if forage utilization levels in (1) riparian areas and (2) upland areas are consistent with applicable standards and guidelines	Percent utilization in grazing allotments	10% over recommended use per allotment.	M/H	Sample key areas on at least 20% of the allotments annually Each allotment should be sampled at least once every four years with the highest priority placed on known or suspected problem areas 4/	District Ranger, Range Staff	Annually	District GIS files	$5,000

MONITORING ITEM	ACTIONS/ EFFECTS *MONITORED*	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION *RELIABILITY*	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
Conditions of Range resources	Determine if vegetative condition and trend is being maintained or improved to meet Forest Plan objectives Determine *if areas are in a satisfactory* condition	Condition evaluation in grazing allotment.	Allotment condition and trend not fair or better condition with upward trends	M/M	Range condition and trend transects, photo transects	District Ranger	10% of the allotments annually	District 2200 files	$15,000
Range/Wildlife Conflicts	Determine that livestock use on winter range won't reduce value for deer and antelope	Utilization of forage	Use by livestock other than spring and summer months Forage not available for wintering animals.	M/M	Field survey	District Ranger	Annually	District files	$300
RECREATION Semiprimitive	Comparisons of actual use with social and managerial setting criteria for ROS Class in Squaw Creek Management Area. 5/	Recreation visitor days and encounters per visitor day	When desired physical, social and managerial setting for each Recreation Opportunity Spectrum Class would not be achieved 15 encounters/day over 20% off-season	M/M	Visitor contacts, trail registration, observations of resource conditions at heavy use area.	District Ranger, Rec Staff	Annually	RIM data	$2,500
ORV Effects	ORV use effects on soil, water, vegetation, fish and wildlife, visuals, other visitors or cultural and historic resources	On site conditions and public comments	If ORV use conflicts with management direction for a management area, such as unacceptable damage to soil, vegetation or visual quality, the area will be considered for closure or restriction of ORV use, and rehabilitation of area.	H/H	On-ground review of ORV use areas. *Review* of public comments	District *Ranger* Collect on-ground information and propose changes to ORV Management *Plan* Recreation and Lands Staff Review District comments	Annually	Files	$2000/yr
Use	Compatibility of recreation use with ROS class and management area allocation	RVD as per *RIM*	Inappropriate use in congressionally designated areas, more than 5 complaints annually of inappropriate use	M/M	Joint review, by District and S O Rec staff, of use levels by mgmt. area.	District Rec Staff	At least every 3 years	S O	$1500
TRAILS	Trail system	Miles of trail established or maintained	50% of planned system not built in first 5 year period Trails not being maintained to standard Trails lost to resource development.	H/H	Visitor contact, condition survey, review of trail system	Recreation Staff	5 years	Trail Inventory	$500

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
MANAGEMENT ACTIVITIES	Riparian Management Area Activities	Variable depending on standard	Activities depart from established standards more than 10% of the time or indications that management goal of any area may be compromised	M/M	Activity/Area specific monitoring to gauge accomplishment of management area standards Number and frequency of reviews in each category will be dependent on relative risk rating associated with activities and management area category a. Key Site b Special emphasis c General	Range & Watershed Staff	Annually 2 samples per District.	2520, 2620 TRI / GIS	$5,000/yr
FUELWOOD	Fuelwood - Amount of fuelwood provided	Cords/MBF	Supply exceeded by demand	M/M	Field Observations Public Comment # of permits	District Ranger	Annually	Annual Free Use Timber Report, Timber Cut & Sold Report	$1000
SCENIC RESOURCES	Whether the condition of the visual resource is commensurate with standards required in the management prescription	Visual quality objective achievement.	Conflict of management goals with VQO on more than 10% of the area.	M/M	Program and Activity Reviews, corridor plans, photo log of corridors	DR/LA	Minimum every two years	File (2380)	$5000/yr
WATERSHED Stream improvement	Improvement in stream conditions (morphology)	Miles	Average stream condition less than excellent, not showing improvement, or stream condition declining	M/M	Survey of stream morphology using established survey points on selected streams	District, Soil & Water Biologist	5 years	District, S O	$3000
Vegetation Improvement	Improvement in riparian vegetation	Miles	Riparian vegetation in condition that is declining, lacking in vigor, or otherwise no contributing to stream stability	M/M	Survey using established survey points on selected streams	District, Soil & Water Biologist	5 years	District, S O	$5000
WILDLIFE Old Growth (pileated woodpecker)	Old Growth juniper	Acres old growth & allocation	Less than 1 designated stand or habitat area per 12,000 acres	H/M	Review of old growth management acres	Wildlife Staff, District Ranger	Annually	GIS Files	$400
Antelope Winter Range	Determine if projects on antelope winter range are consistent with objectives.	Number of projects	Projects on >10% of area not conforming to standards and guides.	M/M	Review of EA's, with field verification	District Range and Wildlife Staff	Annually	2600 files / GIS	$500
Antelope Winter Range Use	Determine if animals are using designated winter range	Percent of designated winter range used	20% or more of winter range not being used	M/M	Field survey	District Ranger, Wildlife Staff	Annually	2600 Files / GIS	$200

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
Deer and elk habitat and population trends	Determine if habitat is managed to meet big game management objectives	Habitat capability based on cover/forage relationships, trend of vegetation, open road densities	HEI vary 10% from management objective 6/	M/M	Analysis of habitat using HEI model, with field verification Population trends using ODFW data.	District Ranger and Wildlife Staff	Project level analysis annually	File 2600 GIS	$10,000
Primary cavity excavators population trends and snag numbers, sizes, species and use	Determine if habitat for snag dependent species is being managed properly	1) Number of snags and live wildlife trees per acre, 2) primary cavity excavator use (numbers and species observed)	1) Not Sufficient standing and down, dead and defective trees to meet objectives, 2) to be determined	M/M	Pre- and post project review of snag numbers and live wildlife trees/acre in 25% of harvest units	District Ranger and Wildlife Staff	At least one presale and one postsale project/district/year, randomly selected	2600 GIS files	$8,000
WILD AND SCENIC RIVERS	Determine the effects of activities on Wild and Scenic River attributes on Crooked and Deschutes Rivers, and Squaw Creek	Lands adjacent to Crooked and Deschutes Rivers, and Squaw Creek.	When resource condition or level of activities would lower Wild and Scenic River designation, or experience level Management plan not complete within first half of decade	H/M	Review Project Activity considering activity on adjacent lands	District Ranger and Recreation Staff	Annually	Supervisor's Office wild and scenic river files	$5,000
SOCIO-ECONOMIC									
AMERICAN INDIAN INTERACTION	Responsiveness of Grassland Management activities to the rights, interests and concerns of American Indians as reserved by Treaty and defined by the American Indian Religious Freedom Act.	Documentation of Contacts	Potential conflict identified between Grassland Management objectives, and American Indian rights to, and/or for, an area or resource	M/H	Coordination of project plans and Environmental Analysis, where appropriate, with affected tribal representation	Forest Supervisor, Native American Coordinator, District Ranger	Annually	Project Files	$1,000/year
COMMUNITY LIFESTYLES	Responsiveness to local lifestyles, attitudes, beliefs or values	Various	Established trend toward Forest-Community conflict or identification of problems	M/H	Interviews with key publics and opinion leaders in communities, observation, etc (See FSH 1909 17) Public Involvement.	Planning Staff, Line Staff Officers	Annually	Files, newspapers, anecdotal data	$500
EFFECT OF GRASSLAND MANAGEMENT ON INDIVIDUALS AND OTHER GOVERNMENT AGENCIES	Identify emerging issues, concerns, opportunities Includes problems of interagency cooperation		Failure to have general acceptance of Grassland management.	M/M	Collect public input through contacts, letters, verbal comments, interagency contacts, etc	Public Affairs	Annually	S O and Districts	$300

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
HUMAN AND COMMUNITY DEVELOPMENT	Whether Human and Community Development goals are met.	Enrollee years by program	-10% variation from goals	H/H	Maintain personnel record by Forest Service programs (YCC, CETA, Senior Citizens, Volunteers, other)	Admin Officer, Planning Staff	Annually	Personnel Records Forest Attainment Reports	$200
COMMUNITY ECONOMIC PARAMETERS	Population, income, employment, industrial needs	Varies	Developing problems in local economy	M/M	Retrieve data from IMPLAN at FCCC	Budget and Accounting Analyst	5 years	State Employment Office, Personnel	$1000
ECONOMICS Economic effects of Plan implementation	To compare projected estimated economic effects with actual	Dollars	25% variation from estimated	H/H	Compare expenditures, contracts, salaries, actual payments to counties and returns to the Treasury with Forest Plan projections.	Budget & Accounting Analyst	Annually	TSPIRS, Supervisor's Office	$1,000
MONITORING NEEDED TO EVALUATE PLAN EFFECTIVENESS OR MEET LOCAL/ADMINISTRATIVE RESPONSIBILITIES									
ADMINISTRATIVE									
LAND OWNERSHIP	Lands being acquired or disposed as opportunities arise consistent with plan direction	Acres	Review and ownership plan not complete	M/M	Review, update ownership plan	Lands Staff, District Ranger	Annually	5400 files	$200
CIVIL RIGHTS & EQUAL EMPLOYMENT OPPORTUNITIES	Workforce diversity	Number minorities and women employed, retained	5% deviation from goals	H/H	Personnel Records Review	Admin Officer	Annually	Personnel Files	$200
ECONOMICS Comparison of actual and planned implementation costs and value	To compare projected expenditures and value with actual expenditures and value	Dollars spent.	2% deviation from total Financial Work Plan as compared to Forest Plan projections	H/H	Extract actual costs and compare with plan estimates	Budget & Finance	Annual (Quarterly)	PAMARS	$1,000
NEPA Project compliance with National Environmental Policy Act, including cumulative effects analysis	All project level decisions	Management activities	Meet NEPA Regulations and FSM direction on environmental documentation, meet standards and guidelines	M/H	EA review by office and field staff of 1-2 projects per District per year	District Ranger and Planning Staff	Each project	1950 files	$25,000

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
PLANNING MODELS Modeling assumptions (primarily FORPLAN)	Comparison of the projected outputs and effects modeled in the Forest Plan with the actual outputs and effects	Selected parameters	Plus or minus 20% in each area, subsequent analysis to determine if pattern exists	H/H	Review outputs per area FORPLAN projection	Land Management Planning	One analysis per district per year	S O	$8,000
STANDARDS AND GUIDELINES	Adherence to standards and guidelines not covered by separate monitoring item, goals and objectives met by standards and guidelines	All standards and guidelines	Unacceptable deviation from stated goals and objectives	M/H	Review of selected activities	District Ranger and S O Staff	Annually	Files	$5,000
RESOURCES									
AIR QUALITY	Total suspended particulate production	Tons of TSP	Any increases of annual tons of TSP over last 5 yr average	L/L	Project burns planning, further research, annual treatment reports	Fire Staff & Water/ Soil Staff	Annually	Accomplishment Reports	$500
CULTURAL RESOURCES	Protection of significant cultural resources during project implementation (where specified)	Properties	Any disturbance to, or alteration of, the property	H/M	Review Environmental Analyses and project work plans, sytematic field inspection during project activities inspection of selected projects to determine effectiveness of mitigation actions	Forest Archeologist, District Ranger	Annually	Project plan files, District and S O cultural resource files	$10,000
USE/ OCCUPANCY Permits, Leases, Claims	Effects on resources by management emphasis areas of mining claims and mineral permits	Operating plans requirement & stipulations	Any noncompliance	M/M	Review of operating plans & onsite inspections	District Ranger	Annually	2810, 2850 files	$1000
SPECIAL USES	Special Uses	Operation plans, requirements & stipulations	Noncompliance	M/M	Review special uses	District Ranger	Annually	Paper Files	$500
OIL & GAS	Oil, Gas, & Geothermal leases	Number of leases	Inadequate surface resource protection	M/M	Review Leases	Forest Supervisor	Annually	2820 Files	$500
FIRE Fire Effects	Ecological effect of underburning	Ecological effects	Prescription not being met on 20% or more of areas	M/M	Research PNW	Research PNW	Annually	PNW Report	$500

MONITORING ITEM	ACTIONS/ EFFECTS MONITORED	UNITS OF MEASURE	VARIABILITY THRESHOLD	DATA PRECISION RELIABILITY	SUGGESTED METHODS	WHO WILL MONITOR	MONITORING FREQUENCY	DATA LOCATION	ESTIMATED ANNUAL COST
Fire Protection	FMEI - Cost of pre-supression & suppression plus net value change effect of wildfire	$/1000 acres protected (FMEI)	+ 25% increase in FMEI in any year or > 10% increase in FMEI of 5 yr average	M/H	FEP costs FFFcosts NVC assoc with acres burned by Fire Intensity Level (Form 5100 29)	Fire Staff	Annual comparing to last 10 year acreage	FCCC Fire History Files - Budget Records - Nat'l Fire Mgmt. Planning System - FCCC	$500
RECREATION User experience and physical setting in dispersed and developed use sites and areas	Site conditions and user satisfaction assure that a broad spectrum of ROS settings and recreational opportunities are provided	Developed and dispersed sites and areas	>20% physical, social, and managerial setting for each ROS Class not achieved Developed site not providing barrier free facilities, not maintained, not meeting public expectations, facilities deteriorating	M/M	Condition surveys, user satisfaction surveys ROS/ RIM vehicle counts, visitor use counts, visitor contacts	District Ranger, Rec Staff	Annually	R I M Data and File 2300	$15,000
INFORMATION	Information available to inform public of areas suitable for proposed use	ROG	ROG not available at District or information in guide outdated	H/M	Review of ROG's	Rec Staff, District Ranger	Minimum every 2 years	Districts	$1,500
SOIL	Growth losses caused by accumulative compaction	Cubic feet.	>10% decline in tree growth	H/M	25% of earth disturbing projects sampled	Soil Staff/ Silviculture	Annually	2550	$10,000/yr
Changes in soil productivity	To determine if soil management and conservation practices are being implemented and to assess their effectiveness	Percentage of detrimental soil disturbance and/or vegetative recovery or growth loss Amount of organic matter retained in harvest units	Minimum of 80% of an activity area will be left in a non-detrimental impacted state following a soil disturbing activity	M/M	25% of earth disturbing projects sampled	Soil/ Watershed Staff	Annually	GIS, 2550 files	$6,000
TIMBER	Population levels of insects & disease following management activities	Acres infected	As recommended by Regional Office specialists	M/M	Annual insect & disease survey (by R 6 Forest Pest Mgmt specialists) Compare with past surveys to detect trends	Timber Staff Officer	Annually	Survey Report	$500/yr
LAND SUITABILITY	Land Suitability	Acres	+ or - 5000 acres	H/H	Stand Exams Aerial Photos Field Observation	Forest Silviculturist	Annually	DBMS R2MAP	$2000
THREATENED, ENDANGERED AND SENSITIVE ANIMALS AND PLANTS	To determine if management and recovery objectives for Threatened, Endangered and Sensitive species are being met.	Acres of suitable habitat.	Defined management objectives not being met. Suitable habitat lost.	H/M	Five year activity schedule evaluations, habitat review, EA project review	District Ranger, Range and Wildlife Staff	Update activity schedule evaluations at least every 5 years Annual review of habitat and Project EA's	GIS, File 2670	$2,500

MONITORING PLAN NOTES

This monitionng plan is intended to be a dynamic plan subject to revision as the Forest and Grassland Plans are implemented The process to update and, or amend the plans is iterated in figure 5-2, p ___

Definitions of monitoring plan elements

Monitoring Item - Primary resource or activity to be monitored
Action or Effect to be Monitored - A specific statement of what will be checked
Units of Measure - A quantifiable amount related to the action or effect.
Variability Threshold - Levels which, if exceeded, may trigger the need for re-evaluation of the Forest Plan
Data Precision/ - How exact or accurate the measurement, rated high, moderate or low (H, M, L)
Reliability - Expected probability that information acquired through sampling will reflect actual conditions Rated high, moderate or low (H, M, L)
Suggested Methods - Statement of how monitoring will be accomplished
Who Will Monitor - Identifies Program Manager in charge of implementation of monitoring, data collection, analysis, evaluation, and report preparations
Monitoring Frequency - The scheduling of sampling for the item to be monitored stated in years or parts of years
Data Location - Indicates where the collected monitoring data, analysis and evaluation reports for the item monitored are accumulated
Estimated Annual Cost - This cost includes existing and planned monitoring items
Action Indicated Codes related to types of procedures implemented when variability thresholds are exceeded

FOOTNOTES

1/ GIS- Graphic Information System The monitioring plan recognizes that when GIS is implemented on the Forest and Grassland, it will provide the base data upon which monitioring will rely In the interim, the existing data bases will be used

2/ Bucket or ocular sampling using techniques outlined by Munther and Lilburn (Aquatic Environment and Fisheries Habitat, 1986 Monitoring Report. 1987 Bitteroot, Deerlodge, and Lolo NF)

3/ Cross section and pool rifle ratio- Use standard inventory procedures outlined by Hankin and Reeve's stream survey process (Estimating Total Fish Abundance and Total Habitat Area in Small Streams Based On Visual Estimation Methods, Hankin, D G & Gordon H Reeves, Canadian Journal of Fish & Aquatic Science, Vol 45, 1988)

4/ Utilization levels will be incorporated into allotment management plans

5/ Recreation Opportunity Spectrum

6/Habitat effectiveness index- The HEI model, using cover, forage relationships, vegetation trends and road density, measures habitat capability for big game at a point in time The HEI provides trend information over time to determine whether habitat capability objectives are being met.

Appendix A

Schedules

APPENDIX A1

LANDLINE LOCATION SCHEDULE

YEAR	LOCATION	PROJECT
FY89	T 10S , R 12E , Sec 36 T 11S , R 12E , Sec 13, 14, 22, 23, 24, 25, 26, 35	Hurber's Canyon Round Butte
FY90	T.13S , R 13E , Sec 15, 16, 22 T 13S , R 13E., Sec. 11, 12, 13	ATV Area Kings
FY91	T 13S , R 11E , Sec 1, 2, 3, 4, 9, 10, 11, 12	Geneva
FY92	T 12S , R 11E , Sec 13, 23, 25, 26, 27, 28, 34, 35	N of Geneva
FY93	T 13S , R 11E , Sec 16, 20, 29, 32, 33, 34, 35	Squaw Flat
FY94	T 11S , R 13 , Sec 17, 18, 19, 20 T 12S , R 14E , Sec 13, 14, 23, 24	E of Round Butte Blanchard Well
FY95	T 10S , R 15E , Sec 6 T 10s , R 14E , Sec 1, 2, 3, 10, 11, 12	Kennedy Alottment
FY96	T 11S , R 12E , Sec 31, 32, 33 T.12S , R.12E , Sec 5, 6, 7, 8	N of Grandview
FY97	T.13S., R 12E , Sec 3, 4, 5, 8, 9 T 13S , R 12E., Sec 21, 28, 29, 31, 32, 33	Peninsula Steelhead Falls
FY98	T 12S , R 14E , Sec 5, 6, 7, 8 T 12S , R 13E , Sec 1, 2, 11, 12, 14	Boyce
FY99	T 12S , R 12E , Sec. 16, 17, 18, 19, 20, 29, 30, 31	Grandview
FY00	T 13S , R 13E , Sec 7, 8, 17, 18, 19, 20, 30	Opal City

APPENDIX A2

RANGE ALLOTMENT MANAGEMENT PLAN SCHEDULE

YEAR	ALLOTMENT
FY 1990	Canadian Bench Allotment Holmes-Squaw Creek Allotment
FY 1991	Clevenger Allotment Goldmine-Falls Allotment
FY 1992	Williams Allotment
FY 1993	Peninsula Allotment Round Butte Allotment

This completes a management plan on every allotment. At this point, revisions will be started on allotments as they are needed. Revisions will be scheduled based on changes found to be needed during monitoring of existing allotment management plans, or changes in permittees on an allotment who have a different type of operation It is estimated that one to two revisions per year will be done

APPENDIX A3

RECREATION DEVELOPED SITES CONSTRUCTION SCHEDULE

First Five Years

SITE	COST (M$)
Haystack Reservoir Campground Addition	200
Rimrock Trail/Interpretive Site	117
ORV Trail System	78
ORV Staging and Camp Area	240
Horse Camp and Endurance Trail	120
Willow Creek Trail	148
Squaw Creek Dispersed Site (toilet)	30
Smith Rock Tie Trail	25

Second Five Years

SITE	COST (M$)
Extended ORV Trail System	120
Rimrock Trailhead	35
East-West Intertie (New Oregon Trail)	160
Deschutes Canyon Trail and Squaw Creek Trail	115
Viewpoint Overlook	110

APPENDIX A4

WILDLIFE AND RIPARIAN HABITAT IMPROVEMENT SCHEDULE

Metolius Deer Winter Range - In order to produce optimum deer winter range habitat, juniper must be cut and burned in patches to bring the cover/forage ratio to 40% cover and 60% forage To meet this objective by the end of the first decade, 256 acres per year must be cut and burned, 51 acres, or 20% of those acres, will be seeded to grass species After the first decade, 200 acres per year will need to be cut and burned to maintain a sustained 40/60 cover/forage ratio 40 acres, or 20% of those acres, will be seeded to grass species

Antelope Winter Range - 800 acres every other year will be treated with fire to maintain optimum antelope winter range This will keep shrub species at or below 24 inches in height Patches of juniper and taller shrubs will be maintained for overall diversity

Ponderosa Pine Area - Cut juniper and underburn 70 acres per year for the first five years as per direction in existing environmental assessment

Riparian and Wildlife - The following schedule lists all the riparian and wildlife projects that are left to be done on the Grassland They are scheduled to be done between 1990 and 1993 After 1993, maintenance will be nearly all that will be necessary

(R) = riparian
(W) = wildlife

PROJECT	ACRES	MILES/FENCE	COST	YEAR
Jap Cr Pipe Overflow (W)	1 0	17	425	1990
Sumner Aspen (W)	2 0	4	1000	1990
Trail Crossing Cottonwood (W)	1 0	2	500	1990
Pipe Spring (W)	1 0	2	500	1990
Windom New Riparian (W)	10 0	5	1250	1990
Braiden Spring Overflow (W)	1 0	25	625	1990
New Land (barn area) (R)	20 2	1 8	4500	1990
Cottman Drainage				
(below scales corral road (R)	3 0	4	1000	1990
Trail Crossing Willow Area (R)	4 0	56	1400	1990
New Land Pond Area (R)	4 3	57	1425	1990
Upper Mud Spring CR (R)	7 0	75	1875	1990
Sumner Spring Overflow (W)	1 0	25	625	1991
Juniper Spring Overflow	1 0	2	500	1991
Parkey Springs & Overflow (W)	2 0	.3	750	1991
Cat Tail Pond Drainage (R)	8 0	1.05	2625	1991
Cotman Drainage Lower (R)	3 0	.4	1000	1991
Monner #3 & 4 (R)	7 4	86	2150	1991
Sherwood Canyon Spring (W)	0 05	2	500	1992
Rodman Hill Spring (W)	2 0	.3	750	1992
Buck Butte Spring (W)	1 0	11	275	1992
Kekler Spring Overflow (W)	1 0	2	500	1992
Cottonwood Spring (R)	4 6	45	1125	1992
McMeen (all) (R)	14 0	1 7	4250	1992
Cyrus (W)	5 0	4	1000	1993
Boyce Pond (W)	1 0	25	625	1993
Cotter Pond (W)	2 0	25	625	1993
Lower Mud Sp. Changing Area (R)	30 0	2 0	500	1993

APPENDIX A5

CULTURAL RESOURCE OUTPUTS AND C.I.P. SCHEDULES

CROOKED RIVER NATIONAL GRASSLAND
FY 90-99

PROJECT / ACTIVITY	FY	FUND	MEASURE	UNIT	COST (M$)
Survey (Project Inventory)	90	NFCR	Acres	1 1M	3
Rimrock Interpretive Feasiblity	90	NFCR	Project	1	1
Survey	91	NFCR	Acres	1.1M	3
Rimrock Interpretive Signs	91	NFRN	Project	1	2
Headquarters Interpretive Feas	91	NFCR	Project	1	
Survey	92	NFCR	Acres	1.1M	3
Rimrock interpretive Design	92	NFRN	Project	1	4
Headquarters Interpretive Design	92	NFRN	Project	1	2
Survey	93	NFCR	Acres	1 1M	3
Headquarters Interpretive Display	93	NFRN	Project	1	5
Viewpoint Overlook Interp Feas.	93	NFCR	Project	1	1
Survey	94	NFCR	Acres	1 1M	3
Viewpoint Interpretive Design	94	NFRN	Project	1	2
Thematic Nomination, Homesteads 1	94	NFCR	Project	3	
Survey	95	NFCR	Acres	1 1M	3
Viewpoint Interpretive Signs	95	NFRN	Project	1	4
Thematic Nomination, Homesteads 2	95	NFCR	Project	1	3
Survey	96	NFCR	Acres	1 1M	3
Homestead Interp Feasibility	96	NFCR	Project	1	1
Grassland Archaeo District Feas	96	NFCR	Project	1	3
Survey	97	NFCR	Acres	1 1M	3
Homestead Interp Design	97	NFRN	Project	1	2
Thematic Nomination Archeo Dist	97	NFCR	Project	1	3
Survey	98	NFCR	Acres	1 1M	3
Homestead Inter Site	98	NFRN	Project	1	6
Thematic Nomination Archeo Dist	98	NFCR	Project	1	3
Survey	99	NFCR	Acres	1.1M	3
Prehistoric Lifeways Interp. Feas.	99	NFCR	Project	1	2
Archaeo Site Protection Plan	99	NFCR	Project	1	3

*Surveys are performed for all proposed ground-disturbing projects, such as range, wildlife, and recreation improvements, as well as energy transmission corridors and new or reconstructed roads.

APPENDIX A6

WILD AND SCENIC RIVER PLAN SCHEDULE

YEAR	RIVER
FY 89, 90, 91, 92	Deschutes River and Crooked River
FY 90, 91	North Fork Crooked River

* Squaw Creek will be schuduled if and when congressional designation occurs.

* Coordinate with the BLM as per memorandum of understanding in the preparation of congressionally mandated management plans.

Appendix B

Land Ownership Plan

Appendix C

Threatened, Endangered, and Sensitive Species

Appendix B

Land Ownership Plan

Because the existing land ownership pattern may not be optimum for accomplishing the Grassland's goals and objectives, a land ownership plan has been devised. This plan identifies which lands should be retained, disposed of, or acquired to achieve the best ownership pattern.

The fact that a parcel of land has been identified for acquisition in this plan does not guarantee that the parcel will be acquired in a given period of time. The private landowner must be willing to either participate in a land exchange involving the parcel, or to donate the parcel; there are no plans to purchase or condemn lands. In addition, in most cases, the Grassland will not acquire lands containing significant improvements.

The objective of the land adjustment program is to attain an optimum land ownership pattern that provides for resource uses that best meet the people's needs and that reduces administrative costs. A consolidated land ownership pattern helps accomplish these objectives. Adjustments will be accomplished through exchanges or donations. It is unlikely that private lands will be purchased.

Lands within the Grassland boundary have been grouped into the following ownership categories:

1. Areas where Congress has directed the Forest Service to retain Federal lands and to acquire non-Federal lands for a designated purpose. The Deschutes Scenic River falls into this category.
2. Areas where National Grassland ownership is necessary to meet management objectives. Federally owned lands will be retained, and non-Federal lands will be acquired as the opportunity or need arises.
3. Lands allocated for commodity production, where the lands would be managed to provide similar types of output regardless of ownership. Federal lands may be retained, or they may be used to acquire lands in Categories 1 and 2. However, lands in this category will not be disposed of if that would result in a breach in a solid block of Federally-owned land. Private lands within this category may be acquired in order to consolidate Federal ownership.
4. Small, isolated blocks of National Grassland lands which do not contain special features, and which are expensive and difficult to manage. These lands will be used to acquire lands in Categories 1, 2 and 3. Disposal of Category 4 lands will have priority over the disposal of lands in Category 3.
5. Areas where more intensive study and planning are necessary to determine the optimum land ownership patterns. Federal lands in Cove Palisades State Park are included in this category.

The management areas are classified as follows:

Management Area	*Land Ownership Category*
General Forage	3,4
Metolius Deer Winter Range	2
Antelope Winter Range	2
Juniper Old Growth	2,4
Rimrock Springs Wildlife	2
Cove Palisades State Park	5
Squaw Creek	2
Haystack Reservoir Area	2
Research Natural Areas	2
Riparian	2,4
Utility Corridors	2,3,4
Deschutes River Scenic Corridor	1
Crooked River Recreation River	2

Figure B-1

LAND ADJUSTMENT PLAN MAP

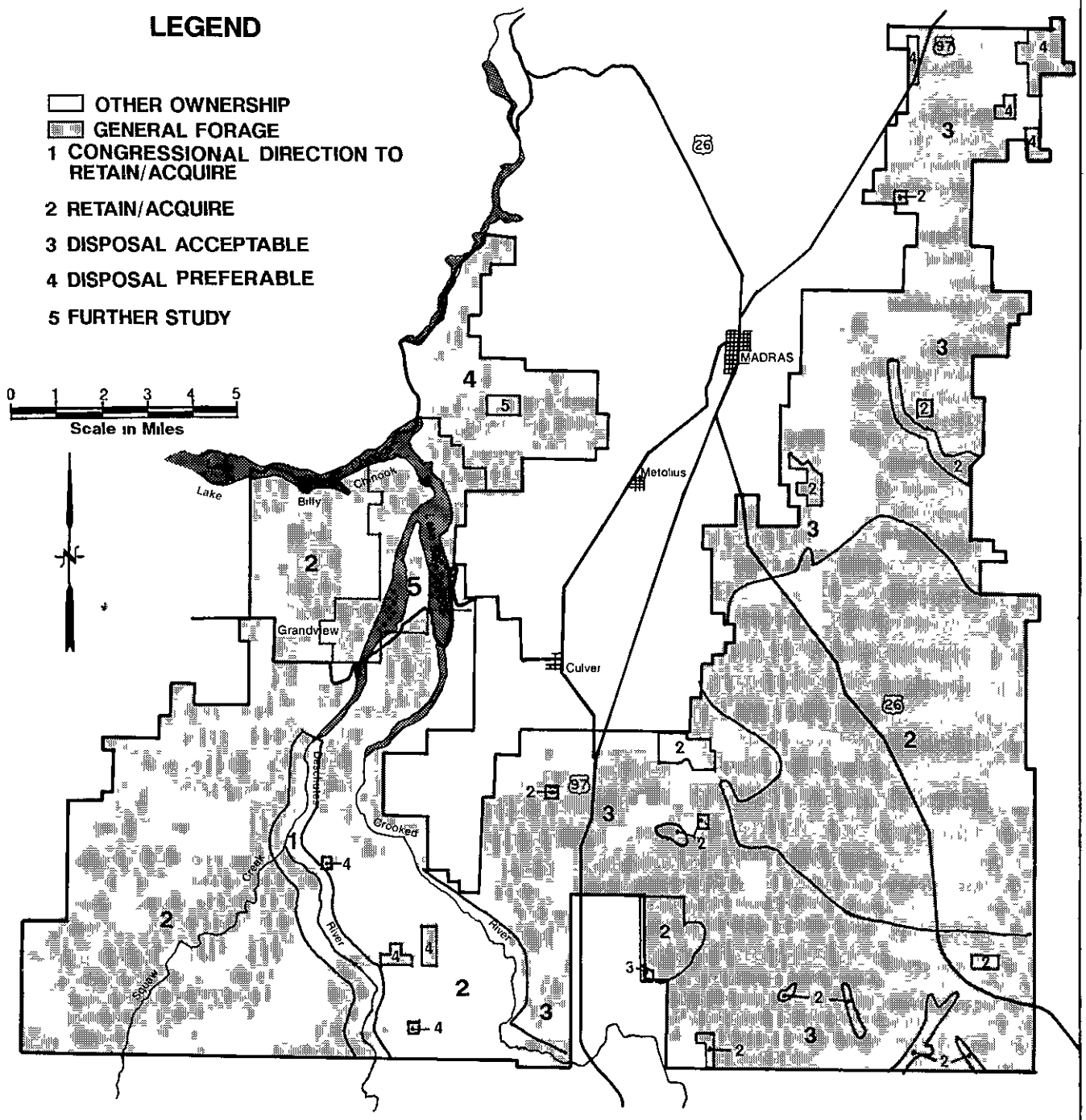
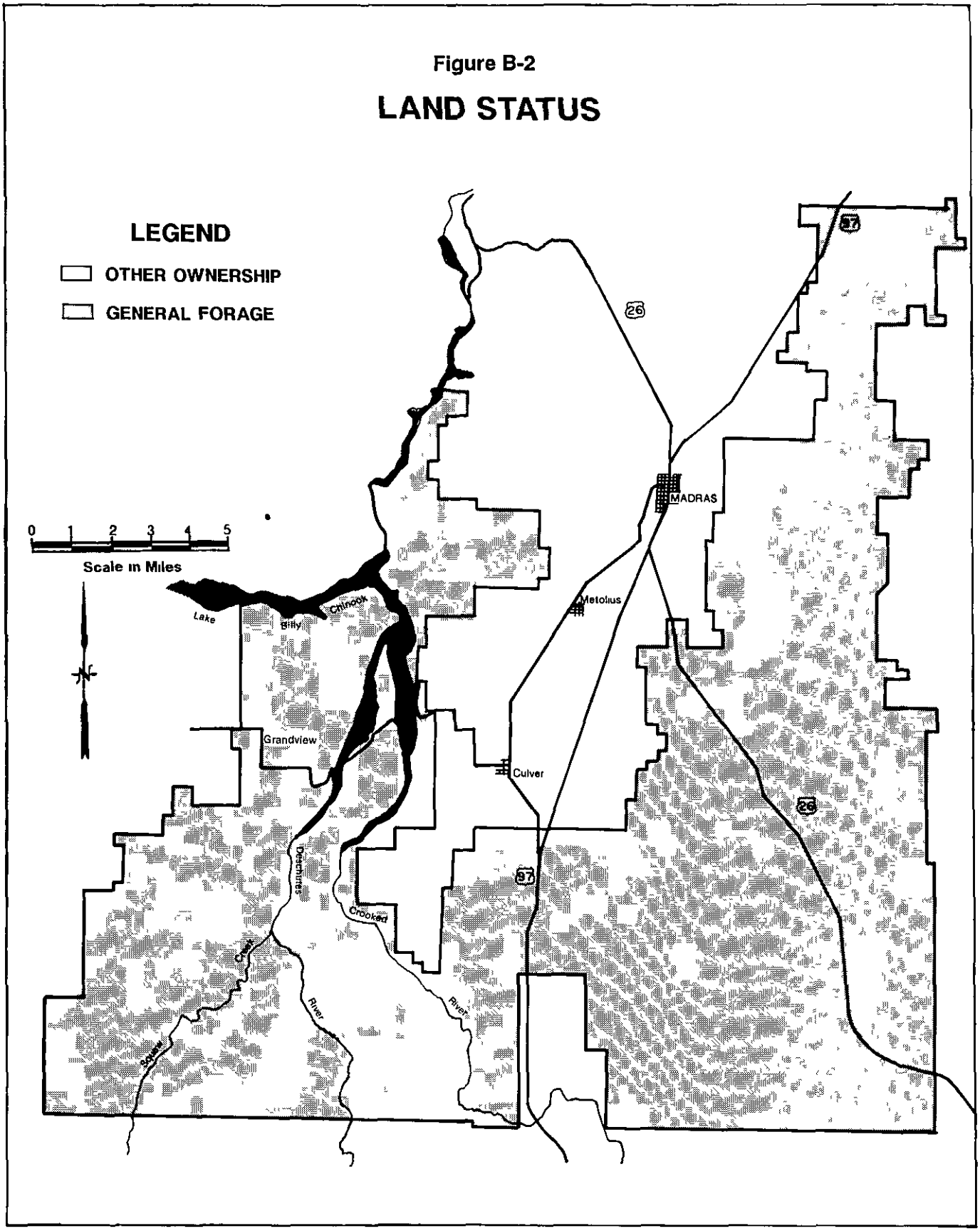


Figure B-2

LAND STATUS



Appendix C
Threatened, Endangered, and Sensitive Species

		Federal	State	R-6	N.G.
Sensitive Birds					
Ferruginous Hawk	*Buteo regalis*	Cat. 2		OR	S
Swainson's Hawk	*Buteo swainsoni*	Cat. 2	S	OR	D
N. Bald Eagle	*Haliaeetus leucocephalus*	T	T	*/OR	D
Greater Sandhill Crane	*Grus canadensis tabida*		S	*/OR	D
Western Snowy Plover	*Charadrius alexandrinus nivosus*	Cat. 2	T	*/OR	S
Long-billed Curlew	*Numenius americanus*	Cat. 2		*/OR	D
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*				
Sensitive Mammals					
Preble's Shrew	*Sorex preblei*	Cat. 2		OR	S
Sensitive Plants					
Bristle-flowered Collomia	*Collomia macrocalyx*	Cat. 2	S	OR	D
Henderson Ricegrass	*Oryzopsis hendersonii*		T	*/OR	D

Definitions

Federal: 1985 Federal Register Notice of Review

T = Threatened

Category 2 = Needs additional information before proposing a federal listing.

State: Oregon State Status Regional Forester's

E = Endangered

T = Threatened

S = Sensitive

R-6: Sensitive Species List

OR = Sensitive in Oregon

* = Potential candidate for Regional Forester's list.

N.G.: Crooked River National Grassland

D = Determined to be present

S = Suspected to be present

Appendix D

Travel Plan

Appendix E

Spill Incident Response Plan

Appendix D

Travel Plan

Process

Various laws, regulations, and Executive Orders recognize on-road and off-road uses as legitimate activities on national grasslands and forests.

The Transportation Planning Handbook, FSH7709.55 contains procedural direction on access and travel management. The objective in the handbook states, "... identify and document recreational opportunities by integrating off-road travel management with on-road management, under the common framework of access management."

The direction under FSM 2355, which sets objectives for recreation, states, ". . . provide off-road vehicle recreation opportunities that are in concert with the environmental setting, minimize off-road vehicle effects on the land and resources, promote public safety, and control conflicts with other uses of the National Forest System lands."

The regulation 36 CFR 219.21(d), requires that we consider the impacts of proposed recreation activities on other uses and values and the impacts of other uses and activities associated with them on recreation opportunities, activities, and quality of experience. Off-road vehicle use is specifically addressed by 36 CFR 219.21(g):

Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted.

Executive Order No. 11644, as amended by Executive Order 11989, directs that the designation of off-road vehicle areas shall be based upon minimizing damage to soils, watersheds, vegetation, and other resources, and minimizing conflicts with other uses. The travel map development, which consists of describing how users access the Ochoco National Forest and Crooked River National Grassland, is consistent with this direction. It includes all forms of travel, including on-road and off-road.

Traffic management (on-road) and off-road vehicle standard and guidelines for all management areas were determined through an integrated interdisciplinary team approach and are found in the prescriptions in Chapter 4 for the Forest and the Grassland Plans.

Implementation

The following is representive of the action items or activities which will be scheduled and completed through implementation of the Forest and Grassland Plans:

Enforcement

Orders will be issued by the Forest Supervisor in accordance with 36 CFR 261.50. A copy of the order imposing prohibitions will be placed in the offices of the Forest Supervisor and district rangers.

The closures and restrictions(controls) covered under Title 36 CFR 261, Subpart B are applicable and are supplemental to those in 36 CFR 261, Subpart A.

Traffic and Off-Road Management

Uniform travel management direction will be developed for road design standards, road maintenance plans, traffic control devices (to include signing), closure orders, and trail design standards.

Revise the Forest and the Grassland sign plans to

bring them in line with the Plans.

From the appropriate management area direction and standard and guidelines, apply appropriate entrance information that communicates to the Forest and Grassland visitor the current conditions and purpose intended by management.

Establish priorities by management areas to insure consistent and timely application of the travel access management decisions.

Establish travel management needs during each phase of the program development and budget (PD&B) process, identifying those needs and direction specific to the situation.

Explore the potential for using the Forest and Grassland development road system to provide off-road travel opportunities. Roads temporarily closed to vehicular traffic could be used to supplement off-road vehicle opportunities.

Education and Involvement

Endorse organization of various motorcycle clubs and off-road enthusiasts to help implement this plan. This coalition could help develop, monitor, and maintain existing and new trail systems, which could minimize Forest Service cost through the use of volunteer work and partnership projects.

Initiate a program to educate employees in the technical linkage between the Plans, transportation planning, resource objectives, and travel management.

Implement the monitoring program to keep management appraised of changing needs so that methods, techniques, facilities, and settings can be managed appropriately.

Revisions

The Forest and Grassland will move towards controlling off-road vehicle use in order to minimize impacts to resources and other user groups while not necessarily restricting off-road users. The use of closed road systems, and the designation of trails and destinations, will be encouraged for those management areas without existing off-road restrictions, such as General Forest and General Forage.

Additional off-road vehicle recreation opportunity proposals will be in accordance with management area direction and standards and guidelines. All projects and activities are subject to analysis under the National Environmental Policy Act (NEPA) process before they can be implemented.

The travel map will be updated annually or as necessary to reflect these changes as well other changing conditions or new information, such as changes to the traffic management of open on-road use under the Green Dot program. If these or other situations are identified as being outside the limits of acceptable variability, appropriate amendments or other changes may be made. The amendment process, as well as monitoring and evaluation, can be found in Chapter 5 of the Forest and Grassland Plans.

The successful implementation of new off-road vehicle trails, or other changes, will be dependent upon a policy that insures that these opportunities are met through an integrated, interdisciplinary, and public approach, and that they adhere to the requirements of the Forest and Grassland Plans.

Appendix E

Spill Incident Response Plan

The Forest Spill Incident Plan establishes reporting and response procedures to be followed in the event of an accidental spill of toxic, hazardous or otherwise dangerous materials, including petroleum products.

Because of the serious health and water pollution potential of many of the materials used with our varied land management activities and transported across our land, spills will be given the same emergency priority as a forest fire.

The Plan relies on the expertise of the local, state and federal agencies, and private contractors for spill containment and cleanup. The Forest Service's role in a spill incident is communication and coordination. The key Forest players in a spill response are Dispatch and the Forest spill coordinator. They may request others to assist them, depending on the nature of the spill.

Spill Response

Health and Safety

Of paramount importance is the health and safety of personnel at the spill site, and of downstream water users if supplies are contaminated.

When approaching any spill site, the following precautions must be taken.

Approach from the up wind direction if possible;

Keep all unauthorized people away from the spill site;

Avoid inhaling fumes, smoke, vapors and dust even if no hazardous materials are involved; and

Do not assume that gases or vapors are harmless because of lack of smell.

Identify the spilled material from a distance as soon as possible. Until the material is identified, avoid all contact including breathing fumes.

Remember that the Spill Plan is written for professionals trained and equipped for emergency responses. The people at the spill site are probably not such professionals, and should not be encouraged to exceed their abilities.

Priority should be given to notifying downstream water users, especially those with domestic, fish hatchery, and irrigation supplies.

Responsibility

The party responsible for the spill should be identified as soon as possible. This party is responsible for containment and cleanup of the spill and is liable for any damages that might occur. The party is also responsible for reporting spill incidents involving toxic, hazardous or otherwise dangerous materials to the appropriate state and federal agencies. The Forest Service will also notify local, state and federal agencies of such spills to ensure that the proper agencies are promptly notified.

Spill Containment

Upon evaluating a spill incident (identification of the material, health and safety problems, and quantity), action will be taken as soon as possible to contain the material at the immediate spill site. This

is especially important if there is a potential for contaminating nearby streams, lakes, or wetlands and downstream water supplies.

Exceptions to taking any immediate containment action would be when the spill material is extremely hazardous and is beyond the ability of the agency and local contractors to handle or it cannot be adequately identified.

Spill Cleanup

All spills involving toxic or hazardous materials or other substances which could contaminate nearby streams, lakes, wetlands or downstream water supplies will be cleaned up as soon as possible.

Spills involving toxic or hazardous materials should be evaluated for having the cleanup and disposal work performed by companies that specialize in this type of work.

Responsibilities of Forest Personnel

Reporting Person

Avoid contact with spilled material.

Call Dispatch for help.

Identify yourself, tell how you can be contacted, location of spill, identity & quantity of spilled material.

Isolate the spill area.

Wait for additional instructions.

Dispatch

Obtain information from Reporter to fill out Spill Incident Report (See Figure E-1).

Notify Forest Spill Coordinator or the Forest Alternate Spill Coordinator.

If no one can be reached in 1 & 2 above, call OARS and follow their instructions (see Notification List).

Forest Spill Coordinator

Notify and coordinate with the appropriate local, state and federal agencies for spill scene security, containment, and cleanup.

Assure the health and safety of Forest personnel and the Public.

Inform the Forest Supervisor, District Ranger and appropriate Forest staff of spill incident status.

Notify downstream water users of spills if there is a potential for contamination of domestic, or irrigation water supplies.

Prepare initial and final spill response reports for each incident.

Notify the Regional Office of spill.

Provide Forest leadership in Spill Response planning.

Table E-1

Spill Incident Notification List

Agency	Telephone No.	Remarks
Forest Hazardous Substances Coordinator		
Work	447-9513	Call immediately.
Home	447-1882	
Oregon Accident Response System (OARS)	1-800-452-0311	Call immediately.
National Response Center	1-800-424-8802	Call immediately.
Sheriffs - Emergency Management Coordinators		Call Immediately.
Crook	911, 447-4168	
Deschutes	911, 388-0107	
Gilliam	384-2851	
Grant	575-1131	
Harney	911, 573-6156	
Hood River	386-2098	
Jefferson	475-2201	
Klamath	883-7111	
Lake	947-3308	
Sherman	565-3622	
Wasco	(509) 575-4080	
Wheeler	763-4101	
Oregon State Police	911, 1-800-452-6824	
Oregon Dept. of Environmental Quality	388-6146	
Environmental Protection Agency	(206) 442-1263	Notify for spills of inland waters.
Oregon Department of Fish & Wildlife	(206) 696-6211	Notify for spills which could contaminate surface waters.
FS RO Hazardous Spill Coordinator (B.Pinto)	(503) 221-2931 (FTS) 423-2931	
BLM OSO Hazmat Coordinator	(503) 231-6977,2253	

Figure E-1
Hazardous Spill Report Form

Hazardous Substances
Initial Field Report

1. Type/Description of Incident: _____

   _____

2. Date of Sighting: _____

   Time: _____

3. Location(Describe - road #, name etc): _____

   Township: _____

   Range: _____

   Section: _____

   Subsection: _____

4. Hazardous Material or Substance: _____

   Label(placard): _____

   Unknown: _____

   Name: _____

   Waste No. or I.D. No.: _____

   Manufacturer: _____

   Transporter: _____

5. Name and Address of Responsible Party: _____

   _____

6. Site Secured: [Yes] [No] Describe: _____

   _____

7. Environmental Conditions: _____

   Terrain: _____

   Weather: _____

   Water Resources: _____

   Soil: _____

   Vegetation: _____

Appendix F

Water Quality

Appendix G

History

Appendix F

Water Quality

Memorandum of Understanding between the U.S. Department of Agriculture, Forest Service and the Oregon Department of Environmental Quality

December 1, 1978

This document can be found at the Ochoco National Forest Supervisor's Office, in Forest Service Manual 1561.5 - Water Department (Irrigation and Flood Control). Exhibit 1.

The Memorandum of Understanding between the Oregon Department of Environmental Quality (DEQ) and the U.S. Department of Agriculture, Forest Service (USFS), delineates the responsibilities and activities to be performed by each agency pursuant to the implementation of the Oregon Statewide Water Quality Management Plan on lands administered by the USFS.

The Statewide Water Quality Management Plan has been developed to meet the requirements of state law, federal law, the Federal Water Pollution Control Act, and the Clean Water Act.

The DEQ's overriding purpose is to control pollution. The Forest Service's job is to manage public national forest lands. Under the memorandum of understanding, USFS and DEQ mutually agree to specified provisions in order to prevent duplication of effort and provide the coordination necessary to meet the implementation requirements of the Clean Water Act.

Specified provisions cover a range of areas, including: agency roles; implementation, coordination, and administration of the memorandum; and designations of control.

Appendix G

Section 1

Chronological History

Crooked River National Grassland

1869	Surveyors begin to plot Townships in Central Oregon (the Grassland locale).
1880 to 1913	Homesteading active.
1929 and 1930	Stockmarket crash and drought.
1931	Congress authorizes Federal Farm Board to investigate possibility of reducing the amount of submarginal land in cultivation.
1931	A national conference on land utilization held.
1932	National Land Use Planning Committee made up of Federal bureaus and land-grant colleges is created.
1932	Bureau of Chemistry and Soils undertakes a nationwide classification of land according to its physical adaptability for various uses. Its report shows 454,000 farms in problem areas on land too poor to provide a living, involving some 75 million acres.
1933	The National Resource Board prepares a comprehensive report on the land and water resources of the United States. The report suggests that national policies should promote land ownership and land use patterns that are clearly in the interest of the general public rather than individuals or groups. The Board recommends that the Federal Government acquire some 75 million acres of land to "supplement the assistance to private forestry and erosion control work." The Board suggests acquiring selected areas of submarginal land and demonstrating how it could be used to serve the public. The necessity of relocating occupants of the land and providing a greater economic base in the submarginal farmland areas was recognized.

1935	Resettlement Administration is formed in the Department of Agriculture. Repurchase of abandoned farms begins.
	Responsibility for the Land Utilization Program transferred to the Resettlement Administration from the Federal Emergency Relief Administration (FERA).
1937	Congress passes the Bankhead-Jones Farm Tenant Act (see Appendix G2). Title III of the Act directs the Secretary of Agriculture "to develop a program of land conservation and land utilization, including the retirement of lands that are submarginal or not primarily suitable for cultivation in order thereby to correct maladjustments in land use."
	Resettlement Administration is moved into the Department of Agriculture and renamed the Farm Security Administration. The Land Utilization Program is transferred to the Bureau of Agricultural Economics.
1938	Land Utilization Program is transferred to the Soil Conservation Service.
1946	Acreage acquired under the Land Utilization Program totals 11,299,000 acres. Total cost was $47.5 million, or an average of about $4.40 per acre for the land purchased.
1954	A total of 8,847,000 acres in Land Utilization Projects are assigned by the Secretary of Agriculture to the Forest Service. This included 6,958,000 acres assigned on this date from the Soil Conservation Service, 1,062,000 acres earlier assigned, and 827,000 acres under Forest Service custodianship that were being managed by State agencies under long-term leases or sales contracts.
	Eighteen Land Utilization Projects, containing 2,464,000 acres, were transferred to the Bureau of Land Management. Eighty of the Land Utilization Projects, totaling 1.3 million acres, were transferred to the State and local agencies.
1960	The Secretary of Agriculture designates 19 of the Land Use Projects acquired by the Forest Service as National Grasslands. The name "Central Oregon Land Utilization Project" is officially replaced by Crooked River National Grassland.
1970	Forest Service Manual amended making it Forest Service policy to manage National Grasslands under the principles of multiple use.

Section 2

Bankhead-Jones Farm Tenant Act

*Act of July 22, 1937 (Ch. 517, 50 Stat. 522, as amended; 7 U.S.C. 1010-1012; 16 U.S.C. 551)

Title III

Sec. 31. "The Secretary is authorized and directed to develop a program of land conservation and land utilization, in order thereby to correct maladjustments in land use, and thus assist in controlling soil erosion, reforestation, preserving natural resources, protecting fish and wildlife, developing and protecting recreational facilities, mitigating floods, preventing impairment of dams and reservoirs, developing energy resources, conserving surface and subsurface moisture, protecting the watersheds of navigable streams, and protecting the public lands, health, safety, and welfare, but not to build industrial parks or establish private industrial or commercial enterprises." (7 U.S.C. 1010)

Sec. 32. In order to put the above program into practice, the Secretary of Agriculture is authorized to do the following:

Protect, improve, develop, and administer any property acquired, and to construct structures that may be necessary in adapting land to its most beneficial use.

Sell, exchange, lease, or otherwise dispose of any property acquired. Any sale, exchange, or grant shall be made only to public authorities and agencies, and only on the condition that the property is used for public purposes. An exception to this provision may be made, allowing exchanges with private owners or agencies of State governments, if the Secretary decides that it would not conflict with the purposes of the land conservation and utilization program.

Make dedications or grants for any public purpose, and to grant licenses and easements under reasonable terms. However, this does NOT include granting easements for rights-of-way (Federal Land Policy and Management Act of 1976).

Cooperate with Federal, State, territorial, other public agencies, and local nonprofit organizations in developing land conservation and utilization programs involving conservation, development, and utilization of water for the benefit of aquatic animals or plants, or for recreational development. This involves assisting in carrying out such plans by:

> Making loans (normally of not more than $500,000),
>
> Conducting surveys and investigations relating to conditions and factors affecting the overall program and methods of accomplishing the aquaculture program,
>
> Bearing the costs of installing any works of improvement applicable to the goals of the overall program,
>
> Providing technical and other assistance, and
>
> Paying for any storage of water included in reservoir structures involved in the aquaculture program, and needed for rural community water supply.

Make rules and regulations as necessary to prevent trespasses, and regulate use and occupancy of these lands. Violations shall be punished by a fine of not more than $500 or imprisonment, or both.

Sec. 33. At the end of each calendar year, the Secretary will pay 25 percent of the net revenues received from the use of the land (not from the sale of land) to the county in which the land is held. If the land is

situated in more than one county, the amount to be paid will be divided equitably among the respective counties.

These payments will be made on the condition that they be used for school or road purposes, or both.

Section 3

Administration of Lands Under Title III of the Bankhead-Jones Farm Tenant Act by the Forest Service

Authority: 50 Stat. 525, as amended, 7 U.S.C. 1010-1012.

213.1 Designation, administration and development of national grasslands.

Land utilization projects administered by the Department of Agriculture are named and referred to as "national grasslands."

They are part of the National Forest system and are permanently held by the Department of Agriculture for administration under the provisions and purposes of Title III of the Bankhead-Jones Farm Tenant Act.

They shall be administered under sound and progressive principles of land conservation and multiple use, and to promote development of grassland agriculture and sustained-yield management of the forage, fish and wildlife, timber, water, and recreational resources in the areas of which the national grasslands are a part.

Resources shall be managed to maintain and improve soil and vegetative cover, and to demonstrate sound and practical principles of land use for the areas in which they are located. The Chief of the Forest Service shall provide policies for management of Federally-owned lands that exert a favorable influence for securing sound land conservation practices on associated private lands.

There are 20 national grasslands in 11 states throughout the midwest, southwest, and west. The Crooked River National Grassland is the only one located in Oregon.

213.2 Authority for Chief, Forest Service, to group, define, and name national grasslands.

The Chief of the Forest Service is authorized to group national grasslands into administrative units; to define, change or modify their boundaries; and to provide specific designations as necessary and desirable for effective and economical administration.

213.3 Protection, occupancy, use, administration, and exercise of reservations.

In general, the rules and regulations applicable to national forests as designated in Title 36, Code of Federal Regulations are used to govern the national grasslands. Provided, however, that Forest Service officers, under delegated authority, may acquire lands, make exchanges, grant leases, and enter into leases, permits, agreements, contracts and memoranda of understanding involving lands as authorized by Title III of the Bankhead-Jones Farm Tenant Act.

213.4 Prior rules and regulations superseded.

The rules and regulations issued before September 18, 1962, for land utilization projects, are superseded. However, existing valid rights, reservations, easements, leases, permits, agreements, contracts, and memoranda of understanding, which affect these lands, shall continue as long as they remain in accordance with their designated terms.

Appendix H

Range Allotments

Appendix I

Mineral Report

APPENDIX H

RANGE ALLOTMENTS

RANGE ALLOTMENT	SUITABLE ACRES	GROSS ACRES	OBLIGATED AUM'S	ESTIMATED CARRYING CAPACITY AUM'S
Blanchard	7903	7903	2355	2355
Boyce	5589	5589	2373	2373
Canadian Bench	2408	2408	---	160
Clevenger	685	685	40	40
Cyrus	7054	9142	1418	1408
Fox	7364	7364	2357	2357
Goldmine-Falls	783	783	53	53
Gorge	1153	1153	236	236
Grizzly	8998	9087	2354	2540
Holmes-Squaw Creek	3684	3684	509	509
Juniper Butte	8151	8151	2120	2120
Lone Pine	8992	8992	1884	2180
Lower Desert	11275	11787	---	695
North	10247	10247	3248	3234
Peninsula	2111	2111	---	488
Round Butte	3180	3180	143	143
Rush	7526	7526	1686	1914
Steer	2350	2350	286	630
Williams	1340	1340	222	222
Kennedy	720	720	---	100
TOTAL	101513	104202	21284	23757

Appendix I

Section 1

Mineral Potential[1]

[1] A complete copy of the Mineral Potential Report for the Crooked River National Grassland is available at the Supervisor's Office

Lands Involved

The Crooked River National Grassland lies within Jefferson County, in T10S through T13S, and R11E through R15E, W.M. The Grassland encompasses 173,629 acres; 111,379 acres are under Forest Service administration, and 62,250 acres are either privately owned or owned by other government agencies.

In the eastern part of the Grassland, rolling hills and mountains dominate the landscape. The western part is a plateau dissected by steep-sided canyons. Temperatures are moderate and rainfall averages 10.5 inches per year. The land is used for cattle grazing, recreation and wildlife habitat. It is easily accessed by State Roads 26 and 97, and a well-developed system of Forest Service roads.

Status Record Data

The land administered by the Forest Service in the Grassland consists of 100,379 acres of acquired land and 10,806 acres of public domain land. The mineral rights are vested in a number of different owners:

Public domain lands where the mineral rights are owned by the United States.

Acquired lands where mineral rights are owned either privately or by the United States.

Private lands where mineral rights are owned either privately or by the United States.

Minerals are classified as locatable, leasable or saleable. Locatable minerals are deposits that are subject to disposal under the 1872 Mining Law. This law allows individuals to locate, develop and patent mining claims on public domain lands. Gold, silver, mercury and diatomite are locatable minerals if the deposits occur on public domain lands.

Leasable minerals are exempted from the 1872 Mining Law. Instead, these minerals are disposed of through a leasing system. On public domain lands, energy and fertilizer minerals are leasable. On acquired lands, all minerals (except saleable minerals) are leasable.

Saleable, or common variety, minerals include sand, gravel, cinders and stone. They are disposed of through a permit system under the Materials Act of 1947 as amended. On acquired lands, common variety minerals may only be sold to public agencies and for public purposes.

At present, there are 7,160 acres of land in the southeastern part of the Grassland under lease for oil and gas. A total of 29,408 acres have been leased in the past. One well was drilled in the 1960's but was abandoned when it proved dry. No further drilling has been attempted.

Three hardrock exploration permits have been issued in T13S R13E W.M. No leases have been issued in this area.

There are no mining claims located on the Grassland.

Regional Geology

Three physiographic provinces occur in the Grassland: the southwest part of the Blue Mountains province, the High Lava Plains province and the Deschutes-Umatilla Plateau province.

The oldest rocks in the Grassland belong to the late Eocene Clarno Formation and are about 40 million years old. The Clarno Formation consists of a series of rhyolite, andesite and basalt flows, pyroclastic rocks (tuffs and breccias) and some waterlaid sedimentary rocks.

The late Oligocene and early Miocene John Day Formation is approximately 30 million years old. It is made up of rhyolitic flows, bedded tuff and varicolored fluvatile and lacustrine tuffaceous sedimentary rocks.

The Columbia River Basalt Group, a series of thick, dark-gray basalt flows, is middle to late Miocene in age (10 to 15 million years old). These rocks occur in isolated outcrops in the Grassland.

The Pliocene Dalles Formation (approximately 3 million years old) consists of water-laid, pumice-rich pyroclastic rocks interbedded with basalt and andesite flows. The Dalles Formation is capped with younger basalt flows.

Recent basalt flows can be found in the canyons of the Deschutes and Crooked Rivers. The canyons were cut by the rivers, and then filled by the lava flows. The rivers have since partially eroded the flows, resulting in steep-sided, narrow canyons.

Mercury, Gold and Silver

Local Geology and Mineral Deposits

Anomalous values for mercury and gold have been detected in the Gray Butte area in the southeastern part of the Grassland. This area is underlain by the John Day Formation and faulted by northeast-trending faults. Small outcrops of Columbia River Basalt overlie the John Day Formation in the faulted area.

Cinnabar (HgS) is the principal mercury ore mineral. Cinnabar deposits are most often found in regions of Tertiary and Quaternary orogeny and volcanism. The cinnabar is deposited from mineralized hot waters related to magmatic activity, and the deposits usually contain calcite and chalcedony. The hot, mineralized solutions rise along faults, cooling as they near the surface. As they cool, cinnabar is deposited in fractures and voids. The host rocks are often altered in both composition and appearance by the mineralized solutions. The principal products of this alteration are clay, silica and carbonate materials (Brooks, 1971).

Gold also occurs in hydrothermal deposits. The gold is deposited by mineralized solutions traveling through fractured zones. These deposits can also contain quartz, calcite, silver, sulfides, and cinnabar (Brooks, 1968; Jenson, 1981).

The Gray Butte mercury prospect is located in SE1/4 Section 13, T13S, R13E W.M, approximately 1-1/2 miles north of Gray Butte. Brooks (1963) reported cinnabar along an east-trending fault zone approximately 1,000 feet long. He also reported a 2- to 6-foot wide rib of silicified tuff bordered on the north by a 2-foot wide zone of silicified gouge and brecciated tuffs, with cinnabar occurring as fracture coatings along the north side of the rib.

During a field visit to the Gray Butte Prospect, the Ochoco National Forest Geologist examined the fault zone but did not find any cinnabar.

Two miles southwest of Gray Butte, in SE1/4 SE1/4 Section 22, T13S, R13E, W.M, a hydrothermally-derived calcite vein, a pebble dike and a garnet-bearing breccia outcrop in the John Day Formation (Gray, 1986).

Mineral Exploration and Development

The Gray Butte Prospect was discovered by Staley in June 1942 (Brooks, 1942) Rodman and Chamness located the Tom and Jerry claims here in 1955. A trench about 25 feet wide has been dug along the fault zone for a distance of approximately 400 feet, and numerous small exploration pits have been dug in the area.

In 1963, H.G. Plog, a Forest Service geologist, conducted a mineral examination of the claim group and declared the claims invalid due to lack of discovery. The claims are abandoned.

Jerry Gray and Gary Baxter of the Oregon Department of Geology and Mineral Industries sampled the pebble dike outcrop for assaying and petrographic analysis. Six samples were assayed. All six samples showed detectable amounts of gold. Two samples contained anomalous silver values, and one sample contained anomalous mercury values (Gray, 1986).

The Bureau of Land Management sponsored the geochemical analysis of 74 stream sediment samples, 55 rock chip samples and 22 drill core samples in the Gray Butte area. The samples were collected in:

T12S R13E Sections 29, 31, 32 and 36;

T13S R13E Sections 5, 8, 9, 10, 12, 13, 14, 22, 23, 24, 25, 26, 27, and 36;

T13S R14E Sections 8, 9, 10, 19, 20, 21, 22, 27, 28, 29, 31, 32, and 33.

The analysis of these samples showed some anomolous gold and mercury values (Rimal, 1987).

Mineral Production and Marketing

Mercury is listed as a Strategic and Critical Mineral in the Strategic and Critical Materials Stockpiling Revision Act of 1979.

Mercury is used for industrial, chemical and military purposes. The world sources of mercury are concentrated in a few areas, and imbalances in supply and demand are common. Because of rapid price fluctuations, the U.S. mercury industry is highly unstable. Oregon's mercury mines have operated almost exclusively during periods of war (Brooks, 1971).

According to Brooks, the Gray Butte prospect has produced less than 1 flask (76 pounds) of mercury (Brooks, 1971).

Mineral Potential

Based upon existing information, the geologist of the Ochoco National Forest classified the Gray Butte area as having moderate potential for mercury, gold and silver, with a Level of Certainty C (BLM Manual 3031, see Appendix A). Refer to the Mineral Potential map in the map packet for the location of this area.

Moderate potential is defined as: "The geologic environment, the inferred geologic processes and the reported mineral occurrences or valid geochemical/geophysical anomaly indicate moderate potential for accumulation of mineral resources" (BLM Manual 3031).

Level of Certainty C is defined as: "The available data provide direct evidence but are quantitatively minimal to support or refute the possible existence of mineral resources" (BLM Manual 3031).

Existing information indicates that this area warrants further exploration work to discern its true mineral potential.

Diatomite

Local Geology and Mineral Deposits

An active diatomite mine on the Deschutes River is located 1/2 mile south of the Grassland's southern boundary, approximately 6 miles west of Terrebonne. Diatomite is a lightweight sedimentary rock composed of the siliceous shells of microscopic aquatic plants called diatoms. Diatomite has a wide variety of industrial uses, including use as a filter aid, a filler in paints, paper and plastics, and as an insulating material.

The diatomite occurs in a roughly circular deposit in the late Tertiary Deschutes Formation. Sand and volcanic detritus underlie the deposit, and sand and gravel deposited by the Deschutes River cover the diatomite. The deposits formed in the bed of a lake dammed by lava flows. Because the deposit is very clean, it is likely that the lake was fed by springs instead of streams (Bates, 1969).

Mineral Exploration

Geologic conditions favorable for similar diatomite deposits occur in the Grassland, especially along the Deschutes and Crooked Rivers. Winters (1983), in his mineral investigation for the Deschutes River Rare II area, did not discover any diatomite deposits. In addition, neither Williams (1957), Walker (1977), nor Peck (1983) indicate any diatomite deposits on their map. However, a diatomite deposit could easily be overlooked if it were covered with overburden, as is the case with the Terrebonne deposit.

Mineral Potential

Based upon existing information, the geologist of the Ochoco National Forest classified the Crooked River/Deschutes River area as having a moderate potential for diatomite, with a Level of Certainty A (BLM Manual 3031, see Appendix A). Refer tothe Mineral Potential Map in the map packet for the location of this area.

Moderate potential is defined as: "The geologic environment, the inferred geologic processes and the reported mineral occurrences or valid geochemical/ geophysical anomaly indicate moderate potential for accumulation of mineral resources" (BLM Manual 3031).

Level of Certainty A is defined as: "The available data are insufficient and/or cannot be considered as direct of indirect existence of mineral resources within the respective area" (BLM Manual 3031).

It is possible that further exploration could result in the discovery of a diatomite deposit in the area indicated on the map.

Oil and Gas

The oil and gas potential of the Grassland is not well-defined. Although areas of the Grassland have been leased for oil and gas development, only one hole has been drilled. This hole was abandoned after proving dry.

Central Oregon is believed to be underlain by Mesozoic marine sediments that could produce petroleum. However, the thick covering of volcanic rocks has deterred exploration (Newton, 1965).

Smith (1976) classified the eastern portion of the Grassland as prospectively valuable for oil and gas (see the Oil and Gas Potential Map, Figure I-3, p. I-9). This classification is based on the assumption of 1,000 feet of sedimentary rocks occurring within 10,000 feet of depth.

The oil and gas potential of the western part of the Grassland is low to zero. Here, the presence of volcanic activity in the Cascades may have metamorphosed any organic matter to a thermal state which would destroy hydrocarbons (Fouch, 1983).

Geothermal Energy

There are no Known Geothermal Resource Areas (KGRA) or Potential Geothermal Resource Areas (PGRA) listed within the Grassland by USGS (Justus, 1979).

The Oregon Department of Geology and Mineral Industries has classified the entire Grassland as favorable for the discovery of geothermal resources. This classification is based on various geothermal, volcanic and tectonic phenomena including thermal wells, youthful volcanism, mineralization, and anomalous concentrations of faults and lineaments (Oregon Department of Geology and Mineral Resources, 1982).

Two thermal wells are located near the Grassland boundary southeast of Madras. One, located in NE1/4 NE1/4 Section 24, T11S R13E W.M, intercepts water measuring 25 C (77 F). The other, with water at 21 C (70 F) is located in SE1/4 NE1/4 Section 24, T11S R13E W.M. (Oregon Department of Geology and Mineral Industries, 1982).

Rockhounding Areas

Rockhounding is a popular activity on the Ochoco National Forest, and minerals of interest to rockhounds occur in several locations on the Crooked River National Grassland.

Shirley (1965 and 1967) located the following deposits on the Grassland.

Agate: T13S R13E Section 26

Amethyst and agate: T13S R13E Sections 17,18,19,20

Jasper and agate: T13S R13E Section 28

Moss agate: T11S R14E Section 15

Moss agate: T10S R14E Sections 10, 11

Angel wing agate: T10S R15E Section 12, T10S R15E Section 6

Petrified wood: T13S R14E Section 30.

Common Variety Minerals

There are 13 developed materials sources on the Grassland. Refer to Table I1-1 for material types and land status of these sources.

Only three of these sources, Round Butte, Schmoker and Cyrus, have development plans.

Round Butte has an estimated reserve of 400,000 cubic yards (cy) of cinders, an estimated demand of 10,000 to 20,000 cy per year, and therefore, a lifespan of 20 to 40 years. Oregon State Highway Department removes approximately 70,000 cy each decade. The Forest Service, Jefferson County, and the City of Culver also use cinders from this source. The cinders are used for aggregate for road construction and to improve traction on icy roads.

Schmoker has an estimated reserve of 40,000 cy of basalt of variable quality. This quarry is used primarily by Jefferson County for road construction.

Cyrus contains fine-grained, weathered basalt which is easily rippable. No reserve estimates are available.

McPheeters contains an estimated 84,000 cy of basalt. This quarry is used primarily by the Oregon Department of Transportation.

There appears to be a sufficient supply of rock to meet the local demand in the next decade. The development of a rock resource management plan that addresses long-term supply and demand, as well as area management strategies, would assure a continuing supply of these materials.

Table I-1

Material Sources

Name	Location	Land Status	Material Type
Round Butte	SW1/4 SE1/4 Sec 13, T11S R12E	Acquired	Cinders
Big Canyon	NW1/4 SW1/4 Sec 31, T11S R12E	Acquired	Clay/gravel
Metolius	NW1/4 NE1/4 Sec 36, T11S R13E	Acquired	Sand/gravel
Schmoker	NW1/4 NW1/4 Sec 3, T11S R14E	Acquired	Basalt
Grandview	NW1/4 NE1/4 Sec 16, T12S R12E	Acquired	Sand/gravel
Juniper Butte	SE1/4 SW1/4 Sec 32, T12S R13E	Acquired	Sand/gravel
Geneva	SE1/4 NE1/4 Sec 4, T13S R12E	Acquired	Basalt
Canal	SE1/4 SW1/4 Sec 22, T13S R13E	Acquired	Gravel
McPheeters	SW1/4 SW1/4 Sec 27, T13S R13E	Public Domain	Basalt
Haystack	NE1/4 SW1/4 Sec 36, T13S R13E	Acquired	?
Cyrus	NE1/4 SE1/4 Sec 18, T13S R14E	Acquired	Basalt
Gray Butte	SW1/4 NE1/4 Sec 30, T13S R14E	Public Domain	?
Jap Creek	SE1/4 SE1/4 Sec 35, T13S R14E	Acquired	?

Figure I-1

MERCURY, GOLD AND SILVER POTENTIAL

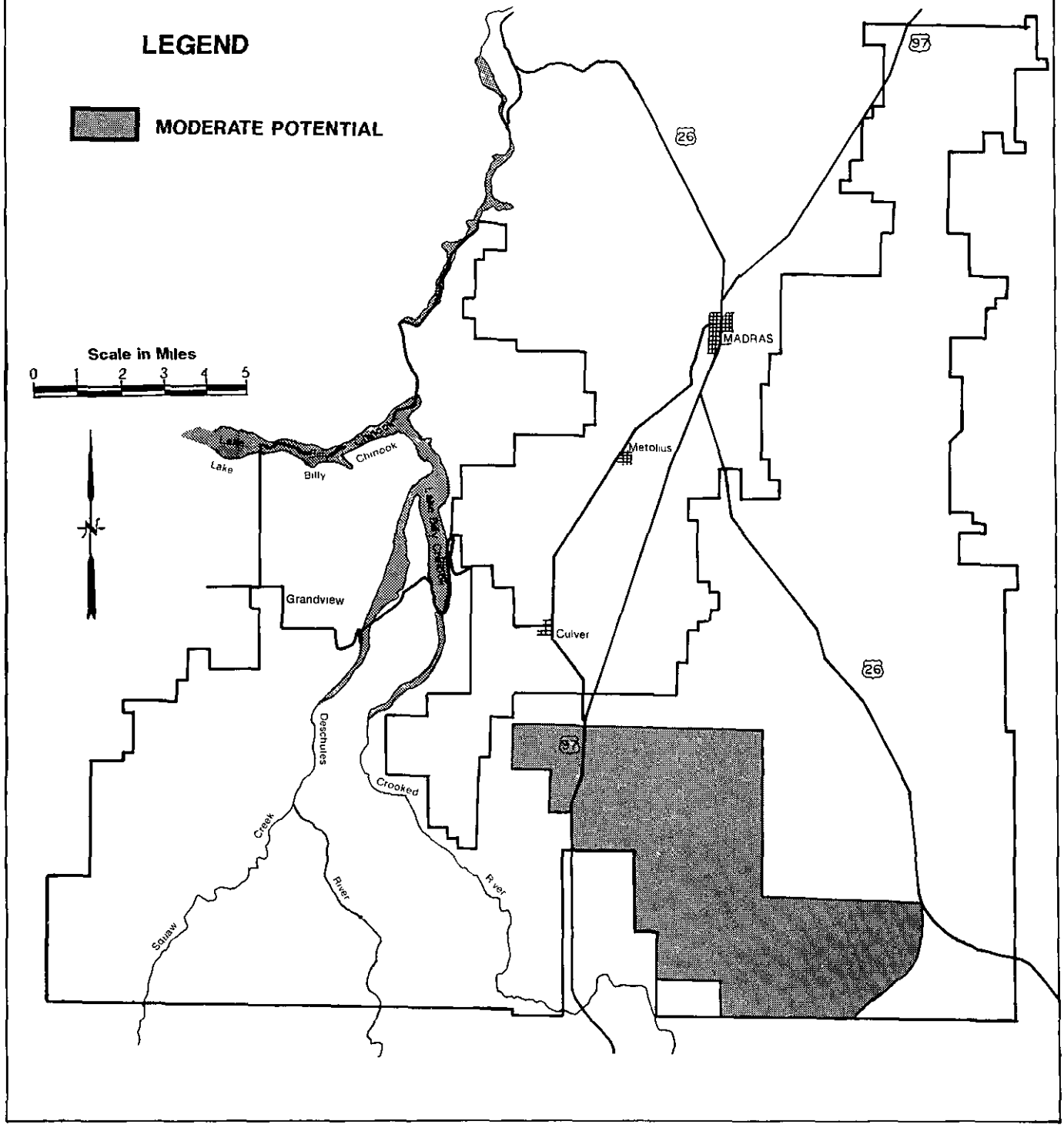


Figure I-2

DIATOMITE POTENTIAL

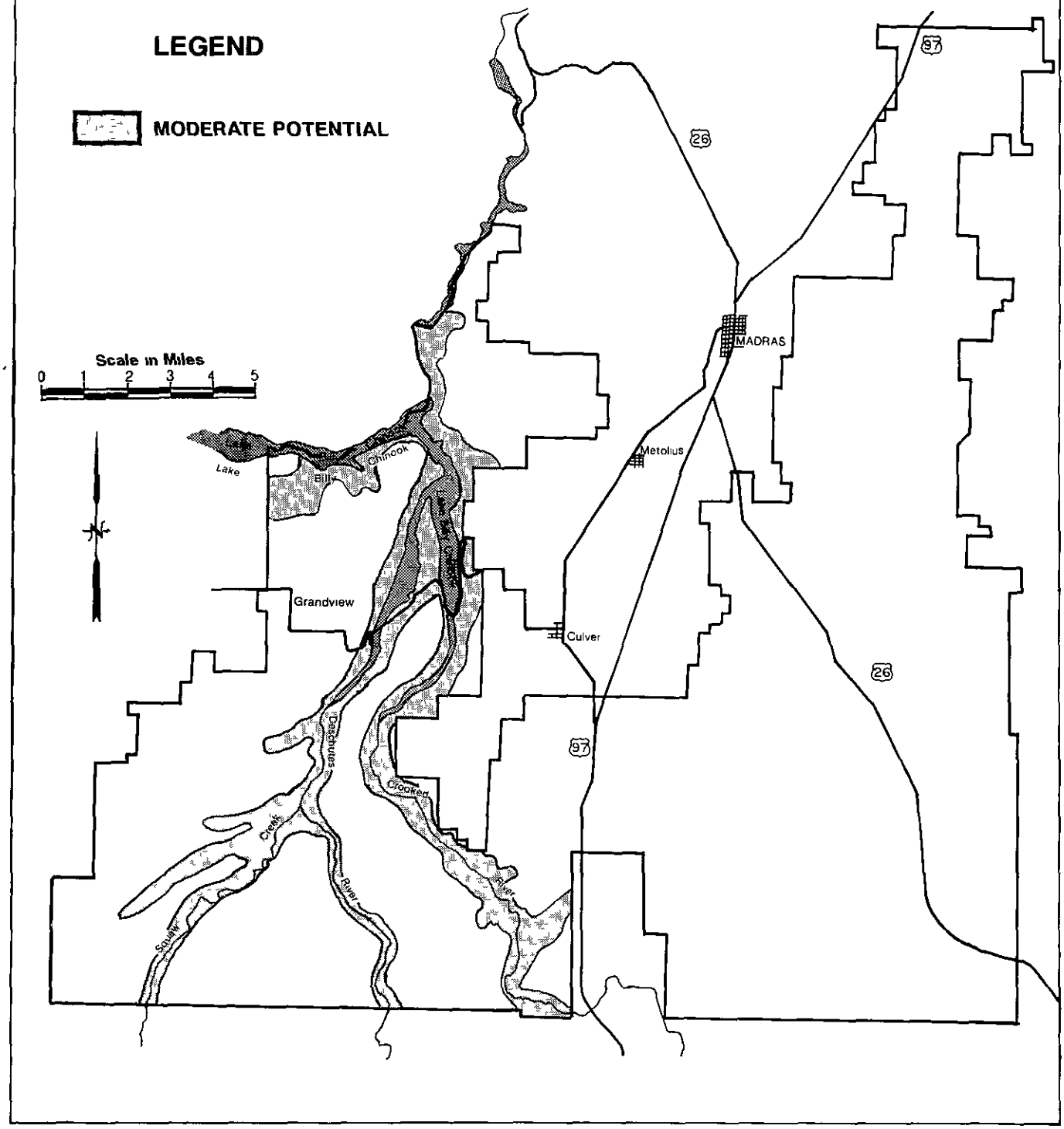
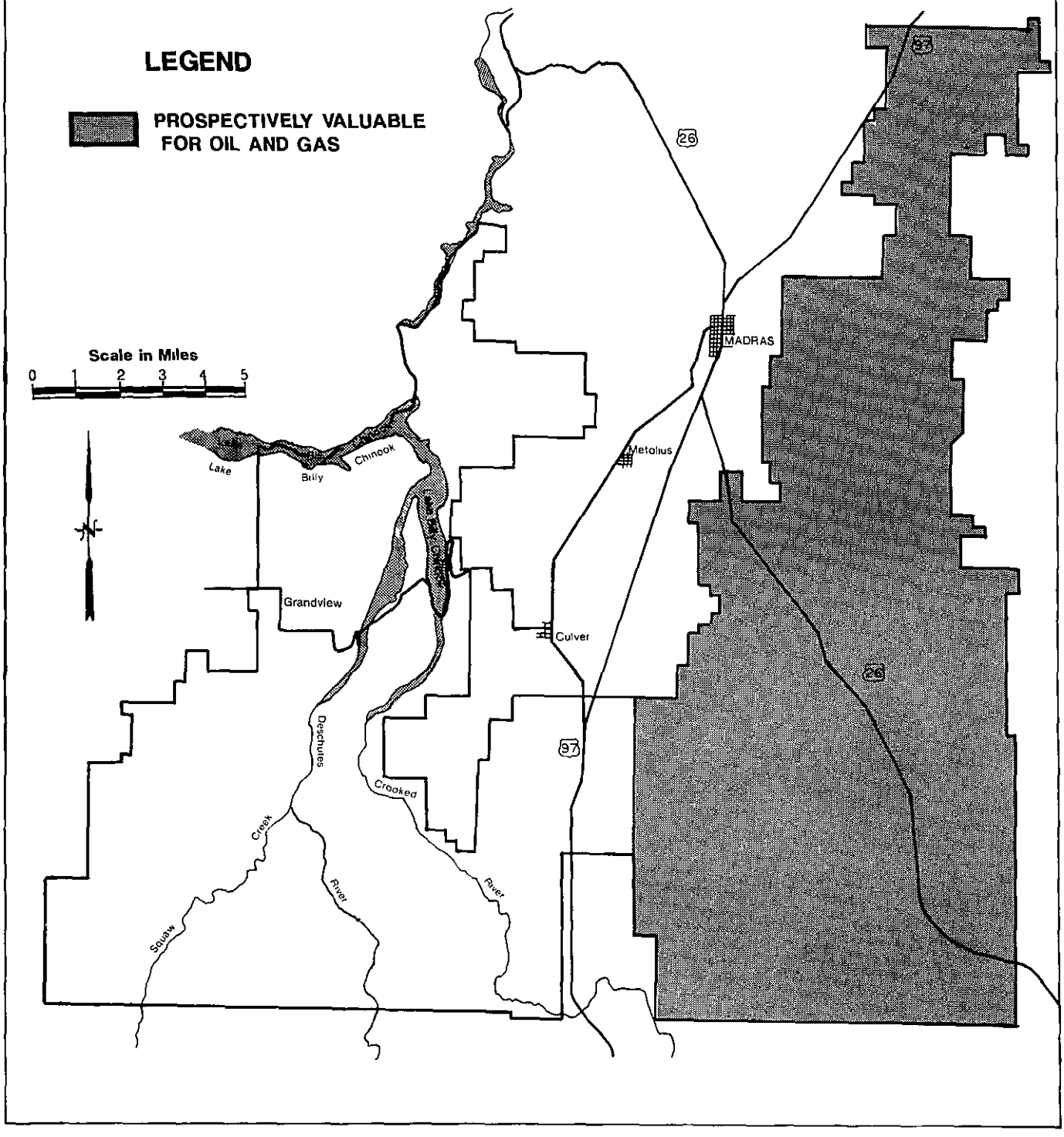


Figure I-3

OIL & GAS POTENTIAL



Section 2

Oil and Gas Lease Stipulations

Stipulations will be included in leases to protect surface resources. A stipulation may be modified or waived if the Forest Service determines that factors have changed so that the protection provided by the stipulation is no longer justified, or that the proposed operation would not cause unacceptable impacts.

The following stipulations will be included in all leases:

Allow no occupancy or other surface disturbance on slopes in excess of 30 percent.

Allow no occupancy or surface disturbance in the vicinity of eagle, hawk, or owl nesting sites as specified in Wildlife and Fish Standards and Guidelines.

To maintain esthetic values, require all semipermanent and permanent facilities to be painted or camoflaged to blend with the natural surroundings.

Additional stipulations will be required in the following Management Areas.

Antelope Winter Range

Allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to antelope on the winter range. This limitation does not apply to maintenance and operation of producing wells.

Cove Palisades State Park

Allow no occupancy or other surface disturbance within park boundary.

Haystack Reservoir

Allow no occupancy or other surface disturbance.

Juniper Old Growth

Allow no occupancy or other surface disturbance.

Metolius Deer Winter Range

Allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to deer on the winter range This limitation does not apply to maintenance and operation of producing wells.

Research Natural Areas

Allow no occupancy or other surface disturbance.

Rimrock Springs Wildlife Area

Allow no occupancy or other surface disturbance.

Riparian Areas

Allow no occupancy or other surface disturbance within riparian zones.

Squaw Creek

Allow no occupancy or other surface disturbance within Squaw Creek canyon.

Elsewhere, allow exploration, drilling, and other developmental activities only between April 1 and November 15 to reduce harassment to deer on the winter range. This limitation does not apply to maintenance and operation of producing wells.

Utility Corridors

Allow no drilling or storage facilities within 2,000 feet of utility lines.

Section 3

Land and Mineral Estates on the Crooked River National Grassland

There are eight administrative land categories involved within the Crooked River National Grassland. The laws and regulations governing the administration and disposal of minerals vary according to land categories.

For administrative purposes, Federal minerals are divided into the three categories that follow.

(1) Locatable minerals:

Uncommon varieties of sand, stone, gravel, cinders, pumice, pumicite or cinders;

All "valuable mineral deposits" (General Mining Law, 1872) except those specifically excluded as leasable or salable.

(2) Leasable minerals:

All minerals except salable minerals on acquired lands;

Coal, phosphate, oil, gas, chlorides, sulfates, carbonates, borates, silicates or nitrates of potassium or sodium, native asphalt, solid and semisolid bitumen and bituminous rock including oil-impregnated rock or sand from which oil is recoverable only by special treatment after the deposit is mined;

Geothermal resources and associated by-products.

(3) Salable minerals:

Common varieties of sand, stone, gravel, cinders, pumice, pumicite and clay.

The eight administrative land categories involved within the Crooked River National Grassland are:

(1) Land acquired under Title III of the Bankhead-Jones Farm Tenant Act that are administered by the Crooked River National Grassland. Mineral ownership is vested in the United States.

Under this category, minerals that would normally be locatable are instead classified as leasable. Thus, all minerals, except salable minerals, are disposed of through a leasing system. Salable minerals may be disposed of only to public authorities and agencies, and only on the condition that the minerals are used for public purposes (FRF 228.41(4)).

(2) Lands reserved from the public domain that are included as part of the Crooked River National Grassland. Mineral ownership is vested in the United States.

Under this category, locatable minerals are available for location under the 1872 Mining Law, unless the land is specifically withdrawn from the operation of the mining laws. In other words, any citizen of the United States, or person declaring his/her intent to become a citizen, may locate a mining claim for the purpose of developing a mine. Leasable minerals are disposed of through a leasing system. Salable minerals may be disposed of by sale, free use permit or contract (CFR 228.57).

(3) Lands acquired under Title III of the Bankhead-Jones Farm Tenant Act and administered by the CRNG, but all or part of the mineral rights are in private ownership.

The mineral rights vested in the United States will be administered as in (1) above. The development of the minerals rights in private ownership is, of course, controlled by the owner. However, because the United

States owns the surface rights, surface use would be administered by the United States in cooperation with the owner of the mineral estate.

(4) Lands acquired under Title III of the Bankhead-Jones Farm Tenant Act and administered by the CRNG, but all or part of the mineral rights are vested in the State of Oregon.

This situation is the same as (3) above, except that the State of Oregon replaces the private owner.

(5) Lands reserved from the public domain that are administered by the Deschutes Area of BLM's Prineville District. Mineral ownership is vested in the United States.

BLM administers minerals on these lands.

(6) Private lands with all or part of the mineral ownership vested in the United States.

Minerals are administered as in (2) above. State law protects and regulates the surface owner's rights.

(7) Private ownership with partial mineral ownership vested in the United States.

Minerals owned by the United States are administered as in (6) above. When the land and minerals are both privately owned, they are privately administered.

(8) Lands and minerals are privately owned.

These land and mineral estates are privately administered.

Section 4

Materials Source Management Plan

This appendix contains information from the Crroked River National Grassland Materials Source Management Plan. The entire Plan can be found in the Forest Supervisor's Office in Prineville, Oregon.

Summary and Conclusions

Thirteen materials sources were identified on the Grassland. Mineral rights at each materials source are owned by the United States. The property lines and extent of federal mineral ownership at McPheeters M.S. are pending the outcome of a survey that will be completed by April 1989.

Two of the materials sources have up-to date development plans. Three have development plans in progress pending completion of airphoto-derived topographic maps in 1989 or 1990. Four materials sources are in occasional use and need development plans completed or updated. Three materials sources will receive no forseeable use and need rehabilitation plans. One material source should be rehabilitated for recreational use by off-road vehicles.

A total of approximately 9,000-15,000 cubic yards of material are removed from the Grassland each year, and an additional 30,000 cubic yards are removed for special projects about every 5 years.

At the present rate of use, rock supplies are adequate for the next 20 years. It is unclear whether or not there will be adequate supplies further into the future due to the difficulty of projecting a future rate of use.

Recommendations

Long-term use permits issued in the 1950's and early 1960's should be discussed with the five agencies currently in their possession and, if possible, terminated or replaced with short-term use permits.

Canal M.S. should be closed to use as a borrow and waste storage site and rehabilitated for use by off-road vehicles.

Waste storage at Boyce M.S. should be discontinued. Use of this materials source should be limited to removal of the two existing stockpiles, and the area should then be rehabilitated and closed to future use.

Grandview M.S., which is located inside Cove Palisades State Park, should be rehabilitated and closed to future use.

Haystack M.S. and Big Canyon M.S. have no anticipated use, and should be rehabilitated and closed to future use.

Unauthorized removal of material occasionally occurs at sites outside of recognized materials sources. Rehabilitation should be accomplished at these unauthorized sites to discourage future removal of material.

The feasibility of a land exchange agreement should be examined as a means of giving the Forest Service's portion of Round Butte M.S. and McPheeters M.S. to the state.

Table I-1

Land Status and Mineral Ownership of Materials Sources

Name	Land Status	Mineral Rights	Long-term Use Permits
1. Round Butte	Acquired	United States	1958 Jefferson County 1961 City of Culver
2. Big Canyon	Acquired	United States	none
3. Metolius	Acquired	United States	1955 Jefferson County
4. Schmoker	Acquired	United States	none
5. Fence	Acquired	United States	none
6. Grandview	Acquired	United States	1958 Jefferson County
7. Boyce	Acquired	United States	1955 Jefferson Co. Court
8. Haystack	Acquired	United States	1959 Jefferson County 1960 City of Madras 1962 City of Culver
9. Geneva	Acquired	United States	1959 Deschutes Valley Water District 1960 Jefferson County
10. Canal	Acquired	United States	none
11. McPheeters	Public Domain	United States	none
12. Cyrus	Acquired	United States	none
13. Japanese Creek	Acquired	United States	none

A new pit run or grid roll material source on the west side of the Deschutes River would be valuable for Forest Service road maintenance in that area. Examination of the area for a new material source should be concentrated in the area where the Clarno Formation is exposed.

On some of the material sources, long-term use permits have been issued. Long-term use permits have no expiration date and no stated rate or quantity of removal. One of the requirements listed on the permit is that development plans must be submitted by the permittee and approved in advance by the Forest Supervisor. The long-term permits on the Grassland predate the National Forest Management Act of 1976, which sets a 10-year limit on permits issued to government agencies (36 CFR 228.62(b)). As a result, these long-term permits are grandfathered in.

Recommendation is hereby made that the long-term permits be discussed with the five agencies involved and be terminated or replaced, if possible, with short-term use permits. Conversion to short-term use permits would allow more up-to-date use records and improved management of the materials sources by the Forest Service.

Short-term use permits, generally for a period of less than one year, are called mineral material use permits (form FS-2800-9). They may be obtained from the Crooked River National Grassland District Office.

Development and Rehabilitation

Provisions must be made in contracts and permits to ensure the efficient removal and conservation of the material (36 CFR 228.47(c)). Requirements for reclamation of the areas disturbed by removal must also be included (36 CFR 228.47(f)). The Forest Service must prepare the development and reclamation plans if the material is in a community site or common-use area (36 CFR 228 64).

For removal of more than 5,000 cubic yards of material or disturbance of more than one acre during a 12-month period, non-Forest Service entities must obtain development and land reclamation permits from the Oregon Department of Geology and Mineral Industries and must have a long- or short-term use permit from the Crooked River National Grassland. For removal of less than 5,000 cubic yards, non-Forest Service entities are required to have a long- or short-term use permit from the Grassland. The Grassland District notifies the Engineering Section of the Ochoco National Forest Supervisor's Office so that use records in the individual materials source files can be kept up-to-date. The Forest Service may use its own materials sources without need for a permit, but is responsible for having a development plan and accomplishing final rehabilitation.

Development plans take into account the need for visual screening, drainage, road access, crusher and stockpile locations, variation in material quality, and the method of excavation of the material. The Forest Service follows the regulations of the Federal Mine Safety and Health Administration in regard to height and slope of working slopes and benches.

Two of the materials sources on the Grassland have up-to-date development and reclamation plans: Round Butte M.S. and Cyrus M.S. Three materials sources will have airphoto-derived topographic maps: McPheeters M.S. will have its topographic map completed by April 1989, while Metolius M S. and Japanese Creek M.S. will be completed in spring 1990. When each detailed topographic map for these three quarries is made available, a development and reclamation plan should be completed. The following five materials sources are in occasional use, and need to be surveyed with a compass and clinometer and have development and reclamation plans completed or updated: Geneva M.S., Boyce M.S., Fence M S., and Schmoker M.S. There are three materials sources that will receive no forseeable use and are in need of reclamation plans: Grandview M S., Haystack M.S., and Big Canyon M.S. One material source, Canal M.S., should be rehabilitated for recreational use and is in need of a reclamation plan.

Rehabilitation plans take into account the need for proper sloping of pit or quarry walls, spreading stockpiled overburden over excavated areas, mulching, and reseeding. The Ochoco National Forest follows regulations of the Oregon Department of Geology and Mineral Industries Mined Land Reclamation Program in regard to specification of final slopes and other reclamation practices.

Specifications of Rock Quality and Quantity

Gravel Roads

Forest Service gravel roads in the Grassland are maintained as low-traffic-volume roads, in which base material is used but not surfacing material. Road maintenance includes blading, primarily to provide adequate drainage on the roads, and secondarily to improve driveability. Water bars may be bladed into the roads Most of the Forest Service roads in the Grassland that are gravel roads are intended for vehicles with high clearance.

Table I-2 summarizes the Forest Service and Oregon State Highway Division (OSHD) requirements for crushed aggregate to be used on gravel roads. Lower-grade material such as pit run or borrow material is not expected to meet these specifications because they are used on low-traffic-volume roads.

Rock from Schmoker M.S. was crushed for use in surface rock and base rock on county roads, and was expected to meet the specifications.

The state has no gravel roads in the Grassland under its jurisdiction, but Jefferson County has jurisdiction over several gravel roads in the Grassland and follows state requirements for rock quality. The Forest Service has jurisdiction over many gravel roads in the Grassland and follows Forest Service requirements for rock quality.

Paved Roads

There are no paved roads in the Grassland under the jurisdiction of the Forest Service, except for two short lengths of pavement--one on the south side of Haystack Reservoir and one on the east side of the reservoir leading into a campground. The Federal Highway Administration will be adding to the pavement on the south side of the reservoir in 1991 or 1992, and this addition will be under the jurisdiction of the Forest Service. The state maintains two paved roads--Highway 97 and Highway 26. Jefferson County has jurisdiction over all other paved roads in the Grassland, and is in the process of paving many of their gravel roads using rock obtained from a privately-owned rock quarry north of Grizzly Mountain. The Oregon Parks and Recreation Division has jurisdiction over roads within Cove Palisades State Park.

Table I-3 summarizes the Forest Service and Oregon State Highway Division requirements for paved roads. Jefferson County follows the state requirements for rock quality, and the Federal Highway Administration follows their own third set of requirements. The table gives the requirements for "flexible pavement" rather than for roads with a "chip seal" surface.

Determination of Excavated Volume from In-Place Volume

The quality of the material is taken into consideration in determining excavated rock volume from in-place volume. Material used from gravel roads ideally contains a percentage of silt and clay sufficient to act as a binder. This rock will generally swell approximately 20% upon excavation. Cinders are porous and readlily break down, generally decreasing in volume by 70% leaving 30% of original in-place volume. Material used in paving, "oil rock," ideally contains no silt or clay. If any silt or clay is present a "scalper," which is a screen, may be used to remove them, or they may be removed by washing. For oil rock, excavated volume should equal in-place volume.

Table I-2

Specifications for Crushed Aggregate on Gravel Roads in the Grassland (Base Rock)

Description	USFS Test (AASHTO)	USFS Requirement	State Test (OSHD)	State Requirement
Percent Wear; Abrasion, LAR	T96	40 max	TM211	45 max.
Durability Index	T210	35 min.	TM208	35 max.
Fine Aggregate Degradation				
Liquid Limit	T89	25 max.	TM102	nonplastic or 35 max.
Plasticity Index	T90	6 max.	TM103	nonplastic or 6 max.
Sand Equivalent	T176	35 min.	TM101	25 min.

The first test listed in Table I-2 is the percent wear or abrasion test. Test 96 of the American Association of State Highway and Transportation Officials (AASHTO) is also known as the Los Angeles Rattler (LAR) test. This test indicates the relative resistance of material to breakdown into sand-sized or smaller particles as a result of tumbling in a cylinder with a prescribed number of 2-inch metal spheres. A high number indicates that the material readily wears into sand-sized or smaller particles.

The second test in Table I-2 is the durability index or fine aggregate degradation test. It indicates the relative resistance of material to break down into claylike small particles as a result of agitation in a container with water, calcium chloride, glycerine, and formaldehyde. The USFS test has a minimum requirement because the post-test weight of the material that doesn't pass through a sieve is reported as a percentage of the pre-test weight of the total sample The state test has a maximum requirement because they report the percentage of the material that does pass through the sieve.

The liquid limit is that water content of at which the material passes from a plastic to a liquid state.

The plasticity index is the range of water content within which the material is in a plastic state.

The sand equivalent test is intended to show the percentage of sand-sized particles in a sample. The sample is agitated in a cylinder containing water, calcium chloride, glycerine, and formaldehyde. After agitation, the material in the cylinder is allowed to settle for 20 minutes and then the amount of material that has accumulated at the bottom of the cylinder is measured.

Description of Individual Materials Sources

The individual materials sources on the Grassland have been classified according to the Unified Rock Classification developed by Doug Williamson of the Forest Service. This classification scheme provides a brief description of the engineering characteristics of rocks based on observations in the field. When used with other geotechnical information such as water table location, it permits an estimate of rock performance in such areas as excavation, slope stability, material use, blasting character, and water transmittal. It is not used to classify unconsolidated sand and gravel deposits. The Unified Rock Classification is listed in Table I-4.

Table I-5 lists the individual materials sources and summarizes information on the rock type, Unified Rock Classification (URC), primary use of the materials source, and secondary use.

The following paragraphs describe the individual materials sources in order by their primary use.

Pit Run

Pit run material consists of native materials that are of a size and grading that can be taken directly from the source and placed on the road without crushing.

There are three materials sources on the Grassland that contain pit run material. Two of them, Geneva M.S. and Round Butte M.S., are composed of cinder, while Cyrus is composed of fractured basalt of the Clarno Formation.

Cyrus M.S.

Cyrus Material Source is located on the northeastern slope of Gray Butte, approximately one mile north of the top of Gray Butte. It was discovered about 15 years ago by the Forest Service road crew. Visibility of the pit from Highway 26 became a problem as the pit enlarged, and was mitigated by construction of berms on the northwest and northeast sides of the excavation area. The berms have been seeded so they will blend in with the hillside and shield view of the excavation from Highway 26. Any southwestward expansion of the pit further into the hillside beyond the limits of the current 1988 pit plan will require close cooperation between the Engineering Section and the Grassland District to ensure that visual constraints are met; excavation further into the hillside may require higher berms.

The 1988 pit plan shows that the current excavation may be extended 100 feet to the northwest and not at all in the other directions. Drill hole data indicate that the highly fractured basalt at the surface extends downward 12 to 17 feet. Less-weathered, and therefore less-broken rock, is encountered below 12 to 17 feet. This material would probably be gridrollable in contrast to the pit-run material at the surface, and may even require crushing. The rock extends to more than 108 feet, which is the depth of the deepest of four drill holes at the site.

Based on the current development plan, which shows excavation to about 15 feet in depth, there are about 150,000 cubic yards of material remaining. The material contains a sufficient amount of silt and clay to set up almost like concrete when used on gravel roads, and this, in combination with its average size of 2 inches in diameter, makes it ideal pit run material for use on the low volume gravel roads on the Grassland. This rock has been used by the Forest Service at Haystack Reservoir's boatramp and parking lot and on many of the gravel roads in the area. If used by other agencies it would be rapidly depleted, so it is reserved for exclusive long-term use by the Forest Service. Access to the materials source is restricted by a locked gate near the entrance to the pit.

Table I-3
Crushed Aggregate Specifications for Paved Roads in the Grassland (Flexible Pavement)

Description	USFS Test (AASHTO)	USFS Requirement	State Test (OSHD)	State Requirement
Percent Wear; Abrasion, LAR	T96	40 max.	TM211	30 max.
Durability Index, Fine Aggregate Degradation	T210	35 min.	TM208	30 max.
Sand Equivalent	T176	45 min.	not listed	not listed

For a brief description of each test, see Table I-2

Note that in sampling material for rock quality testing, a representative sample must be obtained from the area to be mined Sampling technique is important so that the test results reflect the rock quality that will be obtained from the quarry and not just the best rock in the quarry

Table I-4
Unified Rock Classification System by Doug Williamson

In using the Unified Rock Classification System, one observation that best describes the rock is chosen from each of four sets of descriptive terms, and the corresponding letter symbols are assigned to the rock.

Letter Symbol	Observation--Interpretation
Degree of Weathering Terms	
A	Magnifying-lens fresh state--high quality rock for foundations and excavations
B	Visual fresh state--standard quality rock for foundations and excavations
C	Stained state
D	Partly decomposed state
E	Completely decomposed state--Unified Soil Classification tests should be run
Specimen Strength Terms	
A	Rebound reaction with hammer blow--free-draining,fragments may form sharp and angular "arrowheads," high energy transfer in response to blasting

B	Pits with hammer blow--free-draining, high energy transfer in response to blasting
C	Dents with hammer blow--usually not suitable for road fill or surfacing and is not free-draining, low energy transfer in response to blasting
D	Craters with hammer blow--responds to freeze-thaw stresses by cracking, produces poorly drained embankments, not suitable for road fill or surfac ing, very low energy transfer when blasting
E	Moldable with finger pressure--must be evaluated as a soil for design pur poses

Planar and Linear Terms

A	Solid with random breakage--rare; the strength of any individual piece is indicative of the strength othe entire mass
B	Solid with preferred breakage--may produce an undesirable size or shape for rock aggregate
C	Latent planes of separation--in most cases, blasting energy will be reflected by the plane and produce a separation and breakage at right angles to the plane
D	Two dimensional, open separations--important to consider the attitude of the planes in design considerations; water transmission can be determined by water tests
E	Three dimensional, open separations--the attitude of the planes with respect to the slope or excavation is a chief design consideration; water transmission can by determined by water tests

Unit Weight Terms

A	Greater than 160 pounds per cubic foot--suitable more than 50% of the time for use as road aggregate, concrete aggregate, or riprap without lab t testing
B	From 150 to 160 pounds per cubic foot--requires laboratory testing
C	From 140 to 150 pounds per cubic foot--typically not suitable for use as road aggregate, concrete aggregate, or riprap, does not produce free-draining fill, and will probably degrade
D	From 130 to 140 pounds per cubic foot--typically not suitable for use as road aggregate, concrete aggregate, or riprap, does not produce free-draining fill, and will probably degrade
E	Less than 130 pounds per cubic foot--likely to degrade during excavation under abrasion of excavating equipment

Table I-5

Rock Description Summary and Use of Materials Sources

Materials Source	Rock Type	URC	Primary Use	Secondary Use
1. Round Butte	cinders	CDAE	pit run	riprap
2. Big Canyon	sand/gravel	--	borrow	waste area
3. Metolius	sand/gravel	--	borrow	waste area
4. Schmoker	basalt	BBEA	crusher	riprap
5. Fence	rhyolite	BBEE	grid roll	--
6. Grandview	sand/gravel	--	borrow	waste area
7. Boyce	rhyolite	CBBD	riprap	crusher
8. Haystack	rhyolite	CBED	grid roll	riprap
9. Geneva	cinders	CDAE	pit run	riprap
10. Canal	sand/gravel	--	borrow	recreational (ORV's)
11. McPheeters	basalt	BBEA	crusher	grid roll
12. Cyrus	basalt	BBEA	pit run	grid roll
13. Japanese Creek	basalt	BBEA	crusher	riprap

Round Butte M.S.

Round Butte material Source is a cinder pit complex located on the north slope of Round Butte, approximately two miles east of Round Bute Dam and the Deschutes River. Round Butte is included in the pit run category because this material would be used by the Forest Service as pit run material although the Forest Service has not used any cinder from this pit to date. The primary user of this pit crushes the cinder for use in sanding icy paved roads.

The state is the primary user of the pit, although the City of Culver has a long-term use permit and has removed small quantities of cinder. The state owns the mineral rights in the SW 1/4 Section 13, which is in the western half of the cinder pit complex, and has a long-term use permit from the Forest Service in the rest of the material source. Even though the state has a long-term use permit, it nevertheless obtains short-term use permits, this serves as a way of keeping the Forest Service informed on its rate of use.

Cinder was removed from the middle level of the pit complex many years ago, probably during the 1940's and 1950's. Hazardous vertical walls and narrow haul roads at the middle level are the legacy from this era of excavation. The state is now removing material from the top of the pit complex downward and will gradually obliterate the hazardous area, leaving an overall 2:1 slope. The cinder pit is not visible from the paved road and viewpoint at the top of Round Butte, which is part of Cove Palisades State Park.

Every 4 or 5 years the state crushes approximately 20,000 cubic yards of material to store in a stockpile and use over several years. As a result, the state obtains a reclamation permit from the Oregon Department of Geology and Mineral Industries about every 5 years and the pit is listed as inactive during the other years. In 1987 the state crushed 25,000 cubic yards of which 4,500 cubic yards were obtained

from Forest Service property. This cinder was removed under a 1987 permit from the Forest Service for removal of 70,000 cubic yards of material over 10 years At the current rate of use, this 1987 permit will allow two more entries before the permit needs to be renewed.

Because a more durable material is available in this area for road construction, this cinder is best suited for its present use in road sanding. The state had seven rock quality tests run in 1963, on cinders sampled from various locations in the pit complex. The tests revealed an LAR of 45-50, liquid limit of 34-41, and no plasticity. No drilling has been done to determine the extent of the cinder deposit, but based on the current rate of use and a brief visual inspection of surface material, there is sufficient material for the next 20 years.

Because the state is the primary user of this materials source and owns the mineral rights in the western part of the pit complex, it is recommended that the Forest Service look into the feasibility of giving their portion of Round Butte M.S. to the state as part of a land exchange agreement.

Geneva M.S.

Geneva M.S. is located about 3 miles west of Juniper Butte, overlooking the Crooked River Gorge Long-term use permits by Deschutes Valley Water District and Jefferson County indicate development and use of this cinder pit by those agencies. The Forest Service has not obtained material from this pit.

Cinder from the pit has been excavated using a backhoe, screened, and used on roads in the immediate vicinity. There is currently a screen and a stockpile of 8-inch-minus material near the center of the pit. Oversized cinder and basalt boulders from the 5-foot-thick overlying basalt flow are stored on the western side of the pit near the cliff edge. The pit is now about 200 feet by 200 feet in size. The cinder extends down about 30 feet below the present depth of excavation based on exposures in the canyon wall. This indicates that there are about 30,000 cubic yards of cinder remaining. Thirty percent of 30,000 cubic yards of in-place volume calculates to about 9,000 cubic yards of excavated volume remaining.

The pit may be expanded to the north, east, and south, but it is unknown how far the cinder extends horizontally beneath the capping basalt flow. No drilling has been done to determine the extent of the cinder deposit. This pit is well-suited for its current low-volume, local use.

Grid Roll

Grid-roll material consists of native materials of a quality that can be taken directly from the source, without crushing, and broken down on the road by a grid roller. This material generally is platy or partially decomposed rock that is too large in size to be pit run material.

There are two materials sources that primarily contain grid roll material. Both are in the John Day Formation.

Fence M.S.

This material source is located along Road 53, approximately 7 miles southeast of Madras. The material is platy welded ash, and a portion of the materials source has already been removed. Approximately 600 cubic yards of material is available for future excavation, and may be removed up to a fenceline without adverse visual impact. The area for future excavation is approximately 20 feet wide, 150 feet long, and 5 feet deep.

Haystack M.S.

Haystack Materials Source is located on a butte approximately one mile south of Haystack Reservoir. This material has been used on county roads in the area. Long-term use permits are held by Jefferson County and the City of Culver.

The pit is currently at its limits of expansion due to visual constraints. It is unknown how much deeper the excavation may be extended, but probably not more than 20 feet based on a brief visual inspection. No drilling has been done in the pit. The material abruptly becomes clayey on the western side of the pit, and this white, clayey material should be avoided. Based on an excavation 50 feet wide, 400 feet long, and 20 feet deep, there are approximately 15,000 cubic yards of material remaining. Approximately 500 cubic yards of riprap have been stored near the center and on the western side of the excavation. This riprap may not be durable as indicated by the ready decomposition of the smaller-sized rock from this pit where it has been used on the road into the campground at Haystack Reservoir.

This materials source has received little use in the past 10 years. Access is restricted by a locked gate at the beginning of the access road.

Because the rock decomposes readily and there is no anticipated demand for the rock, it is recommennded that this materials source be rehabilitated and closed to future use.

Crusher

Material for crushing must meet the requirements listed in Table I-3 on specifications of rock quality for paved roads. In general descriptive terms, material suitable for crushing is clean (lacking in silt and clay), hard, and durable. Two of the materials sources in this category are in the Columbia River Basalt Group, and one is in the Clarno Formation.

Schmoker M.S.

Schmoker Materials Source is located on a butte approximately 4 miles east of Madras. This quarry was developed by the state during paving of Highway 97, and it contains clean, durable rock suitable for use in paved roads. In 1986, Jefferson County crushed 20,000 cubic yards of rock, stockpiled 25% of it for Forest Service use, and removed the balance for use as base rock and leveling rock on two gravel county roads in the area. The Forest Service has already used half of the stockpiled crushed rock leaving 2,500 cubic yards for future use.

The 1986 development plan is now in need of updating due to removal of material from Phase 1 and Phase 2 by Jefferson County in 1986. No drilling has been done in this quarry to aid in determination of the extent of the resources. Based on a brief visual inspection, the floor of the quarry could be lowered to remove approximately 15,000 cubic yards and bring it to the depth shown on the 1986 development plan. An additional 15,000 cubic yards may be removed to let down the quarry floor to the depth of the underlying ash bed. The floor may be lowered on the west side of the quarry only, because the westward-dipping ash bed, which is unusable, already has been encountered on the east side. West side lowering of the quarry floor must not disturb the outslope, which provides a visual barrier.

The Forest Service uses approximately 2,000 to 3,000 cubic yards per year for road maintenance. At this rate, the materials source will be exhausted in about 10 years. Because there is a limited amount of rock left in this pit, future use should be reserved for the Forest Service exclusively.

McPheeters M.S.

McPheeters Materials Source is located approximately 1.5 miles east of Highway 97 and 3 miles northwest of Smith Rock State Park. It contains clean, durable rock suitable for use in paved roads although the north side of the pit contains clayey material. Due to questions concerning land ownership in the area, property lines will be posted on the ground by April 1989, by a surveyor under contract to the Forest Service.

The Oregon State Highway Division developed the quarry originally, and over the course of many years removed approximately 50,000 cubic yards of rock. Jefferson County removed 30,000 cubic yards in 1986 for use as base rock and as leveling rock on about 15 gravel county roads.

A 1985 development plan is in need of updating using new land ownership determinations and detailed topographic data that will be available by April 1989. Rock from Phases 1, 2, and 3 of the 1985 plan were removed by Jefferson County in 1986, leaving approximately 70,000 cubic yards available

for future use in Phases 6 through 8. No drilling has been done in this quarry to delineate the extent of the resource. The quarry is at its limit of expansion on the north side due to visual constraints and due to the presence of a clay block that extends to an unknown depth and over which the basalt lava apparently flowed and abruptly decreased in thickness. Development of the quarry may continue indefinitely back into the hillside to the east and may extend to neighboring knobs to the south depending on the outcome of the property ownership determination.

Two rock quality tests were run in 1987 by the state, one of which was from 1-inch-minus rock that Jefferson County had crushed. The crushed rock had test results as follows: abrasion of 16, fine aggregate degradation of 30, and sand equivalent of 35; fines with a liquid limit of 45 and plasticity index of 16 were present in the sample. This sample does not meet requirements for oil rock, but may be used on gravel roads. A second rock sample from the quarry had test results as follows: abrasion of 17, fine aggregate degradation of 17, and sand equivalent of 41; no fine-grained sand, silt, or clay were present. This sample meets specifications for oil rock.

The Federal Highway Administration would like to obtain 20,000-30,000 cubic yards for construction work on the road south of Haystack Reservoir in about 2 or 3 years. The state would like to remove about 40,000 cubic yards for overlay work on the Madras Highway in about 4 or 5 years. The Forest Service uses approximately 300-400 cubic yards per year for road maintenance.

The state is the primary user of this pit and apparently owns the mineral rights in the area where the materials source will be developed in the future. Because of this and because this pit is outside the Grassland boundary, it is recommended that the Forest Service examine the possibility of giving their portion of McPheeters M.S. to the state as part of a land exchange agreement.

Japanese Creek M.S.

Japanese Creek Materials Source is located approximately 1.5 miles south of Highway 26 and 4 miles southwest of Grizzly Mountain. It was developed by the state, and the material consists of clean, durable rock suitable for crushing. The Forest Service has used this rock for gabions at the Haystack Reservoir boatramp and uses 800-1,000 cubic yards per year for road maintenance.

No drilling has been done in this quarry, but the rock may extend to approximately 50 feet in depth based on the visually estimated thickness of this geologic unit exposed in outcrops one mile to the north as viewed looking south from Gray Butte. Opalized flow breccia from the top of the basaltic lava flow is present on the north side of the quarry. The rock unit dips 5 degrees to the southeast. Assuming that the quarry may be extended to the south approximately 1,000 feet, in an east-west direction 200 feet, and to a depth of 50 feet, the total resources of the quarry are roughly estimated as 370,000 cubic yards. Due to the remoteness and seclusion of the location, there are no visual constraints to development. The southern boundary of the Grassland occurs less than 1/2 mile south of the quarry.

Riprap

Riprap is large, durable pieces of rock that are placed to prevent erosion and thereby preserve the underlying surface or structure. There is only one material source on the Grassland with its primary use as supply of riprap, although several other materials sources may supply riprap as a secondary function.

Boyce M.S.

Boyce Material Source is located approximately 2 miles west of Highway 26 and about 3 miles northeast of Haystack Reservoir. The quarry is a roadcut along the east side of Road 89, and was probably developed by the state.

Rock that may be removed without adverse visual impact consists of 5-feet-minus boulders that are in two stockpiles of about 500 cubic yards each at the

north and south end of the quarry. Removal of these stockpiles would visually improve this quarry, but removal of additional rock would have an adverse visual impact. Fill piles have been placed near the center of the quarry, and these need to be leveled and seeded. Additional waste storage should be discouraged at this site due to its adverse visual impact.

This quarry recieves occasional use as a source of riprap. It is not needed for crushed rock due to visual constraints and the availability of rock from Japanese Creek M.S.

Borrow

Borrow is earth material such as sand and gravel that is removed to be used for fill at another location. All four of the materials sources in this category are in the Deschutes Formation.

Metolius M.S.

Metolius Materials Source is located on a ridge approximately three miles south of Madras, less than 1/4 mile east of Highway 26. This material consists of silty sand and gravel in horizontal beds. It has been used continually by Jefferson County at a rate of 4000 to 5,000 cubic yards per year as base rock and leveling rock on gravel county roads. A privately-owned gravel pit occurs to the north of this materials source.

The material is currently being removed by advancing an upper bench and two lower benches. Advancement of the upper bench removes the top of the ridge, and approximately 75 feet of the original ridgetop remains in the northern end of the pit. The two lower benches are at the same horizontal level but are advancing in opposite directions. No drilling has been done in this pit to determine material type with depth. Assuming that no unusable material is encountered, 500,000 cubic yards of this material may be remaining At the present rate of removal, the resource will last for well over 50 years. Development of the pit should take into account visual constraints, which will become important as excavation proceeds and the ridge becomes lower.

Grandview M.S.

Grandview Materials Source overlooks Lake Billy Chinook on the west side of the Deschutes River canyon, about 5 miles southwest of Round Butte Dam. Silty sand, gravel, and cobbles occur in this material source. Cobbles in this material are generally too numerous and too large for use on gravel roads. Use of this materials source, in the past, by the Forest Service road crew, required waste storage of large amounts of the excavated material.

Because this materials source is located inside Cove Palisades State Park and there is no anticipated demand for the rock, it is recommended that this materials source be rehabilitated and closed to future use.

Canal M.S.

Canal Material Source is located two miles east of Highway 97 and 1 mile north of McPheeters M.S. This site was developed as an artillery target range during World War II and has since been used as a borrow source and for waste storage. In one outcrop the material consists of approximately 30% silty sand and 70% gravel that is generally 1 to 3 inches in diameter. The site is currently within an off-road vehicle (ORV) management area and is being used by motorcycles and all-terrain vehicles. Because this material is not in demand and is low in quality, it is hereby recommended that this materials source be closed and rehabilitated for use by recreational vehicles.

Big Canyon M.S.

Big Canyon Material Source is located south of the Metolius River, approximately 4 miles southwest of Round Butte Dam. This materials source is not in current use and was not visited for review in this report. Leroy Burke, of the Forest Service road crew, reports that the rock consists of clayey gravel and is not suitable for use on the gravel roads in the area.

Because there is no anticipated demand for the rock, this materials source should be rehabilitated and closed to future use.

Projections of Future Use

Materials supplies are adequate for the next 10 years, but it is unclear whether or not there will be adequate supplies further into the future. Visual constraints, noise constraints, and other limits on development of materials sources will make development of new sites more difficult as population in the area increases. In addition, increasing numbers of houses in the Madras-Redmond-Prineville area will occupy areas that could otherwise be good sources of material, bringing added pressure on Forest Service land to supply rock to the county and state.

Projections of the amount of material that will be needed by the State, Jefferson County, Federal Highway Administration, and Forest Service were obtained by contacting each agency. The use of the materials determines the type of material needed, and supplies of materials are needed as close to the area of use as possible to reduce haul distances and thereby reduce costs. As a result, the use for the material is noted and the amount of material is attributed to specific materials sources that contain rock of appropriate quality and that are located close to the area of use.

Oregon State Highway Division

In a telephone conversation with Rolland Van Cleave on 10-7-88, future needs of the Oregon State Highway Division were estimated as:

Round Butte M.S.--approximately 4,000 to 5,000 cubic yards per year for road sanding on state highways in the Madras area.

McPheeters M.S.--approximately 40,000 cubic yards will be needed in about 1991, for an overlay on the Highway 97 high bridge over the Crooked River (T. 13 S., R 13 E., Sec. 32).

Japanese Creek M S.--If rock is not available from McPheeters due to ownership problems, the rock may be obtained from Japanese Creek M.S.

The State does not anticipate expanding Highway 97, between Redmond and Madras, to a 4-lane highway in the forseeable future.

Jefferson County

In a telephone conversation with Don Wood on 10-7-88, future needs of Jefferson County were estimated as:

Metolius M.S.--approximately 2,000 to 4,000 cubic yards per year for road maintenance in the Madras area.

The County has approximately 700 miles of road, of which about 200 miles are paved. The County is paving some of their gravel roads each year, and expect this paving program to continue for about 20 years. Most of the material needed for their paving is obtained in a private quarry about 2 miles northwest of the townsite of Grizzley, from which they extract approximately 50,000 to 60,000 cubic yards per year. The County expects this quarry to be able to continue to supply large quantities of rock for the next 20 years

Federal Highway Administration

In the same telephone conversation with Don Wood on 10-7-88, future needs of the Federal Highway Administration were estimated as:

McPheeters M.S.--approximately 20,000 to 30,000 cubic yards to move the road on the south side of Haystack Reservoir from its current route through a farmer's yard to a nearby route on land donated by the farmer. The road work would be done in about 1991 or 1992, by the Federal Highway Administration in cooperation with Jefferson County and Ochoco National Forest.

The Federal Highway Administration paves public access roads into national forest land using money directly from Congress. The Federal Highway

Administration can pave only state or county roads, not Forest Service Roads--Forest Service roads are paved by private contractors using Forest Service money budgeted to the Federal Road Program. The Oregon State Highway Division, representing itself and the counties, meets with the Forest Service and the Federal Highway Administration yearly to decide which state and county roads the Federal Highway Administration should pave for Forest land access.

Forest Service

In a conversation with Jim Zimmerlee of the Ochoco National Forest Engineering Office on 10-14-88, the issue of Forest Service jurisdiction versus Jefferson County jurisdiction on roads leading into the Grassland was discussed. Some county roads provide access to Grassland land only and the Forest Service would like to obtain jurisdiction over them and maintain them at the level at which they receive use. Some roads currently maintained by the Forest Service primarily serve residents of the area, and the Forest Service would like to give its jurisdiction of these roads to the County. Overall, there are more roads for which the Forest Service wants to give jurisdiction to the County than the Forest Service wants to obtain from the County. If the jurisdiction exchange occurs, the County would have additional roads that would eventually be paved by them using rock mostly from the private quarry north of Grizzly Butte.

In a conversation with Leroy Burk on 10-7-88, future needs of the Forest Service on the Grassland were estimated as:

Cyrus M.S.--approximately 3,000 to 4,000 cubic yards per year for road maintenance and small projects.

Schmoker M.S.--approximately 2,000 to 3,000 cubic yards per year for road maintenance.

McPheeters M.S.--approximately 300 to 400 cubic yards per year for road maintenance in the immediate vicinity.

Japanese Creek M.S.--approximately 1,000 cubic yards per year for road maintenance and for the new boat ramp and parking area at Haystack Reservoir.

Boyce M.S.--approximately 400 pieces of 2-feet to 4-feet diameter riprap for use at Haystack campground.

A new pit run or grid roll rock source on the west side of the Deschutes River would be valuable for Forest Service road maintenance in that area. Approximately 2,000 cubic yards would be used per year on Road 6350 and Road 6360 if a suitable rock source could be found. Grandview M.S. and Big Canyon M.S. are in the area but are not suitable for pit run or grid roll use. Examination of the area for a potential material source should concentrate on the area where the Clarno Formation is exposed.

Table I-6 summarizes the availability and demand for rock from each materials source. The estimated amount of rock available from each materials source is based only on brief visual inspection except at Cyrus M.S., where drilling has been done. As a result, these estimated amounts are subject to revision, pending drilling.

A total of approximately 9,000 to 15,000 cubic yards of material are removed from the Grassland yearly for maintenance of gravel roads and sanding icy paved roads. An additional 30,000 cubic yards are removed approximately every 5 years for paving projects by the Oregon State Highway Division, Jefferson County, and the Federal Highway Administration. Material is obtained mostly by three agencies from four materials sources: the Oregon State Highway Division (4,000-5,000 cubic yards per year from Round Butte M.S., of which approximately 1,000 cubic yards per year is from the Forest Service portion of Round Butte M.S.), Jefferson County (4,000-5,000 cubic yards per year from Metolius M.S.), and the Forest Service (7,000-9,000 cubic yards per year dominantly from Cyrus M.S. and Schmoker M.S.).

At the present rate of use, rock supplies are adequate for the next 20 years. It is important to note that this assumes that the estimated resource figures are accurate. After 20 years, Round Butte M.S., Schmoker M.S., and Boyce M.S. will be exhausted. It is unclear whether or not there will be adequate supplies further into the future due to the difficulty of projecting a future rate of use.

TABLE I-6
AVAILABILITY AND DEMAND FOR MATERIALS
(Quantities Listed are in Cubic Yards)

		FUTURE USE				
Materials Source	Estimated Resource	State	Jefferson Co	Federal Highway Admin	USDA Forest Service	Years Remaining
Round Butte *	100,000	4,000-5,000/Yr				20
Big Canyon	Unknown	**	**	**	**	Unknown
Metolius	500,000		4,000-5,000/Yr			100
Schmoker	30,000				2,000-3,000/Yr	10
Fence	600					Unknown
Grandview	Unknown	**	**	**	**	Unknown
Boyce	1,000				500 in 1989	5
Haystack	15,000					Unknown
Geneva	9,000		Minor Use			Unknown
Canal	1/	1/	1/	1/	1/	
McPheeters 2/	Pending a 4/89 survey	40,000-1991		20,000-30,000 in 1991 or 1992	300-400/Yr	Pending
Cyrus	150,000				3,000-4,000/Yr	37-50
Japanese Cr	370,000	40,000 in 1991 3/			1,000/Yr	50

* Approximately 1,000 cubic yards per year of this 4,000 to 5,000 per year total is obtained from the Forest Service portion of Round Butte M S , the majority of the rock is from the state-owned portion of the materials source The estimated resource amount includes both the state-owned and Forest Service-owned portions

** Not currently in demand.

1/ *Recommended for closure*

2/ Initial entry and development is in the Forest Service-owned portion of the materials source Continued development will enter onto the state-owned portion, most of the resource is state-owned

3/ If not obtained from McPheeters

Figure I-4

MATERIALS SOURCES

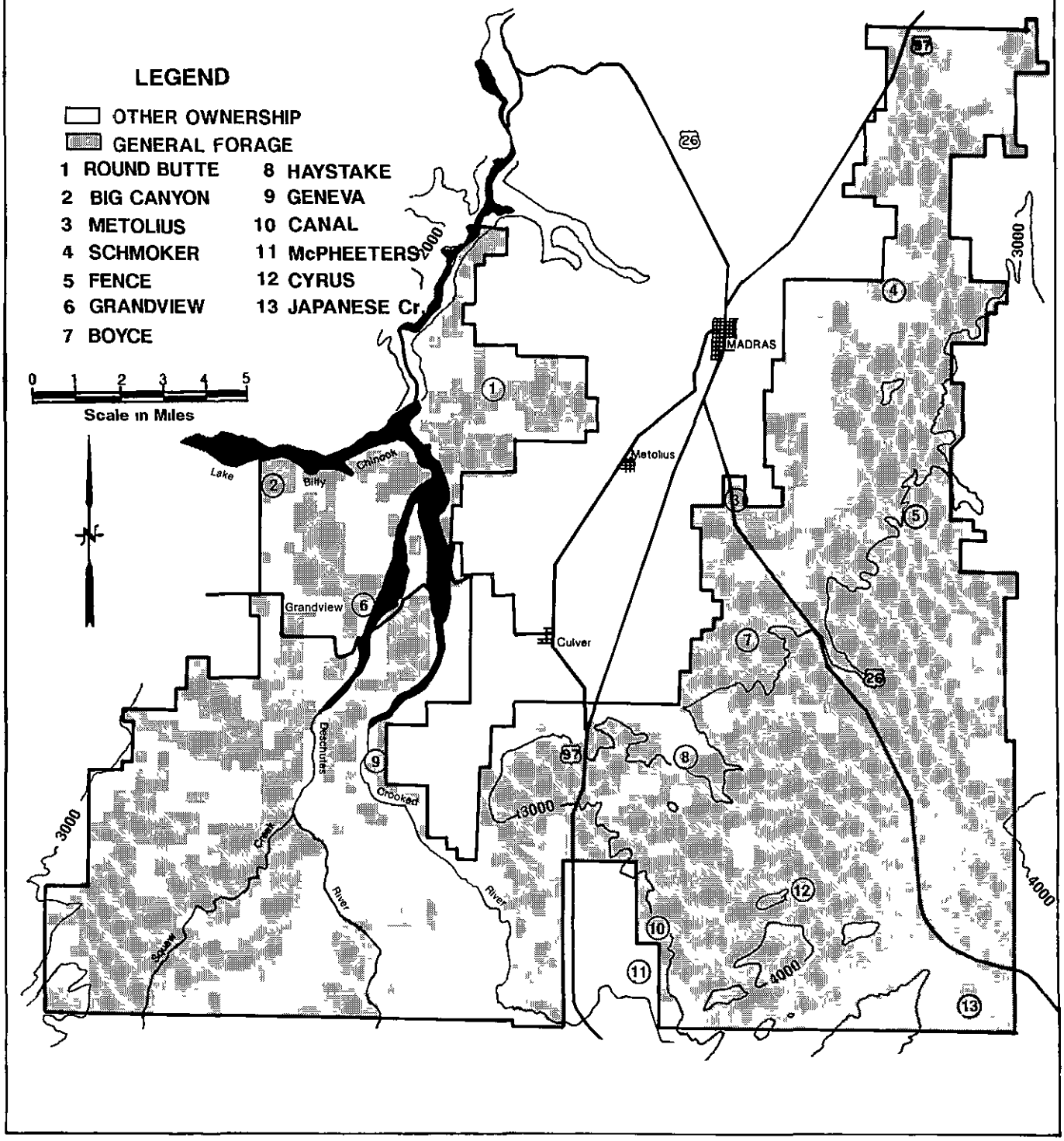
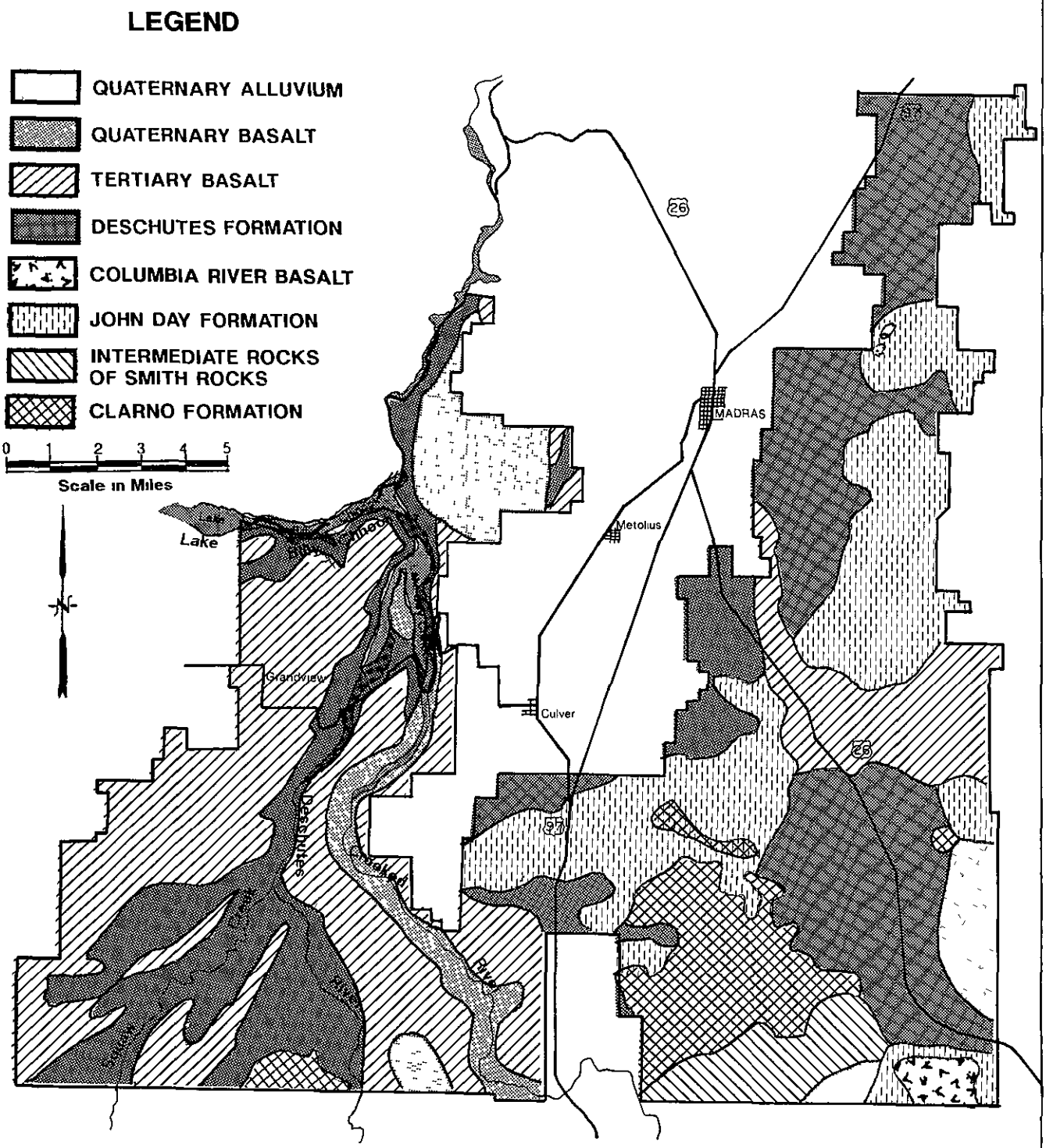


Figure I-5

GEOLOGIC MAP



Appendix J

Rimrock Springs Wildlife Management Area

Appendix K

Cove Palisades State Park

Appendix J

Rimrock Springs Wildlife Management Area

Management Plan and Memorandum of Understanding

The Rimrock Springs Wildlife Management Area is located in the center of the Crooked River National Grassland, adjacent to State Highway 26, midway between Prineville and Madras.

The presence of ponds and springs in a semiarid grassland ecosystem provides a wide variety of plant communities and unique wildlife habitat in a relatively small area. The presence of rimrock, old homesteads with farm fields, and a variety of plant communities on various soil types adds to the diversity.

In the past, activities have focused on administrative grazing and hunting uses. More recently, demand for environmental study, wildlife viewing, photography, and nature study by numerous individuals and groups has increased.

Because of these demands, the 450-acre area has been developed cooperatively with the state and private groups. Two official documents dealing with the area, both signed in 1981, are on file and can be viewed at the Ochoco National Forest Supervisor's Office.

Rimrock Springs Wildlife Management Area Management Plan - this document was developed by the Forest Service. While the Grassland Plan provides a description of the area, emphasis and desired future condition (Chapter 4, Section 2), as well as management practices, standards and guidelines, this management plan contains more detailed descriptions of habitat and wildlife, and actions to be taken in order to meet objectives for the area.

Memorandum of Understanding between the USDA Forest Service and the Oregon Department of Fish and Wildlife for Administration of Rimrock Springs Area - this document was drawn up in cooperation with the two mentioned parties, and outlines the administration of the area, the responsibilities and coordination of agencies involved, and contains the legal description of the area.

Appendix K

Cooperative Agreement With the State of Oregon for Cove Palisades State Park

Background

Cove Palisades State Park is a developed recreation complex - campgrounds, boat ramps, swimming beaches, and picnic grounds - located on the Deschutes and Crooked River arms of Billy Chinook within the boundaries of the Crooked River National Grassland.

Land ownership within the park is a mix of State and Federal lands totalling 7,000 acres, as follows:[1]

State Land	1,434 acres
Leasedfrom Forest Service (National Grassland)	2,695
Leased from BLM	1,170
Lake Billy Chinook	1,700

Except for the proposed Island Research Natural Area and fire protection, the park is managed by the State Division of Parks and Recreation with little input or interference from the Forest Service.

The park was originally located along the Crooked and Deschutes Rivers, but was relocated to higher ground along the shores of Lake Billy Chinook and expanded when the Round Butte Dam was constructed.

A file (2740) located at the Ochoco National Forest Supervisor's Office includes the cooperative agreement between the State of Oregon and Department of Agriculture, signed April 9, 1940, and extensive correspondence between the State and Forest Service regarding the park. Over the years, three main issues have surfaced.

Park Boundary

The files indicate that modification of the park boundary has been discussed by the Forest Service and State, but never fully resolved. In their 1981 master plan, the State proposed changing the park boundary to eliminate 1,080 acres of National Grassland land, located on the outer edges of the park on the plateaus above the canyon rim, that were not considered essential to the managing of the park.

Transfer of Ownership

The files indicate that the idea of transferring most of the National Grassland lands within the park boundary to the State has also been discussed repeatedly. The concept has been supported by both parties, but a transfer has not yet taken place.

The most recent attempt at a land transfer was tabled when the Forest Service/BLM interchange was proposed several years ago. Apparently, the feeling was that the Federal agencies should resolve the land ownership problems between themselves before attempting to deal with the State.

One parcel within the park boundary that the Forest Service has expressed its intent to retain is the Island Research Natural Area, located on a peninsula between the Crooked and Deschutes River arms of Lake Billy Chinook. Most of the Island is under BLM administration, and both agencies agree to manage it as a research natural area.

If Forest Service lands within the park boundary were transferred to the State, the lease agreement would no longer be needed.

[1] from The Cove Palisades State Park Master Plan, State of Oregon Department of Transportation, 1981

Minerals

Proposed policies for managing minerals on National Grassland lands within the park boundary have generated the greatest amount of discussion between the State and the Forest Service.

In 1982, the Forest Service prepared an environmental assessment responding to seven applications for oil and gas leases on National Grassland lands within the park. The Forest Service's preferred alternative proposed leasing 900 acres with standard stipulations, 1,000 acres with special stipulations, and 800 acres with no surface occupancy.

In responding to the proposal, the state park administrator stated:

> "We strongly recommend that the...Park...not be leased for mineral exploration or only non-surface leasing be considered..."

The National Park Service expressed the opinion that because the park had been developed in part with funds from the Land and Water Conservation Fund, use other than for outdoor recreation could only be permitted if permission was granted from the Secretary of Interior.

The debate never came to a head because the environmental assessment was never signed, and the leases were not developed. However, it is likely there will be interest in leasing again at some time in the future, which suggests that the underlying issues need to be resolved.

Appendix L

Haystack Reservoir

Appendix L

Haystack Reservoir Recreation Management Plan

Haystack Lake, a 233-acre reservoir, was constructed in 1958. It was constructed to provide interim storage of irrigation water for the Madras-Culver area. North Unit Irrigation District oversees the flow of water and manages the dam and related facilities. The dam was constructed by the Bureau of Reclamation. Reservoir capacity is 5,635 acre feet and is usually held at 80 percent capacity. Water comes to the reservoir from Wickiup Reservoir, via the Deschutes River from Wickiup to Bend, and by canal from Bend.

The reservoir is administered by several federal, state, and county agencies. These include the U.S. Forest Service - Crooked River National Grassland, the Bureau of Reclamation, Oregon Department of Fish and Wildlife, Oregon State Marine Board, North Unit Irrigation District, and Jefferson County. Since each agency has different management objectives, a plan was necessary in order to guide the overall management of the area in a manner agreed upon by all. Consequently, the Haystack Reservoir Recreation Management Plan was developed in 1986.

The plan elaborates on a number of factors involving the reservoir, including:

The Physical Setting - vegetation, wildlife, fisheries and unique habitats; topography and climate; man-made facilities and other recreation sites.

The Social Setting - types of recreational experiences available and the amount and type of contact between people.

The Managerial Setting - management policies and objectives of the agencies involved; public comments and concerns which were well documented through on-site interviews, public meetings and the involvement of local representatives serving on the Haystack Area Planning Committee.

Summary of Past Land Management - land transfer proposals, management agreements, leases, and permits.

Future Management - special zones, area specific developments, a development schedule, and monitoring methods.

The Haystack Reservoir Recreation Management Plan is on file in the Ochoco National Forest Supervisor's Office.

Bibliography

BIBLIOGRAPHY

Adams, Darius M., Haynes, Richard W , "Changing Perspectives on the Outlook for Timber in the United States." *Journal of Forestry*; 1985.

Advisory Council on Historic Preservation, *Treatment of Archaeological Properties - A Handbook.* Part II, Section X, Washington, DC; 1980.

Aho, Paul E., "Decay of Grand Fir in the Blue Mountains of Oregon and Washington Pacific Northwest Forest and Range Experiment Station." USDA Forest Service PNW-229, Portland, OR, 1977

Alderfer, R. B ; Robinson, R R , "Runoff from pastures in relation to grazing intensity and soil compaction." *J Am Soc Agron.* 39:948-58; 1947.

American Geological Institute, *Dictionary of Geological Terms.* Anchor Press. Garden City, NY; 1960.

Amman, Gene D ; et al., "Guidelines for Reducing Losses of Lodgepole Pine to the Mountain Pine Beetle in Unmanaged Stands in the Rocky Mountains." Intermountain Forest and Range Technical Report INT-36; 1977.

Anderson, Henry W., "Sediment Deposition in Reservoirs Associated With Rural Roads, Forest Fires and Catchment Attributes." In Proc. Symp. Man's effects on erosion and sedimentation. UNESCO. International Association of Hydrology Science Publication 113, 1974. pp. 87-95.

Anderson, Henry W., et al , "Forests and Water' Effects of Forest Management on Floods, Sedimentation, and Water Supply." USDA Forest Service General Technical Report PSW-18, 1976.

Anderson, R. G., et al., "Snags," pp. 60-77, in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington.* Edited by J. W Thomas. USDA Forest Service Agriculture Handbook No 553; 1979. 512 p.

Anon , "Water Quality Management for National Forest System Lands in California." FSH 2509.22 Region 5, USDA Forest Service, 1985.

Ashwill, Melvin, "An Exposure of Limestone at Gray Butte, Jefferson County, OR " in *Oregon Geology*, Vol. 41, #7, July, 1979

Bacon, Warren R.; Dell, John. "National Forest Landscape Management." Vol 2, Ch. 6, Ag. Handbook No. 608, USDA Forest Service, 1985.

Bailey, Robert G , "Proceedings of the Workshop on Lessons from Using FORPLAN " Washington DC; USDA Forest Service; 1986.

Baker, D. L.; et al , "Energy - and Nitrogen-based Estimates of Elk Winter-Range Carrying Capacity." *Journal of Wildlife Management* 46(1): 12-21; 1982.

Balda, Russell; Brown, Jeffery, "Use of Nest Boxes in Ponderosa Pine Forests." Dept Bio Sciences, N. Ariz Univ, Flagstaff, AZ; 1984

Balda, Cunningham, & Gaud, "Selection and Use of Snags by Secondary Cavity-nesting Birds of the Ponderosa Pine Forest." USDA Forest Service Research Paper RM-222, 1980

Baldwin. E M *Geology of Oregon*. Kendall/Hunt Publishing Co, Dubuque, Iowa, 1981.

Barrett, James W., "Silviculture of Ponderosa Pine in the Pacific Northwest: The state of our knowledge" Pacific Northwest Forest and Range Experiment Station, USDA Forest Service PNW-97 Portland, OR, 1979

Barrett, James W., et al , "Northwestern Ponderosa Pine and Associated Species " In. Burns, Russell M , tech comp. Silvicultural Systems for Major Forest Types of the United States Agriculture Handbook No 445. Washington, D C., USDA Forest Service; 1983; pp 16-18.

Barrett, James; Roth, Lewis P , "Response of Dwarf Mistletoe Infested Ponderosa Pine to Thinning " Pacific Forest and Range Experiment Station Research Paper PNW-330; 1985.

Bates, Robert L , *Geology of the Industrial Rocks and Minerals* Dover Publication, Inc, NY; 1969

Beall, R. C , "Winter habitat selection and use by a western Montana elk herd " Ph D. Diss , Univ Mont., Missoula; 1974. 197 p

Beaulieu, John D., "Geologic Formations of Eastern Oregon " Oregon Dept of Geology and Mineral Industries Bulletin 73, 1972

Behan, Ph. D., Mark J , "The Cycle of Minerals in Forest Ecosystems." In. combined business meeting, Intermountain Fire Research Council and Symp , 1970

Behrens, Norm, "Personal Communication " Oregon Department of Fish and Wildlife; 1985

Bergstrom, Dorothy, "Trees Help Keep a Forest Fertile " Forest Research West, USDA Forest Service May, 1979.

Berry, J A., "Modeling the impact of logging debris in streams " In Watershed Management ASCE - 1975 Proc. Watershed Mgt. Symp.; 1975, pp. 676-680.

Beschta, Robert L., Johnson, Michael G , "Logging, Infiltration Capacity and Surface Erodibility in Western Oregon." *Jour of For* Vol. 78 No. 6; June, 1980

Blackburn, W. H , "Livestock Grazing Impacts on Watersheds." Rangelands 5(3) 123-125, 1983.

Borden, John H , Doliner, Laura H , "Pest Terms. A Glossary of Forest Pest Management Terms " Center for Pest Management, Dept of Biological Sciences, Simon Fraser Univ. Burnady, B C V5A156, 1984

Bottom, D. L.; et al., "The Effects of Stream Alterations on Salmon and Trout Habitat in Oregon " Oregon Department of Fish and Wildlife, Portland, OR; 1985.

Bowen, R G., et al , "Low-to-Intermediate-Temperature Thermal Springs and Wells in Oregon " Oregon Department of Geology and Mineral Industries, GMS-10, 1978

Boyer, Donald E.; Dell, John D , "Fire effects on Pacific Northwest Forest Soils " USDA Forest Service, Pacific Northwest Region, Watershed Management, and Aviation and Fire Management, Portland, OR ; 1980.

Brody, S., *Bioenergetics and Growth.* Hafner Publishing Co Inc , New York; 1945. 1023 p

Brooks, H C., "Quicksilver in Oregon." Oregon Department of Geology and Mineral Industries, Bulletin 55; 1963.

Brooks, H.C., "Quicksilver Deposits in Oregon " Oregon Department of Geology and Mineral Industries, Miscellaneous Paper 15, 1971.

Brooks, H.C., "Ochoco National Forest Geology." Oregon Department of Geology and Mineral Industries, unpublished report, 1976.

Brooks, H.C, and Ramp, L., "Gold and Silver in Oregon." Oregon Department of Geology and Mineral Industries, Bulletin 61; 1968.

Brooks, H C and Ferns, M L , "Geology and Mineral Industries of the Ochoco National Forest " Excerpts from a Report in Preparation USFS unpublished report, 1968.

Brown, C.E. and Thayer, T.P , "Geologic Map of the Canyon City Quadrangle, Northeastern Oregon." USGS Miscellaneous Geologic Investigations, Map I-447, 1·250,000, 1966

Brown, George W., Krygier, James T , "Changing water temperatures in small mountain streams " Journal of Soil & Water Conservation 22 242-244, 1967

Brown, H.E., et al , "Opportunities for Increasing Water Yield and Other Multiple Use Values on Ponderosa Pine Forest Lands." Rocky Mountain Forest and Range Experiment Station USDA Forest Service, Research Paper RM-129 36 p ; 1974.

Bruns, Herbert, "The Economic Importance of Birds in Forests." Bird Study, Vol 7(4): 193-208; 1960.

Bryant, L D , "Response of Livestock to Riparian Zone Inclusion " Journal of Range Management. 35(6). 11-82; 1982.

Bryant, Richard; et al., "The Effects of Yarding Operations on Archaeological Sites " Volume II A report prepared by professional analysts for the Pacific Northwest Region, USDA, Forest Service, Portland, OR, 1982

Bull, Evelyn, "Habitat utilization of the pileated woodpecker, Blue Mountains of Oregon." Thesis, Oregon State University; 1975.

Bull & Meslow, "Habitat requirements of the pileated woodpecker in northeastern Oregon." Journal of Forestry, Vol. 75(6)· 335-337, 1977.

Bullard, W. E., "Effect of Highway Construction and Maintenance on Stream Sediment Loads." USDA Miscellaneous Publication 970 Symposium 1. - Land erosion and control; 1963

Bureau of Mines, U.S. Department of the Interior. "Mineral Commodity Summaries, 1987." Bureau of Mines; 1987

Campbell, R. W; et al , "Predation by birds and ant affects aggregation of the western spruce budworm." From *The Role of the Host in the Population Dynamics*, L Safranyik editor, Pacific Forest Center of the Canadian Forest Service, Victoria, B C ; 1983.

Campbell, T.M., "Short-term Effects of Timber Harvest on Pine Marten Ecology." M S. Thesis, Colorado State University Fort Collins, Colorado, 71 p., 1979

Canyon Creek Youth Conservation Corps., "Mines of the Ochoco Mountains." unpublished report, Ochoco National Forest, 1974.

Carlson, Clinton E.; et al , "The Western Spruce Budworm in Northern Rocky Mountain Forests: A Review of Ecology, Past Insecticidal Treatments and Silvicultural Practices." Forest Science Laboratory, Missoula, MT; 1983.

Carlson, Clinton E.; et al., "Alternatives to Chemical Insecticides in Budworm - Susceptible Forests Western Wildlands." Forest Science Laboratory, Missoula, MT; 1983.

Central Oregonian, Jan 17·1 (col. 3) "Moulding Plant County's Top Employer." 1984.

Chamberlin, T. W., "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America: Timber Harvest " USDA Forest Service, General Technical Report PNW-136; 1982

Chambers, C. T., "A Second Look at Thinning: The Effect of Thinning on Allowable Cut - The State Position." DNR No. 17, State of Washington; January 1977.

Christner, J , "Changes in Peak Streamflows from Managed Areas of the Willamette National Forest " USDA Forest Service, Pacific NW Region.

Cleary, Brian D., et al , "Regenerating Oregon's Forests· A Guide for the Regeneration Forester." Oregon State University School of Forestry, Corvallis, OR; 1978

Cochran, P. H.; Seidel, K W., "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " Pacific Northwest Forest and Range Experiment Station USDA Forest Service PNW-121 Portland, OR; 1981.

Confederated Tribes of the Warm Springs Reservation, "Warm Springs Reservation Comprehensive Plan (Draft)." [Place of publication unknown]; [Date unknown]. 429 p.

Cole, David N., Schriner, Edward G. S., "Impacts of Backcountry Recreation: Site Management and Rehabilitation--An Annotated Bibliography." USDA Intermountain Forage and Range Exp Sta., General Technical Report INT-121; 1981.

Cole, Walter E.; McGregor, Mark D., "Reducing or Preventing Mountain Pine Beetle Outbreaks in Lodgepole Pine Stands by Selective Cutting." [Proceedings of IUFRO Banff Centre Sept. 1983 L Safranyik (Editor)] Pacific Fy Res. Centre of Can Fy. Service, Victoria BC, 1983.

Cornish, P. M , MacKay, S M., "Effects of Wildlife and Logging on the Hydrology of Small Catchments Near Eden, N.S.W " In The First National Symposium on Forest Hydrology, Melbourne, Australia; 1982

Corono, Julie M., Wilcox, William R , "Western Wood Heating Value Calculator; Colorado State Forest Service " Colorado State Univ , Fort Collins, CO, Sept 1980.

Cox, D P et al., "Mineral Deposit Models " USGS Bulletin 1693, 1987.

Crawford, Hewlette S , et al , "Effects of Fire on Fauna " A state-of-knowledge review-- USDA Forest Service General Technical Report WO-6, US Government Printing Office Washington, D C , 1978; 22 p

Cromack, Jr , et al , "A Comparison of Harvesting Methods and their Impact on Soils & Environment in the Pacific Northwest " From: Forest Soils & Land Use, Proc Fifth N A For Soils Conf , Aug 6-9, 1978

Crook, County of. "Crook County--Prineville Area Comprehensive Plan." Prineville, OR; 1978; 209 p

Crouch, Glenn L., "Wild Animal Damage to Forests in the United States and Canada." Pac. N.W. Reg. & Expt. Sta. USDA. Olympia, WA; 1976.

Crow, James F., Kimuna; Matoo. "The Measurement of Effective Population Numbers." Evaluation 17(13); 1963, pp 279-288.

Curtis, Robert O., "Growth and Yield in Uneven-Aged Stands." [Combined proceedings of two in-service workshops, Uneven-Aged Silviculture and Management in the U.S.] Timber Mgt. Reg. F.S. USDA. Washington, D.C ; 1976

Dasmann, et al., "Ecological Principles for Economic Development." 1973; pp 22-23.

Davis, Goodwin, et al , "Snag Habitat Management: Proceedings of the Symposium." USDA Forest Service General Technical Report RM-99; 1983.

Deschutes, County of. "Deschutes County Year 2000 Comprehensive Plan." Bend, OR; 1979; p. 272.

Dolliner, Laura H; Borden, John H. "PESTERMS. A Glossary of Forest Pest Management Terms " Center for Pest Management, Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A156; 1984.

Dolph, Robert E "How to Hazard Rate Lodgepole Pine or Second-growth Ponderosa Pine Stands and Develop Management Guidelines to Prevent Future Mountain Pine Beetle Losses." Pacific Northwest Region V.S.E.S. Department of Agriculture, Portland, OR, 1983.

Dolph, Robert E.; Filip, Gregory M., "Forest Insect and Disease Activity on the Ochoco National Forest and Guidelines for Preventing/Reducing their Losses." Pacific Northwest Region of Forest Service, Department of Agriculture, Portland, OR, 1980

Dolph, R. E.; Sartwell, Charles , "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine." Pacific Northwest Forest and Range Experiment Station USDA Forest Service. Research Note PNW-268, 1976

Dryden, M., "Interim Cultural Resource Inventory Design for the Ochoco National Forest and Crooked River National Grassland." Working Paper edited by Thomas L. Burge, Prineville, Oregon. Ochoco National Forest ; 1988

Dyrland, Richard D., "Resource Capability System, a User's Guide." Part VI. *Basic Economic Concepts and Procedures* San Francisco, CA. USDA Forest Service, Region 5, Division of Soils and Watershed Management; 1973.

Dyrness, C. T.; et al , "Research Natural Area Needs in the Pacific Northwest " General Technical Report PNW-38. Portland, OR· USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1975; 231 p

Edgerton, P. J.; McConnel, B. R. "Diuvnal temperature regimes of logged and unlogged mixed conifer stands on elk summer range." USDA Forest Service Pacific Northwest Forest and Range Experiment Station La Grande, OR Res Note PNW-277, 1976; 6 p

Ellison, A. C., "Changes in Peak Streamflow " In a letter to R-6 Forest Supervisors, March 6, 1981.

Ferns, M.L , "Mining Activity and Exploration in Oregon, 1988 " *Oregon Geology*, Oregon Department of Geology and Mineral Industries, Vol 51, #2, March 1989.

Ferns, M L. and Brooks, H C , "Geochemical Survey of the Western Part of the Ochoco National Forest, Crook and Wheeler Counties, OR." Oregon Department of Geology and Mineral Industries, Open-File Report 0-83-4; 1983.

Ferns, M.L. and Huber, D F , "Mineral Resources Map of Oregon." Oregon Department of Geology and Mineral Industries, GMS-36, 1 500,000, 1984.

Filip, Gregory M., "Forest Pest Survey of the Ochillee Stand." Prineville R.D., Ochoco National Forest, Pacific Northwest Region Forest Service USDA,Portland, OR; 1983.

Fischer, et al., "Habitat management for hole-nesting birds in forests of western larch and Douglas-fir " *Journal of Forestry*, Vol 77(8): 480-483; 1979.

Fouch, T.D , "Petroleum Potential of Wilderness Lands in Oregon " USGS Miscellaneous Investigation Series Map I-1544, 1983.

Francis, D D , Schepers, J S , "Chemical Water Quality of Runoff from Grazing Land in Nebraska: I. Influence of Grazing Livestock " Journal of Environmental Quality Vol 11 No. 3, 1982; pp 351-354.

Frankel, Goheen; et al., "Effects of Management Activities and Dominant Species Type on Pest-caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests " Pacific Northwest Region Forest Service - USDA. Portland, OR, 1984

Franklin, Jerry F. et al , "Ecological Characteristics of Old-Growth Douglas-fir Forests." Gen Tech. Rep. PNW-118 USDA Forest Service, Pacific Northwest Region. 382 pp , 1981.

Franklin, Jerry F.; Dyrness, C. T , "Natural Vegetation of Oregon and Washington General Technical Report PNW-8 " Portland, OR: U S Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1973.

Fredriksen, R. L ; Harr, R A., "Soil, Vegetation and Watershed Management of the Douglas-Fir Region In Forest Soils of the Douglas-fir Region " Washington State University, Pullmann, WA; 1979

Froehlich, Henry A , "Predicting Soil Compaction on Forest Land." Oregon State Univ. Forest Eng Dept, Dec. 1980

Froehlich, H A , "Soil Compaction From Logging Equipment: Effects on Growth of Young Ponderosa Pine " Journal of Soil & Water Conservation, pp 276 - 278, 1979.

Galbraith, A. F., "A Water Yield and Channel Stability Analysis Procedure " Kootenai National Forest, U.S. Forest Service, Libby, MT, 1973; 38 p.

Gara, Robert I , "Insect Pests of Tree Firs in the Pacific Northwest " U of Wash. Proceedings of the Biology and Mgmt of Tree Firs Seattle, WA, Feb. 1981.

Gardner, R. B.; et al , "Road Design Guidelines for the Idaho Batholith, Based on the China Glenn Road Study " USDA Forest Service, Research Paper INT-204, 1978.

Garton, et al., "Effects of Stand Characteristics on Avian Predators of Western Spruce Budworm " From: *The role of the host in the population dynamics of forest insects* L Safranyik - Editor. Pacific Research Centre of the Canadian Forest Service, Victoria B C ; 1983

Gebhardt, K. A.; Johnson, C. W. "Predicting Sediment Yields from Sagebrush Rangelands " Agriculture Experiment Station University of Idaho, Moscow, ID, 1981

Geist, Michael, J.; et al., Research Progress Report; 1984.

Gibbs, Carter B., "Uneven-aged Silviculture and Management? Even-aged Silviculture and Management? Definitions and Differences." [Combined Proceedings Redding, Calif. Oct. 1976]. Timber Management Research, Forest Service USDA Washington, D.C.; 1976.

Glass, Jr , G. G , "The effects From Root Raking on an Upland Piedmont Loblolly Pine Site." Technical Report 56, School of For. Res. NC State U., Raleigh, NC; 1976; 44 p.

Godwin, L.H, et al., "Lands Valuable for Geothermal Resources." USGS, 1:500,000; 1974

Graham, Donald P., "A Training Aid on Dwarf Mistletoe and Its Control " Portland, OR USDA Forest Service, Pacific Northwest Region; 1967; 49 p.

Grant County, "Comprehensive Plan for Grant County, Oregon, John Day, OR." 1969, 24 p.

Gray, J.J., et al , "Mineral Assessment of the Southwest Quarter of the Stevenson Mountain 30- by 60-Minute Quadrangle, Jefferson and Crook Counties, Oregon." Oregon Department of Geology and Mineral Industries, Open-File Report 0-86-4; 1986.

Greene, R C , et al , "Geologic Map of the Burns Quadrangle, Oregon." USGS Miscellaneous Geologic Investigations, Map I-680, 1:250,000, 1972

Guenther, K ; Kucera, T , "Wildlife of the Pacific Northwest " USDA Forest Service, Pacific Northwest Region; 1978.

Haase, William R., "Mitigation of Chaining Impacts to Archaeological Sites " *Journal of Range Management* 36(2): 158-160, 1983.

Haines, Sr., L. W., et al., "The Effect of Mechanical Site Preparation Treatments on Soil Productivity and Tree Growth," Forest Soils and Forest Land Management by Bernie E. Weinget. Proc. 4th N4G. Soil Conf., Lawal, Quebec; 1975, pp 379-395

Hall, Frederick C., "Growth Basal Area: A Field Method for Appraising Forest Site Potential for Stockability." Can. Fr. of Fy. Res. Vol. 13 No 1; 1983

Hall, Frederick C., "Fire and Vegetation in the Blue Mountains: Implications for Land Managers " Proc Annual Tall Timbers Fire Biology Conference No 15· 155-170; 1976.

Hall, Frederick C., "Plant Communities of the Blue Mountain Area in Eastern Oregon and Southeastern Washington." USDA Forest Service Pacific NW Region-Area Guide 3-1, 1973

Harney, County of, "Comprehensive Plan, Oregon." (Place of publication unknown); (Date unknown). 140 p.

Harr, R D , "Movement of Subsurface Water on a Steep, Forested Slope " Trans Am Geogphys Union 56(8) 532, 1975

Harr, R D., "Forest Practices and Streamflow in Western Oregon " Gen Tech Rep. PNW-49, 18 p USDA Forest Service, 1976

Harr, Dennis R ; et al., "Changes in Streamflow Following Timber Harvest in Southwestern Oregon." USDA Forest Service Research Paper PNW-249, 22 p , illus Pacific Northwest Forest and Range Experiment Station, Portland, OR; 1979.

Harvey, Alan E., et al , "Decaying Organic Materials and Soil Quality in the Inland Northwest: A Management Opportunity." Gen Tech. Rep. INT-225, USDA Forest Service; 1987.

Hayes, H. H.; et al , "Temperature Effects on Physiological Traits of White-tailed Deer." Can. J. of Ecology 53: 679-685; 1975.

Helvey, J. D., "Effects of a North Central Washington Wildfire on Runoff and Sediment Production." Water Resources Bulletin, Amer. Water. Res Assn. Vol 16 No. 4; 1980; pp 627-634.

Helvey, J. D.; et al., "Climate and Hydrology of the Entiat Experimental Forest Watersheds Under Virgin Forest Cover." General Technical Report PNW-42. Portland, OR. USDA Forest Service Pacific Northwest Forest and Range Experiment Station; 1976; 18 p

Henjum; et al., "Habitat Effectiveness Index Model: Elk on Blue Mountain Winter Ranges." Ore. Dept. Fish and Wildlife, LaGrande, OR, 1985.

Hershey, T. J.; Leege, T A , "Influence of logging on elk summer range in north-central Idaho " pp. 73-80, in Proc Elk - Logging - Roads Symposium, Univ. Idaho, Moscow, 1976.

Hewlett, J. D , Doss, R., "Forests, Floods, and Erosion A Watershed Experiment in the Southeastern Piedmont." 1984, 433 p.

Hibbs, C.H , "Mayflower Claims Group (Ochoco Mining District) Preliminary Cultural Resource Evaluation and Recommended Management Direction." Unpublished report, Ochoco National Forest; 1979

Hinschberger M.; et al , "Gros Ventre cooperative elk study final report." 1974-1979. Wyoming Game and Fish Department, Cheyenne, and USDA Forest Service; 1980; 192 p

Hodgson, Allen H., "A History of the Ochoco National Forest " USDA, Forest Service; 1913

Hopkins; et al , "Sensitive Plant and Animal Field Guide for Area IV." USDA, Forest Service, R6-ECOL pp 1-131, 1983.

Hopkins, William E.; Kovalchik, Bernard L , "Plant Associations of the Crooked River National Grassland." R6 Ecol pp. 133-198 USDA Forest Service, Pacific Northwest Region; 1983

Houpt, H. F., "Road and slope characteristics affecting sediment movement from logging roads " *Journal of Forestry* 57.327-332; 1959.

Iverson, David C.; Richard M. Alston, "The Senesis of FORPLAN. Region 6 Training," USDA Forest Service, IMRS; 1986.

Jackman, Siri M ; Scott, Dr. J Michael, "Literature Review of Twenty-three Selected Forest Birds of the Pacific Northwest " USDA Forest Service, Pacific Northwest Region. 382 pp ; 1975

Jefferson County, "Comprehensive Plan." Madras, OR, 1981; 210 p

Jenson, M L and A.M. Bateman, *Economic Mineral Deposits* John Wiley and Sons, NY, 1981

Johnson, K , "Westside Coordination Meeting Notes " USDA Forest Service Memo; September 21, 1983

Justus, D.L., "Geothermal Energy in Oregon: Site Data Base and Developmental Status." US Dept. of Energy (Draft); 1979.

Keegan, Charles E. III; et al, "Changes in Production Efficiency in Montana's Forest Products Industry, 1976-1987." Montana Business Quarterly 25(4):8-12; 1987.

Keegan, Charles E. III; Polzin, Paul, "Trends in the Wood and Paper Products Industry and Their Impact on the Economy in the Pacific Northwest." Montana Business Quarterly 25(4) 2-7; 1987

Keen, F. P.; Miller, J M, "Biology and Control of the Western Pine Beetle." USDA; March 1960.

Kelly, James W.; et al, "FORPLAN Version I: User's Guide." USDA Forest Service, Washington DC, LMP Systems Sections; 1986.

Kent, Brian M.; et al, "FORPLAN," Version I: Mathematical Programmers' Guide. USDA Forest Service, Washington DC, LMP Systems Sections; 1985.

Keyser, James D.; et. al., "Editors Management Strategy for the Treatment of Lithic Scatter Sites" Studies in Cultural Resource Management No 7. Portland, Or USDA Forest Service Pacific Northwest Region; 1988.

Kidd, W. J; Megahan, W F., "Effects of Logging and Logging roads on Erosion and Sediment Deposition from Steep Terrain" In Journal of Forestry, Vol 70, No 3, March 1972.

Kimball, J.; Savage, F., "Diamond Fork Aquatic and Range Habitat Improvement" Ogden, Utah: USDA Forest Service, Intermountain Region; 1977, 19 p.

Klock, G. O.; Lopushinsky, W., "Soil Water Trends after Clearcutting in the Blue Mountains of Oregon." USDA Forest Service, PNW - 361; May 1980.

Koplin, James R., "Measuring predator impact of woodpeckers on spruce beetles." *Journal of Wildlife Management*, Vol. 36(2): 308-320, 1972

Kovalchik, Bernard L., "Preliminary Riparian Community Type Classification of Central Oregon" USDA Forest Service. Region 6 Ecology Program June 1986

Leckenby, D. A., "Elk use and availability of cover and forage habitat components in the Blue Mountains, Northeast Oregon, 1976-1982" Oregon Department of Fish and Wildlife, Report No 14. Portland, OR, 1984.

Leckenby, D A., "Management of mule deer and their habitat: applying concepts of behavior, physiology, and microclimate" West. Proc Ann Conf. West Assoc. State Game and Fish Comm. 57. 206-217; 1977.

Lewis, Robert C., "Policy Formation and Planning for Outdoor Recreation Facilities." Outdoor Recreation - Advances in Application of Economics, by Hughes and Lloyd, USDA Forest Service, General Tech. Report WO-2.

Leege; Nelson, J. R, "Nutritional requirements and feed habits." Chapter 8, *Elk of North America*. Edited by J W. Thomas and D. E Toweill. Stackpole Books; 1982, 698 p.

Likens, G. E.; et al, "Effects of Forest Cutting and Herbicide Treatment on Nutrient Budgets in the Hubbard Brook Watershed Ecosystem." Ecological Management 40:24-46; 1970

"Lithic Scatter Programmatic Memorandum of Agreement," Advisory Council on Historic Preservation, USDA Forest Service (Central and Eastern Oregon Forests) and Oregon State Historic Preservation Office, 1984

Long, B ; et al , "Gros Ventre Cooperative Elk Study -Final Report, 1974-1979 " Cheyenne, Wyoming, Wyoming Game and Fish Department and USDA Forest Service; 1980; 192 p

Loomis, John; Sorg, Cindy, "A Critical Summary of Empirical Estimates of the Values of Wildlife, Wilderness, and General Recreation Related to National Forest Regions Rock Mountain Forest and Range Exp Stn , USDA Forest Service, 1982

Lull, Howard W ; Reifsnyder, William E., "Radiant Energy in Relation to Forests " Tech Bull. No. 1344, U S Dept Agriculture; 1965

Lusby, G., "Hydrologic and biotic effects of grazing vs nongrazing near Grand Junction, Colorado " *J Range Mgmt.* 23(4).256-260, 1970

Lynch J. A ; et al , "Best Management Practices for Controlling Nonpoint-source Pollution on Forested Watershed." *Journal of Soil and Water Conservation* Vol. 40, No 1; 1985; pp. 164-167.

Lyon, Jack L.; et al., "Effects of Fire on Fauna " General Technical Report WO-6. Washington, D.D.. USDA Forest Service; 1978; 22 p.

Lyon, Jack, J , "Field Test of Elk/Timber Coordination Guidelines." USDA, Research Paper INT - 325, Ogden, UT, 1983

Lyon, L. J., Ward, A. L., "Elk and Land Management." pp. 443-477, in *Elk of North America - Ecology and Management*, ed J W Thomas and D.E Towell; 1982; 698 p.

Lyon, L J , "Habitat effectiveness for elk as influenced by roads and cover." *Journal of Forestry 77: 658-660*; 1979.

MacCracken, J. G , Hansen, R M , "Diets of domestic sheep and other large herbivores in south-central Colorado " *Journal of Range Management*; 34·242-243, 1981

MacMellon, C. R , "Woodpeckers as predators of the codling moth in Nova Scotia " *The Canadian Entomologist*, Vol XCI(11): 673-680, 1959

MacMellon, C. R , "Role of woodpeckers in control of the codling moth in Nova Scotia." *The Canadian Entomologist*; Jan 1958; pp 18-22.

Mackie, R J , "Impacts of livestock grazing on wild ungulates " Trans N Amer. Wildl. and Nat Res. Conf. 43.462-475; [Date Unknown].

Mahan, Mike, "Economic Survey Analysis " JTPA District 10. Salem, OR, State of Oregon, Employment Division, Department of Human Resources, 1984; 120 p.

Maley, T.S., "Mining Law from Location to Patent " Mineral Lands Publications, Boise, ID. 1985

Mannan, R.W., "Territory Size and Habitat Preferences of Pileated Woodpeckers in Western Oregon." OSU Corvallis Ag Exp Stat Tech., 1982

Manning, K.J., "Reconnaissance Geologic Report on a Portion of the Western Ochoco Mountains, Ochoco National Forest, Oregon, with an Emphasis on Rockhound Deposits " Ochoco National Forest, unpublished report; 1971.

Martin, R E., "Prescribed Burning for Site Preparation in the Inland Northwest " PNW Forest and Range Exp. Station, USDA Forest Service; 1976.

Martin, Robert E , "Fire history and its Role in Succession." In· Means, Joseph E , ed. Forest succession and stand development research in the Northwest Proceedings of a symposium, 1981; Corvallis, OR: Forest Research Laboratory, Oregon State University, 1982.

Mason, Richard R.; et al , "Douglas-fir Tussock Moth " USDA Pacific Northwest Region Forest Service; Forest Insect & Disease Leaflet #86, 1981.

McIntire, Tim, "Forest Health Through Silviculture and Integrated Pest Management - A Strategic Plan " USDA Forest Service, 1988, 26 p.

Megahan, W., "Channel stability and channel erosion processes " In· Proceedings, workshop on scheduling timber harvest for hydrologic concerns, Portland, OR, 1979.

Meyer, Walter H., "Yield of even-aged stands of ponderosa pine." USDA Technical Bulletin No. 630. Washington, D C.; 1938.

Minor, R ; et al , "Prehistory and History of the Ochoco National Forest, Central Oregon." Part I and Overview, and Part II Site Inventory. Cultural Resource Report No 3 Prineville, Oregon: Ochoco National Forest, 1987.

Minore, Don. "Comparative Autecological Characteristics of Northwestern Tree Species - A Literature Review." Pacific Northwest Forest and Range Experiment Station, USDA Forest Service General Technical Report, PNW 87; 1979.

Mitchell, R. G.; et al., "Thinning Lodgepole Pine Increases Tree Vigor and Resistance to Mountain Pine Beetle." Forest Service, Vol. 29 No. 1, 1983; pp 204-211.

Moehring, D. M.; et al., "Clearcutting vs. Alternative Timber Harvesting Regeneration Systems. Effects on Soils and Environment of the South." 1979; pp 447-515.

Moen, A M , "Wildlife Ecology." San Francisco W. H. Freeman and Co.; 1963; 458 p.

Nelson, J. R ; Thomas, Jaqck Ward, "Relationship of Elk and Other Large Herbivores in Elk and North America Ecology and Management." ed. J.W. Thomas and D.E. Towell. Stockpole Books, Harrisburg, PA, 1982; 698 p

Nelson R. L.; Platts, W S , "Streamside and Upland Vegetation Use by Cattle " Rangelands 7(1); 1985.

Newton, V.C., "Oil and Gas Exploration in Oregon." Oregon Department of Geology and Mineral Resources, Miscellaneous Paper #6; 1965.

Obermiller, W A , "Geologic, Structural and Geochemical Features of Basaltic and Rhyolitic Volcanic Rocks of the Smith Rock/Gray Butte Area, Central Oregon " MS Thesis, Dept. of Geology, University of Oregon, Eugene, OR, 1987.

Oregon Dept. of Geology and Mineral Industries. "Bibliography of the Geology and Mineral Industries." Bulletin 103; 1987

Oregon Dept. of Geology and Mineral Industries. "Geothermal Resources of Oregon " map, scale 1 500,000; 1982.

Oregon, State of. "Economic Development Department." County Economic Indicators, Salem, OR; 1984; 22 p

Oregon, State of Employment Division, Department of Human Resources "Data for 1984 Affirmative Action Programs (Crook County) " Salem, OR; [Date unknown], 18 p.

Oregon, State of. Employment Division, Department of Human Resources. "Data for 1984 Affirmative Action Program (Harney County)." Salem, OR; [Date unknown]; 18 p.

Pacha, R. E., "Effects of Dispersed Recreation on Water Quality." In Interior West Watershed Management symposium, April 1980, Spokane, WA. Edited by Baumgartner, Washington State University, Pullman. p. 161-168.

Parmeter, Jr, J. R., "Forest Stand Dynamics and Ecological Factors in Relation to Dwarf Mistletoe Spread, Impact, 2nd Control Symposium on Dwarf Mistletoe Control through Forest Management." April 11-13, 1978. Berkely, CA. Pacific Southwest Forest and Range Experiment Station, USDA Forest Service General Technical Report PSW - 31; 1978.

Paulson, Dale J., "Ochoco National Forest Soil Resource Inventory." USDA Forest Service, Pacific Northwest Region, 1977; 289 p.

Payne, G. F.; et al , "Vehicle Impacts on Northern Great Plains Range Vegetation " Journal of Range Management 36(3):327-331; 1983.

Peck, D L., "Geologic Map of Oregon West of the 121st Meridian." USGS Miscellaneous Investigation Series, Map I-325, 1 500,000, 1983

Pedersen, R. H., "Management and impacts of roads in relation to elk populations " Pages 169-173 in Proc. Rec. Impact on Wildlands Conf , Univ Wash , Seattle, 1978.

Pedersen, Richard, Biologist "Personal Communication." USDA, Forest Service, Regional Office, 1983.

Perry, C.; Overly, R , "Impacts of roads on big game distribution in portions of the Blue Mountains of Washington 1972-1973 " Washington Game Department Applied Research Section, Olympia, 1977, Bull 11 39 p

Philipek, Frances M., "Over-Snow Logging. Analysis of Impacts to Lithic Scatters. Studies in Cultural Resource Management." No. 5. Pacific Northwest Region USDA, Forest Service, Portland, OR; 1985.

Phillips, C.A., Roberts, R "Documentation of Wildlife Management Requirements." USDA Forest Service Memo, June 4, 1985

Phillips, et al , Wildlife Habitats and Species Management Relationship Program 1981

Picton, H D , "Land use impacts on elk in the Gallatin Valley." J. Soil and Water Conserv. 35(2). 93-95; 1980.

Platts, W. S.; Meehan, W R , "Livestock grazing and the aquatic environment " *Journal of Soil & Water Conservation* 1978, pp 274-278.

Platts, William S , "Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America· effects of livestock grazing " William R Meehan Ed. USDA Forest Service GTR-PNW-124, 1981, pp 9-12

Power, W E , "Effects & Observations of Soil Compaction in the Salem District " USDI, BLM, Technical Note, 1974

Programmatic Memorandum of Agreement for Management of Depression-Era Administrative Structures on National Forest Lands in Oregon and Washington. USDA Forest Service, Pacific Northwest Region, Oregon and Washington State Historic Preservation Offices, and the Advisory Council on Historic Preservation, 1983.

Raphael, Martin G.; White, Marshal, "Use of Snags by cavity nesting birds in the Sierra-Nevada." Supplement to Journal of Wildlife Management, Vol (48)10: 1-66; 1984

Ream, Catherine H. "The Effects of Fire and other Disturbances on Small Mammals and their Predators: An Annotated Bibliography." Intermountain Forest and Range Exp. Station; 1981.

Rice, R M., "A Perspective on The Cumulative Effects of Logging on Streamflow and Sedimentation In· Proceedings." Edgebrook Conference. Standiford, R B ; S I. Ramacher, ed Berkely, CA; 1980.

Rice, R. M ; et al., "A watershed's response to logging and roads. South Fork of Casper Creek California." 1967-1976. Research Paper PSW-146, 12 p. Southwest Forest and Range Experiment Station; 1979.

Rich, L. R.; Thompson, J.R., "Watershed Management in Arizona's Mixed Conifer Forests· The Status of Our Knowledge " Rocky Mountain Forest and Range Experiment Station. USDA Forest Service Research Paper RM-130, 15 pp.; 1974.

Rimal, D. et. al , "Sediment, Rock Chip and Drill Core Geochemical Analytical Data, Gray Butte Area, Crooked River National Grassland, Jefferson County, Oregon." USDI Bureau of Land Management, Oregon State Office, Portland, OR; 1987.

Robison, P.T. and Stensland, D. H., "Geologic Map of the Smith Rock Area, Jefferson, Deschutes and Crook Counties, OR " USGS Miscellaneous Geologic Investigation Series Map I-1142, 1:48,000; 1979

Rosenthal, Donald H.; Brown, Thomas C., "Comparability of Market Prices and Consumer Surplus for Resource Allocation Decisions." Journal of Forestry, pp 105-109; 1985.

Robson, Thomas P.; Stanford, Richard B., "Management of the Eastside Pine Type in Northeastern California Proceedings of Symposium." June 1982. Northern California School of American Foresters. SAF 83-06; 1983.

Roth, Lewis F.; et al , "Marking Ponderosa Pine to Combine Commercial Thinning and Control of Armillaria Root Rot " *Journal of Forestry*; Vol 75 No 10; Oct. 1977.

Rothwell, R.L., "Watershed Management Guidelines for Logging and Road Construction in Alberta " Information Report NOR-X-208. Northern Forest Research Center, Edmonton, Alberta, Canada, 1978.

Rothwell, R L , "Erosion and Sediment Control at Road-Stream Crossings." The Forestry Chronicle 4·83; 1983, pp 62-66

Row, Clark H., et al , "Discount Rate for Long-Term Forest Service Investments." 1981.

"Runoff from pastures in relation to grazing intensity and soil compaction " *J. Am Soc.* Agron 39 948-58.

Russell, Kenelm W , "Precommercial Thinning in Dwarf Mistletoe Control " Washington State Department of Natural Resource, Olympia, WA, [No date]

Ruttner, Franz, "Fundamentals of Limnology " 3rd University of Toronto Press, 1963, 295 p

Sartwell, Charles, Dolph, R E , "Silvicultural and Direct Control of Mountain Pine Beetle in Second-Growth Ponderosa Pine." Research Note PNW-268 Portland, OR. USDA Forest Service Pacific Northwest Forest and Range Experiment Station; 1976.

Schmitt, Craig, L , et al , "Effects of Management Activities and Dominant Species Type on Pest Caused Mortality Losses in True Fir on the Fremont and Ochoco National Forests." Portland, OR USDA Forest Service, Pacific Northwest Region; 1984.

Schuster, Ervin G ; et al., "Provisions for Protecting and Enhancing Nontimber Resources in Northern Region Timber Sales." Intermountain Forest and Range Experiment Station, USDA Forest Service, Ogden, UT; 1984

Schwavzbart, Gideon, Schmitz, Patrick L., "Methods for Evaluating Energy Effects of Forest Management Alternatives." Volume 1 Berkeley, CA. USDA - Forest Service, Management Sciences Staff, 1982

Seidel, K W , "Natural regeneration after shelterwood cutting in a grand fir - Shasta red fir stand in central Oregon " USDA Forest Service, Research Paper PNW - 259, 1979

Seidel, K. W ; Cochran, P. H., "Silviculture of Mixed Conifer Forests in Eastern Oregon and Washington " General Technical Report PNW-121 Portland, OR. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1981

Shirley, R F., "Area Recommended for a Recreation Withdrawal from Mineral Entry for all Non-Metalliferous Minerals, Including, but Not Limited to, Agate, Jasper, Thundereggs, Limb Casts and Related Minerals Under the Authority of the Act of June 25, 1918 " 43 USC 141, 142 unpublished report, Ochoco National Forest; 1970.

Shirley, R F., "Mineral Report, Rockhound Areas, Ochoco National Forest, and Crooked River National Grasslands " Unpublished report, Ochoco National Forest, 1966.

Sidle, R. C., "Impacts of Forest Practices on Surface Erosion." PNW 195; 1980, pp 5-9.

Skeesick D G ; Stewart, K.S., "Stream Rehabilitation Needs Associated with Timber Harvest Units and Roads " USDA Forest Service, Willamette National Forest; 1981

Skinner, Q , et al , "Effects of summer use of a mountain watershed on bacterial water quality Journal of Environmental Quality 3(4) 329-325; 1974

Smith, B , "Lands Valuable for Oil and Gas " Oregon USGS Map, 1:500,000, 1976

Soule, M E , Thresholds for survival· maintaining fitness and evolutionary potential." In M. E. Soule and B. A. Wilcox (ed) *Conservation biology; an evolutionary-ecological perspective.*" Sinauer Assoc , Inc., Sunderland, MA 345; 1980.

Sparrow, S D ; et al., "Effects of off-road vehicle traffic on soils and vegetation in the Denali Highway region of Alaska " Journal of Soil and Water Conservation Vol 33(1); 1978, pp 20-27.

Spitz, Jim, "Socio-Economic Overview of the Ochoco National Forest and Crooked River National Grassland." Prineville, OR, Ochoco National Forest; 1982, 137 p

Steele, R W.; Barney, R. J , "Bulldozers in Fire Management· Current Designs and Uses "
USDA Forest Service Intermountain Forest and Range Experiment Station, Research Note INT-328, 1983.

Stone, E., "The impact of timber harvest on soils and water." In Rep. President's
Advisory Panel on Timber and The Environment, 1973; pp 427-467.

Stoszek, Karel J., "Protection Concerns in Plantation Establishment." [Proceedings of tree
planting in the inland northwest] - D. Baumgartner editor, Feb 1976; Washington State University, Pullmen, WA; 1976

Street, Bill, "Economic Survey Analysis, JTPA District 12." Salem, OR, State of Oregon,
Employment Division, Department of Human Resources, 1985, 120 p.

Street, Bill, "Economic Survey Analysis, JTPA District 14 " Salem, OR, State of Oregon,
Employment Division, Department of Human Resources, 1985, 120 p.

Styskel, E. W., "Problems in snag management implementations - a case study " pp 24-27
in Proc. Snag Habitat Mgt. Symposium USDA Forest Service Rocky Mountain Range and Experiment Station, General Technical Department RM-99 Ft Collins, CO, 1983

Swanson, D A., "Reconnaissance Geologic Map of the East Half of the Bend Quadrangle,
Crook, Wheeler, Jefferson, Wasco and Deschutes Counties, OR " USGS Miscellaneous Investigation Map I-568, 1:250,000; 1969

Swanston, D N., "Impact of Natural Events." In: Influence of Forest and Rangeland
Management on Anadromous Fish Habitat in Western North America, USDA Forest Service, GTR PNW-104; 1980

Swinney, C M, et al., "Reconnaissance Geologic Map of the Lookout Mountain Quadrangle,
Crook and Wheeler Counties, Oregon." USGS Miscellaneous Geologic Investigations, Map I-543, 1.62,500; 1968,

Teply, John, "Ochoco National Forest - Summary Tables for Timber Resource Inventory "
Pacific Northwest Region F S USDA Portland, OR, 1982.

Theisen, Peter A., "Gains and Benefits from Tree Improvement." Pacific Northwest Region
USFS Department of Agriculture Tree Improvement Training Packet No. 1; Aug 26, 1980.

Thomas, Jack Ward, "Wildlife Habitats in Managed Forests The Blue Mountains of Oregon
and Washington." Agriculture Handbook No. 553, USDA Forest Service; 1979.

Tout, Deborah S., "Mineral Potential Report." Crooked River National Grassland, 1988.

Troendle, C.A.; Leaf, C F , "An Approach to Water Resources Evaluation of Non-point
Silvicultural Sources " Chapter 3, Hydrology. EPA 60018-80-012, 173 pp. Env. Research Lab Athens, GA, 1980.

USDA Forest Service "A Report on Minimum Management Requirements for Forest Planning on
the National Forests of the Pacific Northwest Region." June 1986

USDA Forest Service, Pacific Northwest Region "Regional Guide for the Pacific Northwest
Region." Covering Forest programs that affect the States of Oregon, Washington, and portions of California and Idaho, 1984

Utzinger, Don, M.S. Graduate Student "Personal communication " Portland State
University; 1985

Volland, Leonard A , Dell, John D , "Fire Effects on Pacific Northwest Forest and Range Vegetation." USDA Forest Service, Pacific Northwest Region, Portland, OR; July 1981.

Walker, G W., "Geologic Map of Oregon East of the 121st Meridian " USGS Miscellaneous Investigations Series, Map I-902, 1 500,000; 1977.

Ward, L A , "Elk behavior in relation to multiple uses on the Medicine Bow National Forest." *Proc. West. Assoc State Game & Fish Comm 53:125-141; 1973.*

Waters, A.C., "Reconnaissance Geologic Map of the Post Quadrangle, Crook County, Oregon." USGS Miscellaneous Geologic Investigations, Map I-542,1:62,500; 1968.

Waters, A.C, and R H Vaughan, "Reconnaissance Geologic Map of the Eagle Rock Quadrangle, Crook County, Oregon " USGS Miscellaneous Geologic Investigations, Map I-540, 1:62,500, 1968.

Waters, A.C, and R H Vaughan, "Reconnaissance Geologic Map of the Ochoco Reservoir Quadrangle, Crook County, Oregon." USGS Miscellaneous Geologic Investigations, Map I-541, 1:62,500; 1968.

Waters, A.C., "Reconnaissance Geologic Map of the Bend Quadrangle, Jefferson and Wasco Counties, OR -" USGS Miscellaneous Geologic Investigations Map I-555, 1:125,000, 1968

Webb, R. H.; et al , "Environmental Effects of Soil Property Changes with Off-Road Vehicle Use." Environmental Management Vol. 2, No 3, 1978; pp 219-233.

Wert, S ; Thomas, B. R , "Effects of Skid Roads on Diameter, Height & Volume Growth in Douglas-Fir." Soil Sciences of America Journal, Vol. 45; 1981; pp 629-632

Wessenborn, A.E , "Mineral and Water Resources of Oregon " Oregon Department of Geology and Mineral Industries, Bulletin 64; 1969.

Wheeler County and the Cities of Fossil, Mitchell, and Spray. Comprehensive Plan. Technical Report (Draft). Pendleton, OR, East Central Oregon Association of Counties; 1980; 260 p.

Wick, H. L.; Canutt, P. R., "Impacts on wood production." Pages 148-161 in *Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington.* ed J W Thomas. USDA Forest Service Agriculture Handbook No 553; 1979; 512 p.

Wickman, Boyd E.; et al , "Douglas-fir Tussock Moth " Forest Insect and Disease Leaflet #86. Portland, OR· USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1981.

Williams, H , "A Geological Map of the Bend Quadrangle, OR " Oregon Dept of Geology and Mineral Industries, Map, Scale 1 125,000; 1957.

Winters, R.A., "Mineral Investigation of the Deschutes Canyon, RARE II Area (No. 6321), Jefferson and Deschutes Counties, OR " USDI Bureau of Land Management, Portland State Office, Portland, OR, 1983

Wollott, S T ; Pullar, D M , "Changes in Soil Physical Properties under Grazed Pastures." Journal of Soil Resource, 22: 342-348, 1984

Wooldridge, D D , "Suspended Sediment from Truck Traffic on Forest Roads, Meadow and Local Creeks." Water Quality Planning, Office of Water Programs, Department of Ecology, Olympia, WA, 1979

Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

* *Term is defined in the Glossary*

Acronym	Definition
"8A"	Contracts set aside for Minority Contractors
A	Alternative A
A.	Acres
ACF	Acre Foot *
ACHP	Advisory Council on Historic Preservation *
ADRV	Air Quality Related Values
AFDC	Aid for Dependent Children
AIRFA	American Indian Religious Freedom Act
AMP	Allotment Management Plan
AMS	Analysis of the Management Situation *
ASQ	Allowable Sale Quantity *
ATV	All-Terrain Vehicle *
AU	Animal Unit *
AUM	Animal Unit Month *
B-MOD	B-Modified Alternative
BD	Brush Disposal
BG	Big Game Habitat (Area Management Objective) *
BLM	Bureau of Land Management
BMP	Best Management Practices *
BOR	Bureau of Reclamation
B.t.	*Bacillus thuringiensis* *
BTU	British Thermal Units
C-MOD	C-Modified Alternative
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFL	*Commercial Forest Land* *
CFR	Code of Federal Regulations
CMAI	Culmination of Mean Annual Increment *
CRITFC	*Columbia River Inter-Tribal Fish Commission*
CRNG	Crooked River National Grassland
DBH	Diameter Breast Height *
DC/SF	Deschutes Canyon/Steelhead Falls
DEIS	Draft Environmental Impact Statement *
DEP	Departure *
DEQ	Oregon Department of Environmental Quality
DF	Douglas Fir
DIB	Diameter Inside Bark
DOGAMI	Oregon Department of Geology and Mineral Industries
E-DEP	E-Departure Alternative
EA	Environmental Assessment *
EA	Euro-American (Cultural Resources)
ECA	Equivalent Clearcut Area *
EEO	Equal Employment Opportunity
EFSA	Escaped Fire Situation Analysis
EHA	Equivalent Harvest Area *
EHE	Earned Harvest Effect *
EIS	Environmental Impact Statement
EO	Executive Order
EPA	*Environmental Protection Agency*
FDR	Forest Development Road *
FEIS	Final Environmental Impact Statement *

FIA	Forest Influence Area
FMEI	Fire Management Effectiveness Index *
FORPLAN	Forest Planning Model
FPFO	Forestry Program for Oregon *
FRES	Forest and Range Environment Study
FS	Forest Service
FS	Forest Supervisor
FSH	Forest Service Handbook
FSM	Forest Service Manual
FUD	Fishing User Days
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year *
HE	Habitat Effectiveness *
HEI	Habitat Effectiveness Index
HCI	Habitat Capability Index *
I	Alternative I
ICO	Issues, Concerns, and Opportunities
ID	Interdisciplinary
IDT	Interdisciplinary Team (ID Team) *
IMPLAN	Forest Service Input-Output Economic Model *
IPM	Integrated Pest Management *
K-V	Knutson - Vandenberg Act of 1924 *
KV	Kilovolt
LIDES	Local Interactive Digitizing and Editing System
LMP	Land Management Planning
LP	Lodgepole Pine
LP	Linear Programming
LRMP	Land and Resource Management Plan
LTSYC	Long Term Sustained Yield Capacity *
M	Roman Numeral for 1000 *
MA	Management Area *
MA-D1-14	Management Area-Draft Plan, Areas 1-14
MA-F1-28	Management Area-Forest Plan, Areas 1-28
MA-G1-16	Management Area-Grassland Plan, Areas 1-16
MAI	Mean Annual Increment *
MAR	Management Attainment Report
MAX	Maximum Viable Population
MBF	Thousand Board Feet *
MC	Mixed Conifer *
MCF	Thousand Cubic Feet
MIS	Management Indicator Species *
MM	Million *
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MO	Management Objective
MOA	Memorandum of Agreement *
MOU	Memorandum of Understanding
MR	Management Requirement *
MRVD	Thousand Recreation Visitor Days
MVP	Minimum Viable Population *
NA	Native American
NC	No Change Alternative
NEPA	National Environmental Policy Act *
NFCR	North Fork Crooked River
NFDRS	National Fire Danger Rating System
NFF	National Forest Fund *
NFMA	National Forest Management Act *
NFS	National Forest System Land *

NIRP	National Information Requirements Project
NWPS	National Wilderness Preservation System
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle *
ONF	Ochoco National Forest
ORV	Off-Road Vehicle *
OSWC	Oregon State Wildlife Commission (Now ODFW)
PAMARS	Program Accounting Management Attainment Reporting System
PAOT	Persons at One Time *
PL	Public Law (also P.L.)
PMOA	Programmatic Memorandum of Agreement
PNV	Present Net Value *
PNW	Pacific Northwest
PP	Ponderosa Pine
PSD	Prevention of Significant Deterioration
R	Rural (ROS Classification) *
R-6	Forest Service, Northwest Region
RAMIS	Range and Management Information System
RARE II	Roadless Area Review and Evaluation *
RIM	Recreation Information Management *
RMO	Road Management Objective
RN	Roaded Natural (ROS Classification) *
RNA	Research Natural Area *
RO	Regional Office
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum *
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974
RVD	Recreation Visitor Days *
RWS	Recreation Wilderness Spectrum *
SCORP	State-wide Comprehensive Outdoor Recreation Plan
SEV	Soil Expectation Value
SHPO	State Historic Preservation Officer (or Office) *
SIP	State Implementation Plan (for Air Quality)
SMU	Streamside Management Units
SPM	Semiprimitive motorized (ROS Classification) *
SPNM	Semiprimitive Nonmotorized (ROS Classification) *
SRI	Soil Resource Inventory *
STARS	Sale Tracking and Reporting System.
S&G	Standards and Guidelines
T&E	Threatened and Endangered Species
T/R	Area to be developed for Timber/Forage Production
TIS	Transportation Inventory System
TRP	Timber Resource Plan
TSI	Timber Stand Improvement *
TSP	Total Suspended Particulates
TSPIRS	Timber Sale Program Information Reporting System
USDA	United States Department of Agriculture
USFS	United States Forest Service
VAC	Visual Absorption Capability
VIS	Visitor Information Service
VMS	National Forest Visual Management System
VQO	Visual Quality Objective
WFUD	Wildlife/Fish User Day *
WRS	Wilderness Resource Spectrum *
WS	Wild and Scenic Designation
WSA	Wilderness Study Area
WUD	Wildlife User Day

Glossary

GLOSSARY

These definitions apply to Forest Service land management and planning. Meanings may differ when used in another context. Some definitions were shortened, paraphrased or adapted to fit local conditions Definitions of other terms used in resource management but not included in this glossary may be found in the following publications·

* American Geological Institute; *Dictionary of Geological Terms*. Doubleday & Company Inc., New York, 1962.

* Kothman M.M., *A Glossary of Terms Used in Range Management*. Society for Range Management, 1974

* Mifflin, Ronald W. and Hiton H Lysons. *Glossary of Forest Engineering Terms*. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1979

* Schwarz, Charles F ; Thor, Edward C., Elsner, Gary H. *Wildland Planning Glossary* USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, General Technical Report PSW-13, 1976.

A

ACCEPTABLE RIPARIAN CONDITION - A shady, brushy riparian condition with frequent amounts of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen; the site has the potential to produce conifers and/or hardwood species. Moderately gentle bank slopes containing moderate to high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas Frequent channel scouring and deposition will largely be replaced by mossy aquatic growth on assorted sizes of tightly packed rocks.

ACRE EQUIVALENT - Used to adjust actual acres of habitat improvement or improvement structures to reflect overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species For example, a single water development for upland game birds has an acre equivalent of 160, whereas a single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals

ACRE FOOT (ACF) - A unit for measuring a volume of water. Quantity of water required to cover 1 acre (43,560 square feet) to a depth of 1 foot

ACRES OF DEGRADED WATERSHED CONDITION - represents existing soil/watershed areas which are degraded and contributing to loss in site productivity and/or creating water quality deterioration when hazardous events occur. The Soil/Water Restoration Inventory (1979) for the Ochoco National Forest (located at the Ranger District Offices) delineates these areas.

ACTIVITY - Actions, measures, or treatments that are undertaken that directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives. Forest Service activity definitions, codes, and units of measure are contained in the Management Information Handbook (FSM 1309 11.).

ADVISORY COUNCIL ON HISTORIC PRESERVATION (ACHP) - An independent advisory body established by the National Historic Preservation Act of 1966. The mission of the Council is to advise the President and Congress on national historic preservation policies, to encourage private and public interest in historic preservation, and to review and comment on Federal undertakings that might have an effect on properties listed on or eligible for the National Register of Historic Places

ALL-TERRAIN VEHICLE (ATV) - An abbreviation whose initials stand for All-Terrain Vehicle, which is any motorized off-highway vehicle 50 inches or less in width ATV's usually have a dry weight of 600 pounds or less, traveling on three or more low pressure tires and having a seat designed to be straddled by the operator

AIRSHED - A geographical area that, because of topography, meteorology, and climate, shares the same air.

ALLOTMENT - see Range Allotment

ALLOWABLE SALE QUANTITY (ASQ) - (Comparable to programmed allowable harvest used in previous plans). The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan This allowable sale quantity (ASQ) is usually expressed on an annual basis as the "average annual allowable sale quantity." (FSM 1900).

ALL-TERRAIN VEHICLE (ATV) - Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low pressure tires with a seat designed to be straddled by the operator Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less as recommended by the vehicle manufacturer.

ALTERNATIVE - One of several policies, plans, or projects proposed for decision making.

AMENITY - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity value is typically used in land-use planning to describe those resource properties for which market values (or noncash values) are not or cannot be established, such as hiking or scenic viewing.

ANADROMOUS FISH - Those species of fish that mature in the sea and migrate into streams to spawn Salmon, steelhead, and searun cutthroat trout are examples

ANALYSIS AREA - An area of land (not necessarily contiguous) which for FORPLAN analysis purposes has homogeneous timber management costs and vegetative responses to timber management activities.

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) - A step required under the National Forest Management Act in which the Forest determines its ability to supply goods and services to meet society's demand for them.

ANIMAL UNIT (AU) - An animal unit is a 1,000 pound mature cow, or its equivalent based on an average daily forage consumption of 26 pounds dry matter per day.

ANIMAL UNIT MONTH (AUM) - The amount of forage required by an animal unit for one month.

ANNUAL PROGRAMMED HARVEST - That part of the potential timber yield that is scheduled for harvest in a specific year.

APPROPRIATE SUPPRESSION RESPONSE - The kind, amount, and timing of suppression action on a wildfire which most efficiently meets fire management direction under current and expected burning conditions. The action may be from prompt control to confinement. (See definitions for confine, contain, and control.)

AQUEOUS - Of, relating to, or resembling water

ARCHAEOLOGY - The scientific study of the physical characteristics of cultural resources in order to describe and explain former ways of life

ARTERIAL ROAD - Roads comprising the basic access network for National Forest System administrative and management activities. These roads serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. They provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary

travel routes. The location and standards are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually they are developed and operated for long-term land and resource management purposes and constant service.

B

***Bacillus thuringiensis* (*B.t.*)** - A biological agent used to initiate insecticidal treatments of the western spruce budworm populations.

BACKGROUND - The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. (See "Foreground" and "Middleground.")

BASALT - A dark gray to black, fine-grained igneous rock.

BENCHMARK - An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints.

BENEFIT COST RATIO - An economic indicator of efficiency, computed by dividing total priced benefits by priced costs Usually both benefits and costs are discounted so that the ratio reflects efficiency in terms of the present value of future benefits and costs.

BEST MANAGEMENT PRACTICES (BMP) - A specific activity, measure, course of action, or treatment.

BIG GAME (BG) - Those species of large mammals normally managed for sport hunting, generally elk, deer, and antelope.

BIOLOGICAL DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan

BIOLOGICAL POTENTIAL - The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

BOARD FOOT - A unit of timber measurement equaling the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

*Board foot volume measurement varies with size of trees and is designed for certain product specifications and current technology Young stands that have been regenerated cannot be measured in board foot or equivalent units of measurement, attempting to do so would underestimate the biological potential of timber producing lands and make future growth estimates impossible See cubic foot

BRECCIA - A rock made up of highly angular coarse fragments

BROADCAST BURN - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as silvicultural treatment, or both.

C

CANOPY CLOSURE - The progressive reduction of space between crowns as they spread laterally, increasing the canopy density.

CAPABILITY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as on the application of management practices, such as silviculture or protection from fire, insects, and disease

CAPITAL INVESTMENT COST - Costs generally associated with construction such as trails, roads, and physical structures for range, recreation, and fish and wildlife. Other major functions include reforestation, timber stand improvement and prescribed burning.

CAVITY - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals.

CINNABAR - A mineral (HgS) which is the principal ore of mercury

CLEARCUTTING - The harvesting in one cut of all trees on an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield

COLLECTOR ROAD - Roads that serve smaller land areas than a Forest arterial road, and usually connected to a Forest arterial or public highway. Collect traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long-term multiresource service needs, as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility

COMMERCIAL FOREST LAND (CFL) - Forest land that is producing or is capable of producing crops of industrial wood and (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; and (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within 5 years after final harvesting.

COMMERCIAL THINNING - A cut in a stand under rotation age designed to remove excess merchantable trees The objective is to place the growth capability of the site on the remaining leave trees

COMMODITY - A transportable resource product with commercial value, all resource products that are articles of commerce

COMMON VARIETY MINERAL - Saleable minerals.

COMMUNITY COHESION - The degree of unity and cooperation evident in a community as it defines problems and attempts to resolve them.

COMMUNITY STABILITY - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change

COMPACTION, SOIL - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density

CONCERN - A point, matter, or question raised by management that must be addressed in the planning process.

CONFINE - To limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions. Suppression action may be minimal and limited to surveillance under appropriate conditions

CONSTANT SERVICE - A road developed and operated for continuous or annual recurrent service.

CONTAIN - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions

CONTROL - To complete the control line around a fire, any spot fires therfrom, and any interior islands to be saved, burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the contol line, until the line can reasonably be expected to hold under foreseeable conditions

CONVERSION PERIOD - A transition period during which an unregulated forest structure is converted to a regulated one. When regulated, the forest will have a distribution of stand age and size classes, providing approximately equal periodic harvests.

CORD - A unit of volume measurement containing 128 cubic feet of solid wood Generally a stack of round or split wood measuring 4 feet wide by 4 feet high by 8 feet long.

CORRIDOR - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

COST EFFICIENCY - *The usefulness of specified inputs (costs) to produce specified outputs (benefits).* In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

COVER/FORAGE RATIO - The ratio, in percent, of the amount of area in cover condition to that area in non-cover or forage condition; the criteria by which potential deer and elk use of an area is judged

COVER - Vegetation used by wildlife for protection from predators, to ameliorate conditions of weather, or in which to reproduce.

CUBIC FOOT - In timber management a volume measured as a 1 foot cube of solid wood.

*Growth and inventory of forest stands is measured in units of cubic foot volume because it is independent of numerous product requirements occurring within a locale, region, or the nation as a whole

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - The age at which a stand of trees no longer increases in average annual growth

CULTURAL RESOURCES - The remains of sites, structures, or objects used by humans in the past--historical or archaeological.

CULTURAL RESOURCES - Physical remains of districts, sites, structures, buildings, networks, or objects used by humans in the past. They may be historic, prehistoric, archaeological, or architectural in nature Cultural resources are land based and are nonrenewable

CUMULATIVE EFFECTS - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

CURRENT DIRECTION - The direction contained within the following plans that has guided the recent management of the Forest and Grassland.

1. Ochoco-Crooked River Planning Unit Land Management Plan, 1979
2. Silvies-Malheur Planning Unit Land Management Plan, 1978
3. Crooked River National Grassland Land Management Plan, 1980

4. South Fork Planning Unit Land Management Plan, 1978
5. Timber Resource Plan Ochoco National Forest, 1979

D

DATA - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer forms.

DATA RECOVERY - Collection of information through any of a variety of techniques (e.g., photography, mapping, archaeological excavation) conducted for purposes of No Adverse Effect or mitigating Adverse Effect. Data collection is designed to recover representative data from a cultural resource prior to its disturbance or destruction.

DBH - *D*iameter at *b*reast *h*eight. Diameter of a tree 4 feet 6 inches above the ground.

DECISION CRITERIA - Essentially the rules or standards used to evaluate alternatives. They are measurements or indicators that are designed to assist a decisionmaker in identifying a preferred choice from an array of possible alternatives.

DECISION VARIABLE - A component of an alternative in which input costs, outputs and benefits are identified and used for analysis and decision making.

DEMAND - The amount of goods or services that will be consumed if offered over a given range of prices at a particular point in time.

DEMOGRAPHIC - Pertaining to the study of the characteristics of human populations, such as size, growth, density, distribution, and vital statistics.

DEPARTURE (DEP) - Timber harvest schedule which deviates from the principle of nondeclining even flow by exhibiting a planned decrease in the timber sale and harvest schedule in the future. A departure is characterized as a temporary increase over the base sale schedule without impairing the Forest's long-term sustained-yield.

DETERMINATION OF ELIGIBILITY - Formal determination by the Keeper of the National Register, Department of Interior, as to whether or not a cultural resource is eligible for listing on the National Register of Historic Places.

DETERMINATION OF EFFECT - Determination of the effect (No Effect, No Adverse Effect, Adverse Effect) a proposed undertaking will have on cultural resources listed on or eligible for the National Register of Historic Places. Requires consultation with the State Historic Preservation Officer and may require review by or consultation with the Advisory Council on Historic Preservation.

DEVELOPED RECREATION - Recreation that requires facilities that, in turn, result in concentrated use of an area. Examples of recreation areas are campgrounds and ski areas; facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

DISCOUNT RATE - The interest rate used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits to a common time basis.

DISPERSED RECREATION - A general term referring to recreation use outside a developed recreation site; this includes activities such as scenic driving, hunting, backpacking, and recreation in primitive environments.

DISPERSION - To disperse the effects of timber harvest by distributing harvest units more or less uniformly throughout a drainage so that increased runoff and sediment from disturbed sites will be buffered by lower levels of runoff and sediment production from surrounding undisturbed lands.

DISTRICT - See Ranger District.

DIVERSITY - The distribution and abundance of different plant and animal communities and species within the area.

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) - The version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for review and comment. It is a formal document which must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) Guidelines, and directives of the agency responsible for the project proposal.

E

EARNED HARVEST EFFECT (EHE) - An increase in the present harvest based on the expectation of increased yields in the future resulting from management practices such as planting genetically-improved stock and thinning.

ECONOMIC EFFICIENCY - See cost efficiency.

ECOSYSTEM - The interacting system of a biological community and its nonliving environment.

EDGE - The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together. It often contains organisms from both communities as well as those restricted to the interface area. The number of species present is often greater than the surrounding communities.

EFFECTS - Environmental consequences as a result of a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in the FEIS are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

ELIGIBLE - Cultural properties that meet the criteria for listing on the National Register of Historic Places.

EMPIRICAL YIELD TABLE - A table reflecting the existing standing timber volumes today and how they would grow in the future, under various timber management regimes.

ENDANGERED SPECIES - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

ENDEMIC - A taxonomic category (e.g., genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

ENDEMIC ORGANISM - A taxonomic category (e.g., genus, species, variety) whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

ENHANCE - To improve, reinforce, enrich or strengthen the existing condition, value, or beauty of a resource.

ENHANCEMENT - Interpret cultural resources for the public benefit. Cooperate with museums, universities, and other recognized institutions, agencies, and knowledgeable persons in planning and constructing cultural resource exhibits involving National Forest System cultural resources. Coordinate these efforts with

interpretive Services people (FSM 2390). Enhancement efforts may include the full range of interpretive techniques Because enhancement may affect the resource, comply with regulations set forth in FSM 2366. In all cases consider a determination of beneficial effect (FSM 2366 26).

ENVIRONMENT - The sum of all external conditions and influence affecting the life, development, and survival of an organism.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short- and long-term environmental effects, incorporating the physical, biological, economic, social, and environmental design arts and their interactions

ENVIRONMENTAL ASSESSMENT (EA) - A concise public document required by the regulations implementing the *National Environmental Policy Act*.

EPIDEMIC - An outbreak of sudden rapid spread, growth, or development.

EPITHERMAL MINERAL DEPOSIT - A deposit formed in rocks of shallow depth from low-temperature hydrothermal solutions.

EQUIVALENT CLEARCUT AREA (ECA) - That area which when harvested under any of the various silvicultural regimes produces hydrological effects similar to one acre of clearcut.

EQUIVALENT HARVEST AREA (EHA) - The same as Equivalent Clearcut Area (ECA)

EROSION - The processes whereby earthy or rocky material is worn away, loosened, dissolved and removed from any part of the earth's surface.

EVAPOTRANSPIRATION - Process by which water moves from the soil to the atmosphere by evaporation from the soil or transpiration through plants

EVEN-AGED MANAGEMENT - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

EXCELLENT RIPARIAN CONDITIONS - An extremely shady and brushy riparian condition with an abundance of tall overstory conifer trees and shorter hardwoods of alder, willow and aspen will be present; the site has the potential to produce conifer and/or hardwood species. Gentle bank slopes, high plant densities, thick root masses, embedded angular boulders and old logs characterize these areas Channel scouring will be minimized with deposition replaced by mossy aquatic growth on assorted sizes of tightly packed rocks.

F

FAULT A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

FAWNING AREAS - areas used regularly by female deer for fawning (and maintaining fawns for their first few days or weeks); optimum fawning habitat includes low shrubs or small trees under a tree overstory of about 50-percent closure, usually located on slopes of less than 15 percent where vegetation is succulent and plentiful in June and potable water is available within 183 meters (600 feet)

FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS) - The final version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA). It is a revision of the Draft Environmental Impact Statement to include public and agency responses to the

draft. It is a formal document which must meet legal requirements and is the document used as a basis for judicial decisions concerning compliance with NEPA.

FIRE HAZARD REDUCTION - The treatment of fuels and residues, which reduces the potential fire's rate of spread or intensity.

FIRE MANAGEMENT EFFECTIVENESS INDEX (FMEI) - A number derived by totaling the cost of a fire protection organization and fire suppression cost with the net value change and dividing that figure by 1000 acres.

FIREWOOD - Wood, either round, split or sawn, and burned primarily for heating purposes

FISCAL YEAR (FY) - October 1st to September 30th

FLOODPLAIN - The lowland and relatively flat areas adjoining inland and coastal waters (including debris cones and floodprone areas of offshore islands) including, at a minimum, those areas subject to a one-percent or greater chance of flooding in any given year (100-year recurrence)

FORAGE (LIVESTOCK) - All grass and grass-like plants

FORAGE (WILDLIFE) - All browse and herbacious food that is available to wildlife for grazing.

FORBS

1. Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges) and Juncaceae (rushes) families - i.e , any nongrass-like plant having little or no woody material on it.

2 A palatable, broad-leaved, flowering herb whose stem (above ground) does not become woody and persistent.

FOREGROUND - A term used in scenic management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (See "Background" or "Middleground.")

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT OF 1974 (RPA) - An Act requiring the preparation of a program for the management of the National Forests' renewable resources and of Land and Resource Management Plans for units of the National Forest System. It also requires a continuing inventory of all forest, rangelands, and renewable resources nation-wide

FOREST DEVELOPMENT ROADS (FDR) - Roads that are part of the Forest transportation system,which includes all existing and planned roads, as well as other special and terminal facilities designed as Forest development transportation facilities.

FOREST HEALTH - A condition where biotic and abiotic influences on the Forest (i e. insects, diseases, atmospheric deposition, silvicultural treatments, harvesting practices) do not threaten management objectives either now or in the future

FOREST INVENTORY PLAN - A plan, based on known cultural and environmental information, that delineates areas of varying degrees of suspected cultural resource potential.

FOREST PLAN - The National Forest Land and Resource Management Plan (Forest Plan) guides all natural resource management activities and establishes management standards and guidelines for the Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management It is prepared under the implementing regulations and requirements of NFMA

FORESTRY PROGRAM FOR OREGON (FPFO) - A comprehensive forest management program developed by the State of Oregon for all forest lands in the state regardless of ownership.

FOREST STANDARD - A performance criterion indicating acceptable norms or specifications that actions must meet to maintain the minimum conditions for a particular resource This type of standard applies to all areas of the Forest regardless of the other management area direction applied.

FOREST SUPERVISOR - The official responsible for administering the National Forest System lands in a Forest Service administrative unit. He or she reports to the Regional Forester.

FORPLAN - The forest planning model. A linear programming software package used to analyze planning decisions regarding land use patterns, capital investment, and timber harvest scheduling

FUEL BREAK - A strategically located strip of land, usually 100 to 500 feet wide, that has been altered by removal of flammable vegetation so that fires burning into it can be more readily extinguished.

FUELS - Anything within the Forest that will burn. Usually live and dead woody vegetation (e.g., grass, shrubs, trees).

FUEL TREATMENT - The rearrangement or disposal of fuels to reduce the fire hazard

G

GEOMORPHIC - Of, or pertaining to, the form of the earth, or its solid surface features.

GEOTHERMAL - Of, or pertaining to, the heat of the earth's interior.

GOAL - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed

GOODS AND SERVICES - The various outputs, including on-site uses, produced from forest and rangeland resources.

GRAZING - Consumption of range or pasture forage by animals.

GRAZING SEASON - 1. A period of grazing to obtain optimum use of the forage resource. 2. On public lands an established period for which grazing permits are issued.

GREEN DOT SYSTEM - A seasonal vehicular management program which visually indicates travel routes open to public use; roads not identified by the green dot, and cross-country travel, are closed to public use during the designated time period.

GROUND WATER - *Water in a saturated zone of a geologic stratum*

GROUP SELECTION - A modification of the selection system in which trees are removed in small groups at a time.

GUIDELINE - An indication or outline of policy or conduct that is not a mandatory requirement (as opposed to a standard, which is mandatory).

H

HABITAT - The sum total of environmental conditions of a specific place occupied by a wildlife or plant species or a population of such species

HABITAT CAPABILITY INDEX (HCI) - A process used to determine habitat capability for big game by evaluating thermal cover and road density

HABITAT DIVERSITY INDEX - A number that indicates the relative degree of diversity in habitat forest wide.

HABITAT EFFECTIVENESS (HE) - A combination of both quantity and quality of habitat, including both natural and introduced factors, which produces a specific habitat condition that either limits or generates habitat use by a wildlife species.

HARVEST CUTTING METHOD - The combination of management practices used to manipulate forest vegetation resulting in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged.

HEAP LEACH - A mineral extraction process in which a solution (commonly cyanide solution) percolates through a pile (heap) of ore, dissolving the metal being extracted. The solution is collected after it percolates through the heap, and the metal is recovered from the solution. This is a common extraction process for low-grade deposits of gold, copper and silver.

HERBACEOUS - Having little or no woody tissue and persisting usually for a single growing season.

HIGH CLEARANCE VEHICLES - Motorized vehicles that can drive over minor obstacles because of their elevated frame.

HISTORIC - Refers to the period of time for which there are written records (after European contact). In Region 6, the historic era begins at roughly 1800 A.D , with the first explorers who kept journals

HYDROLOGIC - Pertaining to the quantity, quality, and timing of water yield from forested lands.

HYDROPHOBIC - Lacking affinity for water.

HYDROTHERMAL - An adjective applied to heated or hot aqueous-rich solutions, to the process in which they are concerned, and to the rocks, ore deposits, and alteration products produced by them.

I

IGNEOUS ROCK - Rock formed by the crystallization of once molten material called lava or magma.

IMPLAN - A Forest Service input-output model that is an economic model which predicts the behavior of an economy as certain portions of the economy are altered

IMPROVED ROAD - A constructed or maintained vehicle way for the use of highway-type vehicles having more than two wheels

INDICATOR SPECIES - A plant or animal species so highly adapted to a particular kind of environment that its mere presence is sufficient indication that specific conditions are also present. (W-W DEIS).

INTEGRATED PEST MANAGEMENT (IMP) - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

INTENSIVE FOREST MANAGEMENT - A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, pre-commercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest.

INTERDISCIPLINARY TEAM - A group of individuals with different training assembled to solve a problem or perform a task.

INTERMINGLED OWNERSHIPS - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies Because of early land grants, these lands frequently are in checkerboard ownership patterns.

INTERMITTENT SERVICE - A road developed and operated for periodic service and closed between periods of use

INTERPRETATION - Educational activity which aims to reveal meaning and relationships of the natural and cultural environment through first-hand experience

IRRETRIEVABLE - Applies to losses of production, harvest, or use of renewable natural resources For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

IRREVERSIBLE - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods. Irreversible also includes loss of future options.

ISSUE - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process

J

JASPEROID - Agate, jasper, or thundereggs

K

KNUTSON - VANDENBERG ACT OF 1924 (K-V) - An act that allows for the use of receipts for National Forest timber to reforest, to conduct stand improvement work or to perform improvement projects for other resources on the area where timber was harvested.

L

LAND ALLOCATION - The decision to use land for various resource management objectives in order to best satisfy the planning process issues, concerns, and opportunities, and meet assigned forest output targets

LAND EXCHANGE - The conveyance of non-Federal land or interest in the land to the United States in exchange for National Forest System land or interest in the land.

LANDLINE LOCATION - Location of Forest property boundaries.

LIFESTYLE - A characteristic way of living which may be an individual variant within the cultural mainstream or may be an individual expression of a subculture.

LEASABLE MINERALS - Generally include minerals such as oil, gas, oil shale, coal, potassium, sodium, phosphates, sulphur, and geothermal.

LOCAL ROADS - Local roads are usually one-lane roads constructed to serve a dominant use or resource. Local roads do not access large land areas since they are more site specific than arterial and collector roads.

LOCATABLE MINERALS - These resources include gold, silver, lead, copper, and mercury, which are mined and processed for metals, and some uncommon nonmetallics

LOGGING SYSTEMS -

Tractor Logging - A system of log transportation in which logs are pulled from the woods to a landing by means of a crawler tractor, skidder, or similar ground-based equipment.

High-Lead Logging - A system of cable logging in which the working lines are elevated at the landing area by a rigged wooden tree or portable steel spar.

Skyline Logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable

Balloon Logging - A system of cable logging in which the weight of the logs is counteracted by the lift provided by a lighter-than-air balloon

Helicopter Logging - A system of transporting logs from the woods to a landing as an external load on a helicopter.

LONG-TERM EFFECTS - Those effects which will be significant beyond the RPA planning horizon of 50 years.

LONG-TERM SUSTAINED-YIELD TIMBER CAPACITY (LTSYC) - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M

M - The Roman numeral for 1000.

MBF - One thousand board feet. Lumber or timber measurement.

MM - Million

MANAGED STAND - A stand of trees in which stocking level control is applied to achieve maximum growth.

MANAGED YIELD TABLE - A table showing, for a given species (or species mix) on a given site, the progressive development of a managed stand at periodic intervals covering the greater part of its useful life. It usually includes average diameter, basal area, number of trees, standing volume, and harvest volumes for a specific timber management regime

MANAGEMENT AREA (MA) - A unit of land allocated to emphasize a particular resource, based on the capability of the area.

MANAGEMENT CONCERN - An issue, problem or a condition which constrains the range of management practices identified by the Forest Service in the planning process.

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

MANAGEMENT INDICATOR SPECIES (MIS) - A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition Population changes are believed to indicate effects of management activities on a number of other wildlife species

MANAGEMENT INTENSITY - A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.

MANAGEMENT PRESCRIPTION - Management practices selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives

MANAGEMENT REQUIREMENT (MR) - Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives. (See 36 CFR 219.27)

MARGINAL COMPONENT - The portion of the commercial forest land on which it is presently not feasible (economically or technologically) to manage for timber crops but on which it may be possible in the future.

MASS-WASTING - A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. (Dictionary of Geological Terms) Also mass movement.

MAXIMUM MODIFICATION - See "Scenic quality Objectives."

MEAN ANNUAL INCREMENT (MAI) - The total increment up to a given age divided by that age.

MEMORANDUM OF AGREEMENT (MOA) - A three-party agreement (responsible Forest Service Official, State Historic Preservation Officer, Executive Director of the Advisory Council on Historic Preservation) which documents an agreed-upon plan to mitigate a proposed project's adverse effect upon cultural resources listed on or eligible for the National Register of Historic Places

METAMORPHIC ROCK - Rocks changed by heat and pressure causing recrystallization and loss of original characteristics.

MIDDLEGROUND - The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand (See "Foreground" and "Background ")

MINERAL DEVELOPMENT - The activities and facilities associated with extracting a proven mineral deposit

MINERAL ENTRY - Filing a mining claim on public land to obtain the right to any minerals it may contain.

MINERAL EXPLORATION - The search for valuable minerals on lands open to mineral entry.

MINERAL RESERVE - That portion of a mineral resource from which a mineral commodity can be economically and legally extracted

MINERAL RESOURCE - A concentration of naturally occurring solid, liquid, or gaseous materials in or on the Earth's crust in such a form that economic extraction of a mineral resource is currently or potentially feasible (BLM Manual 3031).

MINIMUM VIABLE POPULATION (MVP) - The low end of the viable population range

MITIGATION - To moderate the force or intensity of environmental effects. To lessen or minimize an Adverse Effect upon a cultural resource listed on or eligible for the National Register of Historic Places The two categories of mitigation most often used are project modification and data recovery.

MIXED CONIFER (MC) - A stand of coniferous trees with a mixture of species. Ponderosa pine will usually make up 25 percent to 75 percent of the species composition

MODIFICATION - See "Scenic Quality Objectives."

MONITORING - A process of collecting significant data from defined sources to identify departures or deviations from expected plan outputs.

MOUNTAIN PINE BEETLE - *A small insect (1/8 - 5/8 inch) that bores into the tree's cambium and deposits* its eggs. Larvae emerge from the eggs and feed upon the cambiel layer and thus disrupt the tree's translocation of food. Frequent attacks on the host tree result in the tree's mortality.

MORTALITY - The volume of sound wood dying from natural causes during a specified period

MULTIPLE-AGED STANDS - An intermediate form of stand structure between even-/ and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand

MULTIPLE USE - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

N

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) - An act declaring a National policy to encourage productive harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

NATIONAL FOREST FUND (NFF) - An account that includes all receipts (to the U.S Treasury) from proclaimed National Forests for timber, grazing, land use, power, minerals, and user fees

NATIONAL FOREST MANAGEMENT ACT (NFMA) - A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

NATIONAL FOREST SYSTEM (NFS) LAND - Federal lands that have been designated by Executive order or statute as National Forests, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands.

NATIONAL RECREATION TRAILS - Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the national system of trails authorized by the National Trails System Act. National Recreation Trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas.

NATIONAL REGISTER OF HISTORIC PLACES - A register of cultural resources of national, state, or local significance, maintained by the Department of the Interior

NATIONAL WILD AND SCENIC RIVER SYSTEM - Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designed by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition.

NET PUBLIC BENEFIT - An expression used to signify the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index

NO ACTION ALTERNATIVE (Alternative A) - The most likely condition expected to exist in the future if current management direction were to continue unchanged

NONCOMMERCIAL SPECIES - Species that have no economic values at this time nor anticipated timber value within the near future.

NONDECLINING EVEN FLOW - A policy governing the volume of timber removed from a National Forest, which states that the volume planned for removal in each succeeding decade will equal or exceed that volume planned for removal in the previous decade

NONFOREST LAND - Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc

NONMARKET - (Noncash economic benefits). Products derived from National Forest resources that do not have a well-established market value, for example, wilderness, wildlife

NONPRICED OUTPUTS - Outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs.

NONSTRUCTURAL RANGE IMPROVEMENT - Practices and treatments undertaken to improve range not involving construction of improvements (e.g , seeding, fertilizing, or prescribed burning).

O

OBJECTIVE - A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

OBLITERATE - The action needed to close an unneeded road and return the land to production.

OFF-HIGHWAY TRAVEL MANAGEMENT OBJECTIVES - These objectives relate to the recreation opportunities for off-highway use on areas and trails on National Forest lands The objectives, which include off-highway travel criteria, are developed from management area direction and access management objectives.

OFF-ROAD or OFF-HIGHWAY VEHICLES (ORV's or OHV's) - Any vehicle, including ATV's, which is restricted by law from operating on public roads reserved for general motor vehicle traffic.

OLD GROWTH STAND - An old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics: 1) stands contain mature and overmature trees in the overstory and are well into the mature growth stage; 2) stands will usually contain a multilayered canopy and trees of several age classes; 3) standing dead trees and down material are present; and 4) evidence of man's activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

OPERATION AND MAINTENANCE COSTS - Costs associated with operating and maintaining facilities, program management, and support costs associated with management of other resources.

ORE - A mineral deposit which can be extracted at a profit

ORV CLOSURE - An administration order closing a land area to specified types of off-road vehicle travel yearlong

ORV RESTRICTION - An administrative order restricting a land area to specified types of off-road vehicle travel during specific seasons or conditions

OUTPUT - The goods, end products, or services that are purchased, consumed, or used directly by people. Goods, services, products, and concerns produced by activities that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives A broad term for describing any result, product, or service that a process or activity actually produces.

OVERMATURE - The stage at which a tree declines in vigor and soundness, for example, height growth has usually stopped and probability of mortality is high

OVERSTORY - The portion of trees in a forest which forms the upper most layer of foliage.

OVERSTORY REMOVAL - A type of harvest which is designed to remove all of the trees in the overstory The objective is to release the acceptably stocked understory

OVERVIEW - A report, based primarily on archival research, that organizes and summarizes cultural resource information from a particular National Forest or geographic area.

P

PACIFIC NORTHWEST REGION - A Forest Service organizational unit consisting of all the National Forests in Oregon and Washington.

PARTIAL CUT - Any cutting other than a clearcut. This may include thinning, selection shelterwood or an overstory removal.

PARTIAL RETENTION - See "Scenic Quality Objectives."

PERMITTED GRAZING - Use of a National Forest range allotment under the terms of a grazing permit.

PERSONS-AT-ONE-TIME (PAOT) - The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate the capacity of an area or facility to support peak usage within established user density standards and without degradation to biophysical resources.

PHYSIOGRAPHIC - Pertaining to physical geography.

PHYSIOGRAPHIC PROVINCE - Region of similar structure and climate that has had a unified geomorphic cycle

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions.

PLANNING PERIOD - Generally one decade. The time interval within the planning horizon that is used to show incremental changes to yields, costs, effects, and benefits.

PLANNING RECORDS - A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment

PLANT ASSOCIATION - Climax plant community type.

PLANT COMMUNITIES - A homogeneous unit in respect to the number and relationship of plants in the tree, shrub, and ground cover strata

POTENTIAL YIELD - The maximum, perpetual, sustained-yield harvest attainable through intensive forestry on regulated areas considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment.

PRECOMMERCIAL THINNING - The practice of removing some of the trees less than merchantable size from a stand so that the remaining trees will grow faster.

PREHISTORIC - Relating to the period of time before written records (prior to European contact). In Region 6, before 1800 A D., or before the advent of written records.

PRESCRIBED BURNING - Use of fire in forest management for hazard reduction and vegetative manipulation.

PRESCRIBED FIRE - A wildland fire burning under specified conditions which will accomplish certain planned objectives The fire may result from either planned or unplanned ignitions. Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester

PRESENT NET VALUE (PNV) - The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area

PRESERVATION - See "Scenic Quality Objectives "

PRIMARY CAVITY EXCAVATOR - An animal that excavates a cavity in wood for nesting or roosting.

PRIME FARMLAND - All land which qualifies for rating as Class I or as Class II in the U.S. Soil Conservation Service land use capability classification.

PRIMITIVE ROADS - Roads constructed with no regard for grade control or designed drainage, sometimes by merely repeated driving over an area. These roads are single lane, usually with native surfacing and sometimes passable with 4-wheel drive vehicles only, especially in wet weather

PROGRAMMED ALLOWABLE HARVEST - That part of the potential yield scheduled for harvest in a specific year. It is based on demand, funding, management needs and multiple use considerations and, as a consequence, may vary over time.

PUMICE - A volcanic glass full of cavities and very light in weight.

PYROCLASTIC ROCK - A rock consisting of unreworked solid material explosively or aerially ejected from a volcanic vent.

PUBLIC ISSUE - A subject or question of widespread public interest relating to management of National Forest System.

PUBLIC PARTICIPATION - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

PURCHASER CREDIT - Credit earned by the purchaser of a National Forest timber sale by construction of contract-specified roads Earned purchaser credit may be used by the purchaser as payment for National Forest timber removed.

R

RANGE ALLOTMENT - A designated area available for livestock grazing upon which a specified number, kind of livestock and season of use may be grazed under a term grazing permit. The basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

RANGE CONDITION - The state or health of the range vegetation and soil to produce a stable biotic community based on the composition, density, and vigor of the vegetation and the physical characteristics of the soil Condition is expressed as satisfactory or unsatisfactory

RANGE IMPROVEMENT - Any structure or nonstructural improvement to facilitate management of rangelands or livestock.

RANGELAND - Land where the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for livestock grazing and browsing

RANGE MANAGEMENT - The art and science of planning and directing range use to obtain sustained maximum animal production, consistent with perpetuation of the natural resource

RANGER DISTRICT - Administrative subdivisions of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

RARE II - See Roadless Area Review and Evaluation II.

REAL DOLLAR VALUE - A monetary value which compensates for the effects of inflation.

RECONSTRUCTION - Road or trail construction activities which take place on an existing road or trail and raise the standard of the road or trail. This can include relocation of the facility in a completely new location.

RECREATION CAPACITY - The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience of the biophysical resources.

RECREATION INFORMATION MANAGEMENT (RIM) - A computer oriented system for the organization and management of information concerning recreation use, occupancy, and management of National Forest land.

RECREATION OPPORTUNITY SPECTRUM (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. *Primitive* - Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted

2. *Semiprimitive Nonmotorized* (SPNM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other uses. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

3. *Semiprimitive Motorized* (SPM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

4. *Roaded Natural* (RN) - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

5. *Rural* (R) - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily

evident, and the interaction between users is often moderate to high A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

6. *Urban* - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site. Large numbers of users can be expected both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

RECREATION VISITOR DAY (RVD) - A measure of recreational use of an area. One recreation visitor day consists of 12 hours of recreation use of a site or area. Recreation visitor days are used as a recreation production or output capacity measure.

RECREATION WILDERNESS SPECTRUM (RWS) - This is associated with the recreation opportunity spectrum (ROS), a system used to classify or differentiate areas within wilderness to provide for a variety of management possibilities and wilderness opportunities. The objective of all classifications is to provide wilderness opportunities but to different degrees; from pristine to the semiprimitive transition.

REFORESTATION - The natural or artificial restocking of an area usually to produce timber and other wood products, but also to protect watersheds, prevent soil erosion, and improve wildlife, recreation and other natural resources. Natural reforestation includes site preparation to reduce competing vegetation and provide a mineral seed bed for seed provided by seed trees. Artificial reforestation is the planting of seedlings, cuttings or seeds by hand or mechanical means and may include site preparation.

REGENERATION CUT - The removal of trees intended for the purpose of assisting regeneration already present or to make regeneration of the stand possible.

REGION - The standard administrative unit of the Forest Service administered by a Regional Forester.

REGIONAL FORESTER - The official responsible for administering a single Region and preparing a Regional Guide.

REGIONAL GUIDE - The plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands of a given region It also disaggregates the RPA objectives assigned to the Region and to the Forest within that region.

REGULATIONS - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service.

REHABILITATION - Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.

RESEARCH NATURAL AREAS (RNA's) - An area set aside by the Forest Service to preserve a representative sample of an ecological community; primarily for scientific and educational purposes. Commercial exploitation is not allowed and general public use is discouraged

RESOURCE - An aspect of human environment which renders possible or facilitates the satisfaction of human wants and the attainment of social objectives.

RESOURCE VALUES - The tangible and intangible worth of forest resources

RESPONSIBLE LINE OFFICER - The Forest Service employee who has the authority to select and/or carry out a specific planning action.

RESTORATION - The long-term placement of land back into its natural condition or state of productivity.

RETENTION - A scenic quality objective which means human activities are not evident to the casual forest visitor.

REVEGETATION - The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of man - reforestation or range reseeding.

RIGHT-OF-WAY - The right to pass through another person's land as obtained by condemnation or purchase.

RIM - See Recreation Information Management.

RIPARIAN AREAS - The riparian ecosystem (area) is that land, next to water, where plants that are dependent on a perpetual source of water occur. Riparian sites include fluvial surfaces such as streambanks, active channel shelves, active floodplains, and overflow channels.

RIPRAP - A structure built of broken rock or other material used for protecting exposed soil from erosion along stream channels or road ditches.

ROAD DENSITY - The number of road miles per square mile of land area.

ROADLESS AREA - An area of undeveloped Federal land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

ROADLESS AREA REVIEW AND EVALUATION (RARE II) - A comprehensive process directed by the Secretary of Agriculture to identify roadless and undeveloped land areas in the National Forest system and to determine their uses for either wilderness or other resource management and development and to determine areas that would require further planning to make such a decision.

ROADLESS ISLANDS - A roadless area that is surrounded by permanent waters, or that is markedly distinguished from surrounding lands by topographical or ecological factors such as precipices, canyons, thickets, or swamps.

ROAD MANAGEMENT OBJECTIVES - Road management objectives establish the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria

ROS - See Recreation Opportunity Spectrum.

ROTATION AGE - The age of a stand when regeneration harvest occurs.

RPA - Forest and Rangeland Renewable Resources Planning Act of 1974.

ROCKHOUND - An amateur rock and mineral collector

RVD - See Recreation Visitor Day.

S

SALEABLE MINERALS - Saleable minerals include common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay. In general, these minerals are of wide-spread occurrence and are of relatively low unit value. They are generally used for construction materials and for road building purposes. Saleable minerals, which have some property giving them distinct and special value, remain locatable. Before a deposit can be sold, a determination of "common variety" must be made by minerals staff and legal counsel.

SALVAGE HARVEST - Removal of dead or dying trees resulting from insect and disease epidemics or wildfire.

SANITATION HARVEST - Removal of dead or dying trees to prevent spread of insects or disease

SAWTIMBER - Trees that will yield logs suitable in size and quality for the production of dimension lumber.

SCENIC QUALITY OBJECTIVES - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

1. *Preservation* - Ecological change only.

2. *Retention* - Human activities are not evident to the casual Forest visitor.

3. *Partial Retention* - Human activity may be evident, but must remain subordinate to the characteristic landscape

4. *Modification* - Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

5. *Maximum Modification* - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

SCENIC RESOURCE - The composite of basic terrain, geologic features, water features, vegetative patterns, *and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.*

SCOPING - Determination of the significant issues to be addressed in an EIS.

SEDIMENT - Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

SEDIMENTARY ROCK - A rock made up of sediment.

SEED CUT - Removal of mature trees near rotation age in a shelterwood harvest to permanently open the stand and prepare the site for regeneration from the seed trees left for that purpose.

SEEDLING/SAPLING - A forest successional stage in which trees less than five inches in diameter are the predominant vegetation.

SELECTION CUTTING - The annual or periodic removal of trees (particularly the mature), individually or in small groups from an uneven-aged forest to achieve the balance among diameter classes needed for sustained yields, and in order to realize the yield, and establish a new crop of irregular constitution. NOTE: The improvement of the Forest is a primary consideration.

SELECTION SYSTEM - A silviculture system in which trees in an uneven-aged stand are removed individually, here and there, from a large area each year in order to achieve a balance among diameter classes needed for sustained yield by selection cutting - ideally over a whole forest or working circle, but from practical considerations almost always over the annual coupes of cutting series; regeneration mainly natural and crop ideally all-aged.

SENSITIVE SPECIES - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that are recognized by the Regional Forester as needing special manage*ment to prevent placement on Federal or State lists*

SERAL - A plant and animal community which is transitional in stage of succession, being either short- or long-term. If left alone, the seral stage will pass, and another plant and animal community will replace it

SHELTERWOOD HARVEST - Silvicultural system used to harvest mature trees at rotation age in a series of preparatory, seed and removal cuts designed to regenerate a new even-aged crop under the shelter of the old crop

SHORT-TERM EFFECTS - For timber management planning, those effects which will not be significant beyond the RPA planning horizon of 50 years, for DEQ water quality, short-term effects are defined as two days or less Generally, short-term effects are within the planning period.

SIGNIFICANT - Meeting the criteria for inclusion on the National Register of Historic Places (same as eligible).

SILVICULTURAL SYSTEM - A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced

SILVICULTURE - The science and art of growing and tending crops of forest trees to attain the desired level of marketable and unmarketable products.

SITE INDEX - A measure of the relative productive capacity of an area for growing wood Measurement of site index is based on height of the dominant trees in a stand at a given age.

SITE PREPARATION - Removing unwanted vegetation and debris from a site and preparing the soil before reforestation.

SITE PRODUCTIVITY - Production capability of specific areas of land

SKYLINE LOGGING - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

SLASH - Debris left after logging, pruning, thinning, or brush cutting, and large accumulations of debris resulting from windstorms. It includes logs, bark, branches, and stumps

SMOLT HABITAT CAPABILITY INDEX (SHCI) - Smolt refers to the life history stage of anadromous salmonids in which physiological changes are taking place to adapt them for ocean survival and they are either migrating or will shortly migrate seaward. The three levels associated with this index are·

1. Existing SHC - The number of smolt being produced at the present time with existing escapement levels in existing freshwater habitat

2 Potential SHC - The number of smolt that are capable of being produced assuming there is sufficient adult escapement to fully seed existing freshwater habitat

3. Potential SHC with Full Enhancement - The number of smolt that are capable of being produced, assuming sufficient capital investments have been made to maximize the freshwater habitats and there is sufficient adult escapement to fully seed the existing and enhanced habitat

SNAG - A nonliving standing tree The interior of the snag may be sound or rotted.

SNAG LEVEL - The number of snags per unit of area by d b h. class selected as a management goal; the level is predicted on the theoretical number of snags per unit of area by diameter class needed to support nesting populations of woodpeckers at a selected density.

SOCIOECONOMIC - Pertaining to, or signifying the combination or interaction of, social and economic factors.

SOIL EROSION - The detachment and movement of soil from the land surface by wind, water, or gravity

SOIL COMPACTION - Increase in soil bulk density.

SOIL PRODUCTIVITY - The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

SOIL RESOURCE INVENTORY (SRI) - An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

SPECIAL COMPONENT - The portion of the commercial forest land that needs special treatment of the timber resource to achieve other resource objectives (e.g., old growth, streamside protection, or visual corridors).

SPECIAL USE PERMITS - Permits and granting of easements (excluding road permits and highway easements) authorizing the occupancy and use of land.

STAND - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

STANDARD - Performance criteria indicating acceptable norms or specifications that actions must meet A principle requiring a specific level of attainment, a rule to measure against.

STANDARD COMPONENT - The portion of the commercial forest land on which crops of industrial wood can be grown and harvested with adequate protection of the forest resources under the usual provisions of the *timber sale contract.*

STATE HISTORIC PRESERVATION OFFICER (SHPO) - An official appointed by the Governor of each State to direct implementation of the National Historic Preservation Act of 1966 and subsequent regulations and Executive Order. Responsibilities include: State-wide cultural resource inventory, development of a State Historic Preservation Plan, review of National Register of Historic Places nominations, administration of Federal historic preservation grants, and review of Federal undertakings which might affect cultural resources listed on or eligible for the National Register of Historic Places.

STOCKING - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

STOCKING LEVEL CONTROL - The process of maintaining the desirable number of trees to achieve optimum growth and management.

STREAMFLOW - The discharge of water from a watershed that occurs in a natural stream channel.

STRUCTURAL RANGE IMPROVEMENT - Improvement requiring construction or installation to improve the range, facilitate management, or control distribution and movement of livestock.

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices

SUITABLE TIMBER LAND - Forested lands that are available for timber management because they have not been withdrawn because of Law or Regulation, where irreversible damage would not occur, and where regeneration can be assured

SUMMER RANGE - A portion of the total range on which big game animals normally find food and cover during summer months

SUNK FUNDS - Monies already invested.

SUPPRESSION - The action of extinguishing or confining a fire.

SUSTAINED YIELD - The achievement and maintenance in perpetuity of a periodic output of the renewable resources without impairment of the productivity of the land.

T

TARGETS - Objectives assigned to the Forest by the Regional Plan.

TECTONIC - Of, pertaining to, or designating the rock structure and external forms resulting from the deformation of the earth's crust.

TEMPORARY ROADS - Temporary roads are low-level roads constructed for a single purpose and short-term use. Once use of the road has been completed, it is obliterated, and the land it occupied is returned to production.

THERMAL COVER - Cover used by animals to lessen the effects of weather; for elk the types of cover are:

Summer Range - A stand of coniferous trees at least 40 feet tall with an average crown closure of 40 percent or more

Winter Range - A stand of coniferous trees 10 feet or more tall with an average crown closure of 40 percent or more

THINNING - The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may be done at two different stages.

1. *Commercial thinning* - Removing trees that have reached sufficient size to be manufactured into a product.

2. *Precommercial thinning* - Removing trees that are too small to make a merchantable product

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species.

THRESHOLD - The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

TIERING - Refers to the coverage of general matters in broad environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basin wide program statements or ultimately site-specified statements), incorporating by reference the general discussions and concentrating solely on the issues specific to the statement in question.

TIMBER - A general term for the major woody growth of vegetation in a forest area.

TIMBER CLASSIFICATION - Forested land is classified under each of the land management alternatives according to how it relates to the management of the timber resource. The following are definitions of timber classifications used for this purpose.

1. *Nonforest* - Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

2. *Forest* - Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

3 *Suitable* - Land to be managed for timber production on a regulated basis.

4 *Unsuitable* - Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as not appropriate for timber production in the Forest planning process

5. *Commercial Forest* - Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

TIMBER PRODUCTION - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use The term "timber production" does not include production of fuelwood.

TIMBER SALE PROGRAM QUANTITY - This includes all volume expected to be offered for sale. This includes "green" material, salvage, firewood and miscellaneous products. This is used to measure attainment of RPA budgeted target

TIMBER STAND IMPROVEMENT (TSI) - Management activities conducted in an immature stand to accelerate diameter growth and improve the form of the trees that remain.

TOLERANCE - The ability of a tree to grow satisfactorily in the shade of, and in competition with, other trees

TONS OF SUSPENDED PARTICULATES - A measure of the amount of solid material contributed to the airshed by smoke

TRAILHEAD - The parking, signing, and other facilities available at the terminus of a trail.

TRAIL VEHICLE - Vehicles designed for trail use that are 40 inches wide or less, such as bicycles, snowmobiles, trail bikes, trail scooters, and all-terrain vehicles

TRANSITORY RANGE - Land that is suitable for grazing use of a nonenduring or temporary nature over a period of time For example, on particular disturbed lands, grass may remain in the area for a period of time before being replaced by trees or shrubs not suitable for forage

TRANSPORTATION SYSTEM - All existing and planned roads and trails needed to access the Forest

TUFF - A rock formed of compacted volcanic fragments, generally smaller than 4mm in diameter

U

UNDERSTORY VEGETATION - Grass, small trees, shrubs, and other plants found beneath the overstory (the trees comprising the forest).

UNEVEN-AGED MANAGEMENT - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection

UNIT PLANS - Land management plans prepared for multiple use management of land and resources on portions(units) of the National Forests, which do not necessarily fully incorporate NFMA requirements "Units" do not always follow National Forest boundaries and, in some cases, include parts of two or more National Forests

UNPLANNED IGNITION - A fire started at random by either natural or human causes, or a deliberate incendiary fire.

UNREGULATED - Timber land not managed on a sustained yield basis, such as administrative sites, campgrounds, and experimental forests.

UTILITY AND TRANSMISSION CORRIDOR - A strip of land designated for the transportation of energy, commodities, and communications by railroad, State highway, electrical power transmission (69 KV or above), oil and gas and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use Transportation of minor amounts of power for short distances, such as short feeder lines from small power projects including geothermal or wind, or to serve customer subservice substations along the line, are not to be treated within the Forest Plan effort.

UTILIZATION STANDARDS - Standards guiding the use and removal of timber, which is measured in terms of diameter at breast height (d.b.h.), top diameter inside the bark (top d.i.b), and percent "soundness" of the wood

V

VIABLE POPULATION - The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

VIEWSHED - The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

W

WATERSHED - The area that contributes water to a drainage or stream

WETLANDS - Areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990).

WILD AND SCENIC RIVERS - Those rivers or sections of rivers designated as such by congressional actions under the 1968 Wild and Scenic Rivers Act, as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1 *Wild River Areas* - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America

2 *Scenic River Areas* - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

3. *Recreational River Areas* - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past

WILDERNESS - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation, include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition, and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest

WILDERNESS ACT - Establishes a National Wilderness Preservation System to be composed of Federally-owned areas designated by Congress, administered for use and enjoyment as Wilderness, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as Wilderness.

WILDERNESS RESOURCE SPECTRUM (WRS) - Classification used to further divide a wilderness into zones based on degrees of primitiveness. Areas of the Ochoco Wilderness will be managed under two classes of the WRS system:

1. *Primitive* - characterized by an essentially unmodified environment. Concentration of users is low and evidence of human use is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls.

2. *Semiprimitive* - characterized by a predominately unmodified natural environment of moderate size. The concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimuM on-site controls and restrictions may be present, but are subtle.

WILDFIRE - Any wildland fire that is not a prescribed fire All wildfires require suppression.

WILDLIFE - All nondomesticated mammals, birds, reptiles, and amphibians living in a natural environment, including both game species and nongame species. Animals or their progeny, which once were domesticated but escaped captivity and are running wild (i.e., feral animals), such as horses, burros, and hogs, are not considered wildlife.

WILDLIFE AND FISH USER DAY (WFUD) - One WFUD consists of 12 hours of recreation that is the result of fish or wildlife.

WILDLIFE HABITAT DIVERSITY - The distribution and abundance of different plant and animal communities and species within a specific area.

WINTER RANGE - A range, usually at lower elevation, used by big game during the winter months; usually smaller and better-defined than summer ranges.

WITHDRAWAL - The withholding of an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area.

WORKING GROUP - Comprises those parts of a forest that have generally the same growth potential and management opportunities.

Y

YARDING - The moving of logs from the stump where cut to a central concentration area or landing.

Z

ZONE OF INFLUENCE - The geographic area where most, but not all, of the direct social and economic effects of the Forest and Grassland's management occur

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United States
Department of
Agriculture

Forest Service

Pacific
Northwest
Region

1989



Reprinted
1991

Record of Decision

Land and Resource Management Plan

Ochoco National Forest and Crooked River National Grassland

Caring for the Land...

RECORD OF DECISION

FOR THE
LAND AND RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

OCHOCO NATIONAL FOREST
CROOK, GRANT, HARNEY, AND WHEELER COUNTIES, OREGON

AND

CROOKED RIVER NATIONAL GRASSLAND
JEFFERSON COUNTY, OREGON

USDA FOREST SERVICE
AUGUST 1989

APPROVAL PAGE

RECORD OF DECISION
For The
LAND AND RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

OCHOCO NATIONAL FOREST
Crook, Grant, Harney, and Wheeler Counties, Oregon
and
CROOKED RIVER NATIONAL GRASSLAND
Jefferson County, Oregon

USDA Forest Service, Pacific Northwest Region

The decision represents a selection, and forthcoming implementation of the Land and Resource Management Plan for the Ochoco National Forest and Crooked River National Grassland, pursuant to regulations of the National Forest Management Act (NFMA), Title 36, CFR Pt. 219 and the National Environmental Policy Act (NEPA), Council of Environmental Quality , Title 40, CFR Pts. 1500-1508. The Plan approved and adopted by virtue of this decision document is Alternative I which is identified as the preferred alternative in the Final Environmental Statement.

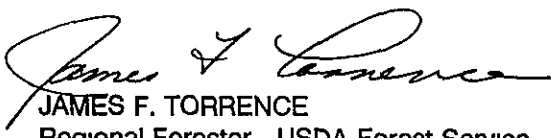
The Plan decision(s) represents a series of interdependent, but separable, judgements, which are generally of a complex, technical or political nature. The decisions relate primarily to programmatic land and resource management allocations and accompanying standards and guidelines, which when viewed in total comprise the Forest and Grassland Plans.

Basic elements of the process and resultant decisions are summarily set forth herewith as a Record of Decision (ROD). These include:

- planning process, authorities, and requirements
- issues, including public responses
- identification of decision(s) and the decision rationale
- alternatives considered
- modification of final alternatives
- rationale for nonselection of alternatives
- compatibility with other agency goals and plans
- implementation schedules
- mitigation and monitoring processes for plan change or amendment
- appeal rights

A decision may be subject to administrative appeal pursuant to 36 CFR 217. Notice of appeal and statement of reasons must be in writing and submitted to the Chief of the Forest Service within 90 days from the date of publishment of Notice of Availability in the Federal Register on September 15, 1989.

I encourage anyone who is concerned about the Ochoco National Forest or Crooked River National Grassland Plan, or decisions contained therein, to first see if concerns or misunderstandings may be resolved with the Forest Supervisor in Prineville, Oregon (Phone 503 447-6247) before submitting an appeal.



8-1-89
Date

JAMES F. TORRENCE
Regional Forester - USDA Forest Service
Pacific Northwest Region
319 SW Pine, P.O. Box 3623
Portland, OR. 97204-3623

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I. INTRODUCTION

This document, the Record of Decision (ROD), summarizes the decisions, pertinent information, and rationale for the selection of a Land and Resource Management Plan for the Ochoco National Forest and Crooked River National Grassland. It is required under the National Environmental Policy Act regulations 40 CFR 1500-1508. Its purpose is to clearly identify the decisions and intended action.

The development of Plans for the Ochoco National Forest and Crooked River National Grassland has progressed over a considerable amount of time. The completion of comprehensive land and resource management plans under the National Forest Management Act of 1976 (NFMA) is a significant and important event in the administration of the Forest and Grassland The decisions represented therein were arrived at through a deliberative process in which available information, data, alternatives, and public comments were carefully weighed and analyzed.

After consideration of pertinent information, my decision is to implement Plans for the Forest and Grassland which are represented by Alternative I The Plans will guide the management of the Forest and Grassland for the next 10-15 years. They will be amendable as described herein (pg ROD-2). Alternative I is described by the Final Environmental Impact Statement (FEIS) and by the Plans themselves.

PROCESS AND CHRONOLOGY FOR THE PREPARATION OF THE FOREST AND GRASSLAND PLANS

YEAR	PROCESS
1980	Notice of Intent Published in the Federal Register
1981	Preliminary Identification of Issues and Concerns
1982	Forest Inventory Completed
1984	Analysis of Management Situation
1985	Formulation and Analysis of Alternatives
	Evaluation of Alternatives
	Draft Preferred Alternative Selection
1986	Draft Environmental Statement Published
	Public Comment Period
1988	Supplement to DEIS Published
1989	Public Comment Period for Supplement
	Evaluation of Public Comment
	Formulation, Analysis and Modification of Final Alternative
	Validation with Public
	Final Plan Published
1990	Plan Implementation, Monitoring and Evaluation

PURPOSE AND NEED

AUTHORITIES AND PURPOSE

The Plans provide for the coordinated multiple-use management of the various resources and uses, including recreation, wildlife and fish, range, timber, watershed, minerals, and wilderness. The Forest and Grassland Plans and Environmental Impact Statement (EIS) were developed under the implementing regulations of the National Environmental Policy Act (NEPA), Council on Environmental Quality, Title 40, Code of Federal Regulations, Parts 1500-1508 (40 CFR 1500-1508); and the National Forest Management Act (NFMA), Title 36, Code of Federal Regulations, Part 219 (36 CFR 219).

The Plans are part of the framework for long-range planning established by the Forest and Rangeland Renewable Resources Planning Act (RPA), as illustrated below under tiering.

TIERING

Forest Service planning is a continuous, interactive process tiered (CFR 40 CFR 1508 28) to and carried out on organizational levels within the National Forest systems These levels are·

1 **National**	Resource Planning Act Assessment and Program
2 **Regional**	Regional Guide.
3. **Forest**	National Forest Land and Resource Management Plans (Forest Plans) for National Forest System lands. Tiered to Regional Guide.
4. **Project**	Site or project specific plans, generally at Ranger District level Tiered to Forest Plan.

WHAT THE FOREST AND GRASSLAND PLANS ARE

The Plans are strategies for managing the Forest and Grassland in an environmentally sound manner to produce goods and services in a way that maximizes long-term public benefits

The Plans are part of the 50-year framework for long-range resource planning established by the Forest and Rangeland Renewable Resources Planning Act (RPA), and establishes general resource management direction for the next 10 to 15 years These decisions are given on pp. ROD 20-39 Information about outputs and effects beyond this time are projected only to indicate the anticipated consequences over time. The Plans will ordinarily be revised on a 10-year cycle or at least every 15 years. The Plans may be revised sooner if the Forest Supervisor determines that environmental conditions or resource demands have changed significantly, or if national policies, goals, or objectives have changed in a way that would require Forest Plan revisions.

Once adopted, the Plans supersede or bring into compliance all previous resource management plans prepared for the Forest and Grassland, subject to existing rights, contracts, and specific direction for areas such as Wilderness, Wild and Scenic Rivers, National Recreation Areas, and National Trails. This will generally be done within three years (see Table 1, pg ROD-4) Congressional land designations, catastrophic events, or major new management or production technologies may require the Plans to be amended or revised

All activities, many of which are interdependent, may be affected by annual budgets The Plans are implemented through various site-specific projects, such as the building of a road, the development of a campground, or the sale of timber. If the budget changes for any given year, the projects scheduled for that year may have to be rescheduled However, the goals and land activity assignments described in the Plans would not change unless the Plans themselves were changed If budgets change significantly over a number of years, the Plans may have to be amended and consequently, would reflect different target outputs and environmental conditions. The significance of budget-related or other changes is determined in the context of the particular circumstances

The decision to adopt these Plans authorizes their implementation During implementation, all specific projects and activities will be evaluated with respect to Plan direction and with appropriate public involvement. Schedules of proposed and possible projects are contained in the Plans, Appendices A. Public involvement and participation will continue as the Plans are implemented, because responsiveness to changing public issues will continue. These Plans and accompanying Environmental Impact Statement are for the most part programmatic. During implementation, when the various projects are designed, site-specific plans and analyses are performed. These analyses may result in environmental assessments, environmental impact statements, or categorical exclusions, and possibly an amendment or revision of the Forest or Grassland Plan Any resulting NEPA documents are to be tiered to the Final Environmental Impact Statement for these Plans, pursuant to 40 CFR 1508 28.

AMENDMENTS

The Plans can be amended at any time. Amendments can be either "significant" or "non-significant" depending on the timing or location of the proposed change, and whether the change alters the goals, objectives, outputs, or management prescriptions. Amendments may be made to respond to changing needs, opportunities, monitoring, Congressional land designations, or catastrophic events (such as major floods or fires), or to take advantage of major new management or production technologies If the change is not significant, the Forest Supervisor may implement the amendment following appropriate public notification and satisfactory compliance with environmental policies and procedures If the change is significant, the Plan must be revised by the same process used to develop and approve the original Plan (see Amendment and Revision Process, p. ROD-59).

WHAT THE PLANS ARE NOT

The Land and Resource Management Plans are not plans for the various administrative activities needed to carry on the Forest Service's day-to-day internal operations. For example, the Plans do not address personnel matters, law enforcement, fleet equipment, or internal organization changes.

The emphasis of the Plans is not on site-specific decisions or specific resource outputs. Instead, the emphasis is on applying various general management practices and intensities (standards and guidelines) to different land areas (allocations) to achieve multiple use goals and objectives in a cost-efficient manner.

While all the outputs in the Plans can be accomplished from a physical, biological, economic, social, and legal perspective, there is no guarantee that these levels will be accomplished. The outputs proposed by the Plan are estimates based on available inventory data and assumptions, and their accomplishment is subject to the annual budget received by the Forest. For example, the actual timber quantity sold or cut can depend on external factors beyond the scope of the Forest Plan. Local demand for raw material, timber imports and exports, national housing starts, and home mortgage rates are among the factors which may influence the annual timber volumes actually harvested or sold in any one year.

CONSISTENCY

The National Forest Management Act requires that all resource plans, permits, contracts, and other instruments for the use and occupancy of National Forest System lands be consistent with the Forest Plan (16 U.S C. 1604(i)). All administration activities affecting the National Forest must be based on the Forest Plan (36 CFR 219 10(e)).

All outstanding permits, contracts, cooperative agreements and other instruments for occupancy and use of lands included in the Forest Plan will be brought into agreement with this Forest Plan, subject to the valid existing rights of the parties involved; this will be done as soon as practicable, and generally within three years of the date of this Plan (see Table 1, pg ROD-4).

Likewise, timber implementation plans such as the Forest Tree Improvement Plan, Seed Orchard Management Plan, and Tree Seed Inventory Plan will be brought into compliance with the direction contained in the Forest Plan within three years of Plan approval.

The schedule of timber sale offerings in Appendix A-10 of the Forest Plan will be updated at least annually. All timber sales offered and all stand management contracts issued after approval of the Forest Plan will be in compliance with direction contained in the Plan Changes to existing contracts, including timber sales and other stand management projects, may be proposed on a case-by-case basis where overriding resource considerations are present Otherwise, all existing contracts will be administered in accordance with original provisions.

RELATIONSHIP OF OTHER PLANS TO THE FOREST AND GRASSLAND LAND AND RESOURCE MANAGEMENT PLANS (LRMP)

The Plans serve as the primary land and resource management direction for the Ochoco National Forest and Crooked River National Grassland. All other land, resource, or functional plans are replaced or must be consistent with the direction in these Plans A list of plans superseded or requiring modification by the LRMP's are given in Table 1.

TABLE 1
REVISED OR SUPERSEDED PLANNING DOCUMENTS

PLAN/AGREEMENT TITLE	SUPERSEDED	UPDATE/REVISE 1/	Prepare
1979 Timber Resource Plan	X		
1978 Silvies Malheur Unit Plan	X		
1979 Ochoco Crooked River Unit Plan	X		
1980 Crooked River National Grassland Unit Plan	X		
1978 South Fork Planning Unit Land Management Plan	X		
1982 Round Mountain Electronics Site Management Plan		X	
Transportation Plan		X	
Fire Management Plan(s)		X	
Residue Management Plan		X	
Special Use Permits		X	
Memoranda of Understanding		X	
Co-op Agreements		X	
Allotment Management Plans		X	
Tree Improvement Plan		X	
Land Adjustment		X	
Recreation Development Plans		X	
Summit Trail Management Plan	X		
Statewide Comprehensive Wildlife Plan		X	
1977 Off-Road Vehicle Plan	X		
Facilities Management Plans		X	
Site Development Plans		X	
Seed Orchard Management Plan		X	
Tree Seed Inventory Plan		X	
Timber Sale Harvest Schedules		X	
Gray Butte Electronic Site Plan		X	
Dry Mountain Electronic Site Plans		X	
Highway 26 Corridor Plan		X	
Wild and Scenic River Plans			X
Wilderness Plans		X	
Wild Horse Management Plan		X	
Forest and District Multiple Use Plans		X	
Cove Palisades Cooperative Agreement		X	
Bald Eagle Recovery Plan		X	
Capital Improvements Plan		X	
Hazardous Materials Plan		X	
Recreation Development Site Plans (Haystack, et al)		X	X
1983 Law Enforcement Plan		X	

1/ These existing plans will be examined and updated or revised as necessary to be brought in conformance with the Forest Plan, or simply incorporated into the Forest Plan if no change is needed

II. PUBLIC PARTICIPATION

ISSUE IDENTIFICATION

In Autumn of 1980, the Forest began the task of identifying issues to be addressed in Forest planning Six meetings with key interest group leaders and individuals were held In the meeting, 125 preliminary issues, concerns and opportunities (ICO's) were identified By an iterative process with the public, and through mailings, media and meetings over the course of several months, these were consolidated into 12 major issues or "planning problems," which are (for more detail see FEIS Appendix A)·

1. Timber supply and Forest management
2. Social and economic wants and needs of local communities
3 Livestock grazing and allotment management
4 Riparian area management
5 Transportation system
6 Big game habitat
7. Roadless areas and wilderness study areas

8. Scenic or visual resources
9 Old growth forest
10. Fuelwood supply
11 Snag dependent wildlife
12. Winter sports

PUBLIC INVOLVEMENT ON THE DRAFT EIS/PLAN

Notice of availability was published in the Federal Register on September 12, 1986 Over 1,000 copies of the documents were distributed. Each document package contained a "Reviewer's Guide" and "Summary." See Table 2 for the summary of public involvement efforts for the DEIS.

By the end of the 90-day review period, approximately 2,150 responses were received All responses were acknowledged with reply cards. Table 3 gives the number of respondents favoring particular alternatives, and Table 4 shows the number of comments by subject area (for more detail see FEIS Appendix I).

TABLE 2
SUMMARY OF AGENCY EFFORTS TO OBTAIN PUBLIC PARTICIPATION

Action	Occurrence
Forest Plan Reports Issued	3
News Releases	7
Public/Informational Meetings	6
Interest Group/Organizational Meetings	33+
Legislative Contacts	5
Display at Harney County Library	1
Extended Office Hours	-
Radio	over 20 interviews on seven stations
TV	3 interviews- on two stations
Newspapers	51+ articles- in four papers
Fliers	3 printed by special interest groups

TABLE 3
RESPONDENTS PREFERENCE FOR PARTICULAR ALTERNATIVES*

ALTERNATIVE	TOTAL
A	19
B	25
C	164
D	5
E	8
F	2
G	2
H	2
B - Departure	0
E - Departure	45
H - Departure	6
B+- (Industry)	1,142

* Respondents either preferred a particular alternative or a certain aspect of a particular alternative Respondents who favored a new alternative other than those presented in the Forest Plan or by the timber industry totaled 65

TABLE 4
ESTIMATED NUMBER OF COMMENTS BY RESOURCE OR ISSUE

RESOURCE/ISSUE	TOTAL
Timber	1,974
Roadless Areas	1,903
Wildlife	829
Planning	804
Range	476
Social Considerations	437
Recreation	347
Fuelwood	339
Old Growth	298
Riparian Management	269
Multiple Use	208
Wilderness	206
Transportation	154
Special Interest Areas	115
Research Natural Areas	113
Scenic Resource	73
Wild and Scenic Rivers	56
Fire	44
Water	43
Wildlife MR's	40
Archeology/History/Cultural Resource	31
Fish	24
Soil	23
Threatened, Endangered, and Sensitive Species	22
Budget	19
Energy	14
Minerals	10
Air	10
Special Land Uses	6
Plants - Native/Introduced	5
Land Status	4
Economics	3
Protection	3
Pesticide Use	3
Law Enforcement	2
Indian Rights	1

INTEREST GROUP METHODS

It appeared that the majority of respondents received their information primarily from fliers, media, or individuals rather than by reading the documents.

The forest products industry printed and distributed a leaflet entitled, "Ochoco Forest Plan to Take Millions of Dollars In Income from County Residents." On one side of the leaflet was a summary of industry's view of the Proposed Plan, including discussion of an industry-supported alternative, "B-plus " On the backside was a response form, consisting of seven multiple-choice options and a

space to write in a short comment The form was preaddressed to the Ochoco National Forest, allowing a respondent to comment on the Plan by simply checking a few blanks and affixing a postage stamp. Mill managers held meetings in which employees were asked to fill out the form An individual was contracted by industry to conduct meetings and distribute materials representing their viewpoint This individual conducted 25-30 meetings, personally distributed 3,000 industry leaflets, and 700 copies of his speech. Other timber industry representatives also conducted meetings or presented information at local civic, business, and other organizational meetings.

Early in the process, analysts from the Northwest Forest Resources Council (NFRC) and timber industry lobby group, met with the Ochoco's planning analyst Disagreeing with how job multipliers were expressed, they charged that job losses were understated. They used the potential yield from the Forest's 1980 timber plan as the basis for their economic arguments A letter requesting withdrawal of the DEIS and Proposed Forest Plan was sent to the Regional Forester by a representative of the NFRC

The Central Oregon Economic Development Council contracted Brian Long, an Economist from Seattle, to review the Forest's economic analyses and Impact Planning (IMPLAN) modeling and data Long prepared a report in which he showed a loss of 317 jobs and 6 5 million dollars due to the Draft Preferred Plan. Long's findings, displayed in a 38-page report entitled "Economic Impact Analysis of the United States Forest Service Proposed Plan for the Ochoco National Forest in the Central Oregon Area," were presented to local community leaders and organizations

A coalition of eight environmental groups published and distributed 8500 copies of a flier entitled, "There Is Still Time to Save the Ochoco." The flier included information on the planning process and issues, and offered suggestions on how to respond to the issues Environmentalist's views of the Proposed Plan were also presented at a public meeting in Bend, on radio and television talk shows, and in newspaper articles.

Two other special interest campaigns included: a statewide drive by snowmobile organizations to keep the Forest open to snowmobiles (particularly Lookout Mountain), and the elderly citizen's desire to re-open the road to the summit of Lookout Mountain

The Northwest Forest Resources Council filed two appeals in May 1986, requesting that the management requirements incorporated into planning processes be reviewed, and that a no action alternative representing current management plans be included in the EIS The Forest responded by preparing and issuing a supplement to the DEIS in the fall of 1988 addressing those issues

The environmental community continued to prepare and circulate brochures and articles in recreation guides on Lookout Mountain. One such brochure appeared in April 1989, by "Friends of Lookout" entitled, "Accept an Invitation...Lookout Mountain Special Management Area." The purpose of this brochure was stated, "to protect the Lookout Mountain Area "

SUMMARY OF PUBLIC COMMENT ON THE SUPPLEMENT TO THE DEIS

The responses received on the Supplement to the DEIS were predominately local in origin. Ninety percent were form letters which came from local mills or mill owners The form letters stated that they had "no major comments on the Supplement to the DEIS itself," but went on to repeat issues the mills and timber industry emphasized concerning the Draft - timber supply and jobs. Over 95% of the comments received on the Supplement to the DEIS did not respond to the issues addressed by the Supplement Of those comments received on the NFMA management requirements incorporated by process, about half indicated the procedure was appropriate, while the others (from the timber industry, whose issue it was) disagreed with the process and cost of the requirements in terms of timber supply. The no change alternative was recognized by most commentators as not meeting the requirements of law, particularly NFMA, and therefore not being a viable implementable alternative.

ISSUE AND PUBLIC RESPONSE SUMMARY

TIMBER SUPPLY AND FOREST MANAGEMENT

Sub-issues relating to timber supply and forest management have been identified and are discussed separately:

Timber Supply and Sustained Even-flow Yield

Forest products manufacturing is the major industry of the area Timber accounts for over 95% of the National Forest receipts The Forest has 6.3 BBF of standing crop, approximately 49% of which is comprised of mature ponderosa pine.

There are 533,177 acres of forest land tentatively identified as suitable for timber production The Forest Plan allocates 496,850 acres to general forest, 92,200 acres to nontimber use such as wildernesses, roadless areas, old growth, and 255,590 acres to other management areas.

Large fine-grained ponderosa pine is the most commercially valuable tree in central Oregon Open, park-like stands of mature ponderosa pine are also what people identify the Ochoco National Forest with and seek out for recreational purposes. Local mills are tooled for large material, although some modification has begun. Ponderosa pine may occur in relatively pure stands generally on relatively low productivity sites, or associated with other conifer species. The latter are referred to as mixed conifer stands and generally occupy the better sites, but existing mixed conifer stands have a high incidence of insect and disease damage, which reduces value and silvicultural options.

The 1979 Forest Timber Resource Plan established a potential yield of 136.5 MMBF The programmed harvest for the Forest, under that plan, has been 129 8 MMBF. The present planning effort developed alternative first decade allowable sale quantities, for the DEIS, ranging from 13 9 MMCF (82 MMBF) to 24 4 MMCF (146 MMBF) Three of the alternatives, including the draft preferred with an ASQ of 123 MMBF, plus an additional 5 MMBF in salvage sales, were departures Yield or an ASQ exceeding 100 MMBF is not sustainable in BF measure over time Because FORPLAN yields were all calculated in cubic feet, sustained yield in board feet was not readily determinable The current net annual growth estimated in board feet for the Forest is about 80 MMBF. The harvest on the Forest has been at a historic high, e g 153 MMBF in 1985 This high level of harvest was a result of the combination of timber availability and a strong market.

Mill capacity of Crook and Harney Counties alone is estimated to be 385 MMBF annually Demand for timber currently exceeds supply The Forest has sold an average of 137 MMBF per annum over the past decade, and cut 110 MMBF of which 75% was ponderosa pine Silvicultural systems applied have been predominately even-aged Intensive timber management and resultant industrial activity on the Forest has potential to conflict with or impact other resources. Conversely, land allocations for other purposes compete with timber interests, and other management requirements can constrain timber management activities and reduce potential yields.

What the respondents said:

Timber industry wanted an allowable sale quantity of 137 MMBF, which was the original, 1979 Timber Resource Plan potential yield They also asked for at least 100 MMBF of the allowable sale quantity (ASQ) to be in ponderosa pine. They attempted to show that the "commercial forest" landbase had been decreased through the suitability determinations and other land allocations in the Draft Plan. Timber industry also wanted a larger salvage program The conservation community, on the other hand, thought the ASQ for the Forest should be about 90 MMBF. Both industry and the conservationists agreed on the desirability of a sustained even-flow yield, but disagreed on the level of yield feasible on a sustained basis.

Ponderosa Pine Management

Large ponderosa pine trees are an economically important forest resource They are more valuable and important than other species or second growth Wood product remanufacturing has been increasing and relies primarily on the high quality lumber milled from ponderosa pine This industry is dependent on large pine (20-inch DBH or larger) that is relatively free of knots The majority of pine grows on relatively low productivity sites producing less than 58 cubic feet/acre/year A quality versus quantity situation exists Current forestry practices include rapid liquidation of old growth pine stands, even-aged management, and emphasis on fiber (quantity) production. Strategies in the DEIS were designed to produce either maximum cubic foot timber volume on available lands or maximum PNV These strategies resulted in harvesting stands at 90 to 100 years and producing trees no larger than 14 to 16 inches DBH.

What the respondents said·

Large ponderosa pine were viewed as a unique product of central Oregon Small diameter second growth trees were not. The stumpage value of large ponderosa pine is many times greater than second growth Some segments of the wood

products industry would like to know what the supply of pine will be over time in order to plan their business operations. Both industry and other publics do not like even-aged management in ponderosa pine Both want "selection" harvests, but for different reasons. Intensive management on low productivity pine sites is said not to be appropriate. It was thought that ponderosa pine, because of its uses and the sites involved, should be managed on a board foot (not cubic foot) basis It was suggested ponderosa pine be inventoried and managed separately, with a separate ASQ established for pine. The timber industry asked for a ponderosa pine ASQ of 100 MMBF annually.

Uneven-aged vs. Even-aged Silviculture

The use of clearcutting as a silvicultural system on the Forest has increased in the past decade. This is due to prescriptions in mixed conifer that favor more clearcutting, and increases in harvest levels as the economy recovered from the recession of the early 1980's. Overstory removal has been applied extensively in ponderosa pine. Clearcut acres under the Proposed Plan would start increasing in the second decade as overstory removal opportunities continue to be reduced and management intensity increases.

The harvest methods employed in FORPLAN modeling and yield tables in the Proposed Plan and alternatives were based on even-aged management. Uneven-aged management of ponderosa pine appears to be a viable alternative with offsetting advantages and disadvantages. Some limited uneven-aged management was programmed for certain management areas in the Proposed Plan

What the Respondents Said

There was strong support for uneven-aged management by the public and forest industry (albeit, for different reasons) and support for incorporation of uneven-aged management into an alternative Some publics see overstory removal as clearcutting Uneven-aged management was perceived as a method to avoid clearcutting (see Clearcutting, this page) and to reduce conflicts with other resources

Departure

This issue stems from the Draft Plan (Alternative E-Departure) proposal for an ASQ of 123 MMBF in the first decade, declining to 118 MMBF in the second decade, and 89 MMBF by the fifth decade (20.6 MMCF to 16.1 MMCF). This amounts to a 25 percent reduction over 5 decades The intent of the departure was to maintain a high timber supply to support community stability during the first decade The issue is, however, larger than that alone. None of the alternatives are sustainable in board feet over time (See Ponderosa Pine Management issue for importance of board feet versus cubic feet, p. ROD 7-8.) It is apparent that the current harvest level in board feet will decline over time and a decision as to the rate and to what level over time is needed, i e. a "glide path" or "stepping down."

What the Respondents Said

None of the respondents liked the idea of departure Industry said they needed a dependable (and higher) supply of timber, especially to encourage new business to central Oregon Conservationists said departure was a euphemism for rapid liquidation of old growth The public, for the most part, asked for a "sustained yield" which they seem to equate with nondeclining even-flow. Some felt we were remiss in proposing anything but sustained yield (nondeclining even-flow).

Clearcutting

Of the approximately 35,000 to 40,000 acres currently under contract on the Forest, only about 15 percent are to be clearcut However, the Forest program in near future years contains substantial acreages of clearcutting in mixed conifer stands The Draft Plan proposed harvesting 1,444 acres (nine percent of total harvested acres), increasing to 2,208 acres (39 percent of total harvested acres) by the year 2030 Root rot and other insect and disease problems, plus slash disposal needs, make any type of partial removal impractical for most of the mixed conifer stands

What the Respondents Said

There was almost unanimous opposition to clearcutting from industry, conservation groups, and members of the general public. Reasons cited included the adverse effects it has on other resources, the waste of fast-growing, younger stock and potential crop trees, and the destruction of advanced regeneration The issue was posed as "clearcutting vs selection " Some publics perceived overstory removal as clearcutting Clearcutting ponderosa pine was simply not considered appropriate Acceptance for clearcut-

ting in mixed conifer was conceded by industry. The uneven-aged issue is related to this issue.

SOCIAL AND ECONOMIC WANTS AND NEEDS OF LOCAL COMMUNITIES

Central Oregon's economy is primarily based on its natural resources. Employment levels, community stability, ability to attract new industry and maintain the present, have been linked by some to timber supply levels. Our analyses show that the Forest can not continue to concurrently provide the same amount of timber and amenities over time as is currently provided As a result, there is likely to be socioeconomic conflict under any alternative

The issue, however, is not as direct as timber supply alone. Other factors, such as remanufacturing, material (log) transport into and out of the area, automation, market conditions, rate of liquidation of old growth, and ponderosa pine management affect jobs, employment levels, county receipts, community stability, and other businesses and industries that contribute significantly to the economic well-being of the communities.

What the Respondents Said

The forest products industry and many individuals were adamant in demanding a high timber supply to maintain the local economy and jobs. Others pointed out the short-sightedness of this viewpoint and suggested that the rapid conversion of old growth and shift to second growth/fiber management might not be positive in the long run. They believe the important resource is large ponderosa pine. Second growth pine is worth $40-60/MBF, old growth $100-300/MBF, so that even if the cut is significantly reduced, management for larger pine could contribute more to the economy The issue is also interrelated with the departure, uneven-age, and ponderosa pine issues. Still others felt that the high harvest levels would result in the loss of amenity resources that are the reason many people choose to live, work, and recreate in central Oregon Nearly all thought that a departure was extremely short-sighted

LIVESTOCK GRAZING AND ALLOTMENT MANAGEMENT

The Forest and Grassland provide summer grazing for about 14,000 cattle and 3,500 sheep, or 75,000 AUM's annually, involving 105 permittees. Changes in public perception about management of the Forest and Grassland in recent years have raised questions of possible conflict between livestock and big game, water quality, riparian conditions, fisheries recreationists and reforestation. Grazing permit administration is tied by law to allotment plans, not the Forest or Grassland Plans

What the Respondents Said

Strong criticism was expressed concerning our past performance in administering the grazing program. The public doubts that riparian conditions can be improved and livestock numbers increased simultaneously.

Some said that any significant reduction in livestock grazing would have an adverse effect on the socio-economic base of Crook, Harney, and Jefferson counties and eliminate currently viable ranching units, and still other respondents suggested that full utilization be made of all available forage

Some respondents requested that additional data about current conditions be presented and that more detailed descriptions of the impacts of livestock use on other resources be provided.

RIPARIAN AREA MANAGEMENT

Approximately 20,240 acres, including 815 miles of streams, of the Forest and Grassland are considered the riparian influence zone. Riparian areas receive a disproportionate amount of recreation and grazing use. Our most productive timber sites also occur along stream bottoms Approximately 6,650 acres of riparian area are considered to be in "poor" condition Public attention for riparian area management and condition is increasing.

The Draft Plan proposed to manage 9,400 acres of streamside to achieve "excellent" conditions. Structural improvements were proposed to enhance these areas as follows: fencing, 255 miles; large woody debris placement, 14 miles; log weir construction, 300 acres, rock structures, 50 acres; and shrub plantings, 50 acres The remaining 9,600 acres would be managed for "good" or "fair" condition

What the Respondents Said

The public is concerned about the impact that grazing, timber harvest, and road building has on

riparian areas. Of particular concern is the proposed increase in livestock use of forage and skepticism over the Forest's ability to adequately manage riparian vegetation The view was presented that all riparian areas should be managed in "good" or better condition. There seemed to be a perception that if riparian areas were in "good condition," there would not be much concern over whether the vegetation was used by livestock or not Some livestock users recommended that where fencing is employed to manage riparian vegetation, the fenced units should be large enough to be managed as riparian pastures; others wanted more specifics on the proposed riparian program

TRANSPORTATION SYSTEM

The transportation system on the Forest and Grassland totaled 4,554 miles of roads in 1985 About 833 miles (18 percent) are maintained for passenger car use, with the remainder maintained for high clearance vehicles. In the past, roads were constructed to relatively high standards. Recently, economic pressures and more rigorous analysis led the Forest Service to adopt lower road standards

Under the Draft Plan, the number of miles of road maintained on the Forest and Grassland would decrease nominally in the future Roads would be closed when needed to protect soil and water, prevent disturbance of big game, and limit investment loss Closures may be seasonal or yearlong

What the Respondents Said

There is strong opinion that road standards and road density are too high Seasonal road closures for protection of big game, and road closure after completion of timber sales are generally supported by the public

The timber industry suggested that the conflicts between roads and big game result from roads being open to use, rather than roads per se. They contend that the needs of big game could be served as well by closing roads as by leaving areas roadless

BIG GAME HABITAT

The Oregon Department of Fish and Wildlife (ODFW) assigned management objectives of 2,600 elk and 22,600 deer to the Forest and Grassland. The Forest and Grassland have potential habitat to support larger populations of big game than these objectives

The Draft Plan proposed management for big game habitat would be the primary emphasis on 227,700 acres (approximately 25 percent) of the Forest and Grassland In these areas, open road density and cover would be managed for high quality big game habitat.

What the Respondents Said

Most desired a larger big game population than what the Draft Plan allowed. They would like more seasonal and permanent road closures They felt all of the big game winter range should be managed for that purpose, and an increase in the cover-forage ratios for the general forest should be made.

ROADLESS AREAS AND WILDERNESS STUDY AREAS

The Draft Plan proposed managing Cottonwood Creek, most of Rock Creek, part of Silver Creek, and a small portion of Lookout Mountain for semiprimitive nonmotorized recreation (25,249 acres total). Green Mountain (7,000 acres) was proposed to be managed for semiprimitive motorized recreation.

The Oregon Wilderness Act of 1984 required the Forest Service to review the Deschutes Canyon-Steelhead Falls Wilderness Study Area (WSA) and make a recommendation in the Forest Plan. The Draft proposed a 5,200-acre wilderness (2,500 acres National Grassland, 2,660 BLM). The total WSA was 18,402 acres. Also, the portion of the Deschutes River flowing through the wilderness study area was being studied for classification under both state and federal wild and scenic river systems. The North Fork Crooked River WSA (1,125 acres) was identified as being part of a larger area over which the BLM had the lead.

What Respondents Said

Public response on this issue was very polarized. Many of those favoring maintaining areas as unroaded on the Forest requested that acreage in each be increased over what was proposed in the Draft Plan. Lookout Mountain was most strongly supported to remain roadless, followed by Rock Creek and Cottonwood Creek areas (Ochoco Canyons)

Those opposing roadless area management for recreation cited single-use management as the basis for their opposition, and grouped roadless areas with what they felt were other single-use areas, i e. wilderness, research natural areas, and old growth.

Those commenting on the Deschutes Canyon-Steelhead Falls WSA favored expanding the wilderness to include more area if we were going to recommend wilderness There were few comments received on the NF Crooked River WSA.

SCENIC OR VISUAL RESOURCES

The Draft Plan proposed managing 3,000 acres in the Bandit Springs area and a 7,000 acre area encompassing Crystal Creek, Walton Lake, Round Mountain, Lookout Mountain, Mount Pisgah, and East Point to protect the natural appearance of the landscape Scenic corridors proposed totalled 52,000 acres, or about 50 percent of the potential roadside viewing of 106,700 acres.

What the Respondents Said

There were relatively few comments from the public on this issue. Most comments favored retaining Highway 26 as a scenic corridor Some people felt that scenic corridors were just another means of reducing the timber base. The State of Oregon expressed strong concern over maintaining the visual character of the Ochoco Forest over time.

OLD GROWTH FOREST

The Draft Plan proposed to provide 26,340 acres specifically allocated (dedicated) to old growth management. Approximately 23,500 more acres of old growth were thought to be available in wilderness and unroaded areas.

The size and distribution of the areas managed for old growth habitat were designed to meet habitat requirements for the pileated woodpecker, a management indicator species

What the Respondents Said

A great majority of those responding desired a larger allocation for old growth. Some also expressed interest in preserving old growth juniper habitat

FUELWOOD SUPPLY

The Forest currently supplies about 10,000 cords of fuelwood per year. This is expected to decrease after a few decades as harvesting is done in younger stands that provide less cull material. There is a large amount of material currently not used because of poor access (distance from road, distance from town) and because of small size The availability and location of fuelwood is related in part to the timber sale program. Fuelwood gathering often conflicts with leaving an adequate number of snags for wildlife.

What the Respondents Said

The people who use fuelwood for heating (which includes a majority of local residents) favored the continued availability or increase in availability of fuelwood.

SNAG DEPENDENT WILDLIFE

The Draft Plan proposed providing 55 percent of the potential snag habitat. Snag levels vary by management area, ranging from 40 percent in areas managed for timber production to 100 percent in wilderness and roadless areas. Fuelwood cutting and timber sales may not be leaving adequate supplies of snags

What the Respondents Said

Most of the respondents on this issue wanted snags reserved for wildlife. There was concern that the Forest Plan did not adequately protect snag habitat and that too many snags would fall prey to woodcutters and commercial timber sales. Conversely, timber industry strongly requested an expanded salvage program, which could conflict with leaving snags or snag replacement efforts

WINTER SPORTS

At present, most of the Forest, except for the cross-country ski trails at Bandit Springs, is open to winter recreation, including snowmobiles The Draft Plan proposed closing the summit of Lookout Mountain (2,950 acres) to snowmobiling.

The greatest limitation to winter recreation on the Forest is the lack of access, which at present is provided almost entirely by roads plowed to access timber sales.

What the Respondents Said

The proposal to close Lookout Mountain to snowmobiling was strongly opposed by snowmobilers This appeared to be the major issue concerning winter sports that surfaced in the public comments In contrast, there was little support by cross-country skiers for closing Lookout Mountain, or other areas of the Forest, to snowmobiling. Staff observations of winter use of Lookout Mountain indicate that the conflict between skiers and snowmobilers is normally minimal, and that at present levels, both uses can be accommodated in the area One suggestion was that separate trails to the top of Lookout Mountain be provided for skiers and snowmobilers.

ADDITIONAL ISSUES NOT IDENTIFIED IN THE ORIGINAL ICO'S

ANADROMOUS FISH

Anadromous fish were not identified as an issue in development of the DEIS and Proposed Forest Plan Anadromous fish were identified as a concern by several individuals and groups, including a lengthy, technical response from the Columbia River Intertribal Fish Commission (CRIFC) Primary concerns included protection and enhancement of spawning habitat, and the adequacy of the monitoring schedule. Native American groups noted that treaties guarantee protection for anadromous fish habitat.

HISTORIC TRAIL PRESERVATION - SUMMIT TRAIL

This issue developed out of a separate study conducted during the interim between issuance of the DEIS/Plan and Final.1/ The Forest coordinated with the State Historic Preservation Office (SHPO) on details contained in the Final. This trail has been related also to other groups' proposals for an east-west intertie to a cross-state trail system.

OFF-ROAD VEHICLE (ORV) USE

This issue re-emerged during the Issue/Final Plan validation phase. It was not evident as an issue in the Draft Plan phase It is being addressed under Transportation System (pg ROD-26).

ROUND MOUNTAIN

The Oregon Natural Resources Council in comment on the Draft Plan asked that a recreation unit be established for the Round Mountain area. This issue was brought up again by one individual in the validation process (see Other Multiple Use Decisions, pg. ROD-38).

VALIDATION OF PUBLIC PARTICIPATION PROCESS

Incorporation of public involvement into the decisions being reached in the Final Forest and Grassland Plans has been an integral step as we have progressed from the draft documents released in September 1986. Significant steps were taken during the last year of final document preparation to insure that direction in the Final Plans responded accurately to comments received on the Draft. Meetings were held, and contacts made with selected groups, individuals, agencies and political leaders in order to:

- Validate public responses received during the process;
- Insure that we correctly interpreted what was said; and
- Insure that we did not miss something or overlook stumbling blocks
  towards successful implementation

This networking followed our efforts in seeking broad public review of our draft documents. During the past year, meetings have been held with groups, agencies, citizens, and internally within the Forest Service organization

In response to this effort, where it appeared appropriate, changes were made in the final planning documents This was intended to strengthen the Plan decision and build a base of support for effective implementation (see pp ROD 40-49 for summary of changes)

1/ Gowan, A 1986 The Summit Trail A History, Comprehensive Survey, and Evaluation USDA For Serv , Ochoco N F Repts 1 & 2

III. DECISIONS

SUMMARY OF THE DECISION

My decision is to approve and adopt the Forest and Grassland Plans which accompany the Final EIS; this decision is referred to as Alternative I for the management of the Ochoco National Forest and Crooked River National Grassland

In arriving at this decision, I reviewed the environmental consequences of the Plans and their alternatives I gave particular attention to the responsiveness of the selected plans to the public issues and management concerns identified in development of the Final Plans Land allocations and standards and guidelines developed through interdisciplinary team analysis and review, reflect public comment, inherent land and resource capabilities, and the laws and regulations under which the National Forest and Grassland are required to be administered In my judgement, Alternative I represents an equitable treatment of all resource considerations, and provides for both monetary and non-monetary outputs in a balanced and environmentally sound manner. In that sense, Alternative I maximizes net public benefits over time

ESTABLISHMENT OF FOREST AND GRASSLAND MULTIPLE USE GOALS

The Forest and Grassland Plans (Chapters 4) establish multiple use goals, objectives and desired future condition. The goals represent a summary of the standards and guidelines on page ROD 15 and are listed below.

The Grassland is administered under different laws than the National Forest, and in addition to the multiple use goals, has legislated primary goals which are.

1 Administer the National Grassland under sound and progressive principles of land conservation and multiple use, and promote the development of grassland agriculture and sustained-yield management of the forage, fish and wildlife, timber, water, and recreational resources

2 Manage the National Grassland resources to maintain and improve soil and vegetative cover, demonstrate sound and practical principles of land use, and exert a favorable influence for securing sound land conservation practices on associated private lands.

In addition, the goals and objectives for the Grassland differ from those of the National Forest for the management of old growth and recreation. For those resources, the Grassland goals deal only with juniper, and desert and canyon environments respectively

SUMMARY LISTING OF MULTIPLE USE GOALS FOR FOREST AND GRASSLAND

Air Quality - Comply with air quality laws and regulations and coordinate with appropriate regulatory agencies.

Biological Diversity - Maintain native, historic, and desirable introduced plant and animal species and communities, including those that may be threatened, endangered, or sensitive

Maintain or enhance ecosystem function to provide for long-term productivity of forest resources and biological communities.

Cultural Resources - Locate, evaluate, protect, and mitigate if necessary, significant archaeological sites Enhance and interpret selected sites for public education and enjoyment. Promote opportunities for academic research

Facilities - Plan, construct, maintain, and manage Forest and Grassland facilities to provide maximum economy, investment protection, user safety, and resource protection.

Fire - Control wildfire aggressively (particularly in urban-Forest interface areas), and in a cost-effective manner (minimize suppression cost plus loss)

Provide for the ecologically sound use of prescribed fire as a cost-effective management tool for achieving resource management objectives.

Forage - Provide forage for wildlife and domestic livestock, in a manner consistent with other resource objectives and environmental constraints, while maintaining or improving ecological condition and plant community stability

Forest Health - Maintain health of the Forest for present and future uses. Forest health is defined as "a desired condition where biotic and abiotic influences on the Forest (i.e. insects, diseases, atmospheric disposition, silvicultural treatments,

harvesting practices) do not threaten management objectives either now or in the future "

Forest Residues - Manage Forest residues (woody biomass), resulting from either natural or man-caused processes, as a separate resource. Provide this resource (on-site) for the benefit of other resources such as soil, water, wildlife, and timber, as well as for the social and economic benefits associated with firewood gathering and other family oriented endeavors centered around residues (Regional Policy - FSM 2403).

Fuelwood - Provide fuelwood for personal and commercial use, consistent with other resource objectives and environmental constraints

Lands - Permit special land uses that have been evaluated in relationship to land management objectives, are harmonious with other resource objectives and environmental considerations, and are in the public interest.

Minerals and Energy - Provide for and facilitate the exploration, development, and production of mineral and energy resources in coordination with other resource objectives, environmental considerations, and mining and leasing laws.

Old Growth - Provide stands of old growth throughout the Forest for wildlife habitat, ecosystem diversity and aesthetic diversity

Recreation - Emphasize the National Recreation Strategy.

Provide for a variety of recreational experiences across all areas of the Ochoco National Forest, consistent with other resource objectives and environmental constraints.

Protect unique natural and recreational features.

Scenic Resources - Participate in the "National Forest Scenic Byways" program through nomination of Forest roads that exhibit exceptional qualities and meet national selection criteria.

Provide natural-appearing scenery along major travel ways, at developed and dispersed recreation sites, and at certain recreation areas

Integrate visual quality management into all resource activities which have potential negative impacts on scenery

Social and Economic - Manage the Forest to lend support to the social and economic viability of local communities, as well as to the nation as a whole.

Provide equal opportunities to people regardless of race, color, creed, sex, marital status, age, handicap, religion, or national origin

Soil - Manage soil to maintain, restore, or improve its natural productive potential, balanced with resource demands over the long term

Timber - Provide for the optimum production of quality wood products, consistent with other resource objectives, environmental constraints, and economic efficiency.

Transportation System - Plan, design, operate and maintain a safe and economical transportation system providing efficient access for the movement of people and materials involved in the use and protection of the National Forest lands.

Water - Maintain or improve water quality and quantity, and timing of run-off.

Comply with the objectives of the "Clean Water Act" and Oregon State water quality standards

Provide water of consistently high quality to users and dependent resources

Wildlife and Fish - Provide, manage and improve fish and wildlife habitats to maintain viable populations of existing native and desired non-native vertebrate species, including threatened, endangered, and sensitive species

ESTABLISHMENT OF MANAGEMENT REQUIREMENTS (STANDARDS AND GUIDELINES) AS LISTED IN CHAPTERS 4, FOREST AND GRASSLAND PLANS

Specific direction for the management areas is provided for in Chapters 4 of the Plans as desired condition statements (prescriptions) and as Forest- and Grassland-wide and management area standards and guidelines. A summary of this information for the Forest and Grassland Plans follows:

NATIONAL FOREST

Management Area Prescriptions
(Forest Plan, Chapter 4 - Section 2)

F1. Black Canyon Wilderness
F2. Bridge Creek Wilderness
F3. Mill Creek Wilderness
F4. North Fork Crooked River Wilderness Study Area
F5. Research Natural Areas
F6. Old Growth
F7. Summit Historic Trail
F8 Rock Creek/Cottonwood Creek Area
F9. Rock Creek/Cottonwood Creek Unroaded-Helicopter Area
F10 Silver Creek Area
F11 Lookout Mountain Recreation Area
F12. Eagle Roosting Areas
F13. Developed Recreation
F14. Dispersed Recreation
F15. Riparian
F16. Bandit Springs Recreation Area
F17. Stein's Pillar Recreation Area
F18. Hammer Creek Wildlife/Recreation Area
F19 Deep Creek Recreation Area
F20. Winter Range
F21 General Forest Winter Range
F22 General Forest
F23. North Fork Crooked River Recreation Corridor
F24. North Fork Crooked River Scenic Corridor
F25 Highway 26 Visual Corridor
F26 Visual Management Corridors
F27. Round Mountain National Recreation Trail
F28. Facilities

Forest-wide and Management Area Standards and Guidelines
(Forest Plan, Chapter 4 - Section 3)

Air Quality
Biological Diversity
Cultural Resources
Facilities
Fire
Forage
Forest Health
Forest Residues
Fuelwood
Lands
Minerals and Energy
Old Growth
Recreation
Scenic Resources
Social and Economic
Soil
Timber
Transportation System
Water
Wildlife and Fish

NATIONAL GRASSLAND

Management Area Prescriptions
(Grassland Plan, Chapter 4 - Section 2)

G1. Antelope Winter Range
G2. Metolius Deer Winter Range
G3. General Forage
G4. Research Natural Areas
G5. Juniper Old Growth
G6. Crooked River Scenic River
G7. Deschutes River Recreation River
G8. Squaw Creek
G9. Riparian
G10. Rimrock Springs Wildlife Area
G11. Haystack Reservoir
G12. Cove Palisades State Park
G13. Lake Billy Chinook View Area
G14. Dispersed Recreation
G15. Gray Butte Electronic Site
G16. Utility Corridors

Grassland-wide and Management Area Standards and Guidelines
(Grassland Plan, Chapter 4 - Section 3)

Air Quality
Biological Diversity
Cultural Resources
Facilities
Fire
Forage
Fuelwood
Grassland Health
Lands
Minerals and Energy
Recreation
Scenic Resources
Social and Economic
Soil
Transportation System
Water
Wildlife and Fish

LAND ALLOCATIONS AND PLAN STRUCTURES

The Plans establish land allocations which apply to specific uses, resource considerations, natural features or legislatively designated areas. The

allocations are mapped (see Alternative I maps depicting management areas) and have had preliminary ground truthing.

The management area allocations for the Forest and Grassland are summarized in Tables 5 & 6. Summary of percent area by resource emphasis is presented in Tables 7 & 8. Objectives and desired future condition have been described by management area in Chapters 4, Forest and Grassland Plans, and in the FEIS Chapter 2 and Appendix B The management areas are individually described in summary form on pages ROD 18-20 (see also Alternative I maps).

TABLE 5
OCHOCO NATIONAL FOREST MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	Acres	% Total	Resource Emphasis
MA-F1 Black Canyon Wilderness	13400	2	Wilderness
MA-F2 Bridge Creek Wilderness	5400	<1	Wilderness
MA-F3 Mill Creek Wilderness	17400	2	Wilderness
MA-F4 North Fork Crooked River Wilderness Study Area	1125	<1	Wilderness
MA-F5 Research Natural Areas	4400	<1	Research
MA-F6 Old Growth 1/	19570	2	Wildlife
MA-F7 Summit Historic Trail	9560	1	Recreation
MA-F8 Rock Creek/Cottonwood Creek	11820	1	Recreation
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter	2480	<1	Timber/Range
MA-F10 Silver Creek Area	3110	<1	Recreation
MA-F11 Lookout Mountain Recreation	15660	2	Recreation
MA-F12 Eagle Roosting Areas	570	<1	Wildlife
MA-F13 Developed Recreation	1810	<1	Recreation
MA-F14 Dispersed Recreation	1970	<1	Recreation
MA-F15 Riparian	18130	2	Riparian
MA-F16 Bandit Springs Recreation	1580	<1	Recreation
MA-F17 Stein's Pillar Recreation	1070	<1	Recreation
MA-F18 Hammer Creek Wildlife/ Recreation	2560	<1	Wildlife
MA-F19 Deep Creek Recreation	770	<1	Recreation
MA-F20 Winter Range	64130	7	Wildlife
MA-F21 General Forest Winter Range	107360	12	Timber/Wildlife
MA-F22 General Forest	496530	59	Timber/Range
MA-F23 North Fork Crooked River - Recreation River Corridor	1830	<1	Recreation

Management Area	Acres	% Total	Resource Emphasis
MA-F24 North Fork Crooked River - Scenic River Corridor	830	<1	Recreation
MA-F25 Highway 26 Visual Corridor	6850	<1	Visuals
MA-F26 Visual Management Corridors	33260	4	Visuals
MA-F27 Round Mountain National Recreation Trail	1000	<1	Recreation
MA-F28 Facilities	460	<1	Facilities
TOTAL FOREST ACRES	844640	100	

1/ Includes 8 old growth units within wilderness, unroaded, and WSA

TABLE 6
CROOKED RIVER NATIONAL GRASSLAND MANAGEMENT AREAS

Allocations and Resource Emphasis By Area

Management Area	Acres	% Total	Resource Emphasis
MA-G1 Antelope Winter Range	22700	20	Wildlife
MA-G2 Metolius Deer Winter Range	12740	11	Wildlife
MA-G3 General Forage	59440	53	Range
MA-G4 Research Natural Areas	110	<1	Research
MA-G5 Juniper Old Growth	*740*	*1*	*Wildlife*
MA-G6 Crooked River-Recreation River Corridor	720	1	Wild/Scenic River
MA-G7 Deschutes River-Scenic River Corridor	650	1	Wild/Scenic River
MA-G8 Squaw Creek	7840	7	Recreation/Wildlife
MA-G9 Riparian	2110	2	Riparian
MA-G10 Rimrock Springs Wildlife Area	430	<1	Wildlife
MA-G11 Haystack Reservoir	150	<1	Recreation
MA-G12 Cove Palisades State Park	*2690*	*2*	*Recreation*
MA-G13 Lake Billy Chinook View Area	560	1	Visuals
MA-G14 Dispersed Recreation	90	<1	Recreation
MA-G15 Gray Butte Electronic Site	80	<1	Facilities
MA-G16 Utility Corridors	460	<1	Facilities
TOTAL GRASSLAND ACRES	111510	100	

TABLE 7
RESOURCE EMPHASIS BY ACRES AND % OF FOREST

RESOURCE EMPHASIS	# MGMT AREAS	ACRES	% OF FOREST
TIMBER/FORAGE	2	499,330	59%
WILDLIFE	3	174,620	21%
OLD GROWTH	1	19,570	2%
RECREATION	10	48,350	6%
SCENIC/VISUAL	3	40,110	5%
WILDERNESS	4	37,330	4%
RIPARIAN	1	18,130	2%
RESEARCH	1	4,400	<1%
WILD & SCENIC	2	2,660	<1%
FACILITIES	1	460	<1%
TOTAL		844,640	

TABLE 8
RESOURCE EMPHASIS BY ACRES AND % OF GRASSLAND

RESOURCE EMPHASIS	# MGMT AREAS	ACRES	% OF FOREST
RANGE/FORAGE	1	59,440	53%
WILDLIFE	3	35,870	32%
RECREATION	4	9,400	10%
RESEARCH	1	110	<1%
RIPARIAN	1	2,110	2%
SCENIC/VISUAL	1	560	<1%
WILD & SCENIC	2	2,740	<1%
OLD GROWTH	1	740	<1%
FACILITIES	2	540	<1%
TOTAL		111,510	

SUMMARY DESCRIPTION OF DIRECTION FOR MANAGEMENT AREAS

MA-F1 BLACK CANYON WILDERNESS - Protect the wilderness ecosystems Manage use to maintain a natural setting and preserve solitude

MA-F2 BRIDGE CREEK WILDERNESS - Protect the wilderness ecosystems Manage use to maintain a natural setting and preserve solitude

MA-F3 MILL CREEK WILDERNESS - Protect the wilderness ecosystems. Manage use to maintain a natural setting and preserve solitude

MA-F4 NORTH FORK CROOKED RIVER WILDERNESS STUDY AREA - Management will maintain the existing conditions of the area for potential wilderness designation pending a decision by Congress or until released from further consideration.

MA-F5 RESEARCH NATURAL AREAS - Provide opportunities for research, education, and ecological benchmarks in naturally occuring ecosystems where natural processes are maintained.

MA-F6 OLD GROWTH - Provide habitat for wildlife species dependent on old growth stands and protect old growth itself.

MA-F7 SUMMIT HISTORIC TRAIL - Protect the integrity of the Summit Trail. Enhance and interpret significant segments for public enjoyment and education. Pristine segments will be managed to protect, interpret, and preserve their historic qualities.

MA-F8 ROCK CREEK/COTTONWOOD CREEK ROADLESS AREA - Provide for protection of soil, water, and fisheries, and for opportunities for nonmotorized recreational use and enjoyment Maintain vegetation on steep slopes to prevent erosion, and to protect water quality and the anadromous fishery.

MA-F9 ROCK CREEK/COTTONWOOD CREEK UNROADED HELICOPTER AREA - Allow timber harvest while protecting the anadromous fishery, sensitive soils on steep slopes, and big game habitat

MA-F10 SILVER CREEK ROADLESS AREA - Protect and enhance the roadless qualities and provide nonmotorized recreational use

MA-F11 LOOKOUT MOUNTAIN RECREATION AREA - Maintain a natural setting, providing continued opportunities for high quality, semiprimitive recreational activities, and wildlife habitat, while maintaining healthy forests.

MA-F12 EAGLE ROOSTING AREAS - Provide winter roosting habitat for migrating bald eagles during the period December through April, annually.

MA-F13 DEVELOPED RECREATION - Provide safe, healthful, and esthetic facilities for people to utilize, within a relatively natural outdoor setting, while pursuing a variety of recreational experiences.

MA-F14 DISPERSED RECREATION - Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences.

MA-F15 RIPARIAN - Manage streamside vegetation and habitat in order to maintain or improve water quality, meeting temperature and turbidity levels as required by state standards under the Clean Water Act.

MA-F16 BANDIT SPRINGS RECREATION AREA - Dispersed, nonmotorized recreational opportunities, within a setting where management activities are generally not evident to the casual observer. The recreational activities and opportunities will be expanded beyond winter recreation to year-round activities.

MA-F17 STEIN'S PILLAR RECREATION AREA - Maintain a scenic, natural or natural-appearing setting associated with unique geologic formations, particularly Stein's Pillar. Provide roadless nonmotorized recreation, with various opportunities to enjoy nature.

MA-F18 HAMMER CREEK WILDLIFE/RECREATION AREA - Provide and maintain habitat diversity for a variety of wildlife species where open road density is minimal, and a scenic, semi-natural or natural-appearing setting for nonmotorized recreational opportunities exists.

MA-F19 DEEP CREEK RECREATION AREA - Provide a near natural setting, where management activities are not visually evident or subordinated to the surrounding landscape, for recreational pursuits within the area

MA-F20 WINTER RANGE - Manage for big game winter range habitat

MA-F21 GENERAL FOREST WINTER RANGE - Manage for timber production with measures taken to maintain habitat effectiveness for big game. Management activities will be designed and implemented to recognize big game habitat needs.

MA-F22 GENERAL FOREST - Production of timber and forage while meeting the Forest-wide Standards and Guides for all resources

MA-F23 NORTH FORK CROOKED RIVER RECREATION CORRIDOR - Management will maintain the appearance of a natural landscape in the foreground view from Road 42 to enhance recreational and scenic values Management activities will protect and enhance public use and enjoyment of the river segment

MA-F24 NORTH FORK CROOKED RIVER SCENIC CORRIDOR - Management will maintain and enhance a natural appearing landscape and protect the scenic river designation.

MA-F25 U.S. HIGHWAY 26 VISUAL CORRIDOR - Maintain and enhance the scenery for travelers along U.S. Highway 26

MA-F26 VISUAL MANAGEMENT CORRIDORS - Maintain the natural appearing character of the Forest along major travel routes, where management activities are not evident, or are visually subordinated to the surrounding landscape.

MA-F27 ROUND MOUNTAIN NATIONAL RECREATION TRAIL - Protect and manage for scenic qualities which make the trail corridor an attractive recreational setting

MA-F28 FACILITIES - Provide a safe, efficient, and healthful working environment where structure design and layout of the site blend with the surroundings.

MA-G1 ANTELOPE WINTER RANGE - Manage for optimum winter range conditions for antelope in conjunction with the Oregon Department of Fish and Wildlife.

MA-G2 METOLIUS DEER WINTER RANGE - Manage for big game winter range habitat.

MA-G3 GENERAL FORAGE - Manage for forage production and utilization in a manner consistent with Forest-wide Standards and Guides for other resources

MA-G4 RESEARCH NATURAL AREAS - Provide opportunities for research, education, and ecological benchmarks in naturally occuring ecosystems where natural processes are maintained

MA-G5 JUNIPER OLD GROWTH - Provide habitat for wildlife species dependent on old growth stands.

MA-G6 CROOKED RIVER RECREATION RIVER - Management will maintain the appearance of a natural landscape to enhance and protect recreational values

MA-G7 DESCHUTES RIVER SCENIC CORRIDOR - Manage for scenic quality and natural appearance of the landscape

MA-G8 SQUAW CREEK - Provide opportunities for semiprimitive nonmotorized recreation in a pristine canyon setting while protecting and enhancing the deer winter range habitat and fisheries Includes a 1,370 acre segment of Lower Squaw Creek recommended for designation as a "scenic river" in the Wild and Scenic River System.

MA-G9 RIPARIAN - Manage streamside vegetation and habitat in order to maintain or improve water quality, meeting temperature and turbidity levels as required by state standards under the Clean Water Act.

MA-G10 RIMROCK SPRINGS WILDLIFE - Provide unique habitat (wetlands, ponds, springs) within the juniper-sagebrush steppe, characteristic of Central Oregon's high desert Provide for nonconsumptive (viewing, photography) wildlife uses in a natural setting.

MA-G11 HAYSTACK RESERVOIR - Provide users with a system of quality facilities that are safe and environmentally sound Continue to emphasize camping, picnicking, boating, fishing, and swimming

MA-G12 COVE PALISADES STATE PARK - Manage for developed campgrounds and water related recreational activities.

MA-G13 LAKE BILLY CHINOOK VIEW - Maintain the natural appearing character of the viewshed from Lake Billy Chinook, where management activities are not evident or are visually subordinated to the surrounding landscape

MA-G14 DISPERSED RECREATION - Provide and maintain a near-natural setting for people to utilize while pursuing outdoor recreation experiences

MA-G15 GRAY BUTTE ELECTRONIC SITE - Accomodate electronic transmission facilities. The site is limited to low power output electronic equipment

MA-G16 UTILITY CORRIDORS - Accommodate energy-transmission facilities.

DECISIONS RELATED TO PLANNING ISSUES (ICO'S) AND THEIR DECISION RATIONALE

Decisions relating to each planning issue (see pp ROD 6-12 for summary description of issues) are listed and followed here by brief rationale for the decisions.

TIMBER SUPPLY AND FOREST MANAGEMENT DECISIONS

DECISIONS.

1. There will be no scheduled or chargeable timber harvest for the National Grassland

2. The suitable land base for forest management activities within this planning period is determined to be 533,177 acres (as shown in FEIS Chapter 2, Table 2-8, and Appendix G in the Forest Plan)

3. Ninety percent or more of the physically suitable Forest acres will have a scheduled or chargeable timber harvest, based on the allocations described in FEIS Chapter 2, and displayed on the Forest plan map.

4. The estimated scheduled timber volumes, harvest type, rotation age or size, and estimated potential contribution to ASQ by management area grouping are

Group I
92,200 Acres - 11%
No scheduled treatment
- 1 Black Canyon Wilderness
- 2 Bridge Creek Wilderness
- 3. Mill Creek Wilderness
- 4 N.F.C R. Wilderness Study
- 5 RNA's
- 6 Old Growth
- 7 Summit Trail (preservation)
- 8. Rock Creek/Cottonwood Creek Unroaded
- 10. Silver Creek Unroaded
- 11. Lookout Mountain
- 28. Facilities

Group II
18,130 Acres - 2%
Silviculture - Even- or uneven-aged
Rotation Age - 200 years
Diameter 20"+
Average annual cu ft volume - 0 3 MMCF
- 15 Riparian

Group III
3,240 Acres - <1%
Silviculture - Even- or uneven-aged
Rotation age - 300 years
Diameter 30"
Average annual cu ft yield - <0 1 MMCF
- 12. Eagle Roosting

17. Stein's Pillar
19. Deep Creek
24 N F.C.R. Scenic River

Group IV
28,110 Acres - 4%
Silviculture - Even- or uneven-aged
Rotation age - Pine 250 years, mixed conifer 200 years
Average annual cu.ft. yield - 0.4 MMCF
7 Summit Trail (retention)
13. Developed Recreation
14. Dispersed Recreation
16. Bandit Springs
25. Hwy 26 Corridor
26. Visual Management (retention)
27. Round Mountain National Recreation Trail

Group V
32,140 Acres - 4%
Silviculture - Even- or uneven-aged
Rotation age - Pine 200 years, mixed conifer 150 years
Diameter - Pine 27", mixed conifer 22"
Average annual cu.ft. yield - 0.6 MMCF
7. Summit Trail (partial retention)
18. Hammer Creek
23. N F.C.R Recreation River
26. Visual Management (partial retention)

Group VI
64,130 Acres - 8%
Silviculture - Even-aged
Rotation age - Pine 125 years, mixed conifer 90 years
Diameter - Pine 16", mixed conifer 15"
Average annual cu ft. yield - 0.9 MMCF
20. Winter Range

Group VII
606,690 Acres - 72%
Silviculture - Even- or uneven-aged
Rotation age - Pine 130 years, mixed conifer 90 years
Diameter - Pine 18", mixed conifer 16" (uneven-aged 20")
Average annual cu ft yield - 16.8 MMCF
9. Rock Creek/Cottonwood Creek Helicopter
21. General Forest Winter Range
22. General Forest

5 The ASQ will be 19 0 MMCF per year which is sustainable in perpetuity. This translates to 115 MMBF average ASQ over the first decade of which an estimated 71 percent, or 82 MMBF, will be comprised of ponderosa pine volume.

6. The Forest will conduct a timber salvage program within the limits of requirements for other resource objectives, such as snags for wildlife habitat, dead and down material as it relates to site productivity and healthy stream ecosystems, and prevention of excessive soil compaction. The annual volume estimated to be available for salvage over the planning period is four MMBF annually of which three MMBF is ponderosa pine.

7. The Forest will employ appropriate silvicultural systems in Forest management based on project analysis of stand structures, stand conditions, species composition and management objectives (see FEIS, Appendix E). Either even-aged or uneven-aged systems may be prescribed Clearcutting will be done where forest conditions, such as disease and insect infestation, allow no other silviculturally acceptable alternative Such situations generally occur in mixed conifer stands or where ponderosa pine is heavily infected with dwarf mistletoe. Approximately 100,000 acres of ponderosa pine stands in the General Forest (MA-F22) will be managed under uneven-aged systems.

8. Ponderosa pine rotation age in the General Forest Management Area (MA-F22) will be 130 years with a tree diameter of 18 inches; for mixed conifer it is 90 years and 16 inches. Stands selected for uneven-aged management will have an average rotational diameter of 20 inches. Rotation ages in other management areas range from 90-300 years and are based on resource objectives (recreation, wildlife, visual emphasis - see item 4 under Decisions, p. ROD-20).

9. Changes in ASQ will be done gradually over time. Table 9 shows the proposed schedule.

TABLE 9
Planned Harvest For 1990-1999
(Glide Path)
(MMBF not including salvage)

	YEAR				
	1990	1991	1992	1993	1994
ASQ	124	121	118	114	113
	YEAR				
	1995	1996	1997	1998	1999
ASQ	112	112	112	112	112

RATIONALE

The intent is to maintain relatively high and sustainable level of allowable sale quantity and salvage program over the next decade in view of dependent communities and wood product demand; however this must be accomplished within the law and regulations, as well as requirements for other resources established by this Plan. In my judgement the combined ASQ and salvage of 119 MMBF annually, when all things are taken into consideration, is reasonable and attainable for the Ochoco National Forest for this planning period.

I have given particular attention to the amount of ponderosa pine that can comprise that volume on a sustainable basis and find it to be approximately 71%, or 82 MMBF for the first decade. Because of product value, considerations, and other resource objectives involved, I have elected to vary rotation ages (diameters) by species and situations in order to insure the continuation of high value products from the Forest, and perpetuation of the aesthetic forest character of the Ochoco National Forest The decision to apply uneven-aged management also relates to those reasons.

The combined ASQ and salvage volume of 119 MMBF is greater than the average annual historic volume of 110 MMBF cut over the past decade. However it is eight percent less than the volume sold, or 10 8 MMBF less than the programmed harvest allowed under the 1979 Timber Resource Plan. The differences in projections may be attributed to new inventory information; improved yield tables, and new allocations, laws, regulations and requirements affecting resource decisions. It is my intention to make these changes in timber availability in a gradual manner so as to cause minimal social or economic affects (see Table 9).

I have considered the potential for providing a higher ASQ should economics or demand continue to improve. Some additional ASQ (<3 MMBF) might be theoretically captured by further increases in management intensity and investment, but this is not presently cost efficient, as demonstrated by the PNV of Alternative B-Modified vs Alternative I (Table 31). Because the forested lands on the Ochoco are for the most part "suitable" and cost-efficient under current economics, changes in demand do not affect ASQ by bringing more acres or situations into solution. In short, there is little potential for increasing ASQ on this particular National Forest due to improved economics at this time. Any such opportunities would contribute insignificantly to the ASQ as calculated and do not appear to be cost effective at this time.

SOCIAL AND ECONOMIC WANTS AND NEEDS OF LOCAL COMMUNITIES

DECISION

The decisions relating to this issue are addressed under the other issues and aspects of the Plan(s). These include, but are not limited to.

1. Allocations which recognize and protect important natural features, recreational attractions, wildernesses, and wildlife habitat.

National Forest - MA - 1,2,3,4,5,6,7,8,10,11, 12,13,14,15,16,17,18,19,20,23,24,25,26,27

National Grassland - MA - 1,2,5,6,7,8,9,10,11,12,13,14

2 Allocations, decisions, and standards and guidelines (direction) which perpetuate the character of the National Forest and Grassland over time, e.g .

a Larger harvest tree diameters than those required to maximize timber outputs.

b Application of uneven-aged management.

c Roadside visual corridors.

d Protection of recreational features or attractions (Deep Creek, Stein's Pillar, N F.C R Scenic River, et al)

3. Timber supply level of 119 MMBF (including salvage) in the first decade, with long-term sustained yield of 19 0 MMCF.

4. Consideration of product value in Forest management decisions; decision for larger rotational diameter for ponderosa pine and approximately 71 percent of the ASQ comprised of ponderosa pine.

5. Decisions affecting range allotments made on a case-by-case basis.

RATIONALE

Decisions under the issue of Timber Supply have the potential to have the greatest and most immediate effects on local communities. The importance of timber harvest levels to jobs is recognized, but decisions by industry (e.g automation) also effect the number of jobs. The decision made in the plan purposefully provides a relatively high level of timber supply, with attention to the amount of ponderosa pine Large ponderosa pine has the greatest value and its sale and manufacture potentially generates the greatest number of jobs and economic returns. The decision to plan for a smaller diameter for other species relates to current product demands, as well as silvics of the species My decisions will provide a sustained, even-flow, of high value timber from the Forest on a decadal basis, while maintaining, protecting, or enhancing wildlife, recreation, water quality and visual resources. In my judgement, Final Plan decisions contribute to a balance between nonmonetary and monetary resources in a manner that can assist the economic stability of dependent communities, and allow the character and recreational settings relating to rural lifestyles carried on near the National Forest and Grassland to be maintained over time.

LIVESTOCK GRAZING AND ALLOTMENT MANAGEMENT

DECISIONS.

1. Forage utilization standards for riparian and primary range are established as described in Table 10.

2 A prioritized program for improvement of riparian areas on an allotment-by-allotment basis has been developed (see Forest and Grassland Plans Appendix A) All riparian areas will have necessary action initiated within this planning period (10 years) to begin improvement of their condition to "excellent."

3 Range allotment plans will be updated and tiered to the above program. Adjustments in permitted stock numbers will be made through the allotment planning process.

4. Fall green-up in Winter Range (MA-F20) and General Forest Winter Range (MA-F21) will be reserved for big game.

5. No domestic stock grazing will be permitted in lower Squaw Creek (MA-F8) from the power line crossing downstream to confluence of the Deschutes River, or on the Island RNA (MA-F4).

6. Interior portions of Rimrock Springs Wildlife Area (MA-F10) are not programmed for planned, recurrent grazing.

7. The current grazing program of 75,000 AUM's for the Forest and Grassland could be reduced by up to 10 percent during this planning period. This reduction would not be an across the board cut, but vary by the condition of the riparian areas within each allotment on a case-by-case basis. Over time, AUM's may increase depending on the effectiveness of the riparian improvement program

RATIONALE

With the establishment of forage utilization standards it is my intent to assure that grazing levels on the National Forest and Grassland do not exceed the carrying capacity of plant communities, and to prevent deterioration of rangelands. I have established a program for updating allotment plans and dealing with conflicts and conditions of overuse on an allotment-by-allotment basis over the next three years On winter ranges where availability of forage is critical to big game, I am reserving fall green-up for the exclusive use of big game. Prohibition of domestic stock grazing on lower Squaw Creek and Island RNA is designed to maintain benchmark areas that have experienced little or no grazing in the past. Lower Squaw Creek represents one of the best examples of excellent riparian conditions on the Forest and Grassland In my judgement the decisions relating to the administration of the grazing program described in the Plans allow each situation to be considered on its merits at a project analysis level This approach is an equitable one, in my opinion. Those permittees which have over the years practiced good range management will have their

TABLE 10
RIPARIAN FORAGE UTILIZATION
Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) By Existing Range Condition			
	Grassland Communities 2/		Shrubland Communities 3/	
Range Resource Management Level	Sat *	Unsat *	Sat.	Unsat
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range	40	0-30	30	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plan vigor include fencing and water development	45	0-35	40	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems	50	0-40	50	0-35

1/ This will be incorporated in annual operating plans and Allotment Management Plans Allotment Management Plans may include utilization standards which are either higher or lower than associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources Includes cumulative annual use by big game livestock.
2/ Utilization based on percent of total annual forage production removed by weight.
3/ Utilization based on percent of the current years growth removed Example measure length of current years growth of browsed and unbrowsed leaders and determine incidence of use Calculate percent of current years growth removed
* For satisfactory and unsatisfactory condition see Glossary in FEIS

TABLE 11
PRIMARY RANGE (Except Riparian)
Allowable Use of Available Forage 1/

	Maximum Annual Utilization (%) 2/					
	Forested Communities		Grassland Communities		Shrubland Communities	
Range Resource Mgmt. Level	Sat	Unsat	Sat.	Unsat.	Sat.	Unsat
B - Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range	40	0-30	50	0-30	40	0-25
C - Livestock managed to achieve full utilization of allocated forage Management systems designed to obtain distribution and maintain plant vigor include fencing and water developments	45	0-35	55	0-35	45	0-30
D - Livestock managed to optimize forage production and utilization Cost-effective culture practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems	50	0-40	55	0-40	50	0-35

1/ Incorporate into annual operating plans and allotment management plans Allotment management plans may include utilization standards that are either higher or lower when associated with intensive grazing systems and specific management objectives that meet other resource objectives
2/ Utilization based on percent by weight of total annual forage production removed for grass, grasslike, and forbs, and percent of current years growth removed for shrubs See example in riparian table for shrubs
* For satisfactory and unsatisfactory condition see Glossary in FEIS

efforts rewarded. Where there have been abuses, actions will be taken to correct the situation (see Riparian Area Management discussion which follows).

RIPARIAN AREA MANAGEMENT

DECISIONS

1. See also Decisions and Rationale under Livestock Grazing (pp. ROD 23-25), and Anadromous Fish (p. ROD-39).

2. Adopt as guidance the Best Management Practices (BMP's) described in USDA Forest Service PNW 1988 publication, "General Water Quality Best Management Practices."

3. Allocation of an average 200-foot streamside management unit (average 100 feet each side) for all perennial and intermittent streams (to which standards and guidelines for protection of riparian areas and water quality have been applied).

4. Application of even-aged or uneven-aged silviculture systems where appropriate

5. Establishment of watershed sensitivities and Forest-wide threshold guidelines of no more than 25-35% of the Forest vegetation removed (harvested) in a watershed at any one time as shown in Table 12.

6. Development of a program for structures, instream devices and woody debris for riparian area and channel condition improvement (see project schedules, Forest Plan, Appendix A).

7. Compliance with Oregon State Water Quality Standards (OR Adm. Rules 340-41-205).

8. On approximately 40 miles (1,000 acres) of selected streams, the streamside management area will average 200 feet on each side to provide "connective habitat."

RATIONALE

The Forest Service is required by law to meet the requirements of the Clean Water Act. In addition, fisheries and fish habitat are important Forest resources, particularly anadromous fish. With national focus on riparian area management and water quality, as well as increased recognition of the importance of anadromous fish habitat, the Forest Service can no longer tolerate nor allow uses or practices which favor individual interests at the expense of riparian areas and water quality. The decisions I've outlined above are a forward step in providing correction and improvement in conditions where necessary, and in assuring that the Forest Service meets its obligations in respect to requirements of law, regulations and objectives for riparian management established by this Plan.

TABLE 12
WATERSHED SENSITIVITIES AND THRESHOLD GUIDELINES

35% Harvest Threshold *Low Sensitivity*	30% Harvest Threshold *Moderate Sensitivity*	25% Harvest Threshold *High Sensitivity*
Middle Fork Crooked River	North Fork Crooked River	John Day
Dry/Stinger	Marks Creek	Trout Creek
Beaver Creek (east)	Emigrant Creek	Bridge Creek
Beaver Creek (west)	McKay Creek	Deep Creek
Bear/Camp Creek	*Howard/Porter*	*Wolf Creek*
Keeton Creek	Ochoco Creek	Nicoll/Sawmill
	Mill Creek	Badger Creek
	Silver Creek	Bear Creek
	Deschutes River	Rock Creek
	Willow Creek	

TRANSPORTATION SYSTEM

DECISIONS

1. Road standards, design and densities (transportation planning) will be related to allocations and management area objectives in the Final Plan.

2. Average open road densities in General Forest (MA-F22) will be 3 mi./sq.mi.; for Winter Range (MA-F20) it will be 1 mi./sq.mi. on a seasonal basis. This decision relates to big game habitat needs.

3. The use of off-road vehicles (ORV's) on the Forest and Grassland will be controlled in respect to management area objectives and resource protection needs as specified in the Forest and Grassland Plans (Standards and Guidelines, Chapters 4), and summarized in Tables 13 and 14.

TABLE 13
MOTORIZED USE ON FOREST MANAGEMENT AREAS

Management Areas

Decisions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
No Motorized Use Allowed	X	X	X	X	X								X														X	
Motorized Use Restricted to Designated Routes and Prohibited From Dec. 1 to May 1.												X																
Motorized Use Restricted to Over-snow Use Only, and from Dec. 1 to May 1.						X		X	X	X	X																	
Over-snow Motorized Use Restricted to Designated Routes Form Dec. 1 to March 30.																X												
Motorized Use Restricted to Designated Routes. Over-snow Use Prohibited From Dec. 1 to May 1.																		X		X	X							
Motorized Use Encouraged on Designated Routes														X								X						
Motorized Use Prohibited Except For Over-snow Use On Designated Routes																	X											
Motorized Use Restricted to Designated Routes															X								X	X				X
Motorized Use Restricted to Designated Routes Except Snowmobiles Over Snow							X												X						X	X		

TABLE 14
MOTORIZED USE ON GRASSLAND MANAGEMENT AREAS

Management Areas

Decisions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
No Motorized Use Allowed				X	X	X	X	X								
Encourage ORV's on Designated Routes, Allow No Cross Country Travel Except For Admin Use and By Permit Only, Provide Designated Trails For ORV Use.			X													
Motorized Use Restricted to Designated Routes									X							
No Motorized Use From Nov. 15- March 31. Motorized Use Restricted to Designated Routes April 1- Nov. 14.	X	X									X		X			
Allow No Vehicles Off Roads, Except For Permittee or Admin Use										X						

* Management Area G12 is administered by the State.

RATIONALE

Decisions related to the transportation system are primarily based on the need to develop and maintain road systems which meet the particular management objectives for an area. Cost-effectiveness and safety are integral in the documents.

In order to minimize motorized use conflicts on the Forest and Grassland, I am adopting a set of restrictions based on existing authority and regulations, that limits or authorizes use of ORV's in a manner compatible with the management objectives of this Plan.

BIG GAME HABITAT

DECISIONS

1. Potential big game winter ranges have been identified on the National Forest and Grassland. To meet ODFW objectives 64,130 acres are allocated to big game winter range on the National Forest (MA-F20), 12,740 acres on the Grassland (Metolius Deer Winter Range MA-G2), and 22,700 acres of antelope winter range on the Grassland (MA-G1).

2. Available winter range on the Forest that is not needed to meet State of Oregon population goals for elk is 107,360 acres (MA-F21). Cover objectives for General Forest (MA-F22) will apply to MA-F21, but other factors such as road densities and vegetation manipulation practices may be altered on a project specific and opportunity basis to benefit big game.

3. No areas are specifically allocated for big game summer range, but big game habitat requirements, and protection of habitat features, will be incorporated into all project analysis on a case-by-case basis.

4. Management areas with seasonal road access restrictions specifically to provide big game habitat and security are, but may not be limited to:

Grassland:

Antelope Winter Range (MA-G1), Metolius Deer Winter Range (MA-G2) - Control access as needed to enhance big game winter range and support other resource objectives.

General Forage (MA-G3) - Close roads seasonally in specific areas: deer hunting season, Sept. 20 - Oct. 30.

Juniper Old Growth (MA-G5) - Control access to protect old growth habitat

Rimrock Springs Wildlife Area (MA-G10) - Allow only administrative and permittee traffic.

National Forest:

Eagle Roosting (MA-F12) - Except for constant service through routes, use will be restricted to administrative use and use by permit only during Dec. 1 to May 1.

Hammer Creek Wildlife/Recreation (MA-F18), Winter Range (MA-F20), General Forest Winter Range (MA-F21) - Except for constant service through routes, use will be restricted during the periods of Dec. 1 to May 1 Access routes will be limited to one mile per section during that period, and three miles per section on the average the remainder of the year.

Old Growth (MA-F6) - Constant service roads will remain open Use on all other roads across the management areas will be eliminated

5 Establishes Hammer Creek MA-F18 (2,560 Acres) in the Maury Mts which feature big game and wildlife habitat management

6 Establishes habitat effectiveness indices guidelines for MA's -F18, 20, 21 & 22 (see Table 15)

7 Open road densities on the National Forest in General Forest (MA-F22) will not exceed, on the average, three mi /sq.mi , on Winter Range (MA-F20) the open road density from Dec 1 - May 1 will not exceed one mi /sq mi. on the average

RATIONALE·

In the establishing requirements for big game habitat on the National Forest and Grassland, I have attempted to recognize the regional and local importance of this resource. The decisions incorporated into the Plans for big game habitat are significant, yet they have been accomplished with very little effect on other resource outputs. They will place additional restrictions on motorized use of some areas of the Grassland and Forest at certain times. With more people, better access, and motorized technology this is necessary to provide habitat security for big game, and to achieve population objectives established by ODFW

ROADLESS AREAS AND WILDERNESS STUDY AREAS (WSA's)

DECISIONS

1 Designates nonwilderness, multiple use allocations for those roadless areas that were reviewed under 36 CFR 219 17 and not recommended for wilderness designation under the Oregon Wilderness Act of 1984. (See Tables 16-18.)

TABLE 15
HABITAT EFFECTIVENESS OBJECTIVES

	Habitat Effectiveness Index (HEI) 1/ (By Decade)				
Allocation	1	2	3	4	5
MA-F18 Hammer Creek Wildlife/Recreation	5	6	8	8	32
MA-F20 Winter Range	5	6	8	8	32
MA-F21 General Forest Winter Range	5	6	8	8	21
MA-F22 General Forest	32	28	28	24	21

1/ See Forest wide Standards and Guidelines for an explanation of HEI Management objectives are based on achieving habitat effectiveness over time The quality and quantity of cover and open road density are the main factors influencing HEI and should be designed in concert to achieve the desired HEI shown in the table by management area.

TABLE 16
SUMMARY OF ROADLESS AREA ALLOCATIONS

	RARE II Acres	Draft (Alt. E) Allocated to Remain Unroaded	Final (Alt I) Allocated to Remain Unroaded
Broadway	8,680	0	0
Green Mountain	6,630	7,000	0
Rock Cr /Cottonwood Cr.	20,340	19,070	11,820
Silver Cr	11,670	3,230	3,110
Lookout Mountain	15,260	2,950	15,660 1/
Deschutes Canyon-Steelhead Falls WSA	FS 10,000 BLM 3,240 2/	2,500 2,660	5,100 3/
North Fork Crooked River WSA	1,300	1,125	1,125
Total Unroaded Acres	73,880	38,535	39,555

1/ Some roading could occur in the MA-F11B portion (8,110 acres) MA-F11A will remain unroaded

2/ BLM WSA, which was not recommended for wilderness, will remain roadless until Congress acts.

3/ An additional 2,740 acres of uninventoried roadless area was added to equal 7,840 acres fro the Squaw Creek Management Area (see Table 6, ROD-17).

TABLE 17
SUMMARY OF PERCENT AREA ALLOCATED TO WILDERNESS OR ROADLESS NATIONAL FOREST AND NATIONAL GRASSLAND

Total Unroaded Area *Total Wilderness Area*	4 1% 3 7%
Total Unroaded or Wilderness	7 9%

TABLE 18
ACRES OF ROADLESS AREA ALLOCATED TO MANAGEMENT AREAS

	Forest Management Areas (See description, pp ROD 18-19)													
Roadless Area	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Broadway						500	390							0
Green Mtn.						300								0
Rock Creek						540	80	5,680	670					10
Cottonwood Creek						690		6,140	1,810					0
Silver Creek					590	290				3,110				20
Lookout Mtn						600					14,450			
North Fork Crooked River 1/				1,125										

	Forest Management Areas (See description pp ROD 18-19)													
Roadless Area	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Broadway								7,550				240		
Green Mtn							4,650	1,590				90		
Rock Creek								2,240				70		
Cottonwood Creek								2,300				110		
Silver Creek								7,570				90		
Lookout Mtn							10	100				100		
North Fork Crooked River 1/														

	Grassland Management Areas (see description pp ROD 19-20)															
Roadless Area	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Deschutes River Canyon 2/		3,600	600		20		650	5,100				20		10		

1/ North Fork Crooked River Wilderness Study Area
2/ Deschutes River Canyon Wilderness Study Area (Forest Service ownership only, Mgmt Area comprised of area outside WSA)

2. Recommended no wilderness for Deschutes Canyon-Steelhead Falls, a study area designated by the Oregon Wilderness Act of 1984; instead allocates 7,840 acres, part which contains portions of the WSA designated for semiprimitive nonmotorized recreation (see also, Decision 4, this page) Other portions of the WSA are included in the Deschutes Scenic River as classified under the Oregon Rivers Act of 1988 Maintains options on the North Fork Crooked River Wilderness Study Area, on which the Bureau of Land Management is the lead agency preparing the environmental documentation and has recommended nonwilderness in a draft EA, until Congressionally decided

3. Establishes a Lookout Mountain Management Area (MA-F11 A&B) and management concept which incorporates the entire Lookout Mountain area, including existing access roads into Brush Creek and Independent Mine Designates 7750 acres (MA-F11A) for unroaded semiprimitive recreation, and the remainder of the area (MA-F11B) for recreational and wildlife habitat purposes. Vegetation management activities and access development would be done only if they can be demonstrated at the project planning level to benefit recreation and wildlife interests No entry for purpose of stand treatment is scheduled or programmed for this planning period unless site-specific analysis is completed and plans approved otherwise Any timber removed through vegetation manipulation projects would be on a nonscheduled or nonchargeable basis

4 Establishes an 7,840-acre Squaw Creek Management Area (MA-G8) on the National Grassland and provides specific decisions for access, recreation, and wildlife habitat management in the area (see Livestock Grazing and Allotment Management, p ROD-23). Identifies the eligibility and suitability of lower Squaw Creek for scenic river classification under the Wild and Scenic Rivers System and recommends designation as a Scenic River.

RATIONALE

1 Roadless Areas

The Green Mountain roadless area was proposed in the Draft Plan/EIS preferred alternative for motorized semiprimitive recreation. There was little, if any, support for that designation in the public comments. In addition, the suitability of the area for such use,

and the details for implementing that type of management, were not convincing based on information available. I have therefore allocated the area to other (multiple) uses as shown by Table 18, pg ROD-29

Silver Creek Roadless Area (MA-F10) is proposed to remain essentially as described in the Draft preferred with some minor adjustments to assure a more manageable boundary There appeared to be general public support for the area as proposed in the Draft.

The Rock Creek and Cottonwood Creek roadless areas were proposed in the Draft to remain unroaded. Public comment and additional analyses supported the idea that portions of these areas might be entered for timber management purposes, and that idea has been incorporated into my final decision (Table 18). Approximately 11,820 acres of the 19,073-acre roadless area will remain unroaded (MA-F8), of which 2,480 acres will be available for helicopter logging (MA-F9), where it is in fact economical and able to be accomplished with no additional roading in MA-F8 or the adjacent old growth areas identified. My decision to retain 11,820 acres in unroaded status is based on several factors. First, the area proposed to remain unroaded (MA-F8) is generally very steep, low in productivity, and has highly erodible soils Both streams have anadromous fish spawning potential There is little assurance, with current economics and technology, that these steep slopes could be logged while still protecting water quality In addition, the difficulty of access afforded by the unroaded area will provide habitat security for big game

What the outcome will be for the Lookout Mountain roadless area has been perhaps the most controversial issue for the Forest Prior, and to an extent concurrent to this planning effort, Congress reviewed the Lookout Mountain Area for incorporation into the National Wilderness system Senate report #98-465 states "This area is presently managed as a 'Special Management Area' for dispersed recreation and backcountry values The area is not presently in the timber base The Committee expects the Forest Service to examine the feasibility of continuing this use in the current National Forest Plan and determine the land allocation in the Forest Plan " This has been done and the decisions described above, and by the Alternative I map It is further described by the rationale below

I do not intend to reopen the 4-wheel drive road from the Independent Mine to the summit of Lookout Mountain This road was closed and rehabilitation work conducted in 1982 The location and grade make this 4-wheel trail unsuitable and unsafe for general public use, with the potential to result in unacceptable resource damage The construction of improved road access to the summit would be in conflict with management objectives for the area Snowmobile use on Lookout Mountain will be allowed to continue At this time, I have not been convinced that the amount of snowmobile and cross country ski use in the area results in any irreconcilable conflicts (see Winter Sports, pg ROD-37) Some separation of snowmobile and ski trails, as planned, should relieve the present concerns. Because the existing roads to Independent Mine and Brush Creek are a part of the management of the Lookout Mountain area, the decisions made regarding these roads affects the Lookout Mountain area I have chosen to incorporate these access routes into the management area I have identified a mountain top subunit (MA-F11A) that is a mosaic of mountain meadow, steep drainage heads, shallow, rocky soil, and low productivity forest This part of the mountain, I have determined is best left unroaded for semiprimitive recreational opportunities and wildlife habitat On the lower elevation subunit (MA-F11B), which is for the most part productive forest land, I am proposing that recreation and wildlife habitat also be emphasized. However, in my judgement, those resources, and the forest setting for related activities, might be enhanced or maintained over time by appropriate vegetation management and access development My decision is that before any activities are initiated in MA-F11B, site specific planning and additional public involvement be completed Project level analysis will be started within the first half (3-5 years) of the planning period to follow. To be consistent with our intentions I have not scheduled the removal of timber products from this area, and it is not part of the Forest ASQ I also intend to pursue opportunities to tie research into this management proposal

2 Wilderness Study Areas

a Deschutes Canyon - Steelhead Falls

The 10,000-acre Deschutes Canyon-Steelhead Falls Wilderness Study Area (WSA) was Congressionally designated in the Oregon Wilderness Act of 1984 Within the WSA, powerlines, private lands, range allotments and improvements, roads, a pumping station and old homestead sites occur In the Draft Plan/EIS a 5,200-acre area was recommended for wilderness This area centered on the Deschutes River and Squaw Creek canyons It had a minimum of the above nonconforming features

While public comment received generally supported the wilderness designation of this area, serious

question also surfaced on the manageability of the area as wilderness. Questions were raised in respect to the confinements of Squaw Creek canyon's ability to withstand concentrated recreational use and still retain the natural features that occur there. Access for range management activities and power line maintenance, access to private land inholdings for power line maintenance, and the limited size of the proposed area were other nagging questions Meetings were held with a few of the key individuals interested in the area, and contacts with other agency representatives were made in an attempt to seek solutions to the apparent potential problems with wilderness designation and management for this area

In this process the Forest Service attempted to identify what were perceived as the important resources within the area in order to determine if wilderness designation was the best course of action, or if there were better means to protect those resources The resources identified were

- Natural springs, e.g Alder Springs
- Geologic formations
- Solitude in the Canyons
- Metolious deer winter range
- Squaw Creek fisheries
- Squaw Creek riparian area

My conclusion was, the tentative proposal in the Draft Plan/EIS for wilderness did not provide a manageable situation, and in fact would work to the detriment of protection and management of the above resources.

In place of wilderness in the Final, I have identified a 7,840-acre management area (MA-G8) centered on Squaw Creek, the management of which would emphasize the above resources and semiprimitive nonmotorized recreation. Existing road access is planned to be restricted on a seasonal basis and some roads will be permanently closed (see Travel Plan). In order to make a logical management area, and to encompass the resources identified in public consultation, the boundary of MA-G8 takes in portions of Squaw Creek canyon not included in the original inventoried roadless area or WSA. In addition, I have made an eligibility and suitability determination for Squaw Creek and am recommending the lower portion, approximately seven miles, of Squaw Creek for an addition to the Wild and Scenic Rivers System.

The Deschutes River Canyon part of the WSA, involving approximately 650 acres of National Grassland, was classified as a Scenic River under the Oregon Rivers Act of 1988.

The direction and objectives for the management of the Squaw Creek unit (MA-G8) are given in Chapter 4 of the Grassland Plan. In my judgement implementation of the wilderness proposal in the Draft Plan/EIS had not been thoroughly analyzed and would have resulted in an unmanageable situation because of size of area and nature of the terrain, that was not in the best interest of the resources involved The management direction for MA-G8, combined with the river classification for the Deschutes River canyon and Squaw Creek, are decisions which best protect the resources identified, retain options, and is in alignment with interests of all user groups concerned I am therefore recommending no wilderness designation for the Deschutes Canyon-Steelhead Falls WSA No actions will be taken that conflict with existing options until Congress either accepts or rejects this recommendation

b North Fork Crooked River

The North Fork Crooked River WSA is described in the BLM "Wilderness Environmental Impact Statement for Oregon" (draft 1985, pp 265-275, and Supplement to the DEIS, pp. 373-379). There are National Forest lands, 1,125 acres, involved in the 10,745-acre WSA The BLM's preferred alternative is "no wilderness" for this area The Forest Service will retain the wilderness option on its 1,125 acres until the wilderness study is complete If the final decision is no wilderness, the land allocations for the National Forest system would be as shown in Table 18, pg ROD-29.

SCENIC OR VISUAL RESOURCES

DECISIONS

1. The canyon slopes viewable from Lake Billy Chinook Reservoir on the National Grassland have been identified as a scenic resource (MA-G13).

2 A visual corridor averaging 1,200 feet (average 600 feet each side) in width along 260 miles of Forest road has been allocated. Of this, 23,960 acres are "partial retention" and 9,300 acres are "retention" (MA-F26).

3 A separate site-specific plan for the management of the Highway 26 corridor has been developed and appended to the Forest Plan (MA-F25).

4. A visual corridor averaging 1,200 feet (average 600 feet each side) in width has been allocated in conjunction with the Round Mtn National Recreation Trail (MA-F27).

5. Segments of the Summit Historic Trail have been allocated on the basis of visual management objectives (partial retention, retention and preservation, MA-F7)

6. Foreground viewing areas around developed recreation sites have been assigned visual management objectives (MA-F13)

7. Certain scenic or concentrated recreational use areas have been allocated for recreational purposes, and protection of the recreation setting, features, or attractions prescribed (MA-F16, 17, 19).

8. All Forest management areas (allocations) have been assigned a visual management objective (see Plans, Chapters 4, Standards and Guidelines)

RATIONALE

The predominant character of the Ochoco Forest is open ponderosa pine interspersed with parklike openings. On north slopes dense stands of mixed conifers occur. The Grassland setting is one of semidesert shrub, grassland and canyon environments The large pine and dense forest which give the Ochoco its characteristic setting are also commercially valuable

It is my intent to maintain the Forest setting and visual character of the Ochoco National Forest to the extent practical over time. The visual settings where people recreate and visit are important to the impressions and experiences they gain. Primary roads and Highway 26 are areas of the National Forest with the greatest amount of public use. The intent in these places is to identify particularly sensitive and visually important areas where forest management will be modified to meet visual management objectives. Where feasible, uneven-aged management, and selective removal of trees or groups of trees, will be practiced to enhance viewing. Assignment of Forest-wide visual objectives by management area emphasizes my commitment to forest management in a manner that protects and retains visual character and diversity over time on the Ochoco National Forest

OLD GROWTH FOREST

DECISIONS

1. The Forest has allocated 72 stands containing 21,970 acres of old growth (MA-F6) to be managed on a "dedicated basis" for its ecological and habitat values Of this amount, 20,700 acres are determined to be "suitable" and 1,270 acres "capable."

2. The distribution, forest types, and acreage of individual stands are listed in Table 19 (see also Mangement Area map).

3. In addition to the above allocations, habitat for old growth dependent species may, in some cases, be provided by management areas which are planned for extended rotations or no scheduled treatment. Includes: MA-F1,2,3,4,5,7,8,9,10,11, 12,15,16,17,18,19,23,24,25,26,27.

4. Based on our best data at this time the decisions in the Forest Plan appear to affect the quantity of available old growth over time as is indicated in Table 20.

5. Seven hundred forty acres in areas dispersed across the National Grassland have been identified and will be dedicated as "old growth juniper habitat," to remain in an undisturbed condition.

6 One thousand acres of "connective habitat" have been identified within the Riparian zones (see Decisions, Riparian Area Management, p. ROD-25) which is designed to provide travel ways for old growth dependent species between suitable habitat areas.

RATIONALE

I have elected to dedicate 21,970 acres of old growth stands on the National Forest and 740 acres of juniper on the Grassland (22,710 acres) for the purpose of preservation over the course of this planning period. To the extent feasible these areas have been located in a manner to minimize conflicts with other resource objectives, and to meet the habitat requirements identified for indicator species (see old growth management area map in the FEIS).

TABLE 19
ALLOCATED OLD GROWTH ON NATIONAL FOREST
PLUS UNALLOCATED 300-ACRE STANDS IN WILDERNESS AND RNA'S

DISTRICT	STAND #	PP	MC	SUITABLE	CAPABLE
Big Summit	1	250		250	
	2	380		380	
1/	3	300		300	
	4		300	300	
	5		360	360	
	6		320	320	
	7		300	300	
	8		300	300	
	9		300	300	
	10	240		240	
	11	400		400	
	12	290		290	
	13		300	300	
	14		300	300	
	15	300		300	
	16		50	50	
2/	17		300	300	
3/	18		300	300	
TOTALS	18 STANDS	2,160 AC	3,130	5,290	0 AC
Paulina R D	1	380		380	
	2		310	310	
	3		310	310	
	4	300		300	
	5		300	300	
	6		300	300	
	7		310	310	
	8		300	300	
	9		320	320	
	10		340	340	
	11		320	240	80
	12		320	200	120
	13		300	180	120
	14		300	300	
	15		330	330	
	16		320	320	
	17	330		270	60
4/	18		300	300	
TOTALS	18 STANDS	1,930 AC	3,760 AC	5,310 AC	380 AC
Prineville	1		300	300	
	2		290	290	
	3		300	300	
	4		280	280	
	5		300	300	
	6		260	260	
	7		290	290	
	8	440		440	
	9	300		300	
	10		300	300	
	11	300			300
	12		300	300	
5/	13		300	300	
TOTALS	13 STANDS	1,040 AC	2,920 AC	3,660 AC	300 AC

DISTRICT	STAND #	PP	MC	SUITABLE	CAPABLE
SNOW MTN	1	300		300	
	2		300	300	
	3		300	300	
	4		300		300
	5	160		160	
	6	300		300	
	7	310		310	
	8	300		300	
	9	300		300	
	10	300		300	
	12	300		300	
	13	300		300	
	14	300		300	
	15	300		180	120
	16	300		300	
	17	260		90	170
	18		300	300	
	19		300	300	
6/	21	300		300	
7/	22	300		300	
8/	23	300		300	
	24	470		470	
	25	430		430	
TOTALS	23 STANDS	5,530 AC	1,500 AC.	6,440 AC	590 AC
FOREST TOTALS	72 STANDS	10,660 AC	11,310 AC	20,700 AC	1,270 AC.

* TOTAL PP/OG (10,660) + MC/OG (11,310) = 21,970 ACRES

TOTAL SUITABLE (20,700) + CAPABLE (1,270) = 21,970 ACRES

1/ In N F Cr River WSA
2/ In Bridge Creek Wilderness
3/ In Ochoco Divide RNA
4/ In Black Canyon Wilderness
5/ In Mill Creek Wilderness
6/ In Silver Creek RNA
7/ In Dry Creek RNA
8/ In Stinger Creek RNA

NOTE These acres do not coincide with those shown for Management Area acres in Chapter 4 of the Forest Plan, which is 19,570 ac for MA #6 Old Growth 19,570 does not include 300 acres of old growth in the NF Crooked River Wilderness Study Area or old growth assigned to each of the wildernesses and RNA s shown above which adds up to 2,400 acres (2,400 + 19,570 = 21,970)

This figure does not include the old growth which, in addition, occurs in wildernesses and unroaded areas As shown by Table 20, the total amount of old growth in the first decade for the Forest is estimated to be 93,800 acres An estimated 55,100 acres of the total will still remain by the fifth decade In my judgement this should adequately provide for the wildlife habitat needs of dependent species. It also preserves representative old growth forest types for their own purpose

I have not elected to provide old growth by extending rotations in selected stands because of the uncertainties and irreplaceable nature of old growth forest Management direction in some of the allocations (e g MA-F15,16,17,18,23,24) calls for extended rotations and time will show, if in fact, such places provide effective habitat for old growth dependent species

For the National Grassland, I have decided to identify some areas of juniper to remain undisturbed The distribution and size of these areas are based on habitat requirements of the common flicker Juniper habitat is not a rarity in Central Oregon, but because of the extensive use of prescribed fire, clearing, and firewood cutting on the Grassland, it would appear prudent to identify some juniper stands to remain undisturbed over time Grazing would continue in these areas, but the existing juniper woodlands identified would be preserved.

I have considered the question of "island biology" or "isolation of populations" raised by allocating widely dispersed areas of old growth. To address

TABLE 20
OLD GROWTH ALLOCATED AND EXISTING ON THE FOREST AND GRASSLAND

		DECADE				
ALLOCATION/EXISTING	UNIT OF MEASURE	1st	2nd	3rd	4th	5th
Dedicated Old Growth 1/	Acres	22,390	22,390	22,390	22,390	22,390
Dedicated Old Growth in Wilderness 2/	Acres	2,400	2,400	2,400	2,400	2,400
Allocated to Old Growth Management Area 3/	Acres					
Forest		19,250	19,250	19,250	19,250	19,250
Grassland		740	740	740	740	740
Unallocated But Preserved Old Growth 4/	Acres	20,500	20,500	20,500	20,500	20,500
Unallocated Old Growth without Programmed Harvest 5/	Acres	17,100	17,100	17,100	17,100	17,100
Total Existing Old Growth 6/	Acres	93,800	83,900	74,200	64,500	55,100

1/ Dedicated old growth is the sum of old growth blocks on the Forest identified to meet the management requirement for the pileated woodpecker (based on one 300 acre block per 12,000 acres)

2/ Those dedicated old growth acres that fall within wilderness and/or wilderness study areas

3/ Old Growth Management Areas F6 and G5 (includes capable acres)

4/ Wilderness, Wilderness Study Areas F1 F2 F3, F4

5/ Existing Old Growth in Unroaded Management Areas without programmed harvest F5 F8, F10 F11A G5

6/ Total Existing Old Growth from 1987 1988 inventory This does not include the 1 270 capable acres allocated for old growth for distributional purposes The total existing old growth for decades 2 through 5 represents that remaining after implementation of the Forest Plan and programmed timber harvest The figures are estimates using the planning process data base and FORPLAN modeling

the question, if in fact time proves it to be relevant, I have introduced the concept of "connective habitat" into the Plan through riparian corridors and extensive blocks of existing old growth in unroaded areas and wilderness.

FUELWOOD SUPPLY

DECISIONS

Standards and guidelines for fuelwood availability are included in the Forest and Grassland Plans.

RATIONALE

It is my decision, that in order to prevent loss of wildlife habitat, only down trees, or standing dead juniper and lodgepole pine will be cut. Standing, signed wildlife trees or snags along roadsides or within old sale areas will not be cut. To avoid conflicts with other uses on the Forest or Grassland, we will continue to designate areas open to firewood gathering and require permits as may be necessary. Firewood cutting will not be allowed in dedicated old growth areas, as it would defeat the purpose for which these areas are established. The Forest and Grassland will continue to meet a share of the fuelwood supply for the local communities, but within requirements necessary to meet other resource objectives as outlined above.

SNAG DEPENDENT WILDLIFE

DECISIONS

1. The Forest will be managed to provide snag habitat at levels appropriate to the resource objectives for the management areas involved (see Table 21)

2. Snag habitat may be provided either through identifiable patches or evenly distributed snags (see Standards and Guidelines, Chapters 4, Plans).

3 The overall Forest snag level of 47 percent is planned to increase over time as shown below:

Decade	1	2	3	4	5
Level	47%	49%	51%	55%	54%

RATIONALE

Past salvage harvest and firewood gathering have made the Forest snag deficient in some areas and forest types

TABLE 21
SNAG LEVEL BY MANAGEMENT AREA

Management Area	Snag Level (%)
MA-F1 Black Canyon Wilderness	100
MA-F2 Bridge Creek Wilderness	100
MA-F3 Mill Creek Wilderness	100
MA-F4 North Fork Crooked River Wilderness Study Area	100
MA-F5 Research Natural Areas	100
MA-F6 Old Growth	100
MA-F7 Summit Historic Trail	80
MA-F8 Rock Creek/Cottonwood Creek	100
MA-F9 Rock Creek/Cottonwood Creek Unroaded-Helicopter	40
MA-F10 Silver Creek Area	100
MA-F11 Lookout Mountain Recreation	100
MA-F12 Eagle Roosting Areas	80
MA-F13 Developed Recreation	--
MA-F14 Dispersed Recreation	--
MA-F15 Riparian	100
MA-F16 Bandit Springs Recreation	100
MA-F17 Stein's Pillar Recreation	100
MA-F18 Hammer Creek Wildlife/ Recreation	100
MA-F19 Deep Creek Recreation	100
MA-F20 Winter Range	60
MA-F21 General Forest Winter Range	40
MA-F22 General Forest	40
MA-F23 North Fork Crooked River Recreation Corridor	80
MA-F24 North Fork Crooked River Scenic Corridor	100
MA-F25 Highway 26 Visual Corridor	100
MA-F26 Visual Management Corridors	80
MA-F27 Round Mountain National Recreation Trail	100
MA-F28 Facilities	--

Under my decision for snag levels, the number of snags on the Forest are projected to increase over time. Snags will be increased in ponderosa pine forest that presently has less than desirable levels; in mixed conifer areas with currently high levels, the number of snags will decrease In no case are snag objectives for areas, other than where public safety is a concern, set below 40 percent. In my judgement, the varied objectives from 40-100 percent as shown by management area will assure adequate snag habitat occurring across the Forest at any one time.

WINTER SPORTS

1. The Ochoco Divide accessed by Highway 26 will continue to be emphasized for opportunities for winter sports recreation. A 1,580-acre area (MA-F16) at Bandit Springs (north of Highway 26) will be managed exclusively for cross-country

skiing, and nonmotorized snow play activities. The area to the south of the highway will be open for snowmobile use. The sled hill use south of Highway 26 at the juncture of FS Road 2630 (Crystal Springs Road) will continue as an established use area

2. The Bandit Springs winter sports area (MA-F16) will have a visual quality objective of retention

3. Lookout Mountain (MA-F11) will remain open to *motorized over-the-snow use* Established snowmobile routes and play areas in the Lookout Mountain saddle through to the Round Mountain/ Walton Lake area (MA-F22) will continue

4 Backcountry skiing will be available in the Round Mtn (MA-F22) and Lookout Mtn areas (MA-F11) Trails may be designated on Lookout Mtn to separate, at places, snowmobile and cross-country skiing use

5. Restrictions such as over-the-snow motorized use on designated routes only and area closures, may be imposed in big game winter range and eagle roosting areas (MA-F12, 20, 21) Essentially, the remaining general forest (MA-F22) will be open to snowmobile use unless otherwise designated.

RATIONALE

Winter sports activities are established uses on the Forest In my judgement, the above decisions allow the continuation of these activities, and minimize the potential for conflict between motorized and nonmotorized winter sport activities. The decisions also support and provide a basis for the continuing enhancement of winter sports activities on the Forest and minimize potential conflicts with big game utilization of winter habitat.

OTHER MULTIPLE USE DECISIONS

Recreation

Recognizes established dispersed recreation sites on the Grassland and National Forest, and provides direction and objectives for their management (Plans, Chapters 4, Standards and Guidelines; see also Alternative I map).

Maintains and continues the management of developed recreation facilities, including 10 fee campgrounds, 13 non-fee campgrounds, 7 dispersed sites with facilities, 4 developed picnic areas, and 4 boat ramps; provides schedules for development of additional recreation facilities (Plans, Chapters 4, Standards and Guidelines).

Provides schedules for recreation trail and trailhead *development, including those for winter sports.*

Makes the decision that the cooperative agreement for the management of the Cove Palisades State Park, *which is due for renewal in 1990, be amended* to include language in regard to a Forest Service and State partnership for the management of the area.

A 74-mile Summit Historic Trail, involving a 1,200-foot corridor with visual management objectives assigned by trail segments, is designated. This trail is also intended to serve as part or all of the East-West Interstate trail across the Ochoco N.F

For Round Mountain, I have considered the need for a "special management area" for recreation as proposed by Oregon Natural Resource Council (ONRC). At this time I do not see that the uses occurring there demand such an allocation. The mountain top electronic site, road(s), skiing and snowmobiling, and national recreation trail (see Winter Sports, pg ROD-37) all take place as part of the multiple uses in General Forest (MA-F22) and are addressed in the standards and guidelines, as well as other multiple use coordination decisions within the Plan. However, I will take the need for a recreation management area on Round Mtn. under advisement and propose to consider it through further planning (see also "Changes....General Recreation," pg. ROD-44).

Research Natural Areas

Identifies and recommends establishment of five new research natural areas (RNA's), and continuation of the one RNA already established on the Forest (see Table 22, p ROD-39)

TABLE 22
PROPOSED RNA'S

RNA Name	NF or NG *	Total NF or NG Acres
Island	NG	39
Dry Mountain	NF	1,187
Silver Creek	NF	844
Haystack	NG	58
Stinger Creek	NF	453

* National Forest or National Grassland

Anadromous Fish

Approximately two percent of the National Forest and Grassland are identified for riparian area management (see Riparian, pg ROD-25). Streamside management areas are increased in width to 400 feet on some anadromous fish streams to provide additional protection for riparian areas, and to serve as "connective habitat." Anadromous fish streams are identified as "sensitive" and equivalent harvest areas (EHA's) were established that reflect their sensitivity in the conduct of cumulative effects analyses (see also p. ROD 54)

I will make it a point that the Columbia River Intertribal Fish Commission (CRITFC) be contacted early in the scoping phase of analysis for any projects located in anadromous fish drainages on the Forest or Grassland In addition, when the Inter-regional agreements with the Forest Service and CRITFC, which are presently being studied are finalized, this Plan will be amended within such time as is practical to incorporate those policies.

Eagle Roosting Areas

Six eagle roosting areas, 570 acres, have been allocated An additional two roosting areas fall within old growth units These areas were identified through contract study and are part of an eagle recovery plan under the Federal Endangered Species Act

Wild and Scenic Rivers

Determines that 7 5 miles of lower Squaw Creek on the National Grassland, 1,370 acres, is eligible and suitable for possible inclusion in the National Wild and Scenic River System as a scenic river Incorporates rivers legislatively designated in the 1988 Oregon River Act, and sets the stage for further planning required under the Wild and Scenic Rivers Act

Grassland	
Crooked River - Recreational	720 acres
Deschutes - Scenic	650 acres
Forest	
North Fork Crooked River (two segments)	
Recreational	1,830 acres
Scenic	830 acres

ORV Use

Off-road vehicle use has been addressed under transportation system (pg ROD-26) Only trails historically established for ORV use are being designated at this time Any others will be accomplished in the plan implementation phase through site-specific analysis and further planning. Restriction guidelines by management areas have been outlined in the Travel Plan and Appendix D, and are summarized herein

COMPATIBILITY WITH OTHER AGENCY GOALS AND PLANS

The goals of other agencies, which could be affected by National Forest system management, were considered early in the planning process and used to develop alternatives in the DEIS and FEIS Public agencies expressed their view during the comment period on how well the Draft Plan met their objectives. (See FEIS, Appendix I for a list of the public agencies comments on the DEIS and Proposed Plan; and Appendix A for a list of agency's contacted early in the planning process)

Alternative I has been carefully coordinated with goals and objectives of the State of Oregon and other agencies, particularly the Bureau of Land Management and Indian Tribes The Plan integrates the recreation and visual resource opportunities and needs identified by the State and meets the wildlife habitat management objectives and places emphasis on economic stability in respect to timber yield and industry associated jobs and income

IV. Changes From Draft Preferred and Rationale

PLAN STRUCTURES AND ALLOCATIONS

Draft

The Plan for the National Forest and National Grassland was one document.

The National Grassland had eight management areas in the Draft, and the National Forest had 14

Final

Two separate Plans were developed, one each for the National Grassland and the National Forest, covered by one Environmental Impact Statement

In the Final, the Grassland has 16 management areas, the Forest 28

Grassland Draft

Emphasis	# Mgmt Areas	Acres	%
Timber/Range	1	73,510	65%
Wildlife	1	34,527	31%
Wilderness	1	2,500	2%
Wild/Scenic Riv	2	734	<1%
Research	2	87	<1%
Riparian	1	559	<1%
Total		111,379	

Grassland Final

Emphasis	# Mgmt Areas	Acres	%
Range/Forage	1	55,440	53%
Wildlife	3	35,870	32%
Old Growth	1	740	<1%
Visual	1	560	<1%
Wild/Scenic Riv	2	1370	<1%
Research	1	110	<1%
Recreation	4	10,770	10%
Riparian	1	2,110	2%
Facilities	2	540	<1%
Total		111,510	

Forest Draft

Emphasis	# Mgmt Areas	Acres	%
Timber/Range	1	491,257	58%
Wildlife	2	190,686	22%
Old Growth	1	26,337	3%
Visual	3	51,773	6%
Wilderness	4	38,529	4%
Wild/Scenic Riv	2	1,930	<1%
Research	1	4,519	<1%
Recreation	3	32,990	4%
Riparian	2	15,484	2%
TOTAL		843,721	

Forest Final

Emphasis	# Mgmt Areas	Acres	%
Timber/Forage	2	499,010	59%
Wildlife	3	174,620	21%
Old Growth	1	19,570	2%
Visuals	3	40,110	5%
Wilderness	4	37,325	4%
Wild/Scenic Riv	2	2,660	<1%
Research	1	4,400	<1%
Recreation	10	48,350	6%
Riparian	1	18,130	2%
Facilities	1	460	<1%
TOTAL		844,640	

Summary of Changes

Separate plans for National Grassland and the National Forest; treated under one DEIS.

Refinement in management area allocations.

Changes in resource emphasis.

Reasons For Change

National Grassland management and direction was overshadowed by the National Forest. The public requested they be separated into two plans.

Additions and changes in management areas (allocations) resulted from responses to public comments, incorporation of new information, new policies, improved understanding of processes related to implementation, and congressionally designated rivers.

FOREST MANAGEMENT AND FORPLAN MODELING

Forest Management

Forest Draft

Even-aged Silvicultural System
General Forest rotation dia. 14-16"
Rotation age 90-100
Departure (by vol first decade).

ASQ Decade	All Spp Cu Ft.	All Spp Bd Ft	PP Bd Ft
1	20 6	123	87
2	19 7	118	82
3	17 8	99	56
4	16 9	93	52
5	16 1	89	55

Forest Final

Even- and Uneven-aged Silv System (uneven-aged systems applied to approx 100,000 acres ponderosa pine). Diameter for even-aged ponderosa pine=18", mixed conifers=16", uneven-aged=20"; Rotation age for ponderosa pine=130 years, mixed conifer=90 years, sustained yield, even-flow (by cu ft vol.), declining volume in ponderosa pine after first decade.

ASQ Decade	All Spp Cu.Ft.	All Spp Bd Ft	PP Bd Ft
1	19 0	115 0	82 0
2	19 0	-	-
3	19 0	-	-
4	19 0	-	-
5	19 0	-	-

Forplan Modeling

The changes from "draft" to "final" have resulted in differences in FORPLAN modeling. The changes in allocations and related management guidelines have resulted in the development of new yield streams for timber and other resources, silvicultural systems, rotation ages, and decade harvest limitations

a New Prescriptions and Yield Streams Applied in FORPLAN Model

Uneven-aged timber management applied to ponderosa pine on general forest (20-inch target size).

Uneven-aged timber management applied to ponderosa pine in special areas with 30-inch DBH target size: Lookout Mountain, Stein's Pillar, Deep Creek, North Fork Crooked River

Uneven-aged timber management (group selection) applied to mixed conifer in some areas

Extended rotation ages and new thinning cycles for ponderosa pine in general forest.

Extended rotation and stricter decade harvest limitations for certain areas.

Changes in the percent thermal cover required by allocation.

More reliance on mixed conifer to produce thermal cover vs. ponderosa pine.

b Acres and Timber Yield Tables

Acres - Condition classes (i e. the amount of pine sawlogs, saplings, etc.) have been updated from the 1983 information used in the Draft. This was done to more accurately assess timber harvest scheduling and resultant associated outputs and effects

Timber Yield Tables - Yield tables were updated to reflect the growth that has occurred in the last five years in order to more accurately determine outputs and effects.

Summary of Changes

Incorporation of uneven-aged management in ponderosa pine where stand structure, condition, and management objectives allow.

Larger tree at rotation for general forest ponderosa pine 18"-20" vs 14"-16" (wood quality).

Sustained even-flow in cu.ft.vol vs. departure (on total volume basis).

Maintains relatively high volume of ponderosa pine first decade, but less than in the Draft Plan

Large target diameters (27"-30+") for recreation, wildlife and visual emphasis management areas

FORPLAN model yield tables, acres, prescriptions and assumptions changed to reflect updated information (see above)

Reasons For Change

Response to public comment for uneven-aged management, growing larger trees, maintaining historic harvest levels in ponderosa pine, sustained yield even-flow vs. departure, improved and updated information and scheduling over time.

ECONOMIC ANALYSIS

Changes in schedules, outputs, allocations, effects, assumptions and new information results in different economic effects and outputs in the Final

Incorporation of additional resources into the economic analysis overlooked in the Draft (mineral leases, anadromous fisheries)

WILD AND SCENIC RIVERS

Forest Draft

Segments of North Fork Crooked River, Crooked River, and Deschutes River eligibility studies completed and management units developed to preserve options for river classification.

Forest Final

Segments of North Fork Crooked, Crooked, and Deschutes Rivers classified under the Oregon Wild and Scenic Rivers Act Lower Squaw Creek eligibility determination completed

Summary of Changes

Rivers Designated by Congress

Lower Squaw Creek evaluated and determined eligible for Wild River designation

Reasons for Change

Oregon Wild and Scenic Rivers legislation Lower Squaw Creek evaluation conducted based on public comment and legislative hearings related to above Act

WILDERNESS STUDY AREAS

Forest Draft

Proposed recommending 5,200 acres (2,500 FS, 2,700 BLM) in the Deschutes Canyon-Steelhead Falls Wilderness Study Area for wilderness classification.

Forest Final

No additional wilderness proposed.

A 7,840-acre Squaw Creek management area emphasizing semiprimitive, nonmotorized recreation, protection of natural features, and vehicle access management incorporates core of previously recommended wilderness; the majority of the remainder of the draft proposed wilderness was included in the Deschutes Scenic River Corridor classified by the Oregon Wild Rivers Act in 1988 A 7 5 mile segment of Squaw Creek has been determined to be eligible and suitable for inclusion in the Wild and Scenic River System as a scenic river

Summary of Changes

From 5,200 acres recommended for wilderness which was centered on Squaw Creek and the Deschutes River Canyon, to a 7,840-acre management unit centered on Squaw Creek; classification of the Deschutes River and canyon portion under the Wild and Scenic Rivers Act, recommendation that a 7 5 mile segment of Squaw Creek be designated as a scenic river.

Reasons For Change

Because of small size and topography which would concentrate use, the manageability and clasification under the Wilderness Act was questioned The Deschutes River canyon portion was classified and protected under Wild and Scenic Rivers Act

The public expressed interest for classification of Lower Squaw Creek under Wild and Scenic Rivers Act

ROADLESS AREAS

See Tables 16-18, pg ROD-29

Summary of Changes

Green Mountain proposal for semiprimitive motorized recreation (the area remaining roadless) was dropped for reasons of no apparent public interest or support. Soil erodibility and slopes found not to be suitable for that use.

Rock Creek/Cottonwood Creek area to be managed as unroaded was decreased. A portion of the area which was determined to be economical for timber management was allocated to general forest and unroaded helicopter. Steeper areas were reserved for roadless area management, or helicopter logging, to protect watershed, anadromous fisheries, recreation, and wildlife values.

Silver Creek area to remain roadless was adjusted to a more manageable boundary along canyon rim

Lookout Mountain area to remain unroaded was increased from 2,950 acres to 15,660 acres. The entire roadless area, plus road corridor, is treated as a separate management unit. Planning for stand treatments for recreation and wildlife will begin in first decade, and no entry will be scheduled until project planning is completed and approved 2/

A portion of the Deschutes River Canyon-Steelhead Falls Wilderness Study Area, and an additional area outside the WSA in Squaw Creek, are combined to form a 7,840-acre management area emphasizing semiprimitive, nonmotorized recreational opportunities and wildlife habitat management. The 5,200-acre draft wilderness proposal is dropped 2/

Reasons For Change

Response to public comments Effort to address the resource values involved in a more specific manner Implementation concerns.

LOOKOUT MOUNTAIN

Draft

2,950 acres to be managed for semiprimitive nonmotorized recreation, 11,323 acres allocated to general forest and scheduled timber harvest, the remainder to old growth areas. The top of the mountain is closed to snowmobiling.

Final

A 15,660-acre Lookout Mtn. area treated as one management area within which there is a 7,550-acre mountain top unit, and two old growth areas. The 8,110 acres remaining are to be managed in a manner that emphasizes recreational and wildlife habitat values and maintains the character of the Forest over time Additional site-specific project planning is required Road access corridors (Brush Creek and independent mine roads) are incorporated into the management unit No scheduled timber harvest. The entire area is open to snowmobiles during specific periods

Summary of Changes

Treatment of entire Lookout Mountain and access corridors as a management area.

No entry planned in the first decade prior to completion of site-specific planning

An increase in unroaded mountain top management area from 2,950 to 7,550 acres.

The lower part of the mountain also managed with recreation and wildlife emphasis

No scheduled or chargeable timber harvest

Open to snowmobiling during specified periods.

Reasons For Change

Public comment. Address resource values involved in a more specific/responsive manner

2/ Discussed separately See Wilderness, pg ROD-42 for Deschutes Canyon-Steelhead Falls Wilderness Study Area (WSA) and this page for Lookout Mountain

VISUAL or SCENIC RESOURCES - Trails, Roads, Recreational Developments

Tables 23 and 24 detail the extent of change in visual resource management allocations between the Draft and Alternative I. Table 23 shows the changes in visual resource allocations between the Draft and Alternative I and Table 24 the acres of visual quality objective by allocation for Alternative I.

TABLE 23
CHANGES IN VISUAL RESOURCE ALLOCATION ACRES

	Draft	Final *
Preservation	0	170
Retention	15,211	36,540
Partial Retention	31,238	27,720

* Does not include the Grassland

TABLE 24
SUMMARY OF FINAL VISUAL RESOURCE ALLOCATIONS FOR FOREST AND GRASSLAND

	ACRES		
Forest Roads	**Retention**	**Partial Retention**	**Total**
Visual Management Corridors	16,150	23,960	40,110
Round Mountain Trail	1,000		1,000
Highway 26	6,850		6,850
Deep Creek	770		770
Bandit Springs Recreation Area	1,580		1,580
Dispersed Recreation Sites	2,060		1,970
Developed Recreation Sites	1,810		1,810
Summit Historic Trail	5,770 1/	3,790	9,560
Lake Billy Chinook View	560		560
Total Acres	36,550	27,750	64,300

1/ Includes 170 acres which were allocated to Preservation

Summary of Changes

Immediate/foreground viewing area around recreational developments (campgrounds) allocated and assigned a visual management objective

The acres with visual management objectives increased from 46,449 in the Draft to 64,300 in the Final. The width of the viewing corridor used in calculations was changed from >2640' to 1200'.

Entire Summit Historic Trail corridor was assigned a visual management objective relative to cultural aspects of the particular trail segment.

Round Mountain National Recreation Trail management corridor reduced in width from >2640' to 1200'.

Added 560 acres of viewing area from Lake Billy Chinook reservoir on the National Grassland

No middle ground viewing areas allocated as management areas.

All Forest management areas assigned a visual quality objective

(See other management areas which have visual management objectives)

Reasons For Change

To incorporate visual management considerations in important foreground viewing areas in a more balanced manner. New information. State of Oregon oral communication Emphasis on maintaining character of the Forest.

GENERAL RECREATION

Draft

No allocation of dispersed recreation site management. Discussed in general

Bandit Springs winter recreation sports area identified.

Restricted all motorized use from Lookout Mountain summit.

No recognition of special features or recreational attractions (other than roadless areas, developed recreation, and wildernesses).

General discussion of significant historic trails. Interpretation of Summit Trail for public enjoyment; management of Round Mountain Trail discussed.

Recreational attractions and developments on the National Grassland generally discussed. Expansion at Haystack Reservoir noted

Final

New horse camps designated

Allocation of 665 sites (@3.1 acres/site) across the Forest and Grassland for dispersed recreation - based on Coda-A-Site and other inventories on file with specific management direction.

Bandit Springs recreation management unit (1,580 acres) allocated; deals with all-season recreational activities instead of only winter

Lookout Mountain open to snowmobile use in winter

Allocation of additional areas emphasizing recreational features or attractions and dispersed recreational opportunities, Stein's Pillar (1,070 acres), Hammer Creek (2,560 acres), Deep Creek (770 acres), Lookout Mtn. (15,660 acres), and recognition of Round Mtn for possible further planning.

Identifies and allocates the Summit Trail National Historic Route, with three different levels of management intensity per various segments. (See Visual/Scenic Resources, p. ROD-44)

Management areas identified (allocations) for Haystack Reservoir, Rimrock Springs Wildlife Viewing area, and Cove Palisades State Park.

(For additional information relating to recreation see Wilderness, Wild and Scenic Rivers, Roadless Areas, Travel Plan, Summit Trail, Visual, and Lookout Mtn. which are addressed separately herein.)

Summary of Changes

Increased recognition of importance of dispersed recreational activities and sites on the Forest and Grassland.

Incorporation of existing recreational attractions, developments, cultural resources and special features overlooked or for which information wasn't available in the Draft.

Lookout Mtn. continuing to remain open to snowmobiles.

Reasons For Change

Improved and more complete information and public comment. National emphasis - recreation strategy.

WILDLIFE

OLD GROWTH

Draft

26,400 acres allocated; approximately 58% "suitable," 42% "capable" on National Forest only.

Final

21,970 acres old growth allocated; approximately 94% "suitable," 6% "capable."

1,000 acres of riparian area is recognized as connective habitat between some old growth areas. The connective habitat is allocated in Riparian MA-F15.

740 acres of old growth juniper allocated on the Grassland Recognition of MA's with extended rotation contribution to old growth habitat, as well as other allocations such as wildernesses and unroaded areas.

WINTER RANGE

Draft

76,000 acres of big game winter range to meet Oregon Department of Fish and Wildlife management objectives.

Final

99,570 acres of big game winter range (deer & elk) allocated, but redistributed spatially across the Forest and Grassland.

Identified 107,360 acres big game winter range that was not necessary to meet ODFW big game management objectives and therefore, not allocated as winter range, but recognized as a separate

management situation called "general forest/winter range."

Added 22,700 acres to area identified as antelope winter range on the Grassland.

SUMMER RANGE

Draft

154,100 acres were allocated to big game summer range with specified amounts and quality of thermal cover for optimum big game habitat.

Final

No areas specifically allocated for big game summer range. Big game habitat requirements are considered throughout the general forest area.

Recognition that (thinning) bug-proofing of ponderosa pine stands, if done, would reduce big game habitat effectiveness due to the inability of those stands to provide cover.

Adjustments in cover guidelines to better reflect natural vegetation capabilities.

SNAGS

Draft

Specific snag management levels were set by management area, which averaged out to an overall forest average of 55% of the potential population level for snag dependent species.

Final

Specific snag management levels by management area average 47% of the potential population level in the first decade, and reach 54% by the fifth decade.

EAGLE ROOSTS

Draft

Management direction provided to preserve the integrity of actual and potential bald eagle winter roost sites, but none were specifically identified.

Final

Eight bald eagle winter roosts are identified. (Two are not shown on map because they are included within old growth areas which have more restrictive management prescriptions.) Site specific management plans for each eagle roost area will be developed in fiscal year 1989 and 1990.

HAMMER CREEK

Draft

No special management designated in Hammer Creek except for an old growth area.

Final

A 2,560-acre management area is allocated for wildlife and recreation emphasis. It surrounds an old growth stand and includes a variety of habitat types.

ROAD DENSITY

Draft

Open road density averaged four miles per section in timber/range emphasis areas, and two miles per section in big game emphasis areas.

Final

Open road density averages three miles per section in General Forest and one mile per section seasonally in winter range.

MODELING ASSUMPTIONS FOR HABITAT EFFECTIVENESS

Draft

Assumed potential four elk/square mile in ponderosa pine types; 10/sq mile in mixed conifer; average six/sq mile.

Final

Assumed potential six elk/sq mile in ponderosa pine types; 15/sq mile in mixed conifer; average nine/sq mile.

Summary of Changes

Reduction of total area allocated to old growth, but increase in quality ("suitable" vs. "capable") of that dedicated. Application of concept of "connective habitat." Increased recognition of importance of old growth occurring within other management areas (e.g. MA-F1, 2, 3, 7, 8, 10, 11, 12, 17, 18, 23, 24).

Allocation of old growth juniper on the National Grassland.

Improved spatial distribution of winter range allocations.

Additional acres of antelope winter range area identified and allocated on the Grassland.

Allocation of general forest/winter range in addition to winter range, resulting in improved maintenance of habitat effectiveness across the Forest.

Elimination of big game summer range allocation and consideration of some big game habitat requirements across general forest.

Snag management level increased on certain wildlife and recreation management areas created since the Draft, but with a minor overall drop in potential population level due to big game summer range allocation change.

Specific identification and management direction for bald eagle winter roosts as part of a recovery plan under the Endangered Species Act.

Allocation of a Hammer Creek Management Area with an emphasis on wildlife habitat management.

Modeling assumptions for habitat effectiveness changed based on new information from ODFW.

More realistic cover requirements relating to forest types involved.

Emphasis on maintaining habitat with quality and quantity of cover and road density comprising the basis for rating habitat effectiveness.

Reasons For Change

Public comments. Consultation with State Department of Fish and Wildlife. Improved information and intent to improve implementability.

GRAZING MANAGEMENT

Draft

Forage utilization standards were broken out by slope class and meadows for each management area. They generally were the same, except for those in the Riparian Management Area which were more restrictive.

Allotment improvements were considered in respect to water developments required across Forest to improve utilization and distribution.

Final

Forage utilization standards developed by the Region for eastside Forests are used. There is one set of standards for riparian areas and another set for all other management areas not excluded from grazing. The standards are based on vegetation type, range condition and Forest and Range Environmental Study (FRES) strategies.

A system for prioritizing range allotment planning needs, and a program estimate for riparian improvements is established on an allotment-by-allotment basis for the Forest and Grassland.

Reasons for Change

Public comments. Provides a means to more effectively address the allotment-specific nature of concerns relating to grazing management, and to tier allotment management planning to the Forest and Grassland Plans.

TRAVEL/TRANSPORTATION PLANNING

Draft

All areas on the Forest/Grassland open unless otherwise designated, as determined by other management objectives. The ORV opportunities and closures were outlined on DEIS p.156 and a Travel Plan map published.

Allocated area to semiprimitive motorized recreation.

See road densities under wildlife, pg ROD-46.

Final

Travel access routes and areas designated with respect to management unit objectives. Travel plan map published in FEIS Refers specific designation of ORV trails to project level implementation, identifies closure order requirements

No areas allocated for exclusive ORV use

Summary of Changes

More specificity on area closure and designating of routes or roads within management areas

Refers ORV/OHV trail designation to project level implementation.

Additional emphasis on ORV management and control

Increased emphasis on improved road management with resultant reduction in open road density.

Reasons for Change

Public comment Coordination and attainment of other Forest management objectives, e g improvement of elk habitat effectiveness, reduction of visual and on-site impacts, and other management area objectives

RIPARIAN

Draft

Two allocations or prescriptions "Acceptable" and "Excellent " The latter was assigned to all anadromous fish streams and other to high value fish streams Streams identified for improvement to either "Acceptable" or "Excellent" are listed in Forest Plan Appendix A12 and A15

Final

All streams will be managed under one prescription - "Excellent."

Analysis and scheduling of need for treatment is based on a recently updated (1987) stream condition inventory This inventory aids in setting priorities 3/ when range allotment plans are to be updated. Riparian corridors on approximately 40 miles (1,000 acres) of high value streams have been expanded to offer additional protection to these streams and to enhance "connective" wildlife habitat. (See also Grazing Management, p ROD-47)

Summary of Changes

Provides a simplified and more direct approach - riparian area management planning and analysis priorities will be tied to stream condition and resource values

Allotment management planning will have more detailed direction and objectives.

Provides a system for prioritizing range allotment planning needs on the Forest

Introduces the concept and value of connective habitat.

Reasons for Change

Clarity in communicating planning details. Responsive to public, agency and internal comment. Provides specific information on objectives and impacts affecting allotment management and planning

UTILITY CORRIDORS

Draft

Utility corridors are addressed in general terms in the Forest-wide Standards and Guidelines

Final

Existing utility corridors (rights-of-way) are designated as a management area, 460 acres, in the Grassland Plan Incorporates Federal Power guidelines and requirements (Western Regional Corridor Study, 1986)

3/ Prioritization is a guide, riparian improvement projects will also take advantage of funding or timing opportunities outside this schedule if they occur

LAND ADJUSTMENTS

Draft

The land adjustment plan shows four categories of land

"Consolidate ownership of Cove Palisades State Park area" is listed as a land adjustment priority

Final

A fifth category is added: areas where Congress has directed the Forest Service to acquire non-Federal lands for a designated purpose The Deschutes Scenic River and the North Fork Crooked River Scenic Corridor fall into this category

The land adjustment maps are more detailed and based on recent analysis. Lands are placed in adjustment categories according to management area and priority

The issue of ownership patterns for Cove Palisades State Park is deferred and opportunities for recreation management "partnerships" explored.

NATIONAL FOREST OWNERSHIP

Draft

National Forest ownership totaled 955,100 acres: 843,721 acres of National Forest, and 111,379 acres of National Grassland.

Final

National Forest ownership totals 956,150 acres 844,640 acres of National Forest, and 111,510 acres of National Grassland, due to land exchanges which have occurred since the Draft was prepared

MINERALS AND ENERGY

Draft

Oil and gas leasing activity planning was based on the Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947

Table IV-6, "Average Annual Outputs by Decade," does not include outputs for minerals activities.

The economic analysis does not include revenues from oil and gas leasing.

The issue of providing a mining mineral inventory was deferred for resolution outside the Forest Plan.

Approximately 80% of the Forest and Grassland were leased for oil and gas.

No leasing would be allowed on administrative sites

Leases would be issued with some restrictive stipulations in old growth areas.

Approval for mining operations will be given when concerns are mitigated in a responsible and responsive manner.

Final

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 changes the way oil and gas leasing will be administered. Regulations governing leasing procedures are expected to be finalized in late 1989

The economic analysis has been revised to include oil and gas leasing revenues, and mineral production figures have been updated

A mineral potential map and mineral inventory were prepared

Forest and Grassland area available for leasing is similar, but only approximately 10% of the Forest and Grassland are under lease, due to changes in oil prices

Leases will be issued with a "no surface occupancy" stipulation on administrative sites.

Leases will be issued with a "no surface occupancy" stipulation in old growth areas

Under the mining laws, claimants are entitled to access and develop their mining claims Operating plans will include reasonable and operationally feasible requirements for timely and effective coordination with other resources.

V. ALTERNATIVES

Alternatives Analyzed and Resultant Disposition in the Final

In the DEIS, including the supplement, 12 alternatives were analyzed and presented in detail In addition, eight benchmark alternatives were developed and utilized in the analysis process The benchmarks served as analysis reference points to define bounds for comparison purposes only They were not developed with the intent of being implemented In the FEIS, six alternatives are analyzed in detail, the above remainder are treated as "considered, but eliminated from further detailed study" (Table 25). The basis for elimination of the alternatives was lack of public interest or support and relevance to the NEPA process in final analyses and document preparation

A comparison of the acreage allocations (emphasis) by resource and decade outputs related to issues are presented for the six FEIS alternatives, including Alternative I in Tables 26 and 27. A brief description of the final alternatives follows

Summary Description of Final Alternatives

Alternative NC - NO CHANGE:

The "No Change" alternative has been developed as a no-action alternative representing current management plans. It provides for a level of goods and services as defined in unit plans and the 1979 Timber Resource Plan The alternative does not comply with all provisions of the National Forest Management Act (NFMA), and could not be implemented or used in future management of the Forest without Congressional and/or Secretary of Agriculture action to change the law (see Supplement to the DEIS).

Alternative A - NO ACTION (CD BNCH in Table 25)·

This is the "no action" alternative required by the National Environmental Policy Act It would continue the present course of action established in plans and policies formulated and approved prior to passage of the NFMA and that have been made consistent with present laws and regulations Relatively high levels of timber production, combined with visual quality objectives, and moderate levels of fish and wildlife, are emphasized in this alternative. In the Draft this alternative was represented by the "Current Direction Benchmark with NFMA "

Alternative B-Modified - FOREST PRODUCTS INDUSTRY PREFERRED

This is the alternative supported by the forest products industry Alternative B-Modified evolved from Alternative B, and B-plus post-Draft discussions Alternative B-Modified was developed by industry by amalgamating selected aspects of Alternative I with Draft B

TABLE 25
DISPOSITION OF ALTERNATIVES CONSIDERED IN THE FINAL

	ALTERNATIVES															
TREATMENT	A	B	B Dep	B Mod 1/	C	C Mod	D	E	E Dep	F	G	H	H Dep	I Pre 2/	NC	CD BNCH 3/
Detailed Alts in DEIS	X	X	X		X		X	X	X	X	X	X	X		X	X
DEIS Alts Detailed in FEIS									X						X	X
DEIS Alts Eliminated in FEIS	X	X	X		X		X	X		X	X	X	X			
New Alts Detailed in FEIS				X		X								X		

1/ Alternative B Modified represents evolution and change of Alternative B plus proposed by timber industry Alternative B Modified is a new industry alternative It is different than B plus in the draft, the latter of which was much the same as Alternative B

2/ Preferred Alternative I

3/ Current Direction Benchmark with National Forest Management Act (NFMA) is now Alternative A in this FEIS

The intent is to provide a high level of timber output with some considerations for other resources

Alternative C-Modified - ENVIRONMENTALLY PREFERRED ALTERNATIVE·

Alternative C-Modified emphasizes resources associated with amenity values For example, riparian areas, scenic corridors, retention of roadless areas, recreation and forest management designed to provide big game habitat Old growth and snags would also be provided at high levels. Timber and range resources would be managed at comparatively low levels. This is generally the alternative supported by the conservation community.

Alternative E-Departure - DRAFT PREFERRED:

Alternative E-Departure was the Draft preferred alternative. It emphasizes a combination of timber production, roadless recreation, and big game habitat Timber is scheduled as a departure from nondeclining yield. In other respects, this alternative is the same as Draft Alt. E. Timber harvests are scheduled so that first decade volumes remain close to current levels, and then decline over the next 10 to 50 years. The departure is designed to maintain local economic conditions for the short term All resources are managed or maintained at least at moderate levels.

Alternative I - FOREST SERVICE FINAL:

This alternative represents a new alternative evolved from E-Departure, the Draft Preferred Alternative, in response to new information, recent legislation, and public comment. It is the agency's preferred final. This alternative seeks to maintain a reasonably high level of commodity outputs on a sustained, nondeclining flow. In a complimentary and equitable manner it has also attempted to provide wildlife habitat and recreation resources, as well as preserving the character or setting of the Forest and Grassland over time. Alternative I differs from the Draft preferred E-Departure as described on pp. ROD 40-49.

TABLE 26
RESOURCE EMPHASIS ACREAGES BY ALTERNATIVE

	ALTERNATIVES				
Emphasis	B-Mod	E Dep	I Preferred	A	C-Mod
Wilderness	37,325	39,825	37,325	37,325	47,325
Research Natural Areas	2,145	4,800	4,510	2,230	4,860
Old Growth	18,740	26,340	20,310	36,970	45,030
Cultural	0	0	9,560	0	0
Unroaded Recreation	17,130	27,315	37,060	31,200	40,960
Eagle Roosting	570	570	570	570	570
Developed Recreation	4,650	750	4,650	750	750
Dispersed Recreation	2,060	0	2,060	0	0
Riparian Excellent	18,930	8,260	20,240	3,850	15,550
Riparian Acceptable	0	7,630	0	12,210	0
Special Recreation	3,420	1,580	11,530	0	1,580
Special Wildlife	430	0	2,990	0	0
Big Game Winter Range	35,440	72,310	99,570	32,100	308,150

Emphasis	B-Mod	E Dep	I Preferred	A	C-Mod
Big Game Summer Range	0	154,100	0	61,830	378,775
Timber/Wildlife	171,490	0	107,360	0	0
Timber/Range	603,010	555,020	556,290	649,170	0
Wild & Scenic Rivers	5,400	4,030	5,400	4,030	4,030
Visuals	34,410	46,160	41,670	83,450	101,110
Facilities	1,000	460	1,000	460	460

TABLE 27
INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO ISSUES, CONCERNS, AND OPPORTUNITIES

		ALTERNATIVE					
Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Allowable Sale Quantity (ASQ)							
1st Decade	MMCF	N/A	21 8	20 6	19 0	19 3	15 6
5th Decade	MMCF	N/A	21 8	16 1	19 0	19 3	15 6
1st Decade	MMBF	N/A	130 0	123 0	115 0	115 0	94 0
Average Annual Salvage	MMBF		8	1 5	7	1 4	6
Uneven-Age Mgmt	M Acres	0	120	0	100	0	170
PNV	Million $	380	452	471	475	421	395
Estimated County Receipts	M $'s	Un-known	4 5	5 1	4 9	4 3	3 5
Estimated Change in Jobs	#	Un-known	211	196	118	124	-101
Livestock Use 1/	M AUM's/Yr						
1st Decade		77 5	70 0	79 0	70 0	77 5	73 1
5th Decade		77 5	80 0	79 4	80 0	79 1	74 4
Riparian Areas in Excellent Condition							
1st Decade	M Acres	---	10 0	---	10 0	---	10 0
5th Decade	M Acres	5 4	17 5	9 4	17 5	5 4	17 5
Miles of Primary Road Open and Maintained -End of Planning Period	#Miles	4,774	4,800	4,776	4,734	4,774	4,743
Miles of Roads Closed	#Miles						
1st Decade		694	913	890	1558	694	1520
5th Decade		1,734	2,123	2,082	2,185	1,734	3,224
Deer Population 5th Decade	#	Un-known	17,210	22,600	22,600	22,600	22,600

Resource Output or Item	Unit of Measure	NC	B-MOD	E DEP	I-Preferred	A	C-MOD
Elk Population	#						
1st Decade			3,210	3,170	3,000	3,370	3,740
5th Decade		Un-known	1,700	2,780	2,620	2,690	3,700
Acres Allocated-Unroaded 2/	M Acres	29 1	10 7	27 3	38 4	31.2	41 0
Scenic Resources							
Preservation	M Acres	38 3	39 5	43.3	42 0	38 3	50 9
Retention	M Acres	102 2	60 7	70 7	96 8	102.2	155 6
Partial Retention	M Acres	71.4	28 1	59.4	32 4	71 4	61 5
Allocated 3/	M Acres		34 4	46 2	41 7	83 5	101 1
Old Growth (Allocated) 4/	M Acres	32,860	18,740	26,340	20,310	36,970	45,030
Fuelwood Supply	M Cords						
1st Decade		14 0	15 0	13.1	13 0	14.0	12 0
Snag Habitat for Cavity Nesters	% of Potential						
1st Decade		Un-known	43	46	47	46	51
5th Decade		Un-known	33	55	54	52	69
Area Allocated To Recreation Emphasis 5/	Acres		28,630	35,065	58,120	31,950	48,710
Anadromous Steelhead	SCHI						
1st Decade		26	26	26	26	26	26
5th Decade		126	126	126	126	126	126
Total Miles of ATV Trails	#Miles						
1st Decade		None	95	0	95	0	95
5th Decade		None	190	0	190	0	190
Round Mountain Recreation Emphasis 6/	Acres	N/A	1,000	0	1,000	0	0

1/ Forage production potentials may not be achieved and are at the minimum, directly dependent upon the implementation of the proposed improvements in the first decade It is reasonable to expect that some or all allotments may experience up to a 10% reduction in AUM's during the first decade to allow the accomplishment of riparian management objectives

2/ Total acreage for lands allocated to management areas with unroaded recreation emphasis (D9, F8, F10, F11, G8)

3/ Total acreage for lands allocated to management areas with visual resource emphasis (D5, D6, D7, G13, F25, F26, F27)

4/ Total acreage for lands allocated to management areas with old growth emphasis (D4, F6, G5)

5/ Total acreage for lands allocated to management areas with recreation emphasis (D9, D10, D11, F7, F8, F10, F11, F13, F14, F16, F17, F19, G8, G11, G12, G14)

6/ Acres on Round Mountain with recreation emphasis (applies to Round Mountain National Recreation Trail)

STATE OF OREGON ALTERNATIVE

This alternative was developed by the State of Oregon Governor's Federal Land Planning Team utilizing Forest Service data, and with a public review process separate from that conducted by the Forest Service. The alternative is a result of collaboration between the Forest Service, State agencies, the Governor's staff, and the public.

The analysis of the State's alternative has not been documented in a detailed comparison with other alternatives in the FEIS because of the late date it was received. However, the State of Oregon and Forest Service collaboration involved the former in the final decisions relating to the selection of a plan for the Forest and Grassland.

There were significant differences between the State's alternative and the DEIS preferred Alternative E-Departure. These differences were greatly reduced through the changes I have made between the Draft and Final (pp. ROD 40-49). I now find that the State's alternative is similar to the Forest Service Alternative I. We are together in respect to major and important issues, for example: the level of ASQ, roadless area allocations, disposition of the Deschutes Canyon-Steelhead Falls Wilderness Study Area, big game winter range allocations, grazing management, snag levels, allocations emphasizing recreation, management and planning for ORV use, and the decisions on snowmobile use on Lookout Mountain.

There was, however, some clarification between the State's recommendations and Alternative I needed which I will list here and then address, for the record, below.

STATE RECOMMENDATIONS:

1. Apply more stringent riparian management requirements on anadromous fish streams.
2. Further reduce road densities.
3. Limit numbers of dispersed sites and reduce their visual quality objective.
4. Reduce visual management requirements on certain Forest roads and apply uneven-aged management instead.
5. Add the pine marten and the northern three-toed woodpecker as indicator species.
6. Reach a sustained even-flow for ponderosa pine volume within a decade.
7. Provide a stable timber supply for Harney County.
8. Use both CF and BF measurements for planning and management.
9. Increase the amount of uneven-aged management.
10. Add RNA's.

FOREST SERVICE RATIONALE AND FINDINGS RELATING TO STATE RECOMMENDATIONS ABOVE:

1. Riparian Management

My proposal for riparian area management has had substantial changes between the Draft and Final. It is essentially in agreement with the State, and is in line with recommendations from CRITFC. The only point where we disagree appears to be the level of protection for streams within the John Day Basin. The State feels that the anadromous fish runs in this basin warrant extra protection. There is no disagreement on this point. The State further proposes no scheduled harvest from riparian areas along major perennial streams and no scheduled harvest along the lower half of the riparian areas on minor perennial streams. I believe the anadromous fishery in the Trout Creek watershed (Deschutes Basin) is equally as important and should be included in this discussion.

Table 28 indicates the amount of protection afforded by the Forest Service Alternative I which is, in addition to the standards and guidelines, applied to maintain the ecological potential of these fisheries.

At this time, I believe adoption of the State's proposal for the Ochoco National Forest for more stringent protection in the John Day Basin through non-scheduling of harvest for riparian areas would result in insignificant change to the conditions attainable for the Ochoco National Forest under the proposed Forest and Grassland Plans. Here is why. As shown by Table 28, the level of protection which is being provided for anadromous fisheries is substantial. Half of the stream miles with spawning are allocated to no timber harvest and another nine miles to a double-wide 400 foot corridor. This translates into over 70 percent of the riparian areas which support the spawning of anadromous fish having a special emphasis above that proposed for nonanadromous riparian areas. The remaining streams are protected by a 200 foot corridor, standards and guidelines, reduced timber harvest levels, and more stringent requirements relating to cumulative effects (see Table 12). Therefore, I believe that Alternative I will result in attaining the desired future condition for these streams. With intensive monitoring, any problems will be detected and changes can then be made.

2. Road Densities

The State is of the opinion that open road densities in winter range should not exceed one mile per section in the winter and 2.5 miles in summer, and that densities in general forest (MA-F22) and general forest winter range (MAF-21) should be 2.5 miles per section. The only difference between the State's proposal and mine is the recommendation of 2.5 miles per square mile compared to three miles per square mile. I find reducing the road density to 2.5 miles per square mile would have little to no effect on predicted elk numbers and a 0 to 5 percent change in habitat effectiveness. However, the change to the 2.5 mile guideline would significantly increase road management costs. Since we achieve State big game population objectives with the road densities in Alternative I, and the State and the Forest Service are in agreement that we both desire to manage roads effectively to meet wildlife and recreation objectives, I conclude our differences on this point are really insignificant. With monitoring and further studies (e.g., Starky Experiment Station), improved knowledge concerning open roads will allow future opportunity for any needed adjustments.

3. Dispersed Recreation Sites

Nine hundred and fifty dispersed recreation sites were identified by the Forest Service, and 1,970 acres (MA-F14) allocated for this use. The visual quality objective for these sites was decided to be retention. The State supports this approach, but they recommend a visual objective of partial retention. The change to partial retention in my opinion, would not significantly increase the ASQ on the Forest. Further, the State was concerned that the allocation be limited to the originally identified sites and that the implementation of the Plans not set the stage for a proliferation of new sites, thereby increasing the application of retention standards and hence a potential reduction in ASQ across the Forest. It is my intention that the Forest and Grassland Plans be initially implemented with the acreage allocated as in MA-F14 and MA-G14. Dispersed recreation sites may likely be identified or dropped in future project level planning. With appropriate project analysis and documentation, the dispersed recreation sites identified and their management will likely be modified over time.

4. Visual Management

Between the Draft and Final, my staff re-evaluated visual management objectives for road corridors and viewing areas surrounding recreation sites. The resultant changes, with which the State is in agreement, pertain to elimination of partial retention middleground as an allocation and the reduction in average corridor width to 1,200 feet. The reduction in road corridor to a more realistic width has allowed us to manage more miles of travel corridors with a visual objective and with less loss in timber volume than was possible under the draft preferred alternative approach.

However, we have two apparent differences which involve the specific corridors to be protected and the role of uneven-aged management in visual corridor management, especially on Highway 26. First, the State's proposal differs from that of the Forest Service in that they recommend no visual management objective for roads 12, 16, 42, 4155, 4370, 45, 58, and 5840, involving approximately 5,200 acres. Instead they propose using uneven-aged management wherever feasible and extensive slash clean-up. I believe that reducing the visual management objective to less than partial retention would result in unacceptable consequences to the visual character along important routes and would create inconsistency across the Forest in how visual quality travel objectives are being applied.

The other difference is a proposal for uneven-aged management as the primary method of management for Highway 26. It is my position that uneven-aged management is only one of the silvicultural systems available to meet visual quality objectives; others may also be appropriate to meet objectives dependent on conditions. My decision is that the silvicultural system which best meets objectives for a given situation will be applied.

The Highway 26 corridor is presently managed under an existing visual corridor management plan which will be revised to bring it into compliance with the Forest Plan. This includes incorporation and utilization of uneven-aged management along Highway 26 where it is appropriate.

5. Additional Indicator Species Suggested

A question regarding indicator species arose--concern was expressed about the preservation of pine marten habitat in old growth lodgepole pine on eastern Oregon forests. The Ochoco National Forest has approximately 10,000 acres of widely scattered lodgepole pine stands, most of which occur below the elevational limits for habitat for pine marten. In short, this particular Forest does not have the natural habitat to support a viable population of pine marten. The same situation exists for the northern three-toed woodpecker.

6. Ponderosa Pine Harvest Level Over Time

The State proposed that ponderosa pine volume be leveled within the first decade versus Alternative E-Departure I have chosen to do this over a two decade period, while attempting to minimize the drop and fluctuation and decline between decades two and five (Table 29).

Ponderosa pine volumes proposed for Alternative I are more stable over time than that of in the draft preferred (see Table 29). This is the result of changes from draft to final I have made involving return to sustained yield vs departure, the addition of uneven-aged management, changes in rotation diameters and extended rotations for some management areas, and the model constraints placed on maximum first decade pine volume. It should be noted that although pine volume is estimated to vary through time as showed by Table 29, combined species volume in Alternative I is on a sustained-yield basis

It is my belief that given the structure of the local economy and the uncertainty of the future that this approach better serves local economy needs and is more realistic given the complexities of controlling species mix, sale scheduling, and changing market conditions The gradual two decade decrease in ponderosa pine also allows more flexibility in working with neighboring National Forests in order to maintain a more stable timber supply for the Burns area

7. Harney County Timber Supply

Concern was expressed over future timber supply in Harney County. Attention was brought to the importance of the Malheur and Ochoco National Forests coordination to insure a relatively stable timber supply. It was asked that I analyze ASQ levels to try to more evenly schedule the ponderosa pine volume over time; including decline in the first decade to a sustainable level As with the ponderosa pine issue above, I have given considerable thought to this question. The same measures used to level Forest-wide pine volume apply to the Snow Mountain District pine volume scheduling Additional constraints were modeled at the District level to help address this concern

The State asked for 34 MMBF in the first decade from the Snow Mountain District with declining volume in decade two and beyond; and, that we, in conjunction with the Malheur National Forest, provide a stable flow of ponderosa pine from the Snow Mountain and Burns Ranger Districts in decades two through five. Table 30 shows that the projected volume from the Snow Mountain District is in agreement with the State's proposal Also, volume from decade two on can be manipulated with no effect on the first decade schedule The Ochoco National Forest volume, combined with a preliminary estimate from the Malheur National Forest, shows only minor deviations from the State recommendation until the fifth decade (third decade for pine volume). I am, however, directing the Malheur and Ochoco National Forests to continue to coordinate and monitor this issue with the intent of assuring the stability of a timber supply, within the extent practicable, in the Harney County area

8. Timber Volume Measurement

The State advocated use of both cubic foot and board foot targets for ASQ. This is simply not practical at this time There is considerable variation from stand to stand within the FORPLAN model classes, and it would be difficult to plan sales by making the board foot/cubic foot ratio of each stand a major decision factor in the selection of areas for harvest

The Regional and National direction (1920 ltr 9/13/88 and FS handbook 1922.15) is to use the actual cubic feet volume scheduled for harvest in the first decade to determine the board feet scheduled for harvest Both CF and BF will be tracked in monitoring The Forest Service expects to make the transition from the use of board feet to the use of cubic feet sometime within the first decade.

9. Uneven-aged Management

The State believes that the Forest should conduct uneven-aged management on more than 100,000 acres of ponderosa pine in the General Forest (MA-F22) in addition to riparian, visual areas, et al Again, I am in agreement in principal, but stand conditions such as mistletoe and stand structure may limit the practicality of this For now, the Plan will include management using uneven-aged management on 100,000 acres of ponderosa pine and ponderosa pine/mixed stands . As part of the implementation and monitoring we will look for additional opportunities to use uneven-aged management and where it will meet management objectives and where stand conditions are conducive it can be applied

TABLE 28
SUMMARY OF THE PROTECTION FOR ANADROMOUS FISH
Streams on the Ochoco National Forest (Miles)

	Total Perennial (P)	Perennial With Spawning (S)
Deschutes System	19	6
John Day System	68	36
Total	87	42

	No Timber Harvest 1/		Four Hundred Foot Corridor		Total (No Harvest & 400 Corridor)		Remaining w/ 200' Corridor Protection	
	P	S	P	S	P	S	P	S
John Day Basin	31 5	20 7	12 0	7 8	43 5	28 5	24 5	7 5
Trout (Deschutes)	1 0	3	5 0	1 2	6 0	1 5	13 0	4 5
Total	32.5	21.0	17	9 0	49 5	30 0	37.5	12 0

1/ Includes streams in wilderness, allocated roadless and old growth areas

TABLE 29
ESTIMATED PONDEROSA PINE VOLUME (MMBF)

ALTERNATIVE	DECADE				
	1	2	3	4	5
DEIS - Alternative E-Departure	87	82	56	52	55
State's Proposal	79 (82-70)	70	70	70	70
Alternative I	82	80	70	63	63

TABLE 30
PROJECTED TIMBER SUPPLY VOLUMES 1/
(MMBF)

	Ochoco N F Snow Mountain RD		Malheur N F Burns RD		Total	
Decade	Total Volume	Pine Volume	Total Volume	Pine Volume	Total Volume	Pine Volume
1	35 0	26 0	53 0	29 0	87 0	57 0
2	31 0	26 0	54 0	25 0	85 0	51 0
3	33 0	23 0	49 0	19 0	82 0	42 0
4	21 0	16 0	56 0	24 0	77 0	40 0
5	24 0	18 0	47 0	22 0	71 0	40 0

1/ Includes volume potentially available from the Ochoco and Malheur National Forests in the Burns area (based on available information at this date - Malheur N F volumes subject to change based on outcome of their final plan)

10. Additional RNA's Suggested

The State pointed out they want to meet establishment of the natural areas identified in the Oregon Natural Heritage Plan We therefore are in agreement on the five RNA's proposed in Alternative I The State further recommended that the Forest should work with the Oregon Natural Heritage Advisory Council to investigate the possibility of incorporating two potential additions they have identified I have directed the Forest to work with the PNW Experiment Station ecology section and with the Council to determine the significance of these and any other potential additions The Forest will recommend their incorporation into the Plan by amendment if they should so warrant

VI. REQUIRED COMPARISONS OF ALTERNATIVES

PRESENT NET VALUE (PNV) OF ALTERNATIVES

The preferred Final, Alternative I, has the highest PNV (Table 31). While Alternative I does not offer the greatest timber volumes of the alternatives considered, the amount of timber it provides does not exceed the point where discounted benefits equal or exceed discounted costs (marginal rate of return is positive), this, in addition to a high amount of nonmonetary benefits, provides for a relatively high level of economic efficiency Alternative B-Modified, while providing higher levels of timber availability, is actually less economically efficient In short, it exceeds the point where the discounted benefits are rising faster than the discounted costs. Another way of saying this, is that the value of the extra timber in this alternative is lower and the costs to get it are higher. Alternative C-Modified fails to capture economic opportunities and relies heavily on nonmonetary benefits (see FEIS Appendix B)

ENVIRONMENTALLY PREFERABLE ALTERNATIVE AND NONSELECTION RATIONALE

The "environmentally preferable" alternative is defined by the Council of Environmental Quality (CEQ) regulations as the alternative causing the least adverse impact to the biological and physical environment. This is Alternative C-Modified which emphasizes aesthetic values, wildlife, wilderness, dispersed and unroaded recreation on the Forest. These are nonmonetary resources which generally do not have established market values Economist's inability to express these values satisfactorily in monetary terms may be reflected in the PNV of this alternative, which is 395 million dollars (based on a 50-year period) as compared to Alternative B-Modified at 455 million dollars, which emphasizes commodity resources

TABLE 31
COMPARISON OF PNV BY ALTERNATIVE

(Millions of Dollars)

ALTERNATIVE	PNV
I-Preferred	475
E-DEP	471
B-MOD	455
A	421
C-MOD	395
NC	380

I did not select Alternative C-Modified or B-Modified The former fails to fully recognize demands imposed by local communities, and the economic realities of our society. Another way of expressing this is that Alternative C-Modified does not provide a balance between environmental considerations and economic realities; there are benefits associated with Alternative C-Modified, but implementation could be done only with very high costs and radical change to established local, social and economic settings (see Table 27) The corollary to this is Alternative B-Modified, which while possibly providing the greatest economic benefits in the short term, has potentially undesirable environmental and socio-economic effects over time. It reduces options and increases risk for environmental impacts and socio-economic change that could be irreversible

I believe Alternative I reflects recognition for the landscape and resource diversity of the Forest and Grassland through the allocations or management areas identified While the output of commodity resources from Alternative I is considerably greater than the "environmentally preferable" Alternative C-Modified, the specificity and detail in allocations, and subsequent mitigation through application of standards and guidelines (see Mitigation, p ROD-62) assures a high level of environmental protection and retention of future options

In my judgement, Alternative I provides appropriate environmental safeguards at a minimum direct economic cost This alternative incorporates the perspective that the Forest Service is the trustee of

the environment for succeeding generations An objective of Alternative I is to provide for the proper and continued development of resources in a manner that maintains economic stability, yet retains local natural heritages, such as wildlife habitat, outdoor recreation opportunities, water quality, scenic qualities and open range.

VII - IMPLEMENTATION SCHEDULES

SCHEDULES AND IMPLEMENTATION

The Forest Plan will be implemented through identification, selection, and scheduling of projects to meet the management goals and objectives provided by the Plan (see Plan Appendix A)

The schedule of proposed and possible projects for the first decade is contained in the appendices of the Forest and Grassland Plans Project schedules will be available for review at the Ranger District Offices and Supervisor's Office Schedules of possible projects will routinely change as projects are implemented or are removed from the listings for other reasons, and as new projects take their place. Adjustments to the schedule may be made based on results of monitoring, budgets, and unforeseen events

The Forest Plan provides direction in the form of goals and objectives, standards and guidelines, monitoring requirements, and probable scheduling of management practices It does not cover projects on specific sites except in a broad manner. Each proposed project will be subject to site-specific analysis and documentation in compliance with NEPA. Considerations revealed through this process may result in a decision not to proceed with the proposed project, even though the project may be permissible under the Forest Plan

The Plan's scheduled projects are translated into multiyear program budget proposals The schedule is used for requesting and allocating the funds needed to carry out the planned management direction The Forest's current year tentative annual program of work will be derived from this process Upon approval of a final budget for the Forest, the annual work program will be updated and carried out

The Forest work program will implement the management direction of the Forest Plan Outputs and activities in individual years may be significantly different from those shown in Chapter 4 of the Forest Plan, depending on final budgets, new information derived from updated inventories and monitoring, and any future amendments or revisions of the Forest Plan

The Forest Plan supersedes or incorporates all previous land and resource management plans prepared for the Ochoco National Forest and Crooked River National Grassland as described by Table 1, p. ROD-4. Upon implementation of the Plans, management activities will be made to comply with them. Appropriations or budgets may alter the schedule of activities In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System Lands and resource uses must be in conformance with the Forest Plan. Such documents will be revised where needed as soon as practicable, subject to valid existing rights This updating will generally be done within three years

All timber sales offered for sale after issuance of the Forest Plan will be in compliance with direction contained in the Plan. Timber sales now under contract will be administered under provisions of the existing contracts Changes to existing timber sale contracts may be proposed on a case-by-case basis where overriding resource considerations are present. (See also, Consistency, p ROD-3)

AMENDMENT AND REVISION PROCESS

This Forest Plan may be changed either by an amendment or a revision Such changes may come about as a result of the monitoring process or project analysis (Figure 1, p ROD-61). An amendment may become necessary as a result of different situations They can include, for example:

- Recommendations of the Interdisciplinary Team based on their review of monitoring results

- The determination that an existing or proposed permit, contract, cooperative agreement, or other instrument authorizing occupancy and use is not consistent with the Forest Plan, but should be approved, based on project level analysis

- Adjustment of management area boundaries or prescriptions

- Changes necessitated by resolution of administrative appeals

- Changes needed to improve monitoring plans or information and assumptions used in the Plan

- Changes to correct minor errors or omissions, including clarification of text and tables

- Changes made necessary by altered physical, social, or economic conditions

Based on an analysis of the objectives, guidelines, and other aspects of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change to the Plan. If the change is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a plan. If the change is determined not to be significant, the Forest Supervisor may implement the amendment after appropriate public notice and compliance with the NEPA (Figure 1) The procedure is described by 36 CFR 219.10(e) and (f), 36 CFR 219.12(k), FSM 1922.51-52 and FSH 1909.12

The Regional Forester will approve significant amendments, and the Forest Supervisor "non-significant" amendments. The determination of significance must be documented in a decision notice and would be appealable under 36 CFR 217. A mailing list will be maintained to provide notification and invitation to comment on proposed amendments.

The amendment documentation will include at a minimum:

- A statement of why we are amending the Forest Plan (some possible reasons are mentioned above)

- The actual amendment showing exactly how it will look

- Rationale for the amendment

- A statement of significance related to FSM 1922 51 (This is the NFMA significance and relates to changes to the Forest Plan)

- A statement regarding NEPA compliance (40 CFR 1500-1508, FSM 1950, and FSH 1909 15) regarding effects on the environment and how the effects disclosed in the Plan EIS may change as a result of the amendment

- A statement of the appeal rights.

With respect to revision, the NFMA requires revision of the Forest Plan at least every 15 years. However, it may be revised sooner if physical conditions or demands on the land and resources have changed sufficiently to affect overall goals or uses for the entire Forest If a revision becomes necessary, the procedures described in 36 CFR 219 12 will be followed. The Chief, however, must approve the scheduling of such revision

VIII. MONITORING AND MITIGATION

MONITORING AND EVALUATION

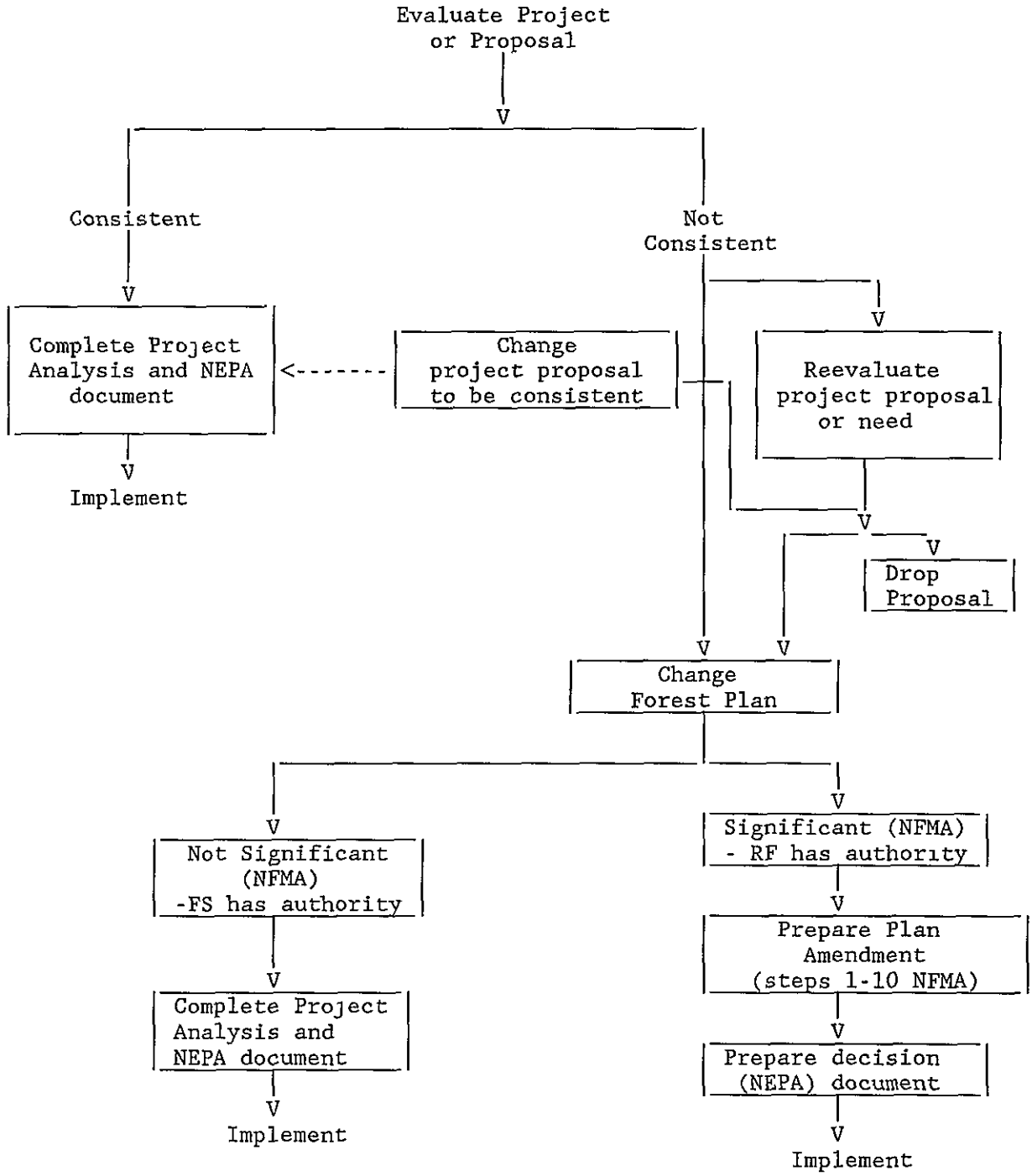
The Monitoring and Evaluation Program is the management control system for the Forest and Grassland Plans. It will be used to provide information on the progress and results of implementation. One of the results of monitoring will be an assessment of the need for amending or revising the Plan The monitoring and evaluation are discussed in more detail in Chapters 5 of the Plans

Monitoring is intended to help keep the Forest Plan dynamic and responsive to changes Monitoring and evaluation each have a distinctly different purpose and scope Monitoring consists of gathering data, observations and information During evaluation, the data and information are analyzed and interpreted This process provides the information necessary to determine if conditions are within the bounds and intent of the Plan direction. Forest Plan monitoring does not replace or substitute other Forest monitoring activities. Many activities are currently being monitored on the National Grassland and Forest to comply with administrative and legal responsibilities (FSM - 1410 Admin Review Procedures)

Monitoring and evaluation will provide information to determine if

- Management prescriptions are producing the predicted or desired environmental effects
- Laws, regulations, and policies are being followed, including Regional Guide and Plan Standards and Guidelines
- The Forest and Grassland Plan is responsive to the issues, concerns, and opportunities

FIGURE 1
AMENDMENT PROCESS AND DYNAMIC NATURE OF PLAN



- Costs of implementing the Plan are as projected.
- Predicted outputs are being produced.
- There are new issues and concerns not adequately addressed by the Plan.

Results of the evaluation will lead to decisions of the following types.

- Continue practice, no change necessary.
- Refer the problem to the appropriate Forest officer for corrective action
- Modify the management practice through Plan amendments
- Modify land allocations through Plan amendments.
- Revise output schedules.
- Revise unit output costs.
- Revise the Plan

MITIGATION

Mitigation measures are intended to minimize or eliminate potential conflicts or adverse effects of implementation. Mitigation measures have been developed through interdisciplinary efforts and incorporated into the Plans at different levels in several different ways

- The standards and guidelines and management area prescriptions in Chapter 4 of the Plan are a fundamental and integral part of these measures, and as such they are a basic and essential part of the Plan.

- The allocations (Tables 5 and 6, pp ROD 16-17) play an important role in mitigation by the separation of incompatible uses, impacts, and conflicts.

- National Forest Management Act (NFMA) requirements were incorporated into the planning process and are reflected in the allocations and standards and guidelines (EIS Appendix B, and SEIS, Pt II)

- "General Water Quality Best Management Practices" (USDA Forest Service, Pacific Northwest Region, November 1988. 86p) are incorporated by reference under requirements of Section 319 of the Clean Water Act.

- Mitigation measures are developed at the site-specific project level of planning, and projects are "tiered" to other planning level measures above (see p. ROD-1).

IX. APPEAL RIGHTS

This decision may be appealed in accordance with the provisions of 36 CFR 217 by filing a written notice of appeal within 90 days after the publish date of the Notice of Availability in the Federal Register on September 15, 1989. The appeal must be filed with:

F. Dale Robertson, Chief
USDA Forest Service
P O. Box 96090
Washington, D.C. 20090-6090
Reviewing Officer

A copy must simultaneously be sent to:

James F. Torrence, Regional Forester
Pacific Northwest Region
USDA Forest Service
319 S W. Pine
P.O. Box 3623
Portland, OR 97208-3623
Reviewing Officer

The notice of appeal must include sufficient narrative evidence and argument to show why this decision should be changed or reversed (36 CFR 217 9). Requests to stay approval of the Forest Plan under 36 CFR 217 will not be granted

Decisions on site-specific projects are not made in this document. The schedule of proposed and possible projects for the first decade is contained in the appendices of the Forest Plan. Final decisions on these proposed projects will be made after site-specific analysis and documentation in compliance with NEPA.

If you would like more information on the Forest Plan or environmental statement, contact the Forest Supervisor in Prineville. I encourage anyone who is concerned about the Plan(s), or decisions herein, to check first with the Forest Supervisor in Prineville, Oregon, (503)447-6247, before submitting an appeal, to see if concerns or misunderstandings might be resolved.

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