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Forest Service

Pacific Northwest Region

R6-MAL-03-004

July 2003

Silvies Canyon Watershed Restoration Project

Final Environmental Impact Statement

Malheur National Forest
Emigrant Creek and Blue Mountain Ranger Districts

ACRONYMS

AM	Animal Month
ASQ	Allowable Sale Quantity
ASTE	*Astragalus tegetaroides* (Deschutes milkvetch)
ATP	Area to Protect
AUM	Animal Unit Month
BBS	Breeding Bird Survey
BI	Beneficial Impact
BLM	Bureau of Land Management
BMP	Best Management Practice
BOCR	*Botrychium crenulatum* (Crenulate moonworts)
CCF	Hundred Cubic Feet
CFR	Code of Federal Regulations
CT	Commercial Thin
CWE	Cumulative Watershed Effect
DBH	Diameter at Breast Height
DecAID	Decayed Wood Advisor
DEIS	Draft Environmental Impact Statement
DOG	Dedicated Old Growth
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERA	Equivalent Roaded Area
FAR	Functioning-at-Risk
FEIS	Final Environmental Impact Statement
FP	Forest Plan
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSS	Forest Service System
FWS	Fish and Wildlife Service
FONSI	Finding of No Significant Impact
GIS	Geographical Information System
HEI	Habitat Effectiveness Index
HRV	Historical Range of Variability
ICBEMP	Interior Columbia Basin Ecosystem Management Project
IDT	Interdisciplinary Team
INFISH	Inland Native Fish Strategy
IT	Intermediate Thin
LAU	Lynx Analysis Unit
LORA	*Lomatium ravenii* (Raven's lomatium)
LOS	Late and Old Structure
LRMP	Land and Resource Management Plan
LWD	Large Wood Debris
MA	Management Area
MBTA	Migratory Bird Treaty Act
MIIH	May Impact Individuals or Habitat
MIS	Management Indicator Species
ML	Management Levels
MBF	Thousand Board Feet
MMBF	Million Board Feet
MOU	Memorandum of Understanding
NEPA	National Environmental Protection Act
NI	No Impact
WA	Watershed Analysis
YFMS	Young Forest Multi Stratum
YUM	Yard Unmerchantable Material
NLAA	May Affect – Not Likely to Adversely Affect
NTMB	Neotropical Migratory Birds
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OED	Oregon Employment Department
OF	Old Forest
OFMS	Old Forest Multi Stratum
OFSS	Old Forest Single Stratum
OHV	Off-Highway Vehicle
ONRC	Oregon Natural Resources Council
OSHA	Occupational Safety and Health Administration
PACFISH	Interim Strategies for Managing Anadromous Fish-Producing Waters
PAG	Plant Association Group
PCE	Primary Cavity Excavator
PCT	Precommercial thin
PETS	Proposed, Endangered, Threatened and Sensitive
PFA	Post-Fledging Area
PIF	Partners in Flight
PIPO	*Pinus ponderosa* (Ponderosa pine)
PM	Particulate Matter
PPL	Potential Population Level
PUM	Pile Unmerchantable Material
PVG	Potential Vegetation Group
RARE	Roadless Area Review
RARE II	Roadless Area Review II
RD	Ranger District
RFA	Regional Forester's Amendment
RHCA	Riparian Habitat Conservation Areas
RMO	Riparian Management Objectives
ROG	Replacement Old Growth
ROS	Recreational Opportunity Spectrum
SCN	Secondary Cavity Nesters
SDEIS	Supplemental Draft Environmental Impact Statement
SEC	Stem Exclusion Closed Canopy
SEO	Stem Exclusion Open Canopy
SI	Stand Initiation
SIO	Scenic Integrity Objectivies
SMS	Scenery Management System
SRI	Soil Resource Inventory
SOPA	Schedule of Proposed Actions
TOC	Threshold of Concern
TE&S	Threatened, Endangered, and Sensitive
UR	Understory Reinitiation
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USGS	United States Geological Survey
VMS	Visual Management System
VQO	Visual Quality Objectives

United States Department of Agriculture | Forest Service | Malheur National Forest | P.O. Box 909
John Day, OR 97845
(541) 575-3000
Fax (541) 575-3001
TDD (541) 575-3089

File Code: 1950

Date: August 4, 2003

Dear Reader:

Enclosed, please find the Silvies Canyon Watershed Restoration Project, Final Environmental Impact Statement (FEIS). The Record of Decision (ROD) documents my decision to select Alternative 7 (The Preferred Alternative) with modifications and the factors I considered in reaching my decision. The effective date of implementation for the decision and the Appeal Rights are also specified in the ROD.

Copies of the FEIS are available for review at the Forest Service Offices in John Day, Prairie City, and Burns, Oregon.

I want to thank those of you who took the time to review and comment on the Draft Environmental Impact Statement (DEIS) and Supplemental DEIS. Your interest in the management of the Malheur National Forest is appreciated.

Sincerely,

Roger W. Williams

ROGER W. WILLIAMS
Forest Supervisor

Enclosure

Silvies Canyon Watershed Restoration Project

Record of Decision and Forest Plan Amendment #55

USDA Forest Service
Pacific Northwest Region

Malheur National Forest
Emigrant Creek and Blue Mountain Ranger Districts

Grant and Harney Counties
John Day, Oregon
July 2003

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Record of Decision **and**
Forest Plan Amendment #55

Introduction

This Record of Decision (ROD) documents my decision and rationale for the selection of the alternative to be implemented for the Silvies Canyon Watershed Restoration Project. It also includes non-significant Forest Plan Amendment #55 to allow activity within portions of the project area.

The Silvies Canyon Watershed comprises about 81,000 acres within seven subwatersheds. The watershed is located about 20 air miles north of Burns, Oregon on the Emigrant Creek and Blue Mountain Ranger Districts (formerly Burns and Bear Valley Ranger Districts) of the Malheur National Forest. Restoration activities will be focused on about 65,000 acres in these subwatersheds: Myrtle Park, Sage Hen Creek, Stancliffe Creek, Burnt Mountain, Boulder Creek / Fawn Creek, Myrtle Creek, and Red Hill.

Purpose and Need/Proposed Action

The purpose of proposed activities is fully described in Chapter 1 of the FEIS. The purpose and need generally included:

- **Purpose:** Reduce road related-impacts to water quality, fish habitat, and wildlife habitat.
  Need: There is a need to reduce road densities to meet Forest Plan standards and to reduce erosion and sedimentation from roads within RHCAs.
- **Purpose:** Enhance riparian vegetation, and manage upland and riparian vegetation structure and composition.
  Need: There is a need for proper management of aspen and cottonwood to prevent the loss of these important components of the ecosystem. Riparian habitat (spring) restoration activities are also needed for wildlife habitat and watershed enhancement.
- **Purpose:** Improve the health, vigor, and resiliency of vegetation to insects, disease, wildfire, and other disturbances, to more closely resemble historical conditions in order to promote long-term forest sustainability and wildlife species diversity.
  Need: There is a need to implement management actions that would begin to move non-forested and forested vegetation toward its historic range and composition and to reestablish fire regimes near historical cycles to reduce the risk of wildfires.
- **Purpose:** Adjust dedicated old growth (DOG) areas and identify replacement old growth (ROG) and feeding areas as appropriate to meet habitat needs for old-growth dependent species.
  Need: In order to meet Forest Plan requirements, there is a need to adjust DOG boundaries and establish ROG and pileated woodpecker feeding areas.
- **Purpose:** Capture the economic value of those trees that are surplus to other resource needs on lands identified in the Forest Plan as suitable for harvest.
  Need: There is a need to provide raw materials to aid in community stability.

My proposed action consisted of a variety of vegetation activities including commercial harvest, precommercial thinning, landscape scale prescribed fire, aspen and cottonwood restoration, riparian habitat (spring) restoration, post and pole sales, juniper reduction and noxious weed control. My proposed action also included road closures, decommissioning, maintenance, reconstruction, and temporary road construction.

Environmental Impact Statement

I determined that proposed restoration actions and their effects could best be analyzed and disclosed to the public through an environmental impact statement (EIS). A Notice of Intent to prepare an EIS was published in the *Federal Register* on December 9, 1999. This was followed by release of the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) the week of February 27, 2001. The Notice of Availability for comment on the DEIS was published on March 9, 2001.

In response to concerns raised during the DEIS comment period, I decided to prepared a supplement to the DEIS. One principal concern prompted my decision:

- I concluded that additional analysis was needed for unresolved issues relating to social and economic impacts before a decision could be made.

A Notice of Intent to prepare an SDEIS was published in the *Federal Register* on August 16, 2001. A Notice of Availability was published in the Federal Register on November 9, 2001. The Supplemental Draft EIS (SDEIS) was published in November 2001. The final EIS (FEIS) and ROD were completed in July 2003.

Consultation with Tribes

Consultation with the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Burns Paiute Tribe occurred prior to and during my decision.

The inherently sovereign status of federally recognized Indian tribes requires that land managing agencies consult with tribes on a government-to-government basis over planned actions that may affect tribal interests. Some examples of tribal interests include: traditional cultural practices, sacred sites, cultural resource sites, certain plant and animal resources, and socio-economic opportunities. The Malheur National Forest Land and Resource Management Plan also directs the Forest to consult with tribes about the effects of projects planned within their areas of historic interest.

The northern segments of the Silvies Canyon project area are within the lands ceded to the federal government by the Confederated Tribes of the Warm Springs Reservation of Oregon in the Treaty with the Tribes of Middle Oregon, June 25, 1855. The entire project area is within areas of interest to the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Burns Paiute Tribe.

My decision is guided by the federal government's responsibility to these Tribes. The Forest Service has an obligation to manage National Forest resources in a manner that harmonizes the Federal trust responsibility to tribes and the statutory mission of the agency. This is one of several legal obligations that I considered as I made my decision, and consultation with the tribes provided me with valuable information in making that decision.

Particularly helpful was the information received from the Burns Paiute Tribe. The Burns Paiute Tribe has informed me that the project area is used for “hunting, fishing, gathering, and religious purposes,” and “every tribal family uses this region for cultural purposes” (Burns Paiute Tribe 2001). The importance for these practices to continue into the future for their culture cannot be overly stressed. I also understand that a portion of the Silvies Canyon Watershed was part of the original proposed Malheur Reservation. Because of these reasons, the lands included within the Silvies Canyon project area, the health of the vegetation, wildlife, water, geology, and soils, have been in the past, and remain today, integral to the life ways of members of the Burns Paiute Tribe.

The anticipated direct and indirect social effects to American Indians, especially the Burns Paiute Tribe are primarily due to changes in motorized access from road closures and decommissioning.

Issues

In response to my proposed action, the public and the Forest Service identified five significant issues. Significant issues were then used to develop alternatives to the Proposed Action. Issues include:

- **Access and Travel Management:** Roaded access provides for tribal, recreational, commercial and management activities. Road densities within the Silvies Canyon Watershed are exceeding Forest Plan standards in both winter and summer range for big game. Additionally, there are almost 33 miles of roads within RHCAs that cross or parallel several tributaries. Sixty-three miles of roads, identified as either previously closed, proposed to be closed under past environmental documents, historic closures, or those closures which have been breached, are contributing to road densities and impacts to watershed function.

- **Roadless Areas:** The National Roadless Area EIS was completed in November 2000, and a final rule at 36 CFR 294 published in the Federal Register (66 FR 3244) on January 12, 2001. Other roadless area direction was published as part of the final planning regulations 36 CFR 219 (65 FR 67514) on November 9, 2000. Recently, there has been interest expressed by environmental groups in designating the Myrtle-Silvies Roadless Area as wilderness.

- **Riparian Habitat, Water Quality, and Fish Habitat:** Myrtle Creek is listed on the final 1998 303(d) list for not meeting temperature standards set by the federal CWA. Current USDA Forest Service data indicate the Silvies River does not meet the temperature standard. The Silvies River may be listed in the future as a 303(d) stream for not meeting the temperature standard and both Myrtle Creek and the Silvies River may be listed in the future because current sediment loads exceed standards of the CWA administered by the State of Oregon.

  Quaking aspen and black cottonwood are special habitats that are isolated, declining, and smaller in number than they were historically. Over 80% of the aspen surveyed in the watershed are classified as over mature to decadent and at risk of loss. Black cottonwood occurs on only two sites in the watershed and is declining due to competition and lack of reproduction.

Many springs in the project area connect to the stream network and augment flows and influence water temperatures. Several springs also appear to be linked with roads and may be the result of intercepted subsurface flows brought to the surface by road cuts.

- **Vegetation Condition:** Many non-forested and forested stands in the watershed are outside Historical Range of Variation (HRV) in terms of composition, density and structure. The Silvies Canyon Watershed is within the low-severity fire regime where fire is frequent (every 5-23 years) and of low intensity (Maruoka and Agee 1994). Past timber harvest activities and effective fire suppression have changed the vegetation composition, density and structure, radically changing the landscape ecology of the fire regime. Wildfires are now infrequent but much more intense, resulting in almost total tree mortality.

- **Big Game Habitat:** Studies indicate that Rocky mountain elk and mule deer need a mixture of hiding and thermal cover as well as forage areas, calving/fawning and rearing areas. Forest Plan cover standards are specific to thermal cover. Harvesting timber could reduce thermal cover below Forest Plan standards. Hiding cover is important to reduce potential vulnerability to hunting and harassment but is not addressed in the Forest Plan. The habitat effectiveness index (HEI) model is used to analyze the arrangement and quality of cover and forage, and miles of open roads within the analysis area.

Twelve additional issues were considered in the assessment of effects, but were not used as the basis for alternative development as they were resolved in other ways (see FEIS, Chapter 1).

Alternatives Considered in Detail

Seven action alternatives and a no action alternative were analyzed in the FEIS. The seven action alternatives considered in the FEIS examine varying combinations and degrees of restoration activities and were developed to address the significant issues and the purpose and need. For additional details on these alternatives, see the FEIS Chapter 2.

No Action Alternative (Alternative 1)

The No Action alternative does not propose restoration activities within the project area. This alternative is the baseline against which the effects of all other alternatives are measured. Activities already planned for the project area, based on previous decisions, will be implemented as originally determined.

The Proposed Action (Alternative 2)

The proposed action would move about 29,000 acres of forested stands in the project area towards historic ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open road in the watershed would be reduced to 45% of current levels by closing and decommissioning. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

Alternative 3

This alternative was developed in response to an agreement made to analyze a non-harvest restoration alternative during an informal appeal resolution for the Crater Vegetation and Watershed Management Project EA and Decision Notice July 26, 1999, as well as comments made during the scoping process.

This proposal would move about 16,500 acres of forested stands in the project area towards historical ecosystem conditions with the use of noncommercial and precommercial activities. Stand compositions and densities of trees less than 9” dbh would move toward more resilient, historic levels. However, trees greater than 9” dbh would not be treated. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 41% of current levels by closing and decommissioning. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

Alternative 4

Alternative Four would move about 33,000 acres of forested stands in the project area toward historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 41% of current levels by closing and decommissioning. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

Alternative 5

This alternative would move about 24,500 acres of forested stands in the project area towards historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 25,311 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 74% of current levels. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

Alternative 6

This alternative was developed in response to management concerns over availability of appropriated funding. This proposal would move about 11,000 acres of forested stands in the project area towards historical ecosystem conditions with the use of noncommercial and precommercial activities. Stand compositions and densities of trees less than 9” dbh would move toward more resilient, historic levels. However, trees greater than 9” dbh would not be treated. In ponderosa pine stands, the goal of moving stand compositions and densities of smaller diameter trees (less than 9 inches dbh) toward more resilient, historic levels would be attempted with the use of prescribed fire. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 36,454 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 61% of current levels by closing and decommissioning. Roads not closed that are identified as contributing sediment to streams would be reconstructed. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

The Preferred Alternative (Alternative 7)

The Preferred Alternative would move about 33,000 acres of forested stands in the project area toward historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Aspen, cottonwood and riparian (spring) habitat restoration activities are proposed as well as manual treatment of 12 noxious weed sites. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 61% of current levels. Eighty-seven miles would be closed or decommissioned. Roads not closed that are identified as contributing sediment to streams would be reconstructed. Reconfiguration and precommercial treatments are planned in Dedicated Old Growth. Designation and treatments of Replacement Old Growth are also proposed.

Alternative 7a

Alternative 7a was developed in response to comments made on the DEIS. Generally, public comments were opposed to any activities within the Myrtle-Silvies Roadless Area. Alternative 7a proposes the same activities as the Preferred Alternative, except it has no activities within the Myrtle-Silvies Roadless Area.

Decision and Rationale

It is my decision to select the Preferred Alternative (Alternative 7) as the Forest Service restoration plan for the Silvies Canyon Watershed Restoration Project area with modifications. I have decided to modify Alternative 7 in response to public comments. Modifications will reduce adverse impacts to northern goshawks and big game cover. I have made the following modifications:

- Alternative 7 proposed commercial thinning in goshawk nest stands; I have elected to not treat about 55 acres of goshawk nest stands and treat about 155 acres with precommercial thinning (Refer to Goshawk and Bald Eagle Changes, Schwenke, July 11, 2003).

- Alternative 7 proposed commercial and precommercial thinning in goshawk post-fledging areas (PFAs); I have elected to modify commercial treatment prescriptions on about 325 acres in PFAs, eliminate commercial treatments but still implement precommercial thinning on about 390 acres, and eliminate both commercial and precommercial treatments on about 105 acres. About 690 acres in PFAs will be treated as originally planned under Alternative 7 (Refer to Goshawk and

Bald Eagle Changes, Schwenke, July 11, 2003).

- I have decided that treatment of 144 acres in the Bald Eagle Management Area (BEMA) will be done through precommercial thinning to match the activities described in consultation with the USFWS and concurred with by the USFWS in their September 26, 2001 letter (FEIS Appendix C). Seven acres of goshawk nest stand that overlap with the BEMA will be precommercially thinned rather than commercially thinned. Because this treatment has already been consulted on with USFWS, there is no need for further consultation.

These modified treatments will maintain canopy cover necessary for northern goshawks and will meet the intent of the Malheur Forest Plan, as amended by the Regional Forester's Forest Plan Amendment #2. The effects of these modifications to Goshawk and Big Game Habitat are discussed on pages R-10 and 11. These changes are within the range of effects discussed in the FEIS Chapter 4.

During the decision process for this project, I realized that I would not be able to fully satisfy all public concerns, as many of them are mutually exclusive. I have selected an alternative that is ecologically sound, both for the short and long term. It also includes a practical restoration approach that reflects sensitivity to conflicting public concerns. In making this decision, I considered and balanced numerous factors:

Access and Travel Management

Road management, whether it includes construction, reconstruction, decommissioning, or closure, is highly controversial, with much passion on all sides.

In deciding how to manage the road system for the future, I had to consider the concerns of a variety of users. I wanted to maintain a road system that will permit adequate access to the area in the future, both for resource management and for recreational enjoyment of the area. I must also reduce the miles of road within the project area and reduce the watershed impacts from remaining roads if I am to adequately protect and improve fish habitat and facilitate hydrologic recovery of the watershed.

The selected alternative will change access from motorized to non-motorized on approximately 87 miles of road. This has the potential to impact the Burns Paiute Tribes ability to participate in traditional cultural practices especially since many elders are not capable of long walks to procure needed plants (Jerofke 2001). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

An additional consideration is that, through commercial harvest sales, I can close roads using funds generated by the sales, thus reducing the amount of other, unidentified funds needed to do this work. It is my objective to close as many of the 87 miles of existing roads as possible through timber sale contracts.

I have determined that 3.5 miles of temporary roads must be built. All temporary roads will be closed or decommissioned when restoration activities are completed.

When evaluated on a watershed scale, all action alternatives would meet summer and winter range road density requirements from the Forest Plan.

I considered several alternatives for dealing with road related issues. I did not select the No Action alternative because I believe it would not be appropriate to forego the opportunity for restoration through the Silvies Canyon Watershed Restoration Project. If I selected the No Action alternative, existing watershed problems would not be rehabilitated unless a future opportunity to correct them arose.

I did not select Alternatives 2, 3 or 4 because I believe that they would not retain an adequate travel system for public and administrative access in the project area. I did not select Alternative 5 because I believe that it would not close or decommission enough roads to benefit wildlife habitat and the watershed condition in the project area. Alternatives 6 and 7A would manage open roads at the same level as Alternative 7.

Roadless Areas

How roadless areas are managed remains controversial to many people. In considering what restoration activities were appropriate within the roadless area, I weighed a number of factors: 1) the need to reduce fuel loadings and thus the risk of future wildfires; 2) potential effects to roadless character, including naturalness and opportunities for solitude; and 3) achievement of objectives from the Malheur Forest Plan.

I considered two alternatives (No Action and Alternative 7a) that did not include activities within the Myrtle-Silvies Roadless Area. I did not select these alternatives because I have determined the treatments in the potential bald eagle roost areas are essential for sustaining eagle habitat. Additionally, fuels treatments in the Silvies River portion are essential for continuing the fuels reduction program already in progress in that area. I believe the long term benefits of activities in the roadless area far outweigh the short-term negative impacts on recreationists (FEIS Chapter 4). All activities in the Roadless Area proposed in the other Action Alternatives including the selected alternative are consistent with the direction for Roadless Area Protection published in the *Federal Register* on January 12, 2001 (66 FR 3244) (FEIS pg. 1-24).

Riparian Habitat, Water Quality, and Fish Habitat

Myrtle Creek, Stancliffe Creek and the Silvies River have been monitored for water temperature and all have exceeded the maximum water temperature standards established by ODEQ at least once during the period of 1995-1999. To date, Myrtle Creek is listed on the 303(d) list for not meeting temperature standards (FEIS Chapter 3).

I did not select the No Action alternative because it would allow stand densities within the watershed to continue to increase influencing water yield and timing of stream flows. Low water flows would likely continue as juniper and other conifer species increase across the landscape. This is a result of increased transpiration and decreased water available for soil storage, spring recharge, and downstream water yield. As fuel levels and stand densities increase, so do the chance for stand replacement fires. An intense wildfire can adversely modify soil conditions, water quality, water quantity and fish populations in the watershed and downstream areas, leading to increased cumulative watershed effects and diminishing watershed health.

With implementation of any of the action alternatives, stream temperatures are not expected to increase because riparian buffers following INFISH standards and guidelines will be applied. INFISH stream buffers will keep harvest units and related skid trails far enough away from streams so potential sediment from these sources will not negatively impact streams (FEIS chapter 4).

No significant impacts are expected from the commercial harvesting of timber due to the implementation of design features, BMPs, INFISH RHCA buffers and monitoring (FEIS chapter 4).

Based on these factors I chose Alternative 7 as modified, over the other action alternatives, because it was no more likely to exacerbate cumulative watershed effects because of design features, mitigation, and monitoring.

Vegetation Condition

The vegetation patterns in the project area are largely a product of human intervention, which include fire suppression, timber harvesting, livestock grazing, fuels management, and road construction. Regardless of the forest type, most stands are generally overstocked and susceptible to insect and diseases (FEIS Chapter 3).

Historical Range of Variability (HRV) was used to compare historical (approximately 1860 to 1900) and current conditions on forest structural stages. Current conditions show:

1. A decrease in non-forested acres and a subsequent increase in the Dry Forest, Hot Dry plant association group. Current conditions display a significant decrease in non-forested acres (27-50%) and resulting increase in the Dry Forest, Hot Dry plant association group (33-35%) in the Stancliffe subwatershed alone.
2. A decrease in large trees stands (0-63% in Hot Dry plant association group and 10-53% in Warm Dry plant association group) compared to historic numbers.
3. An increase in the number of small tree stands (10-65% in Hot Dry plant association group and 14-39% in Warm Dry plant association group) compared to historic numbers (FEIS pg. 3-31).

I based my decision on these conditions. I concluded that active restoration, including commercial harvesting, is an appropriate course of action in this watershed. I realize the one activity that is more controversial than road management activities is commercial harvesting of timber. In weighing my decision, I considered both the vegetation condition (species, amount, size, and arrangement) and habitat for wildlife.

I considered several alternatives for dealing with vegetation issues. I did not select the No Action alternative because I believe it would not be appropriate to forego the opportunity for vegetation restoration through this project. If I selected the No Action alternative, existing vegetation conditions would not be corrected unless a future opportunity to correct them arose.

I did not select Alternatives 3 or 6 because they did not treat vegetation of all sizes (0-21 inches diameter at breast height (dbh)). In order to adequately treat vegetation we should not ignore trees over 7 or 8 inches dbh. I did not select Alternatives 2, 5 or 7a because they did not take advantage of the opportunity to treat an adequate number of acres to make a difference on the landscape. Alternative 4 would manage vegetation at the same level as Alternative 7.

I understand my decision to treat vegetation will have short-term negative effects on big game habitat and goshawk. These effects are described in latter sections of the ROD.

Natural Fuels

There are unnaturally high fuel loads across the project area, largely due to our past fire suppression efforts. Historically, hot-dry/warm-dry and cool-moist biophysical environments experienced low to moderate severity underburns. Absent a source of ignition, high fuel loads would not be a problem. However, from 1959 to 1999, the Silvies Canyon project area has incurred an average of 4.8 fires per year.

Based on these conditions, I concluded that active restoration is an appropriate course of action. In weighing this decision, I considered both fuel characteristics (amount, size, arrangement, continuity, and moisture content) and the likelihood of ignition.

Eventually, I would like to reduce fuel loadings to the point where fire can be returned to its natural role, particularly within the hot-dry and warm-dry biophysical environments. This would require that fuel loads be low enough to allow fire to burn through stands without severely damaging them. However, it is likely to be several decades before those reduced fuel loadings can be achieved.

I considered several alternatives for dealing with fuels issues. I did not select the No Action alternative because I believe it would not be appropriate to forego the opportunity for fuel reductions through this project. If I selected the No Action alternative, existing fuel levels would not be corrected unless a future opportunity to correct them arose.

The action alternatives treat fuel conditions similarly; the significant differences in the alternatives are that some reduce fuel levels through commercial means and some do not. I have concluded that commercial harvesting is an appropriate course of action in this watershed. Therefore I did not select Alternatives 3 or 6 because they did not treat vegetation of all sizes (0-21 inches diameter at breast height (dbh)). In order to adequately treat fuel levels we should not ignore trees over 7 or 8 inches dbh. I did not select Alternatives 2, 5 or 7a because they did not treat enough acres to make a difference in the fuel condition across the landscape. Alternative 4 would manage fuels at the same level as Alternative 7.

Big Game Habitat

Modified treatments in goshawk nest stands and PFAs, and in the Bald Eagle Management Area (as described in the section titled “Decision and Rationale” on page 6) will retain an additional 692 acres of marginal cover and 34 acres of satisfactory cover previously planned for short-term reduction to non-cover. These modified treatments will retain an additional 5% of existing cover across the watershed.

While all subwatersheds will have some level of cover retention, cover retention will occur mostly in the southern 2/3 of the project area. These modifications reduce the consequences to big game when compared to those effects displayed under Alternative 7 cover and habitat effectiveness index (HEI) in the FEIS, Chapter 4. Modified treatments will leave more cover that will slightly increase components of HEI, which could, in turn, increase HEI values. While modified treatments could improve HEI values slightly, the effect on elk will be minor, is not expected to be measurable, and will not meet Forest Plan standards. Nevertheless, HEI values will not be reduced as much in Alternative 7.

Although the Selected Alternative will have short-term negative impacts on big game habitat, I have determined the future benefits will outweigh the immediate impacts. Big game habitat quality will not be substantially degraded lower than the current condition. Although thermal cover will be reduced, in most subwatersheds HEI values will slightly improve over the current condition. Proposed activities, such as thinning, prescribed burning, and road closures / decommissions will have positive effects in developing and maintaining habitat components such as cover (both thermal and hiding) and forage quality. Riparian restoration activities will improve calving and fawning habitat. Ultimately, activities that will result in improved watershed sustainability and reduced risk of stand replacing events will ensure that habitat for big game is maintained in the project area in the long-term.

I also considered the historical amounts of cover that existed in the project area. Crown closure can be modeled from historical data sets recorded by Thornton Munger (1917) and Erickson and Conover (1918) from stands in Eastern Oregon. Modeling shows that historical crown closure varied from 15% to 46%. Only 2 of the 9 data sets had crown closure over 40%, which is considered marginal cover. None of the 9 data sets met current satisfactory cover standards. Two of the 9 data sets had crown cover fewer than 20%.

Aerial photos taken in the summer of 1949 in the project area show stands that are currently proposed for commercial treatment as non-forested areas. In fact areas that are now Dedicated Old Growth (DOGs) show up as two distinct stands of timber in the 1949 photos and between the stands it appears to be non-forested. Aerial photos taken in 1989 show this area as one large stand.

All of these factors combine to display the need for reducing crown closure below Forest Plan Standards but moving them towards HRV.

Goshawk

In the areas where treatments were modified or eliminated, the Selected Alternative will provide habitat in the short-term that meets the needs of nesting and fledgling goshawks. About 690 acres within PFAs will have commercial thinning completed as proposed in Alternative 7, allowing these stands to develop into areas with larger, more resilient trees that may be more capable of providing sustainable goshawk habitat in the future. Implementing modified treatments in PFAs allows us to provide a balance between providing short-term and long-term habitat for goshawks. Precommercial thinning will reduce understory canopy cover but is not expected to measurably reduce overstory canopy cover. Since overstory canopy will remain at or near existing levels, goshawks will benefit from precommercial thinning; this treatment will maintain goshawk prey densities, enhance goshawk hunting success, and reduce hazardous fuels as described in Chapter 4 of the FEIS.

Modified prescriptions applied to goshawk nest stands will meet the short-term needs of nesting goshawks in all nest stands. Modified prescriptions applied to goshawk PFAs will meet the short-term needs of goshawks in all PFAs except Ranger Spring. Canopy cover in PFAs will be completely retained (Myrtle Creek) or retained in adequate amounts (HJ Spring, Van Zandt, Bellows Spring, FL Spring, Crane Creek, South Fawn) to meet the needs of fledgling goshawks; therefore, no detrimental short-term effects to goshawk are anticipated in these PFAs.

In the Ranger Spring PFA, 137 acres of treatment will be modified from commercial thin to precommercial thin to match activities described in consultation with the USFWS about bald eagles. This will benefit goshawks in this PFA in the short term by retaining existing canopy cover on these acres. Commercial harvest of other acreage in this PFA will reduce the amount of habitat providing quality fledgling canopy cover to below Reynolds et al.'s (1992) recommendations, but the commercial harvest units in the Ranger Spring PFA are being proposed to enhance bald eagle nesting habitat. Modified commercial harvest in the PFA will benefit bald eagles, but reduce the quality of goshawk habitat. Much of the younger forest (117 acres) in the Ranger Spring PFA will retain its canopy cover because of modified treatment, providing additional, though likely lower-quality, fledging habitat; this change in treatment should reduce the potential for short-term negative effects to goshawks in the Ranger Spring PFA.

While retaining canopy cover in nest stands and PFA stands with modified prescriptions retains habitat for goshawk in the short-term, it can also lead to the loss of large live trees, canopy cover, and other habitat elements important to goshawk in the long-term. Competition for water and sunlight will continue; forests will continue to provide goshawk nesting, foraging, and fledging habitat, but will tend to degrade over the foreseeable future until habitat characteristics may be lost to a stand-replacing event.

Most of the multi-storied stands in the nest cores are identified as moderate to high risk for stocking-induced mortality and related outbreaks of pests or disease. The proposed precommercial thinning treatments will begin to move stand structure in the area toward historic conditions, and contribute to restoring ecological balance to forest habitat in the project area.

Without further treatment, insects and disease may kill large overstory trees in nest stands, and some stands may fall out of old growth classification (Vegetation Specialist's Report). A reduction in large trees will reduce habitat suitability. Canopy cover may or may not be available depending on insect infestations. Over time, and without further treatment, these stands could become ineffective as nesting or fledging habitat.

Trees in younger nest stands (Van Zandt and South Fawn) will likely continue to grow and provide nesting habitat, though growth may be slow due to high tree densities. Potential for insect outbreaks, which could result in removal of canopy cover, will continue to increase.

I have considered the trade-offs involved in modifying treatments in goshawk habitat. Deferred and reduced treatments in goshawk habitat provides short-term habitat to maintain goshawk in the project area, while PFAs that are treated as originally described in Alternative 7, will provide long-term sustainable habitat for goshawk. Many other treated areas outside goshawk nest stands and PFAs may also develop characteristics that provide quality goshawk habitat. As treated stands develop, stands previously deferred could be treated so that the area can provide adequate goshawk habitat on a continuous basis.

Noxious Weed Control

All alternatives except the No Action alternative propose to manually treat twelve noxious weed sites. In addition, 65 sites will be manually treated as approved in a previous decision. The effects would be identical between Alternatives; manual treatments will result in limited reduction of size and potential spread of known weed sites, but these treatments are unlikely to lead to eradication of noxious weeds in the project area.

Economics

The economics of the alternatives are important for several reasons. First, if fuel reductions cannot be accomplished through economically viable timber sales, there is no practical way to meet long-term resource objectives, such as reducing fuel levels. Second, providing viable timber sales is important to the local community, both in terms of providing job opportunities and personal income. While I recognize the importance of economic considerations, and in particular the importance of forestry and forest products in the local economy, meeting this need was one of many factors I considered in the design and selection of the modified Alternative 7.

The No Action alternative does not meet the purpose and need to provide economic benefits to local communities so I did not find it to be an acceptable alternative (FEIS, page 2-2). Alternatives 4, 7 and 7A would provide the highest level of jobs and personal income. Alternatives 2 and 5 would provide a somewhat lower level of jobs and personal income. Alternatives 3 and 6 would provide the lowest level of jobs and personal income of any action alternative, and would not meet the purpose and need to capture the economic value of those trees that are surplus to other resource needs on lands identified in the Forest Plan as suitable for harvest, and to provide raw materials to aid in community stability.

In initiating ecosystem restoration in the Silvies Canyon Watershed, I view timber sales principally as a means of achieving resource objectives—in this case, reducing excess fuels, moving towards HRV, and helping provide a practical way to meet the area's transportation system objectives. A number of aspects of my decision to implement the modified Alternative 7 reflect this viewpoint: closing or decommissioning 87 miles of roads, choosing precommercial over commercial thinning in goshawk habitat to protect necessary cover, choosing precommercial over commercial thinning in the BEMA to protect bald eagle nesting habitat, as well as requiring numerous design criteria and mitigation measures (FEIS pg. 2-33) to reduce short term impacts from commercial harvesting. These components of the Selected Alternative all tended to reduce the harvest volume and value of the timber sales (and thus their economic contribution), but they are also components that I believe will add substantially to the success of the recovery effort. The Selected Alternative reduces the amount of timber harvest and thus economics. The economics of the Selected Alternative more closely matches those analyzed under the Proposed Action and therefore are within the range of effects discussed in the FEIS, Chapter 4.

Livestock Grazing

Livestock grazing was not directly addressed in the Silvies Canyon Watershed Restoration Project; changes to existing permitted livestock grazing were considered outside the scope of the project (FEIS pg. 1-27). I realize livestock grazing on National Forest lands is a controversial subject, however I chose not to include this action pursuant to 40 CFR 1502.4 (c)(2). Livestock grazing will be addressed as part of NEPA for allotment management plans, which are tentatively, scheduled for Silvies, Big Sagehen, Crooked Creek and Scotty allotments in 2005 (FEIS pg. 1-27). The effects of current and ongoing livestock grazing were considered in the cumulative effects section of the FEIS (Chapter 4).

Cumulative Effects from Ongoing Activities and the Selected Alternative

Current and ongoing uses in and around the project area include permitted livestock grazing, recreation (including hunting, fishing, gathering of forest products, hiking, on- and off-road vehicle use, and camping), and firewood gathering. Recently completed environmental decisions approved closure and/or decommissioning of 63 miles of open road and manual treatment of 65 noxious weed sites. Foreseeable future actions include ongoing road maintenance, road closures, removals and/or replacements of culverts, increasing recreation levels, and additional vegetation and fuels treatments in 25-30 years following the completion of this project. In the event of stand-replacing wildfire or insect/disease outbreak, it is likely that restoration projects, including timber salvage and reforestation would occur after appropriate NEPA is completed. Implementation of this project is not expected to contribute to adverse cumulative effects in the project area. Beneficial cumulative effects include increased health and sustainability of the watershed, improved water quality in the long-term, reduction of noxious weed populations, maintenance and/or improvement of wildlife habitat, and maintenance and/or improvement of public experience in the watershed.

Consultation/Conferencing with USFWS and NMFS

Consultation with USFWS was initiated on activities proposed in Alternative 2 (the Proposed Action) and their effects on bald eagles. It was determined through analysis that the Proposed Action May Affect but is not likely to Adversely Affect bald eagles. USFWS issued a letter of concurrence with these findings on September 26, 2001; this letter is included in the FEIS (Appendix C) and is in the project file.

I have modified the Selected Alternative (Alternative 7) so that it matches the activities in the Proposed Action in the Bald Eagle Management Area; effects to bald eagles will be the same as in the Proposed Action. Additionally, there were No Effects to any other Threatened or Endangered species. Therefore, no additional consultation is necessary.

Legal Requirements and Policy

In reviewing the FEIS and actions involved in Alternative 7, I have concluded that my decision is consistent with the following laws and requirements:

The Preservation of American Antiquities Act, June 1906

The Selected Alternative will have no effect on heritage resources, due to design criteria and mitigation measures. New sites discovered during operations will be protected by provisions in the timber sale contract.

The National Historic Preservation Act

Prior to project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995, pursuant to the stipulated Forest

Archeologist review dated November 15, 1996.

The National Environmental Policy Act (NEPA), 1969

NEPA establishes the format and content requirements of environmental analysis and documentation, such as the Silvies Canyon Project area. The entire process of preparing an environmental impact statement was undertaken to comply with NEPA.

The Endangered Species Act of 1973, as amended

A biological assessment has been prepared to document possible effects of proposed activities on endangered and threatened species in the Silvies Canyon Project area. Appropriate coordination, conferencing, and consultation with USFWS and NMFS have been completed.

The National Forest Management Act (NFMA), 1976

All alternatives were developed to be in full compliance with NFMA.

Clean Air Act Amendments, 1977

The Selected Alternative is designed to meet the National Ambient Air Quality standards through avoidance of practices that degrade air quality below health and visibility standards. The Oregon State Implementation Plan and the Oregon State Smoke Management Plan will be followed to maintain air quality.

The Clean Water Act, 1982

The Selected Alternative will meet and conform to the Clean Water Act as amended in 1982. This act establishes a non-degradation policy for all federally proposed projects. The Selected Alternative meets anti-degradation standards agreed to by the State of Oregon and the Forest Service, Region 6, in a Memorandum of Understanding (Forest Service Manual 1561.5). This will be accomplished through planning, application, and monitoring of Best Management Practices (BMPs). Site-specific BMPs have been designed to protect beneficial uses.

Satisfaction of State Forest Worker Safety Codes

The Oregon Occupational Safety and Health Code for Forest Activities (OAR 437, Division 6) regulations will be met when the Selected Alternative is implemented.

Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income populations. In this assessment, elderly people, especially those on low-incomes that are fixed, were also identified with potential to be impacted by various alternatives. There is no quantifiable information on how much use the area receives from these populations other than the information shared by the Burns Paiute Tribe. None of the alternatives would prevent continuation of these traditional practices. The anticipated direct and indirect social effects to these populations are primarily due to change of motorized access from road closures and decommissions proposed in the action alternatives. This change from road to non-road access will have its greatest effect on the young, elderly, and disabled. Those with other forms of non-motorized transportation – horses, off-highway vehicles, mountain bicycles, et cetera – will be less affected than those without these opportunities. The action alternatives change access on approximately 37 miles of road (Alternative 5), 87 miles of road (Alternatives 6, 7 & 7a), 143 miles of road (Alternative 2), and 160 miles of road (Alternatives 3 & 4). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

Other Policy or Guiding Documentation

A Biological Evaluation was prepared to assess potential effects to sensitive species as identified by the Regional Forester. This evaluation determined that while there may be impacts to individual sensitive species, those effects are not likely to contribute to a trend towards federal listing or loss of viability of the population or species.

The Malheur National Forest Land and Resource Management Plan, as amended, provided the framework for the development of all the alternatives.

I have reviewed the scientific assessment from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) and have incorporated principles from it.

Public Participation

The NEPA scoping process (40 CFR 1501.7) was used to invite public participation, to refine the scope of this project, and to identify preliminary issues to be addressed. The Forest Service sought information, comments, and assistance from Federal, State, and local agencies, the tribes, and other groups and individuals interested in or affected by the Proposed Action. The scoping period lasted 30 days.

The Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) was distributed for comment to the tribes, the public, and other organizations and agencies in March 2001. In response to the DEIS, 18 comment letters were received (FEIS, Chapter 1).

Unresolved issues that remained after comments on the DEIS were received, prompted me to initiate a supplemental DEIS. An SDEIS was distributed for comment to the tribes, the public, and other organizations and agencies in November 2001. In response to the SDEIS, 9 comment letters were received (FEIS, Chapter 1). Responses to these comments are found in Appendix D of the FEIS.

The public was provided numerous opportunities to participate in the Silvies Canyon Watershed Restoration Project. For additional discussion and details, refer to the FEIS Chapter 1.

The Environmentally Preferable Alternative

Under the National Environmental Policy Act, the agency is required to identify the environmentally preferred alternative (40 CFR 1505.2(b)). This is interpreted to mean the alternative that would cause the least damage to the biological and physical components of the environment, and, which best protects, preserves, and enhances historic, cultural, and natural resources (Council on Environmental Quality, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 FR 18026). Factors considered in identifying this alternative include: (1) fulfilling the responsibility of this generation as trustee of the environment for future generations,

(2) providing for a productive and aesthetically pleasing environment, (3) attaining the widest range of beneficial uses of the environment without degradation, (4) preserving important natural components of the environment, including biodiversity, (5) balancing population needs and resource use, and (6) enhancing the quality of renewable resources.

In the case of the Silvies Canyon Project area, I have determined that the environmentally preferable alternative is Alternative 4. Alternative 4 would close or decommission 306 roads for a total of 143 miles, thereby reducing the negative effects of roads to wildlife and the watershed more than any other Alternative. In the long term, Alternative 4 combines the best restoration activities with the lowest risk of additional watershed damage by closing and decommissioning the most roads, correcting other known sediment sources, moving the most acres of vegetation and fuel levels towards more sustainable levels (HRV), establishing and protecting riparian vegetation such as aspen and cottonwood, and minimizing sediment risk from commercial harvest activities through design criteria and mitigation measures. Forest health, risk of stand-replacing events, and long-term sustainability would be improved over the most acreage.

If I were only concerned with the short term, I would have chosen Alternative 3 as the Environmentally Preferred. However I must take into account long-term sustainability of vegetation, risk of stand-replacing events, and their effects to the environment. I did not chose Alternatives 7 and 7A as the environmentally preferred because they do not close or decommission as many roads as Alternative 4. Alternatives 2 and 5 are not environmentally preferable because of their lower level of road closures and decommissioning, and reduced levels of vegetation treatments. The No Action alternative is not environmentally preferable because it does not allow for additional road closures and decommissions, nor does it correct existing road-related sediment sources, or move vegetation towards sustainable levels (HRV), or protect aspen and cottonwood, and it does not lower the risk of a future stand replacement fire.

Design Features and Mitigation Measures

Design features and mitigation measures are site-specific management activities designed to reduce the adverse impacts of timber harvest and associated activities. Design features and mitigation measures will be applied to project design and layout, in timber sale contracts, and permit requirements. Design features and mitigation measures will be implemented through project design, contract specifications, contract administration, and monitoring by Forest Service officers.

As part of my decision, I am choosing to implement the design features and mitigation measures identified in the FEIS Chapter 2. I am confident that selected measures will adequately minimize significant adverse effects for the following reasons: the selected design features and mitigation measures are practices we have used successfully in the past; they are State-recognized best management practices for protecting water quality; or they are based on current research. I have decided to monitor the implementation of these measures and, in some instances, to monitor their effectiveness, as described in the following section.

Monitoring

Resource monitoring will be implemented with the selected alternative. The objectives are to determine if management activities are moving resources toward desired management objectives. In addition to any monitoring requirements that may apply from the Malheur National Forest Monitoring Plan, monitoring activities will include the following:

- Post treatment soil monitoring will be conducted in stands that are expected to have detrimental soil impacts at or above 20%.
- Post-treatment snag and down wood surveys will be conducted as needed to determine the need to create additional snags and down wood. Treatment activities may increase or decrease snag and down wood densities. These surveys will be necessary to determine what action, if any, is needed to move the project area toward Forest Plan standard levels for snags and down logs.
- Roads that have been closed or decommissioned will be monitored over a five-year period to inspect the effectiveness of the closure or decommissioning and hydrologic function of the remaining roadway. If monitoring determines the closure or decommissioning is not effective, it will be corrected to meet objectives.
- Noxious weeds will be monitored for changes in populations. Annual monitoring of landings will continue for a minimum of four years following activity.
- Monitoring of fuels treatment areas will occur pre-treatment, during treatment, and for five years post-treatment, as follows. Prior to implementation of the project, fuel loading information will be gathered by the use of photo series books. Fuels personnel will monitor during implementation of mechanical slash treatment and prescribed fire treatments to assure adequate reduction of fuel loadings and ladder fuels. Fuels personnel will also monitor after the fuels treatments have been accomplished to determine if fuel loadings have been moved towards historic levels.
- Stream temperature, sediment monitoring and fish surveys will continue at established sites.
- Aspen protection measures (4-foot and 8-foot fences, and cages) for protection of regeneration will be monitored for effectiveness.
- Post-harvest monitoring of active goshawk nest sites will be accomplished to determine how nesting territories are affected.
- Post-harvest canopy cover monitoring will occur in 5% of commercially treated acres in goshawk post-fledging areas to determine if remaining cover provides recommended canopy closure for fledgling goshawks. Methods of cover analysis may range from satellite imagery analysis to field surveys with a densiometer.
- Prior to any treatments, surveys will be conducted for nesting gray flycatchers and sage grouse in sagebrush / juniper habitats that have activities planned during the springtime.
- Monitoring of raptor nests will occur when treatments are proposed in buffer zones during raptor nesting season. Known raptor nests, and those discovered during implementation, will be monitored prior to treatment to determine whether nests are active, and therefore will determine if treatments can occur during the proposed time frame. If nests are determined active, treatments will

be prohibited until after nesting season.
- The condition of grazing allotment fences and trails will be monitored during prescribed burning, precommercial thinning, and timber activities to identify damage or destruction of fences and trails.
- Range Forest Officer in Charge and grazing permittees will monitor livestock distribution and location during commercial operations.
- The four springs that will have water developments for livestock will be monitored to assure that spring dewatering does not take place during periods of livestock use.
- Pastures will be monitored annually following prescribed burning activities to determine the amount of area burned and intensity of burn.
- Stands identified for treatment will be monitored following marking to ensure that they comply with the marking instructions.
- Sale administrators will monitor timber harvest to ensure that harvest activities comply with all design criteria and mitigation measures.
- Following commercial treatment, a silviculturist will monitor the resulting stand conditions to determine if treatment objectives were met, and to determine if secondary treatments are still necessary or need to be modified.
- Following secondary and tertiary treatments, a silviculturist will monitor the resulting stand conditions to determine if treatment objectives were met, and to determine if any additional treatments are necessary.
- Where precommercial thinning is to be the primary treatment, a Contracting Officer's Representative will monitor the treatments. Following precommercial treatment, a stand exam will be done to ensure that objectives were met.
- Prior to layout and marking of commercial harvest units, layout and implementation of thinning units, piling and burning activities, road closure, decommissioning and temporary road construction, burning preparation, layout of fence lines, an archaeologist would monitor to ensure cultural resource sites are protected.
- The archaeologist would monitor any over-snow logging operations. Over-snow operations during which logging over sites may be approved, must be conducted within an environment of active and continuous consultation with the Oregon State Historic Preservation Office (SHPO), by the archaeologist.
- Known sensitive plant sites will be monitored for changes in populations.

Forest Plan Consistency

While I believe Alternative 7 to be consistent with long term management objectives discussed in the Malheur National Forest Plan as amended, there are two aspects of Alternative 7 that are inconsistent with the existing standards and guidelines. In order to permit prompt and necessary vegetation activities, I have decided to amend two Forest Plan standards for this specific project:

1) Reduction of big game cover, habitat effectiveness index (HEI), and components of HEI below Forest Plan standards or further reduction of existing conditions that currently do not meet standards.
2) Adjustment of Dedicated Old Growth (DOG) and establishment of

Replacement Old Growth (ROG) boundaries.

Non-Significant Forest Plan Amendment #55

The purpose of this non-significant amendment is to allow for short-term management activities that are not consistent with current Forest Plan direction to lead to long-term resource benefits.

Big Game Cover

My decision will cause big game cover, Habitat Effectiveness Index (HEI), and components of HEI to be below Forest Plan Standards and Guidelines. In some instances, the current conditions do not meet Forest Plan Standards and Guidelines and the commercial thinning I am proposing will reduce them further. Total Cover in summer range will be below standards and guidelines in all subwatersheds. Satisfactory Cover and Total Cover in winter range will be below standards and guidelines in the Boulder/Fawn and Sage Hen Creek subwatersheds. The Habitat Effectiveness, Spacing (HEs), component will be below standards and guidelines in Myrtle and Stancliffe creek subwatersheds. The reduction of HEs will cause the HEI to be below standards and guidelines in Myrtle and Stancliffe creek subwatersheds (FEIS Chapter 4).

The areas I have selected for commercial thinning treatments are areas where high tree densities are increasing their risk to stand replacement fire events and insect outbreak. I have elected to treat these areas now because if I don’t, cover is expected to be reduced in quantity and quality in the foreseeable future due to the increased risk of stand replacement fire and insect defoliation and tree mortality. An insect outbreak or stand replacement fire will reduce the ability of the stand to function as cover and will not leave adequate stocking to recover this loss in an acceptable time frame. In order to produce more sustainable cover in the long term I am proposing to treat these stands now while we have adequate stocking to work with. The canopy cover that will develop is expected to be more sustainable because it will be provided by fewer, but larger and healthier trees that are more adapted to site conditions than those there presently.

DOG/ROG Boundaries

My decision will adjust the existing boundaries of DOG 02011, 02012, 02015, 02016, 02017, and 02039 to better align their boundaries to existing GIS vegetation polygon layers and/or logical breaks such as vegetative changes or roads. These changes will better define the DOG boundaries and ease their identification on the ground. These adjustments will decrease the total acres of DOGs in the planning area by 38 acres, see table 4-32 in the FEIS. This reduction is mainly due to a reallocation of 75 acres in DOG 02017 to ROG 02017. The 75 acres are young forest and do not meet management direction for suitable DOG habitat. Moving the 75 acres into a ROG provides me the opportunity to implement activities to move this stand to future old growth forest stand structure (see FEIS Chapter 4).

I am also designating Replacement Old Growth areas for each of the DOGs listed above as directed by Standard 5 for Management Area 13 (MA 13). This will add 1,146 acres to MA 13 (FEIS Chapter 4). These areas are designated to counter possible catastrophic damage or deterioration of the DOGs.

Determination that the Forest Plan Amendment is Not Significant under NFMA

I have determined that this amendment is not a significant amendment under the national Forest Management Act implementing regulations [36 CFR 219.10(f)]. In reaching this conclusion, I considered the following factors from Forest Service Handbook (FSH) 1909.12:

Timing

A change is less likely to result in a significant plan amendment if the change is likely to take place after the plan period (the first decade). The proposed changes are taking place after the first decade of the current 1990 plan; but will be enacted before the next scheduled revision. The next scheduled revision for the Malheur National Forest is to begin in 2004 with an anticipated completion date of 2008. Therefore, the timing of the two changes in this amendment is not significant because of how late the changes are occurring under the current Forest Plan.

Location and Size

The smaller the area affected, the less likely the change is to be a significant change to the Forest Plan.

Although cover will be affected on approximately 50% of the summer range and 22% of the winter range for about 20 years, proposed vegetative treatments will create more sustainable cover in the long term. After about 20 years marginal cover is expected to develop in the younger stands while older stands will mostly remain below 40% canopy cover. The canopy cover that does redevelop is expected to be more sustainable because it will be provided by fewer, but larger and healthier trees that are more adapted to site conditions than those there presently. Since prescribed vegetative treatments will benefit cover in the long term the amendment is not significant.

This amendment will reduce DOG by 38 acres, establish about 1,146 acres of new ROG areas (this includes about 75 acres of DOG 02017 reallocated as ROG); resulting in a total addition of 1,108 acres to MA 13. The Silvies watershed area encompasses 81,000 acres; the total acreage change of 1,108 acres is about 1 percent of the total watershed area. Since their location remains within the project area and their size change (about 1 percent) is a small percentage of the watershed area, the location and size of this amendment is not significant when compared with the Forest as a whole.

Goals, Objectives, and Outputs

An action is more likely to be a significant Forest Plan amendment if it alters the long-term relationship between the levels of goods and services projected by the Forest Service and particularly if it would forgo the opportunity to achieve an output in later years. The proposed amendment does not change any goals and objectives stated in the Forest Plan.

The short-term reduction in the cover variables from treating these acres now will create more sustainable cover in the long term. Although cover is being reduced, habitat effectiveness improves in most subwatersheds in summer and winter range due to road closures. Harvest generally occurs over a 2-year period, and will occur in about 1/3 of the project area at a time. Road closures will be conducted as treatments allow. Big-game animals might move from an area because of changes in habitat and disturbance (noise) during treatments, but they are expected to return upon completion of treatments. Although cover is being reduced, the effect on big-game populations is not expected to be measurable.

The manipulation of the DOGs and ROGs will implement direction for old growth found at IV-105 in the Forest Plan. The decrease of General Forest acres (MA 1) by 1,108 acres from the current total of approximately 544,700 acres is about a 0.2 percent Forest-wide acreage change.

There is a relationship between MA 1 acres and the allowable sale quantity (ASQ) under the current Forest Plan; however, the decrease in acres does not mean there will be a corresponding decrease in ASQ. The Forest Plan does allow scheduled timber harvests in ROGs that “maintain or enhance the capability of timber stands to provide suitable old-growth habitat in the future” (Forest Plan at IV-106).

I have also considered this decrease in relation to the cumulative effects of other changes to MA 1 acreage from the other 54 amendments to the Forest Plan. The Forest Plan estimated 553,053 acres of MA 1 in 1990, with this decision there will be approximately 543,592 acres. This is less than a 2 percent cumulative change in MA 1 acres. As the Chief determined in his 9/10/84 appeal decisions for the San Juan and Grand Mesa, Uncompahgre and Gunnison National Forest plans, there is no assurance that projected Forest Plan outputs will occur due to limitations of modeling, changes in law and regulations, changes in economic conditions, changes in budgets, site-specific conditions, and other situations. Therefore, this reduction of MA 1 acres is an insignificant change to the potential timber output or other services for the Malheur National Forest.

Management Prescription

A change is more likely to require a significant amendment if it would apply to future decisions throughout the planning area and whether or not the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced.

The reduction of cover values applies only to this planning effort. The changes would not affect future actions and meets the desired future conditions of cover habitat by providing more sustainable habitat in the future.

Although the changes to the DOGs and ROGs will apply to future management in the planning area, it will not alter the desired future condition of the land and resources, standards and guidelines, or the anticipated goods and services to be produced. The decision complies with Forest Plan standards for MA 13. It will also contribute to Forest Plan goals to maintain or enhance ecosystem functions and provide connective and old growth habitat for old growth dependant species. The planned activities will not detract from or jeopardize any of the Forest Plan goals. Because of the small magnitude of change, about a 0.2 percent of MA 1 acreage decrease Forest-wide. This change is insignificant.

Other Factors

After review of the environmental impact statement and project file, I have determined there are no other factors or unique circumstances affecting the Forest Plan from this amendment.

Since I have determined that there is not significant change based on the factors, I conclude that this amendment is not a significant change to the overall Forest Plan direction as defined in the 1990 Malheur Land and Resource Management Plan and its Record of Decision as amended. Therefore, an environmental impact statement for a forest plan revision following the 10 step planning process found at 36 CFR 219.12 does not need to be prepared.

Consistency with NFMA Requirements

In all other respects, I find this decision to be consistent with the Malheur Forest Plan and with the requirements of the National Forest Management Act implementing regulations; specifically:

Silvicultural Practices

The selected alternative is consistent with the management requirements from 36 CFR 219.27(c). No timber harvest is proposed on lands classified as not suited for timber production during forest planning.

Even-aged Management/Clearcutting

The selected alternative is consistent with the management requirements from 36 CFR 219.27(d). This project does not propose even-aged management/clearcutting activities.

Vegetative Manipulation/Management Requirements

The selected alternative is consistent with the management requirements from 36 CFR 219.27 and the seven vegetation requirements from 36 CFR 219.27(b).

Maintaining Viable Populations of Fish and Wildlife Species

The selected action is consistent with the viable population requirements of 36 CFR 219.19.

Implementation

I have reviewed the Silvies Canyon Watershed Project FEIS and its associated appendices. I have determined there is adequate information within these documents to provide a reasoned choice of action. I am fully aware of the possible adverse environmental effects that cannot be avoided, and the irreversible/irretrievable commitment of resources associated with the Selected Alternative. I have determined that these risks will be outweighed by the likely benefits (FEIS, Chapter 4).

Implementing the Selected Alternative is expected to begin in fall/winter of 2003. A schedule for implementing this decision can be found in the FEIS Chapter 2, Table 2-21 and Chapter 4 pg. 4-2. For some activities, the rate of implementation may vary depending on funding received.

Implementing the Selected Alternative will cause no unacceptable cumulative impact to any resource. There will be no significant impact to cultural resources, consumers, civil rights, minority groups, or women. There are no unusual energy requirements for implementing the Selected Alternative. The FEIS adequately documents how compliance with these requirements is achieved.

Procedure for Change During Implementation

Minor changes may be needed during implementation to better meet on-site resource management and protection objectives.

In determining whether and what kind of further NEPA action is required, the Responsible Official will consider the criteria for whether to supplement an existing Environmental Impact Statement in

40 CFR 1502.9(c) and FSH 1909.15, sec. 18, and in particular, whether the proposed change is a substantial change to the intent of the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas or specific activities will be considered together in making this determination. The cumulative impacts of these changes will also be considered.

The intent of field verification prior to my decision was to confirm inventory data and to determine the feasibility and general design and location of a road or unit, not to locate the final boundaries or road locations. For example, harvest unit prescriptions may be modified if site conditions dictate and if other resource objectives can be met. Minor adjustments to unit boundaries may be needed during final layout for resource protection, to improve logging system efficiency, and to better meet the intent of my decision. Many of these minor changes will not present sufficient potential impacts to require any specific documentation or action to comply with applicable laws.

Appeal Rights

My decision is subject to administrative appeal. Organizations or members of the general public may appeal my decision according to Title 36 CFR Part 215. The 45-day appeal period begins the day following the date the legal notice of this decision is published in the *Blue Mountain Eagle*, John Day, Oregon, the official newspaper of record. The Notice of Appeal must be filed with the Reviewing Officer:

Appeal Deciding Officer
Pacific Northwest Region
USDA Forest Service
Attn. 1570 Appeals
PO Box 3623
Portland, OR 97208-3623

Appeals can also be filed electronically at appeals-pacificnorthwest-regional-office@fs.fed.us.

It is the responsibility of those who appeal a decision to provide the Regional Forester sufficient written evidence and rationale to show why my decision should be changed or reversed. The appeal must be filed with the Appeal Deciding Officer § 215.8 in writing. At a minimum, an appeal must include the following:

1. Appellant's name and address (§ 215.2), with a telephone number, if available;
2. Signature or other verification of authorship upon request (a scanned signature for electronic mail may be filed with the appeal);
3. When multiple names are listed on an appeal, identification of the lead appellant (§ 215.2) and verification of the identity of the lead appellant upon request;
4. The name of the project or activity for which the decision was made, the name and title of the Responsible Official, and the date of the decision;
5. The regulation under which the appeal is being filed, when there is an option to appeal under either this part or part 251, subpart C (§ 215.11(d));
6. Any specific change(s) in the decision that the appellant seeks and rationale for those changes;
7. Any portion(s) of the decision with which the appellant disagrees, and explanation for the disagreement;

9. How the appellant believes the decision specifically violates law, regulation, or policy.

Contact Persons

For additional information concerning the specific activities authorized with my decision, you may contact:

Lori Bailey Silvies IDT Leader Emigrant Creek Ranger District 265 Hwy. 20 S. Hines, OR 97738 (541) 573-4300	Steve Cossette Forest Planner Malheur National Forest P.O. Box 909 John Day, OR 97845 (541) 575-3000

Roger W. Williams

August 4, 2003

ROGER W. WILLIAMS
Forest Supervisor
Malheur National Forest
USDA Forest Service

Date

Summary

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SUMMARY

Silvies Canyon Watershed Restoration Project
Malheur National Forest, Oregon

Proposed Action

The Malheur National Forest proposes to conduct restoration activities in the Silvies Canyon Watershed. The main actions proposed are:

- Vegetation treatments, including commercial, precommercial, and intermediate thinning, juniper reduction, and restoration of aspen and cottonwood;
- Landscape-level fuels reduction treatments;
- Riparian restoration at spring sites;
- Manual treatment of noxious weed sites; and
- Access and travel management, including closure, decommissioning, reconstruction and maintenance of roads.

Purpose and Need for Action

The purpose of this project is to:

1. Improve watershed conditions by reducing road related-impacts, specifically negative impacts to water quality, fish habitat, and wildlife habitat; and meet requirements of the Malheur National Forest Plan, (Silvies WA 2000, Step 6, Pages 4-6),
2. Improve riparian and overall watershed conditions through enhancement of riparian vegetation, and management of upland and riparian vegetation structure and composition; and meet requirements of the Forest Plan, (Silvies WA 2000, Step 6, Pages 2-4),
3. Improve the health, vigor, and resiliency of vegetation to insects, disease, wildfire, and other disturbances, to more closely resemble historical conditions in order to promote long-term forest sustainability and wildlife species diversity; and meet requirements of the Forest Plan, (Silvies WA 2000, Step 6, Pages 2-11),
4. Adjust dedicated old growth (DOG) areas and identify replacement old growth (ROG) and feeding areas as appropriate to meet habitat needs for old-growth dependent species, and meet requirements of the Forest Plan (Silvies WA 2000, Step 6, Page 9).
5. Capture the economic value of those trees that are surplus to other resource needs on lands identified in the Forest Plan as suitable for harvest (Forest Plan, III-1, IV-2) (Silvies WA 2000, Step 3, Pages 41-42, and Step 6, Pages 9-10).

Access and Travel Management Need

Open road densities in the project area exceed Forest Plan standards in both winter and summer ranges for elk. Approximately 33 miles of road are within Riparian Habitat Conservation Areas and may be contributing to water quality problems in the project area. At least one road is of specific concern due to allowing access to the Roadless Area. There is a need to manage the Access and Travel system within the project area to meet Forest resource objectives.

Riparian Habitat, Water Quality, and Fisheries Habitat Condition Need

The Silvies River and Myrtle Creek do not meet Clean Water Act standards for water temperature, and both have sediment problems. Stream systems within the Silvies Canyon Watershed area have been impacted by road location, construction, and lack of maintenance.

Aspen and cottonwood habitat provide diversity, contribute to the quality and quantity of riparian habitat, and are important habitat components for many wildlife species. These habitats are in decline and, in several cases, in danger of disappearing from the project area. Springs in the project area have been degraded by past management practices. There is a need to manage and restore riparian habitats within the project area.

Vegetation Condition Need

Past land management (including timber and range practices) and fire suppression have dramatically altered the composition and densities of forested areas in the project area from historic conditions. Non-forested areas such as meadows, riparian areas, and arid shrublands have experienced conifer encroachment and conversion to forested stands. Currently, the vegetation condition throughout much of the project area is at risk to stand replacing events such as epidemic insect and disease outbreak or wildfire. There is a need to address these concerns in forested and historically nonforested areas and implement management actions to begin to move vegetation toward historical conditions.

Economic Need

One of the key issues that guided the development of the Forest Plan was economic stability (Forest Plan, II-1). The Forest's primary zone of influence has been determined to be Grant and northern Harney counties. Malheur National Forest policies have a direct impact on local, dependent industries, which in turn, affect business income, wages, employments, and revenues to the counties. Forest management activities and the resulting outputs influence job opportunities, incomes, and the way of life of the approximately 15,000 residents in local communities. Changes in Forest outputs and activities will affect the social and economic life of the local population (Forest Plan III-1). Forest Plan Goal #42 states: Contribute to the social and economic health of communities which are significantly affected by National Forest management (Forest Plan IV-3). Therefore, there is a need to provide raw materials and employment opportunities through contracts to aid in community stability.

Decision to be Made

The Forest Supervisor of the Malheur National Forest is the responsible office and will decide to:

- Select the Preferred Alternative, an alternative to the Preferred Alternative, or the No Action alternative; or
- Modify an alternative.

Issues

Comments received during public and internal scoping of this project were used to define issues; the following issues guided the development of alternatives.

Issue 1 - Access and Travel Management

Roaded access provides for recreational, commercial, and management opportunities, as well as access for traditional Tribal uses of the project area. However, road densities within the Silvies Canyon Watershed are contributing to several resource impacts.

Issue 2 –Roadless Areas

During scoping for the Silvies Canyon EIS, some individuals felt roadless areas should not be logged or roaded; they should be set aside until a decision is made with the National Roadless Area EIS. One individual felt that these stands have some of the worst forest health issues on the District, and are prime candidates for stand replacement fires. Recently, there has been interest expressed by environmental groups in designating the Myrtle-Silvies Roadless Area as wilderness.

Issue 3 - Riparian Habitat, Water Quality, and Fish Habitat

The Silvies River and Myrtle Creek do not meet Clean Water Act standards for water temperature, and both have sediment problems. Twelve roads were identified during surveys in the watershed as contributing fine sediment directly to stream channels and degrading aquatic habitat. Additionally, there are almost 33 miles of roads within RHCAs that cross or parallel several tributaries within the Silvies Canyon Watershed. The potential is high for sedimentation from portions of these roads.

Over 80% of the aspen surveyed in the watershed are classified as overmature to decadent and at risk of loss. Black cottonwood occurs on only two sites in the watershed and is declining due to competition and lack of reproduction.

Springs within the Myrtle Creek and upper Stancliffe areas connect to the stream network and augment flows and influence water temperatures. Several springs near Sage Hen and Little Sage Hen Creeks appear to be linked with roads and may be the result of intercepted subsurface flows brought to the surface by road cuts.

Issue 4 - Vegetation Condition

Tree vigor and health throughout the watershed are declining as overstocked conditions limit water and nutrients. Many stands are at risk of epidemic insect attacks and are vulnerable to disease. Fir species are now dominant in stands that were historically dominated by fire-resistant ponderosa pine and western larch. Conifer species are now dominant in stands that were historically dominated by aspen and cottonwood. Treatments would reduce stocking levels and move species composition towards historic levels and proportions.

The composition of non-forested vegetation within the watershed is the result of interactions among many factors including tree canopy cover, big game use, historical and current livestock use, management activities, and the presence or absence of fire in the ecosystem. Many of these factors have enabled conifer encroachment into meadows, riparian areas, and rangelands. This increase of woody vegetation reduces soil moisture, thereby causing an increase in annual species and a decrease in perennial species.

The Silvies Canyon Watershed is within the low-severity fire regime where fire is frequent (every 5-23 years) and of low intensity (Maruoka and Agee 1994). Past timber harvest activities and effective fire suppression have changed the forest ecosystems in the watershed generally from large open pine stands and grasslands to stands with dense understories and encroaching fir. This has created higher fuel loading and more ladder fuels, increasing the risk of stand-replacement fires above historic levels. These changes have radically changed the landscape ecology of the fire regime. Wildfires are now infrequent but much more intense, resulting in almost total tree mortality.

Issue 5 - Big Game Habitat

Studies indicate that Rocky Mountain elk and mule deer need a mixture of hiding and thermal cover as well as forage areas, calving/fawning and rearing areas. Forest Plan cover standards are specific to thermal cover. Harvesting timber could reduce thermal cover below Forest Plan standards. Hiding cover is important to reduce potential vulnerability to hunting and harassment. The habitat effectiveness index (HEI) model is used to analyze the arrangement and quality of cover and forage, and miles of open roads within the analysis area.

Other Issues

Several issues were raised that were not used to formulate alternatives. These include:

1. **Economics.** Various levels of vegetation treatments are proposed in the Action Alternatives, and the economic effects of these are disclosed in the Socio-Economic section of Chapter 4.

2. **Social Impacts.** The Silvies Canyon watershed is a high use area for numerous recreation and resource extraction activities. The Burns Paiute tribe uses the project area for traditional activities, and is concerned about access. Elderly people and low-income people were also identified as potentially impacted by the proposed actions. Road closures are of specific concern, and effects to these groups are disclosed in the Access and Travel Management and Socio-Economic sections of Chapter 4.

3. **Cattle Grazing.** Several commenters were concerned about the resource damage being done by cattle, while at least one was a grazing permittee concerned about effects to his allotment. Changes in grazing permits are outside the scope of this project and are not addressed in the FEIS. Cattle grazing is a component of the cumulative effects on resources in the area.

4. **Air Quality.** Effects related to prescribed fire and wildfire are disclosed in the Air Quality section of the Chapter 4.

5. **Clearcutting.** There was some concern about clearcutting; this activity was not proposed in any alternative, and so is not an issue.

6. **Proposed, Endangered, Threatened, and Sensitive (PETS) Species and Management Indicator Species (MIS).** Concern was expressed that proposed activities would impact the viability of PETS and MIS species. The Malheur Forest Plan sets standards and guidelines for the protection of these species. Effects to these species were compared to the standards and guidelines and are disclosed in Chapter 4.

7. **Soil Productivity.** Concern was expressed about soils and soil productivity. Effects of the alternatives were compared to Forest Plan standards and guidelines and are disclosed in Chapter 4.

8. **Snags.** Concern was expressed about the existing levels of snags and down woody material in the project area, and how the proposed actions would affect these levels. Existing levels of snags and logs would be retained by all alternatives, and in some cases, new snags and logs would be created. Effects to snag and log habitat are disclosed in Chapter 4.

9. **Non-connected Actions.** Including "non-connected actions" in one NEPA document makes it extremely difficult to understand and evaluate alternatives, effects, and supporting analysis. Actions not related to the Purpose and Need for Action were not analyzed, except as necessary in analysis of cumulative effects.

10. **Emphasize Timber Production on Management Area 1.** One commenter expressed concern that timber in MA1 is not being managed in accordance with the Forest Plan. Management goals for MA1 are to emphasize timber production on a sustained yield basis while providing for other resources and values. The intent of this project is to move vegetation toward a condition that is sustainable in the long term.

11. **Use of Herbicides, Pesticides and Fertilizers.** Opposition was expressed to the use of toxic or lethal "animal damage control" and any use of herbicides, pesticides or toxic chemicals. The action alternatives propose manual methods for noxious weed control, and no alternative proposes the use of animal damage control, herbicides, pesticides, or fertilizers.

12. **Commercial Harvest Trees Greater than 21" dbh.** There was both opposition to and support for the restriction of limiting commercial harvest to trees less than 21" dbh. Action alternatives follow the standards set by Region Forester's Amendment #2 for harvesting trees greater than 21" dbh.

Alternatives Considered in Detail

Alternative One – No Action
No activities would take place under this alternative. There would be no changes to current management. Sixty-three miles of road closures and treatment of noxious weed treatments approved under other decisions would be implemented. No additional road closures, road maintenance, or vegetation management would take place. Fire would not be reintroduced into the project area.

Projects Common to All Action Alternatives
All action alternatives include proposals to restore spring habitat with juniper reduction, snag creation, and precommercial thinning of conifers; restore aspen stands with precommercial thinning of encroaching conifers or conversion of conifers to snags and large woody material (LWM), and protection of the stands through fencing or placement of other barriers; restore cottonwood stands with fencing, planting cuttings, and precommercial thinning or conversion to snags/LWM of competing conifers; manual treatment of 12 noxious weed sites; reconfiguration of and treatments to protect and maintain designated old growth areas; designation of replacement old growth areas; and treatments to protect and maintain a bald eagle management area.

Alternative Two – The Proposed Action
This alternative was developed to meet the purpose and need of the project. It would move an estimated 43,880 acres (67% of project area) toward historic conditions with commercial, noncommercial, and precommercial activities, which would include 5,885 acres of commercial thin, 7,216 acres of intermediate thin, and 15,109 acres of precommercial thin. About 121 acres of commercial harvest activities would take place in aspen stands, outside of Riparian Habitat

Conservation Areas (RHCAs). There would be 537 acres of juniper reduction and 268 acres of aspen restoration. Post and pole sales would be offered on 452 acres of lodgepole pine stands. Prescribed burning would be utilized on 39,277 acres to move the area toward historic conditions. Miles of open roads would be reduced to 45% of current levels by closing and decommissioning one hundred forty-three miles of road. Road maintenance at varying levels would take place on 164 miles of road. Activities in the Myrtle-Silvies Roadless Area would include 5,526 acres of prescribed burning, riparian habitat restoration at two springs, permanent closure of 1.51 miles of road, and seasonal closure of .58 miles of road.

Alternative Three

This is a non-harvest alternative. It responds minimally to ecosystem health, watershed improvement, and economic objectives. This alternative would move an estimated 43,212 acres (66% of the project area) in the project area toward historic conditions with precommercial and noncommercial activities, including 16,060 acres of precommercial thin. There would be 515 acres of juniper reduction and 268 acres of aspen restoration. Prescribed burning would be utilized on 39,277 acres. Miles of open road would be reduced to 41% of current levels by closing and decommissioning one hundred sixty miles. Activities in the Myrtle-Silvies Roadless Area would include 5,526 acres of prescribed burning, 729 acres of precommercial thinning, riparian restoration at two springs, permanent closure of 2.56 miles of road, decommission of .3 miles of road, and seasonal closure of .16 miles of road.

Alternative Four

This alternative proposes the greatest amount of commercial and noncommercial restoration, and responds to ecosystem health, watershed improvement, and economic objectives more than any other alternative. This alternative would move an estimated 44,450 acres (68% if the project area) in the project area toward historic conditions with commercial, noncommercial, and precommercial activities, including 7,107 acres of commercial thin, 8,437 acres of intermediate thin, and 16,186 acres of precommercial thin. About 121 acres of commercial harvest activities would take place in aspen stands outside of RHCAs. There would be 715 acres of juniper reduction and 268 acres of aspen restoration. Prescribed burning would be utilized on 39,277 acres. Miles of open roads would be reduced to 41% of current levels by closing and decommissioning one hundred sixty miles. Activities in the Myrtle-Silvies Roadless Area would be identical to Alternative Three.

Alternative Five

This alternative proposes the least amount of commercial and noncommercial restoration; it responds to ecosystem health, watershed improvement, and economic objectives. This alternative would move an estimated 35,248 acres (54% of the project area) in the project area toward historic conditions with commercial, noncommercial, and precommercial activities, including 4,411 acres of commercial thin, 5,388 acres of intermediate thin, and 13,733 acres of precommercial thin. About 121 acres of commercial harvest activities would take place in aspen stands outside of RHCAs. There would be 535 acres of juniper reduction and 268 acres of aspen restoration. Post and pole sales would be offered on 452 acres of lodgepole pine stands. Prescribed burning would take place on 25,311 acres. Open roads would be reduced to 74% of current levels by closing and decommissioning thirty-seven miles. Activities in the Myrtle-Silvies Roadless Area would include 5,526 acres of prescribed burning, 729 acres of precommercial thinning, riparian restoration at two springs, permanent closure of .09 miles of road, and decommissioning of .3 miles of road.

Alternative Six
This alternative proposes the smallest quantity of noncommercial restoration in response to concerns about availability of funding; it responds minimally to ecosystem health, watershed improvement, and economic objectives. It would attempt to meet most management objectives through the use of prescribed fire. It would move an estimated 38,300 acres (58% of the project area) in the project area toward historic conditions. Precommercial thinning would be done on 10,799 acres. There would be 268 acres of aspen restoration; juniper removal would be accomplished within burn units using prescribed fire. Prescribed burning would take place on 36,454 acres. Open roads would be reduced to 61% of current levels by closing and decommissioning eighty-seven miles. Roads identified as contributing sediment to streams that are not closed would be reconstructed. Activities in the Myrtle-Silvies Roadless Area would include 5,526 acres of prescribed burning, 729 acres of precommercial thinning, riparian restoration at two springs, permanent closure of 1.51 miles of road, and decommissioning of .3 miles of road.

Alternative Seven – The Preferred Alternative
The Preferred Alternative was developed in response to management concerns over issues. It proposes the greatest amount of commercial and noncommercial restoration, and responds to ecosystem health, watershed improvement, and economic objectives while maintaining open road access at manageable levels. It would move an estimated 44,450 acres (68% of the project area) in the project area toward historic conditions with activities including 7,107 acres of commercial thin, 8,473 acres of intermediate thin, and 16,186 acres of precommercial thin. About 121 acres of commercial harvest activities would take place in aspen stands outside of RHCAs. Juniper reduction would be done on 715 acres and aspen restoration on 268 acres. Post and pole sales would be offered on 452 acres of lodgepole pine stands. Prescribed burning would take place on 39,277 acres. Open roads would be reduced to 61% of current levels by closing and decommissioning eighty-seven miles. Roads identified as contributing sediment to streams that are not closed would be reconstructed. Activities in the Myrtle-Silvies Roadless Area include 5,526 acres of prescribed burning, 729 acres of precommercial thinning, riparian restoration at two springs, 1.51 miles of permanent road closure and decommissioning of 4.3 miles of road.

Alternative Seven-A
This alternative was developed in response to concerns about treatments in the Myrtle-Silvies Roadless Area. It is identical to Alternative Seven, except that it reduced proposed activities in the Myrtle-Silvies Roadless Area to 1.51 miles of permanent road closure and .3 miles of road decommissioning. No fuels treatments, precommercial thinning, or riparian restoration would take place in the Roadless Area. Treatments throughout the rest of the project area would remain the same as proposed in Alternative Seven. An estimated 39,144 acres (60% of the project area) in the project area would be moved toward historic conditions.

Alternatives Eliminated from Detailed Analysis
Additional alternatives were considered but not given detailed analysis for reasons discussed in Chapter 2 of the FEIS. These include:

1. Prescribed burning in the Myrtle Creek portion of the Myrtle-Silvies Roadless Area, additional to treatments proposed in the Proposed Action.

2. Moving the watershed immediately to a condition approximating Historical Range of Variation circa 1860-1900, including open, park-like stands of ponderosa pine (clumps of 2-10 large trees with spacing of 80-100 feet between clumps) and no roads.
3. A combination of activities proposed in Alternative Four and commercial harvest treatments within the Myrtle Canyon portion of the Myrtle-Silvies Roadless Area.
4. Designating Replacement Old Growth for Old Growth Area 02017 based on ecological stand boundaries rather than a Forest Road.
5. Treatment on public lands administered by BLM and on private property.
6. Using prescribed fire for fuels reductions without associated thinning treatments.
7. Using chemical as well as manual methods to manage noxious weed infestations.

Affected Environment

The analysis occurs within the Silvies Canyon Watershed. The project area is about 65,000 acres, and includes the Myrtle Park, Sage Hen Creek, Stancliffe Creek, Burnt Mountain, Boulder Creek/Fawn Creek, Myrtle Creek, and Red Hill subwatersheds. The project area contains about 30,500 acres of General Forest and Rangeland, 14,929 acres of Big Game Winter Range, 7,916 acres of Semi-Primitive Non-Motorized Recreation Area (including the Myrtle-Silvies Roadless Area), 1,537 acres of Old Growth Management Area, 1,702 acres of Visual Corridors, and 5,528 acres of Riparian Habitat Conservation Areas. About 3,026 acres within the project area boundary are management by the BLM or are private property.

Chapter 3 describes the project area in detail and the environment that could potentially be affected by the alternatives.

Environmental Consequences

Chapter 4 discloses the potential environmental consequences of the proposed action and alternatives. The evaluation considers:

- direct effects
- indirect effects
- cumulative effects
- probable environmental effects that cannot be avoided
- possible conflicts with the plans and policies of other jurisdictions
- relationship between short-term use and long-term productivity
- irreversible and irretrievable commitment of resources.

Direct effects are caused by the action and occur at the same time or place. Indirect effects are caused by the action and are later in time or farther removed in distance. Cumulative effects are the impacts that result from the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes such actions.

Major Direct and Indirect Effects of Alternative Seven – The Preferred Alternative

The main activities proposed in the Preferred Alternative (Alternative Seven) are vegetation management, including commercial harvest, precommercial thinning, prescribed burning; riparian restoration, including aspen and cottonwood restoration; and road management, including permanent and seasonal road closures, road decommissions, and road maintenance. The major effects of these activities are as follows:

1. **Vegetation treatments.** About 7,107 acres of commercial thinning, 8,473 acres of intermediate thinning, and 16,186 acres of precommercial thinning would reduce stocking from below, reduce risk of stand-replacing events, improve health and vigor of remaining trees, and move stands toward historical compositions and densities in treated areas. Incidence of mistletoe and bark beetles would be reduced on 13,249 acres of treated ponderosa pine stands; risk of Douglas-fir tussock moth and associated insects would be reduced on 6,869 acres of mixed conifer. Fuel reductions (including precommercial thinning and prescribed burning) over 39,178 acres of the project area would reduce the current levels of natural fuels and break up the continuity of remaining fuels, thus reducing the risk of stand-replacing wildfire in the project area as a whole.

   The project **May Affect but is Not Likely to Adversely Affect** bald eagle nesting habitat, and is expected to have a **Beneficial Effect** on roosting habitat. The project **May Impact Individuals or Habitat, but will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability** of western sage grouse, gray flycatchers, and spotted frogs. The project would have **No Effect/No Impact** on any other proposed, endangered, threatened or sensitive fish or terrestrial animal species.

   Short-term, localized negative impacts to some wildlife may occur. These include disturbance and displacement of individuals, possible nest failures during spring prescribed burns, and reduction of some habitat components (hiding and thermal cover for big game, preferred forest structure for northern goshawks). Long-term (20+ years) benefits to wildlife include reduced risk of habitat loss from stand-replacing events, improved health and resiliency in late- and old-structure forest for the species that use that habitat type, and increases in cover.

   The project **May Impact Individuals or Habitat, but will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability** to a population of Deschutes milkvetch, and would have **No Impact** on any other sensitive plant species.

   Potential impacts to soils resulting primarily from commercial harvest activities, including compaction and puddling over Forest Plan soil standards, would be minimized or avoided through use of design criteria and mitigation measures.

   Potential impacts to water quality and watershed condition would be minimized or avoided through application of Best Management Practices (BMPs), INFISH buffers, and Forest Plan standards.

   Manual treatment of 12 noxious weed sites in the project area would slow the spread and reduce the size of these populations, but would not eradicate them. Commercial and noncommercial harvest activities and natural fuels treatments would create potential seed beds in newly disturbed areas; increased human and vehicle activity associated with these treatments could bring in more weed seeds, providing opportunities for the establishment of new weed sites. Design criteria and mitigation measures are in place to prevent new weed sites from becoming established.

2. **Riparian Restoration.** Overall, the project is expected to improve water quality and fish habitat through aspen and cottonwood restoration, reduction of sedimentation from roads, reduction of juniper and noxious weeds, and improved vigor of native ground vegetation resulting from prescribed burns. Short-term negative effects include temporary increases in water temperature from confer removal at aspen sites and localized increases in sedimentation from road treatments. Negative effects would be minimized or avoided through application of BMPs, INFISH buffers, and Forest Plan standards. There would be no effect to any 303(d) listed stream.

3. **Road Management.** Road closures would benefit wildlife, especially big game, forest carnivores, and woodpeckers and other species dependent upon snag and log habitat, by reducing open road densities and human access. Closure or maintenance of roads identified as adding sediment to streams would improve water quality. Road closures may also benefit recreationists who prefer a non-roaded experience, including hikers and some hunters and anglers.

   Road closures may negatively impact some segments of society, including members of the Burns Paiute Tribe, who rely on the project area for traditional uses such as hunting and gathering, as well as some elderly, disabled, or low-income people who use the project area for firewood, hunting, fishing, and other subsistence activities. Recreationists who prefer a roaded opportunity could be impacted. Motorized access to some dispersed campsites would be eliminated, impacting some forest visitors. Reduced road densities may increase the response time of initial attack crews to some fires, making these fires more difficult to suppress quickly. In general, the project area would still provide an adequate road system to meet all traditional, subsistence, recreational and administrative access needs. Forest visitors would be able to apply for a permit to access a closed area, if necessary.

Cumulative Effects of the Preferred Alternative

Effects of this project would be cumulative with the effects of past activities, previous decisions, ongoing activities, and reasonably foreseeable future activities. Past activities in the watershed include timber sales and fire suppression. Current activities in the project area include permitted livestock grazing and firewood cutting, implementation of approved road closures and noxious weed treatments, and various types of motorized and nonmotorized recreation. It is reasonable to predict that following implementation of this project, activities such as thinning and prescribed burning would be proposed to maintain these treatments and restore additional acreage in the watershed (such proposals would be analyzed in new NEPA processes). Also, it is likely that additional road closures, decommissions, and maintenance as well as culvert removals and replacements would take place as necessary and as budgets would allow. Cumulatively, present and future treatments would move the watershed toward historic conditions, in which a natural fire regime (5-23 year return intervals) would be restored. Watershed and forest health would be restored to the benefit of native wildlife and vegetation as well as human needs. Sustainability and overall health of the ecosystem would be improved.

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Summary of Changes Between Draft and Final EIS

A number of changes, corrections, and clarifications to the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) have been made based on public comments and further analysis. The most notable changes are summarized by chapter. Minor edits and corrections are not included in this list.

Preface Material

- The list of acronyms commonly used in the FEIS has been updated and is located on the inside front cover.
- A summary of changes from the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) has been added.

Summary

- The stand-alone summary of the DEIS has been updated and revised into an Executive Summary and is attached to the FEIS. The Executive Summary identifies key information and components of the FEIS.

Chapter 1

- The arrangement of Chapter 1 has been modified.
- The Purpose and Need section has been expanded.
- The Public Involvement section has been updated. A section on the proposed wilderness designation by the Oregon Wilderness Coalition was included.
- A Roads Analysis (April 2002) has been completed and incorporated by reference.
- The Issues and Other Issues sections have been revised. Big game habitat has been added as an issue and economic and social impacts have been moved to Other Issues.
- The Modified Proposed Action has been renamed the Proposed Action.

Chapter 2

- The arrangement of Chapter 2 has been modified.
- Alternative 10 in the DEIS is now Alternative 6 in the FEIS.
- The Preferred Alternative is now numbered Alternative 7 and this section has been expanded.
- Alternative 7-a has been added due to public comments on the DEIS.
- Fuel blocks have been revised to exclude many areas that are outside the watershed boundary. Fuel block 13 has been dropped.
- Proposed harvesting conifers over 21 inches dbh in aspen stands has been dropped from Alternatives 2, 5, and the Preferred Alternative.
- Proposed harvesting of conifers within aspen stands that are located in RHCAs has been dropped from Alternatives 2, 4, 5, and the Preferred Alternative.

Summary of Changes Between Draft and Final EIS

A number of changes, corrections, and clarifications to the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) have been made based on public comments and further analysis. The most notable changes are summarized by chapter. Minor edits and corrections are not included in this list.

Preface Material

- The list of acronyms commonly used in the FEIS has been updated and is located on the inside front cover.
- A summary of changes from the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement (DEIS) has been added.

Summary

- The stand-alone summary of the DEIS has been updated and revised into an Executive Summary and is attached to the FEIS. The Executive Summary identifies key information and components of the FEIS.

Chapter 1

- The arrangement of Chapter 1 has been modified.
- The Purpose and Need section has been expanded.
- The Public Involvement section has been updated. A section on the proposed wilderness designation by the Oregon Wilderness Coalition was included.
- A Roads Analysis (April 2002) has been completed and incorporated by reference.
- The Issues and Other Issues sections have been revised. Big game habitat has been added as an issue and economic and social impacts have been moved to Other Issues.
- The Modified Proposed Action has been renamed the Proposed Action.

Chapter 2

- The arrangement of Chapter 2 has been modified.
- Alternative 10 in the DEIS is now Alternative 6 in the FEIS.
- The Preferred Alternative is now numbered Alternative 7 and this section has been expanded.
- Alternative 7-a has been added due to public comments on the DEIS.
- Fuel blocks have been revised to exclude many areas that are outside the watershed boundary. Fuel block 13 has been dropped.
- Proposed harvesting conifers over 21 inches dbh in aspen stands has been dropped from Alternatives 2, 5, and the Preferred Alternative.
- Proposed harvesting of conifers within aspen stands that are located in RHCAs has been dropped from Alternatives 2, 4, 5, and the Preferred Alternative.

- Proposed decommissioning of a portion of Forest Road 3100035 has been added to the Preferred Alternative (Alternative 7).
- A description of activities to occur in Dedicated Old Growth and in bald eagle nesting area has been included.
- Design features, management practices and mitigation measures have been updated, revised and expanded.
- Monitoring section has been updated, revised and expanded.
- An implementation schedule has been included to the end of chapter 2.

Chapter 3

- The arrangement of Chapter 3 has been modified.
- All sections have been updated, revised and expanded.
- Soils section was expanded to include soil assessments completed in 2002.
- Vegetation section was revised to include forested and non-forested vegetation and natural fuels.
- Noxious weed section was updated to include six more sites discovered since the DEIS was released.
- A social and economic analysis entitled *Silvies Canyon Watershed Restoration Project Final Environmental Impact Statement – Social and Economic Conditions and Effects* (Kohrman 2003) has been completed and incorporated by reference.
- Socio-Economics section was expanded to include information from Kohrman 2003.
- Information on a newly reported potential sage grouse lek was included.
- Included three goshawk nests to active nest list since goshawk were either found nesting in those areas or goshawk nesting had not been determined in the past five years.
- Information on the existing forest structures in goshawk post-fledging areas was included.
- Open road densities were corrected.
- Data from ODFW on elk and deer populations were included.
- Discussion of snags and down wood was expanded to include a discussion of DecAID (Mellen et al. 2003)
- Neotropical migratory birds section was updated and expanded.
- Cover analysis was redone to be consistent with the Forest Plan.
- HEIs was corrected to reflect corrections in open road density and cover values.
- Recreation section was expanded to include information from Kohrman 2003.
- Cultural resources section was revised, updated and expanded to include additional surveys completed in 2003.

Chapter 4

- The arrangement of Chapter 4 has been modified.
- All effects have been updated, revised and expanded.
- A section on benchmark dates and implementation schedule has been included.

- Each section has been updated to include a section on consistency with direction and regulations.
- Effects on the Myrtle-Silvies Roadless Area have been expanded to include the proposed wilderness designation by the Oregon Wilderness Coalition.
- Effects on watershed and fish habitat have been expanded.
- Effects on soils have been expanded to include soil assessments completed in 2002.
- Effects to vegetation condition section have been expanded to include forested and non-forested vegetation and natural fuels.
- Effects on air quality have been revised, expanded and updated to include seven items the Forest Service must address when proposing alternatives that may affect air quality.
- Effects on noxious weeds have been updated to include an additional six sites discovered since the DEIS was released.
- Effects on socio-economics have been revised, updated and expanded to include information from Kohrman 2003.
- Effects determinations in the BE/BA were modified for some species.
- Effects to DOGs/ROGs were separated from effects to old growth associated species and discussion was expanded.
- Effects of proposed treatments to goshawk and goshawk habitat were reanalyzed and corrected, and discussion was expanded.
- Cover analysis was redone and effects to cover were reanalyzed to be consistent with the Forest Plan.
- HEIs was corrected to reflect corrections in open road density and cover values.
- Effects discussion of snags and down wood was expanded to include a discussion of DecAID (Mellen et al. 2003)
- Neotropical migratory birds section was updated and expanded.
- Effects on recreation have been revised, updated and expanded to include information from Kohrman 2003.
- Effects on cultural resources were revised, updated and expanded to include additional surveys completed in 2003.

Chapter 5

Glossary

- Glossary definitions have been revised for clarity and consistency, and new definitions have been added.

Literature Cited

- Some references have been revised, and many references have been added.

List of Preparers

- The list of preparers and contributors has been updated.

Distribution List

- The list of agencies, organizations, and persons to whom copies of the FEIS were sent has been updated.

Index

- New topic areas have been added.
- Page numbers have been updated.

Appendices

- Appendix A now contains proposed decommissioning of a portion of Forest road 3100035 in the Preferred Alternative.
- Appendix A now contains a copy of the Silvies Canyon Watershed Roads Analysis (April 2002).
- Appendix B has been updated and revised to include site-specific information on aspen stands.
- Appendix C has been updated and revised to reflect the analysis in the FEIS.
- Appendix D has been added to include the comments received on the DEIS and SDEIS and responses to them.
- Appendix E has been added to include site-specific information on soil assessments completed in 2002.
- Appendix F has been added to include BMP's.

Chapter 1 Purpose and Need

Introduction

The United States Department of Agriculture (USDA) Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed watershed restoration activities within a portion (approximately 75%) of the Silvies Canyon Watershed. Restoration activities are proposed to improve the ecosystem health of the watershed (See The Proposed Action on page 1-16).

The Silvies Canyon Watershed comprises about 81,000 acres within seven subwatersheds. The watershed is located about 20 air miles north of Burns, Oregon on the Emigrant Creek and Blue Mountain Ranger Districts (formerly Burns and Bear Valley Ranger Districts) of the Malheur National Forest. Restoration activities would be focused on about 65,000 acres in these subwatersheds: Myrtle Park, Sage Hen Creek, Stancliffe Creek, Burnt Mountain, Boulder Creek/Fawn Creek, Myrtle Creek, and Red Hill. About 16,000 acres, mainly within the Red Hill subwatershed, are not administered by the USDA Forest Service and are not proposed for restoration activities with this analysis.

How This EIS is Organized

This EIS is presented in five chapters as illustrated.

Chapter 1. Purpose and Need

The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded

Chapter 2. Alternatives

This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3. Affected Environment

This chapter gives a description of the physical and biological setting of the Silvies Canyon Watershed.

Chapter 4. Environmental Consequences

This chapter describes the environmental effects of implementing the proposed action and other alternatives and is organized by resources.

Chapter 5. List of Preparers, Distribution List and Other Information

This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement as well as a Distribution List, Glossary, Literature Cited, and Index.

Appendices

The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Appendix A - Proposed Road Closures and Roads Analysis
Appendix B- Proposed Vegetation Units and Aspen Sites
Appendix C - Biological Evaluation/Assessment
Appendix D – Public Comments and Response to Comments
Appendix E- Soils Information
Appendix F – Best Management Practices

Background

On December 9, 1999, a Notice of Intent was published in the Federal Register to announce the preparation of an Environmental Impact Statement (EIS) for the Silvies Canyon Watershed Restoration Project. In compliance with National Environmental Policy Act (NEPA) and other relevant State and Federal laws and regulations, the Malheur National Forest prepared a Draft Environmental Impact Statement (DEIS) on the effects of restoration activities within the Silvies Canyon watershed. On March 9, 2001, a Notice of Availability was published in the Federal Register. The DEIS presented seven alternatives (including the No Action alternative) for improving and enhancing the ecosystem health within a portion of the Silvies Canyon Watershed. It displayed the environmental impacts and management implications of these seven alternatives.

On May 22, 2001, Forest Supervisor Bonnie J. Wood decided to prepare a supplement to the Silvies Canyon Watershed Restoration Project DEIS pursuant to 40 CFR 1502.9(c)(1)(ii). A Notice of Intent to prepare a Supplemental Draft Environmental Impact Statement (SDEIS) was published in the Federal Register on August 16, 2001. A Notice of Availability was published in the Federal Register on November 9, 2001. The SDEIS disclosed additional information on the social and economic effects of the Silvies Canyon Watershed Restoration Project.

This FEIS is designed to inform the public of the No Action, The Preferred Alternative, The Proposed Action, and five alternatives to the Proposed Action, and their effects. The FEIS discloses the direct, indirect, and cumulative environmental impacts resulting from each alternative, as well as any irreversible or irretrievable commitment of resources. It is prepared in accordance with the format established by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508) regulations implementing NEPA.

Figure 1-1 displays the 65,000-acre portion of the Silvies Canyon Watershed proposed for restoration, in relation to the state of Oregon and the Malheur National Forest.

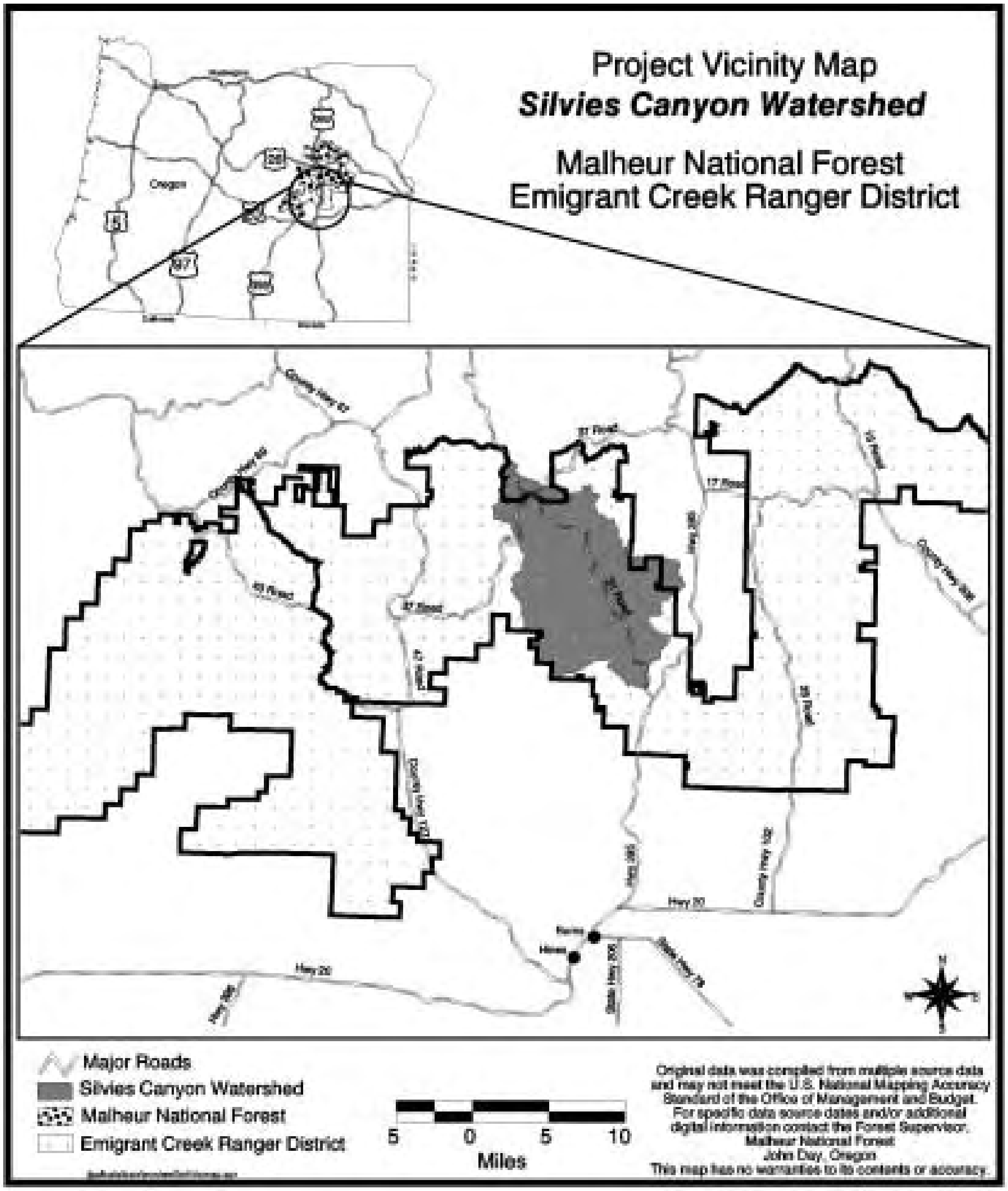


Figure 1-1. Silvies Canyon Watershed Vicinity Map - Location of the Silvies Canyon Watershed on the Emigrant Creek Ranger District, Malheur National Forest.

1 PURPOSE AND NEED

The Decision-Making Process

National Forest planning takes place at several levels. Decision-making begins with long range planning at the National level, continuing through the Regional and Forest levels, and down to the project level. The Silvies Canyon Watershed Restoration Project is a part of this hierarchical planning process. This FEIS is a project-level analysis; its scope is confined to issues within the project area.

Management Direction

This EIS process and documentation has been prepared according to direction contained in the following laws, regulations, and documents:

- *National Forest Management Act* (NFMA)
- *National Environmental Policy Act* (NEPA)
- *Council on Environmental Quality* (CEQ) regulations 40 CFR 1500-1508
- *Clean Water Act*
- *Endangered Species Act* (ESA)
- *National Historic Preservation Act*
- *Forest Service Handbook and Manual*

This FEIS is tiered to the *Malheur National Forest Land and Resource Management Plan FEIS* (herein referred to as the Forest Plan) approved May 25, 1990 as amended by:

- Forest Plan Amendment #29 for *Incorporation of the Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide (The Interim Strategies for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH)),* (herein referred to as Forest Plan Amendment #29) dated August 18, 1994.

- The Regional Forester's Amendment #2 for the *Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales,* (herein referred to as Regional Forester's Amendment #2) dated June 5, 1995.

- The *Inland Native Fish Strategy EA, Decision Notice and Finding of No Significant Impact,* (herein referred to as INFISH) dated July 28, 1995.

Alternatives were designed to meet interim direction for Roadless Area Protection published in the Federal Register (66 FR 44111) on August 22, 2001 and Forest Transportation System Analysis and Roadless Area Protection (66 FR 65796) on December 20, 2001.

This FEIS is not a decision document, but is meant to provide sufficient information to form a basis for decision-making. The Forest Supervisor is the responsible official and will decide to:

- select the Preferred Alternative, an alternative to the Preferred Alternative, or No Action; or
- modify an alternative

Based on the information in the FEIS, the Forest Supervisor will select a course of action, and present the reasons and conditions in a document called a Record of Decision (ROD). The Forest Supervisor will determine if the selected alternative is consistent with the Forest Plan or whether to amend the Forest Plan as necessary. The ROD will document Forest Plan amendments, if any are needed.

Watershed Assessment

A Watershed Assessment (WA) for this watershed was completed in November 2000. The intent of Watershed Assessment is to develop and document a scientifically based understanding of the processes and interactions occurring within a watershed. This FEIS incorporates by reference the *Silvies Canyon Watershed Analysis*, dated November 2000. The *Silvies Canyon Watershed Analysis (November 2000)* followed a six-step process that characterized the watershed (Step 1), identified issues and key questions (Step 2), described current resource conditions (Step 3), described reference conditions (Step 4), synthesized and interpreted information (Step 5), and made recommendations (Step 6). The *Silvies Canyon Watershed Analysis (November 2000)* analyzed opportunities from which to develop site-specific projects designed to meet enhancement or management opportunities that would cause positive trends towards the desired future conditions, as identified in the Forest Plan. Existing conditions were determined from field data. The differences between existing condition and desired future condition represent selected resource opportunities for the Silvies Canyon Watershed. This FEIS incorporates many of the recommendations made in the *Silvies Canyon Watershed Analysis (November 2000).*

Roads Analysis

On March 3, 2000, the Forest Service published its proposed transportation system policy revisions in the Federal Register (65 FR 43). Decisions to close, decommission, reconstruct, construct, and maintain roads are to be informed by a science based Roads Analysis (RA). Miscellaneous Report FS-643, *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System,* was published in August 1999, and describes in detail the Roads Analysis process. Forest Service Manual (FSM) 7700, specifically section 7712, also provides details about how the Roads Analysis process should be done. A Roads Analysis makes recommendations for each road in a specific area. When projects such as the Silvies Canyon Watershed Restoration Project are developed, recommendations from Roads Analysis (and Watershed Analysis) are incorporated.

Analysis of the roads system began in the *Silvies Canyon Watershed Analysis* (November 2000) and was included in the Silvies Canyon DEIS as an Access and Travel Management Plan. Through public comment and interdisciplinary team (IDT) participation, recommendations have been made for each road. The *Silvies Canyon Watershed Roads Analysis* (April 2002) states the overall objective for roads is to reduce road-related impacts to water quality and fish habitat, and reduce road densities for wildlife enhancement while at the same time providing adequate access to users. Many of the recommendations for road closures, repairs, and decommissioning in the *Silvies Canyon Watershed Roads Analysis* (April 2002) have been incorporated into this FEIS (See Appendix A).

Management Areas

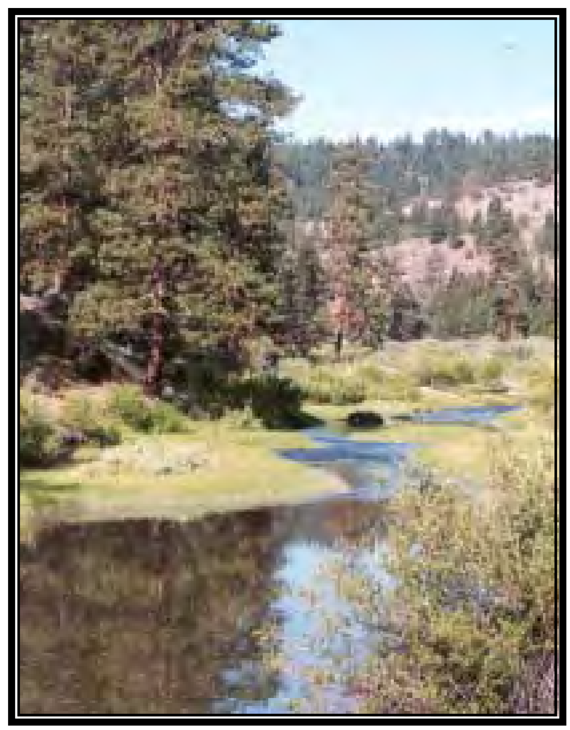
The Forest Plan (1990) divided National Forest System Lands into Management Areas (MA), each with different management goals, resource potential, and limitations. Forest Plan Amendment #29 (1994) amended MA 3A and 3B (Riparian Areas) and provided desired future conditions for each of these MAs. Additionally, this amendment provided more specific numeric standards for these MAs. Standards are now based on the same scientific information used in PACFISH (March 25, 1994) and INFISH (July 28, 1995). Riparian Habitat Conservation Areas (RHCAs) were created with PACFISH and INFISH. In this manner, RHCAs are not management areas; however, they amend the Forest Plan and incorporate new goals, objectives, standards, guidelines, and management direction. These new standards take the place of direction described in the Forest Plan. The Forest Plan also identified Roadless Areas. The following MAs, Roadless Areas, RHCAs and other ownerships are located within the Silvies Canyon project area.

Management Area 1 – General Forest

This Management Area is designed to emphasize timber production on a sustained yield basis while providing for other resource values. The goal is to develop equal distribution of age classes to optimize sustained timber production. Generally, acres for MA 1 and MA 2 (see below) are combined. The Silvies Canyon project area contains about 30,500 acres (47%) of MA 1/2.

Management Area 2 - Rangeland

Management Area 2 primarily consists of non-forested grasslands and low elevation ponderosa pine sites unsuitable for timber production, and Rangeland is usually included as non-forested lands within other MAs, primarily MA 1 – General Forest. The goal of this MA is to emphasize forage production on a sustained yield basis while providing for other resources and values. See MA 1 for acres.



Silvies River
Management Area 3A

Management Area 3A – Non-Anadromous Riparian Areas

Management Area 3A consists of lakes, perennial streams and seasonally flowing streams; lands adjacent to lakes, perennial and seasonal streams; floodplains and wetlands; wet, moist areas such as meadows, springs, seeps, bogs, and wallows; and quaking aspen stands in watersheds that do not support anadromous fish. The goal of this MA is to protect or enhance riparian-dependent resources in watersheds supporting resident fish. MA 3A areas are reflected within RHCAs described below.

Management Area 4A – Big-Game Winter Range Maintenance

Management Area 4A consists of non-forested grasslands, bitterbrush and mountain mahogany brush fields; and forested lands. The goal of MA 4A is to maintain or enhance the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management activities, including access management and restricted activities during winter months. The Silvies Canyon project area contains about 14,929 acres (23%) of MA 4A.

Management Area 10 – Semi-Primitive Non-Motorized Recreation Areas

Management Area 10 consists of areas that are portions of, and lands adjacent to former roadless areas. A variety of physical and biological environments occur in these areas, both forested and non-forested, as determined by soil, slope, aspect, elevation, and climatic factors. The goal of this MA is to protect, enhance, and maintain the natural beauty and character of undeveloped areas through effective visitor-use and resource management. The Silvies Canyon project area contains about 7,916 acres (12%) of MA 10.

Management Area 13 – Old Growth

Management Area 13 is composed of mature and over-mature trees (150 years or older), which provide: habitat for wildlife species dependent on mature and over-mature forest conditions, ecosystem diversity, and preservation of aesthetic qualities. These areas are distributed across the Forest, providing an old growth network. Wildlife species dependent on these lands include the pileated woodpecker and pine marten. These acres reflect both designated and replacement old growth and include only those areas outside wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers. The Silvies Canyon project area contains about 1,537 acres (2%) of MA 13.

Management Area 14 – Visual Corridors

Management Area 14 consists of visible and potentially visible landscapes along major travel routes, and state scenic waterways where the traveling public has a high to medium sensitivity to scenery. U.S. Highway 395 has been identified as a Sensitivity Level 1 Scenic Viewshed. Portions of the Silvies Canyon watershed are within the viewshed (middleground) of Highway 395. The goal of MA 14 is to manage corridors within scenic viewsheds with primary consideration given to scenic quality and growth of large diameter trees. Forest Plan direction would be to manage areas designated middleground, altered (using partial retention as the visual quality objective) in Sensitivity Level 1 corridors. The Silvies Canyon project area contains about 1,702 acres (3%) of MA 14.

Roadless Areas

The 7,916 acres in Management Area 10 are associated with the 11,776-acre Myrtle-Silvies Roadless Area. The Record of Decision for the Forest Plan states the portion of the Myrtle-Silvies Roadless Area that is within the semi-primitive non-motorized area is to be managed with no scheduled timber harvest and in an unroaded condition, but for multiple use. A variety of physical and biological environments occur in this area, both forested and non-forested, as determined by soil, slope, aspect, elevation, and climatic factors. The Myrtle-Silvies roadless area consists of unimproved roads to the canyon rims, trails along Myrtle and West Myrtle Creeks in the canyon bottoms, and the "Silvies River Jeep Trail," a four-wheel drive, two-track road (Forest Road 3100035) which was identified in the Forest Plan for closure at the first river crossing. The Myrtle-Silvies Roadless Area accounts for approximately 19% of the project area; however, it has been accounted for within the Management Area percentages.

1 PURPOSE AND NEED

RHCA – Riparian Habitat Conservation Areas

Riparian habitat conservation areas are portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. The Silvies Canyon project area contains about 5,528 acres (8%) of RHCAs. These areas include traditional riparian corridors, wetlands, intermittent headwater streams (MA3A), and other areas where proper ecological functioning is crucial to maintenance of the streams water, sediment, large woody material, and nutrient delivery systems.

Other Ownership

Other ownership in the Silvies Canyon Watershed is land managed by the Bureau of Land Management (BLM) or private property (PVT). About 3026 acres or 5% of the area within the project area boundary is classified in this manner.

Table 1-1. Acres by Management Area, Silvies Canyon Project Area.

Management Area or Other	Acres
Management Area 1/2	30,500
RHCA	5,528
Management Area 4A	14,929
Management Area 10	7,916
Management Area 13	1,537
Management Area 14	1,702
Other Ownership	3,026
Total	**65,138**

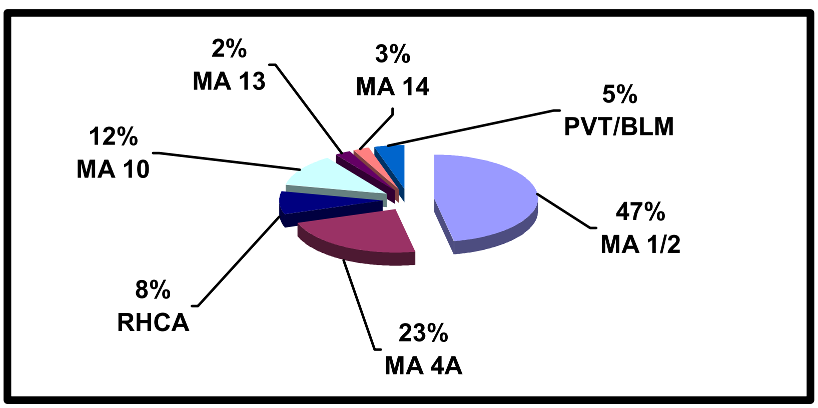


Figure 1-2. Percent of Project Area by Management Area

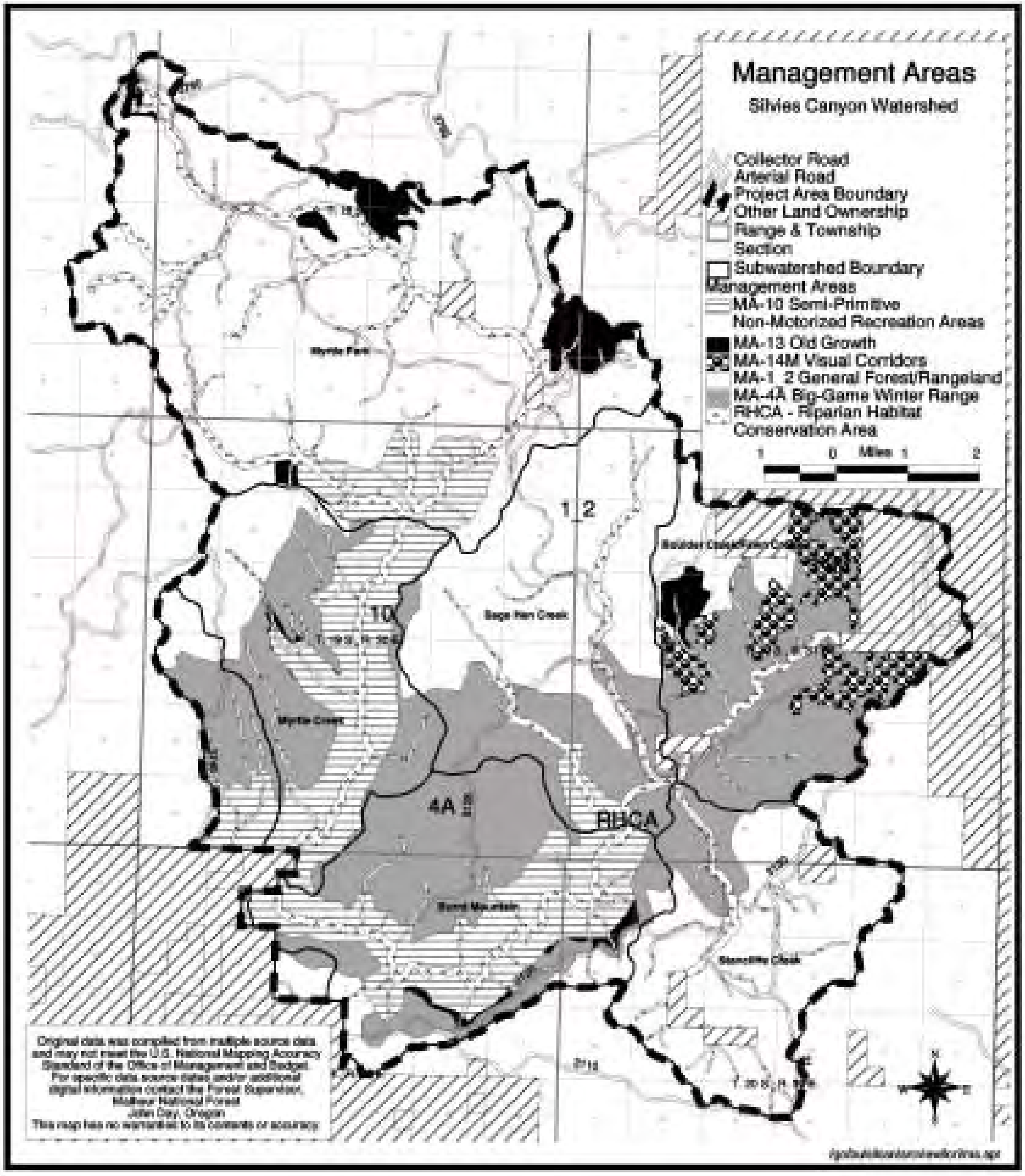


Figure 1-3. Silvies Canyon Watershed Management Areas – Management Areas in the Silvies Canyon Watershed Restoration Project.

Management Area Hierarchy

Overlap of Management Areas is inevitable. When a specific segment of land falls under the goals of two or more MAs, acres are assigned to the higher priority MA. The hierarchy developed to prioritize assignment of MAs is based primarily upon: established authority (i.e. Congress or Forest Supervisor), designated use, and forest requirements. The numbering of MAs does not reflect any hierarchy of acreage assignment. New standards, guidelines, and direction will supersede or replace conflicting direction described in the Forest Plan. For example, RHCAs are more restrictive than MA 3A and therefore supersede or replace them. The management hierarchy for National Forest System Lands that fall within the Silvies Canyon watershed is: RHCA – Riparian Habitat Conservation Areas, MA 10 - Semi-Primitive Non-Motorized Recreation Area, MA 13 – Old Growth, MA 5P – Potential Bald Eagle Winter Roosts, MA 14 - Visual Corridors, MA 3A – Non-Anadromous Riparian Areas, MA 4A – Big-Game Winter Range Maintenance, MA 1/2 – General Forest/Rangeland.

As an example, the Management Area for the Semi-Primitive Non-Motorized Recreation Area (MA 10) associated with the Myrtle-Silvies Roadless Area has acres that are classified as RHCAs but also has acres that are classified as old growth (MA 13), and a potential bald eagle winter roost (MA 5P), but these acres are tracked under the Semi-Primitive Non-Motorized Recreation Management Area. The hierarchy of MAs is the reason that MA 5P is not visible, and why only small portions of MA 13 are visible on Figure 1-3, Silvies Canyon Watershed Management Areas. Figure 1-4 shows the location of old growth areas (MA 13) and potential bald eagle winter roost areas (MA 5P).

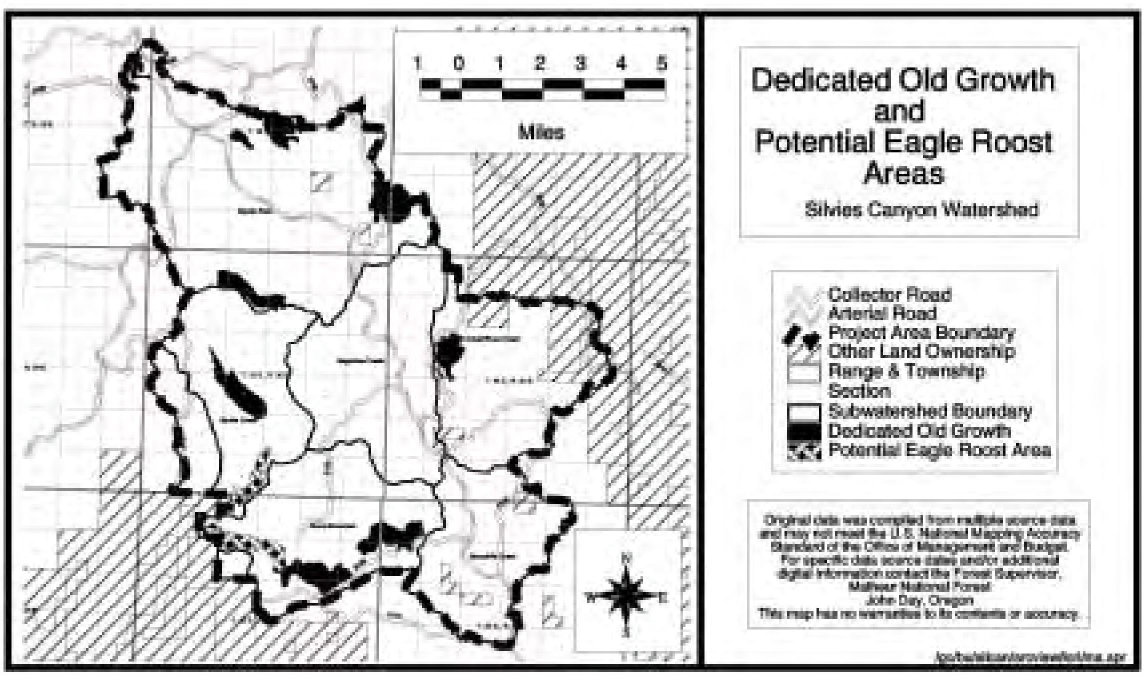


Figure 1-4. Silvies Canyon Watershed Dedicated Old Growth and Potential Eagle Roost Areas.

Purpose of and Need for Action

The purpose of proposed activities for the Silvies Canyon Watershed Restoration Project is to:

1. Improve watershed conditions by reducing road related-impacts, specifically negative impacts to water quality, fish habitat, and wildlife habitat; and meet requirements of the Malheur National Forest Plan, (Silvies WA 2000, Step 6, Pages 4-6),

2. Improve riparian and overall watershed conditions through enhancement of riparian vegetation, and management of upland and riparian vegetation structure and composition; and meet requirements of the Malheur National Forest Plan, (Silvies WA 2000, Step 6, Pages 2-4),

3. Improve the health, vigor, and resiliency of vegetation to insects, disease, wildfire, and other disturbances, to more closely resemble historical conditions in order to promote long-term forest sustainability and wildlife species diversity; and meet requirements of the Malheur National Forest Plan, (Silvies WA 2000, Step 6, Pages 2-11),

4. Adjust dedicated old growth (DOG) areas and identify replacement old growth and feeding areas (ROG) as appropriate to meet habitat needs for old-growth dependent species, and meet requirements of the Malheur Forest Plan (Silvies WA 2000, Step 6, Page 9).

5. Capture the economic value of those trees that are surplus to other resource needs on lands identified in the Forest Plan as suitable for harvest (Forest Plan, III-1, IV-2) (Silvies WA 2000, Step 3, Pages 41-42, and Step 6, Pages 9-10).

The need for action is based on the current conditions of resources within the watershed. This section provides a summary of the need for action. Chapter 3 presents the baseline environment and a more detailed description of relevant resource components of the existing environment.

Access and Travel Management Need

Road densities in the Silvies Canyon Watershed are exceeding Forest Plan standards in both winter and summer range for elk. Forest Plan road density standards are 2.2 mi/mi² in elk winter range, and 3.2 mi/mi² in elk summer range. Open road densities within the watershed average 2.4 mi/mi² in elk winter range, and 3.7 mi/mi² in elk summer range. There is a need to reduce road densities to meet Forest Plan standards.

There are about 33 miles of road within RHCAs that cross or parallel tributary streams within the Silvies Canyon Watershed. Additionally, twelve roads were identified during surveys as contributing fine sediment directly to stream channels and degrading aquatic habitat. A specific road of environmental and public concern is a portion of forest road 3100035, which was identified in the Forest Plan for closure at its first river crossing. This closure has been ineffective. Forest road 3100035 is within the Myrtle-Silvies Roadless Area and makes it possible for motorized vehicles to ford the Silvies River and illegally travel into the semi-primitive non-motorized recreation area, thus violating non-motorized standards for this area. Illegal use of this area by motorized vehicles has not been monitored; however, it is estimated that between 50 and

100 motorized vehicles access this area yearly. There is a need to reduce erosion and sedimentation from roads within RHCAs.

Riparian Habitat, Water Quality, and Fisheries Habitat Condition Need

Water quality standards as set forth in the Oregon Administrative Rules (OAR) that are known to be exceeded, or are suspected of being exceeded, are placed on a listing in Chapter 303(d) of the Water Quality Act as specified by the OAR, in accordance with the Clean Water Act (CWA). Myrtle Creek, Stancliffe Creek and the Silvies River have been monitored for water temperature and all have exceeded the maximum water temperature standards established by ODEQ at least once during the period of 1995-1999. To date, Myrtle Creek is listed on the 303(d) list for not meeting temperature standards. A high degree of embeddedness is a sign that the watershed is producing an excessive amount of sediment to the stream system. Streams with reaches found to have a high degree of embeddedness based on pebble count data include Sage Hen Creek, West Myrtle Creek and Myrtle Creek.

Stream systems within the Silvies Canyon Watershed area have been impacted by road location, construction, and lack of maintenance. Stream data indicate road, or other types of disturbed ground as being sources of sediment routed into the stream. There are almost 33 miles of roads within RHCAs. The potential for sedimentation from these roads is high because of grade of road, lack of adequate drainage, or lack of vegetative cover between the road and stream to filter sediment. Specifically, twelve roads were identified during surveys as contributing fine sediment directly to stream channels and degrading aquatic habitat. There is a need to reduce erosion and sedimentation from roads in the Watershed.

Example of riparian habitat in need of restoration
Gribble Spring
Note the heavily browsed riparian shrubs

Aspen and cottonwood are special habitats that provide diversity, contribute to quality and quantity of riparian habitat, and are an integral part of plant or animal life cycles within the area. A diverse riparian habitat including aspen and cottonwood improves fish, amphibian and invertebrate habitat, by reducing stream bank erosion and correlated siltation, increasing shade to maintain lower water temperatures, and periodically contributing material to the stream channel. Within the 50,035 acres of forested lands in the watershed there are 268 acres of located aspen stands and only two known sites of cottonwood (less than 5 acres). Approximately 50% of the perennial water sources in the watershed originate in these aspen stands, and 60% of the bird species that use the area rely upon riparian vegetation, which is dependant upon these water sources, for feeding or reproduction Additionally, a large number of mammal species rely upon the same riparian vegetation. There is a need for proper management of aspen to prevent the loss of this important component of the ecosystem.

There are 46 mapped springs throughout the watershed, although many springs have not been mapped. Springs within the Myrtle Creek and upper Stancliffe areas connect to the stream network and augment flows and influence water temperatures. Springs near Sage Hen and Little Sage Hen Creeks appear to be linked with roads and may be the result of intercepted subsurface flows brought to the surface by road cuts. Riparian habitat (spring) restoration activities are needed for wildlife habitat and watershed enhancement.

Vegetation Condition Need

Non-forest vegetation within the watershed is dominated by a variety of perennial grasses, forbs, and shrubs. Non-forest vegetation includes grasslands, shrublands, riparian and woodlands. The composition is the result of interactions among such factors as tree canopy cover; big game use; historical and current livestock use, forest management activities, and the presence or absence of fire in the ecosystem. These factors have caused the conversion of meadows, riparian areas, and rangelands into forested lands and conifer encroachment into areas where they were not historically prevalent. There has been an increase in annual species and a decrease in perennial species due to past grazing practices, fire suppression, and the increase of woody vegetation, which has reduced soil moisture. There is a need to implement management actions that would begin to move non-forested vegetation toward its historic range and composition.

Current composition and densities of forested areas are unhealthy and outside the historic range of variability (HRV). Forested areas within the watershed were historically dominated by ponderosa pine. Although most of the watershed is not ponderosa pine climax, periodic, low-intensity fires maintained most of the areas in the ponderosa pine seral stage. With the advent of fire suppression in the early 1900's, the decline in American Indian burning, and past management practices such as timber harvest and grazing, the levels of Douglas-fir and white fir have increased dramatically within the last 100 years, thus changing the forest's species composition, density, and structure. Current tree stocking levels are higher than historic levels. Due to these changes in species composition and stocking conditions, forested areas are experiencing above-normal mortality from insects, causing higher disease levels, lower vigor, and higher mortality rates than normal. Additionally, overstocked conditions, high fuel loading, and increased ladder fuels have increased the risk of large, stand replacement fires.

Throughout the watershed, the large ponderosa pine trees have drastically decreased in percentage of stand composition. This is due to past harvesting of large pines and lack of understory treatment. The existing large pines often have a dense understory, which competes with them for water, the limiting factor in this ecosystem. This has caused a decrease in tree growth, and increased mortality rates. Stress on large ponderosa pines has allowed them to become susceptible to drought and pests such as western pine beetle.

The mixed conifer stands have a much higher component of white fir and Douglas-fir than historically existed while there is a corresponding decrease of ponderosa pine. This is due to past harvesting of large ponderosa pine and effective fire control. This has caused the more shade tolerant fir species to survive in the understory of mixed conifer stands. Additionally, most of the white fir in this understory has been infected with Indian paint fungus stem decay. Dwarf mistletoe in Douglas-fir is wide-spread throughout the watershed. This understory in most areas is generally stunted due to overstory shading and will not develop into healthy, large diameter trees.

1 PURPOSE AND NEED

Some mixed conifer stands dominated by lodgepole pine are overstocked and at risk to mountain pine beetle attacks. Western larch is found in some stands and needs intervention to reproduce. Many mixed conifer sites are experiencing above normal mortality from insects, higher than normal disease levels, low vigor, and mortality due to overstocked conditions. Additionally, these stands are increasingly vulnerable to stand-replacing wildfires due to high fuel loads. Current composition, structure, and densities of mixed conifer stands are outside HRV. There is a need to address these concerns in forested areas and implement management actions that would begin to move forested vegetation toward its historic range and composition.

Juniper has been increasing its range for the last 120 years throughout the watershed into areas where it previously did not grow because of fire control. Juniper is now common throughout the watershed, including riparian areas. Once established, junipers utilize a majority of available soil moisture causing shrub, forb and grass species to decline. Eventually juniper root systems will utilize most of the available soil moisture to a point that shrub lands can be over taken by juniper woodland, reducing total ground cover and leaving bare ground that is more susceptible to erosion and invasion of non-native plant species. There is a need to implement management actions that would begin to move juniper woodlands toward its historic range and composition.

Aspen mainly occurs in riparian areas as stringer stands, and is declining due to competition with conifers, lack of regeneration, browsing of regeneration by ungulates and lack of disturbance, especially fire. Aspen stands were once more extensive, as shown by the numbers of remnant snags, and down woody material. Surveys conducted in the mid-1800s recorded "jungles of aspen" in some meadows on the Malheur National Forest. The present aspen stands are the remnants of these much larger stands. Existing stands are small and generally late to old structure with very few stands having a young component. Over 80% of the aspen surveyed in the watershed are classified as over-mature to decadent and at risk of loss. There is a need to implement management actions that would begin to restore aspen stands before this important part of the ecosystem is lost.

Not much is known about the historical occurrence of cottonwood in the project area or the Emigrant Creek Ranger District. It is surmised from looking at the distribution of the known sites, and the frequency that maps refer to cottonwood, that it once was more common. Now black cottonwood occurs in only two sites within the watershed. On one of these sites, cottonwood is declining due to competition and lack of reproduction. The other site consists of a single black cottonwood tree. Throughout the Emigrant Creek Ranger District cottonwood is rare and seldom reproduces. Lack of reproduction is due to changes in stream function, browsing pressure and lack of genetic exchange. Generally, the existing cottonwoods within the watershed are decadent and susceptible to disease, pests and wind damage. There is a need to implement management actions that would begin to restore black cottonwood stands before this important part of the ecosystem is lost.

Late and Old Structure Stands

Currently, about 14% (9255 acres) of the project area is made up of stands classified as late and old structure stands (LOS) (a term used in the Regional Forester's Amendment #2, which refers to timber stands where large trees (greater than 21" dbh) are common). Almost all of these stands (99.7%) are classified as old forest multi-stratum (OFMS). A HRV analysis shows that historically 30-70% of the forested watershed was classified as old forest multi-stratum. Refer to Chapter 3 for more information on plant association groups, stand structures and HRV analysis. The LOS components (large trees) in some stands are under stress and dying at an accelerated rate because of competition from overstocking (see "Purpose and Need for Action"). There is a need to address overstocking in selected LOS stands and to move younger forest stands in the direction of old forest stands to increase and replace the declining LOS stands.

Potential Eagle Roost Stands

There are two potential eagle roost stands within the Myrtle-Silvies Roadless Area. The Silvies River potential eagle roost is about 482 acres, and Myrtle Creek potential eagle roost is about 277 acres. Surveys suggest a decline is underway in roost suitability in the Silvies River potential eagle winter roost. This is due to shifts in tree species composition, mortality of large ponderosa pine due to competition, and increased risk of loss to fire. There is a need to restore suitable tree composition and structure and lower the risk of fire associated with the buildup of fuels and presence of fire ladders (continuous fuel from ground to tree canopy) within potential eagle roost stands.

Dedicated Old Growth and Replacement Old Growth

Under the Forest plan, the six Dedicated Old Growth areas (DOGs, all of which are included in this analysis) were set aside primarily for the management of pileated woodpeckers. Replacement old growth (ROG) and pileated woodpecker feeding areas, as required by the Forest Plan, have not been established for these old growth areas. The old growth network on the Malheur National Forest was first established in the early 1980s. Since then, various levels of field validation and modification of those DOG areas has occurred because associated activities and new studies have made better information about pileated woodpecker habitat available. There are six DOG areas and a portion of a seventh within the watershed. The majority of the seventh DOG lies outside the watershed and already has a ROG designated, and therefore will not be included in this analysis. In order to meet Forest Plan requirements, there is a need to adjust DOG boundaries and establish ROG and pileated woodpecker feeding areas.

Example of Stand-Replacing Wildfire Outside the Silvies Canyon Watershed 6,000 Acre Jordan Springs Fire Summer 1994

Fire and Fuels

The Silvies Canyon Watershed was historically maintained within a low-severity fire regime by frequent (5 to 23 years) fire of low intensity (Maruoka and Agee 1994). Effective fire suppression for the past 100 years has contributed to a dramatic increase in fuel loading, the arrangement of fuels (fuel ladders), and changes in vegetation composition, structure and density. Generally, because of fire suppression and overstocking of multi-storied stands, the forest ecosystem has changed from large, open pine stands to thick-forested stands with fewer large trees, and overstocked understories of white fir and Douglas-fir. These changes in landscape ecology have radically transformed the effects of the fire regime. A high-severity fire regime (infrequent but intense fire, resulting in almost total tree mortality) has been introduced to an ecosystem that was once quite stable in the presence of fire (Agee 2000).

Fires in recent years have increased in intensity and size. Recent examples of large, stand replacement fires on the Emigrant Creek Ranger District include Bald Butte (1979), 1,250 acres; Sawtooth (1987) 600 acres; Whiting Springs (1990) 6,000 acres; Buck Springs (1990) 18,230 acres; Pine Springs Basin (1990) 77,000 acres; and Jordan Springs (1994) 6,000 acres. The watershed is currently at risk of experiencing large, high intensity, stand-replacing wildfires above historic levels. There is a need to reestablish fire regimes near historical cycles to reduce this risk.

Noxious Weeds

Sixty-five noxious weed sites in the watershed were identified and analyzed for treatment under the Environmental Assessment, Noxious Weed Control, Malheur National Forest, April 2000. Manual treatment at these sites is included in the cumulative effects analysis of this FEIS (see Chapter 4).

Twelve additional noxious weed sites, (five Canada thistle, three Russian knapweed, two spotted knapweed and two Dalmatian toadflax) have been located since completion of Forest Noxious Weed Control EA. Untreated noxious weed sites would reduce the effectiveness of the Forest's noxious weed program and would allow further spread of noxious weeds in the watershed and adjoining areas. In order for the noxious weed program to be effective, there is a need to treat known noxious weed sites.

Economic Need

One of the key issues that guided the development of the Forest Plan was economic stability (Forest Plan, II-1). The Forest's primary zone of influence has been determined to be Grant and northern Harney counties. Malheur National Forest policies have a direct impact on local, dependent industries, which in turn, affect business income, wages, employments, and revenues to the counties. Forest management activities and the resulting outputs influence job opportunities, incomes, and the way of life of the approximately 15,000 residents in local communities. Changes in Forest outputs and activities will affect the social and economic life of the local population (Forest Plan III-1). Forest Plan Goal #42 states: *Contribute to the social and economic health of communities which are significantly affected by National Forest management* (Forest Plan IV-3). Therefore, there is a need to provide raw materials and employment opportunities through contracts to aid in community stability.

The Proposed Action

The IDT developed the Proposed Action using the direction found within the Project Initiation Letter (March 1999), signed by District Ranger Jim Keniston. The project was expanded and the Project Initiation Letter modified to incorporate the changes in December 1999. The Proposed Action was used in the scoping process to invite public participation and refine the scope of this project. After this initial scoping process, changes were made to the Proposed Action in response to public comments and after additional analysis. These changes were documented in Chapter 2, page 2-2 of the Silvies Canyon Watershed Restoration Project DEIS. Because of these changes, the Proposed Action was named the Modified Proposed Action in the DEIS. After receiving comments on the DEIS the IDT recognized there was confusion due to this renaming. Forest Service Handbook (FSH) 1909.15 (11) states, *Scoping includes refining the proposed action*…and CEQ regulations (40 CFR 1503.4) allow for modification of "alternatives including the proposed action" in response to comments. Therefore the IDT decided to forego the name change to the Proposed Action for this FEIS.

The Proposed Action was developed to meet the purpose and need for the project and responds to ecosystem health, watershed improvement, economic objectives and public comments. This section provides a summary of activities proposed under this alternative. A detailed description of the Proposed Action is presented in Chapter 2. Activities already under permit or contract, or authorized under other NEPA based decisions, would continue.

To accomplish the purpose and need for management activity the USDA Forest Service is proposing to move approximately 29,000 acres of forested stands in the project area toward historic ecosystem conditions with the use of commercial, non-commercial and precommercial activities. Moving stand compositions and densities toward more resilient, historic levels would improve tree vigor and reduce the risk of insect and disease. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open road in the watershed would be reduced to 45% of current levels in order to reduce sediment in the area streams, reduce harassment of wildlife species, reduce maintenance costs, and meet Forest Plan road density standards while meeting other management objectives. Closing and decommissioning roads would reduce the current level of motorized access but not eliminate it. Proposed access changes would allow for resource management, fire suppression, recreation and other uses.

Access and Travel Management Activities

Two hundred sixteen roads or segments of roads totaling 78 miles would be permanently closed with an earth berm, sign, or gate; 85 roads totaling 62 miles would be seasonally closed with a sign; and 5 roads totaling 3 miles would be decommissioned. For site-specific information on these activities refer to chapter 2.

Activities Proposed Within the Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5526 acres (fuel block 6);
- riparian habitat (spring) restoration activities on two springs;
- permanent closure of 10 roads totaling 1.51 miles; and
- seasonal closure of six roads totaling 0.58 miles.

These activities are consistent with the interim direction for Roadless Area Protection published in the *Federal Register* on August 22, 2001 (66 FR 44111) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). For more information on these activities, please refer to the following sections, Access and Travel Management Activities, Vegetation Condition Activities, Riparian Habitat, Water Quality, and Fish Habitat Activities.

Riparian Habitat, Water Quality, and Fisheries Habitat Restoration Activities

Restoration activities are proposed on all known aspen stands (268 acres) to enhance decadent aspen. See Appendix B for a complete list of aspen stands and proposed restoration activities. Specific actions under the Proposed Action includes the following methods: commercial harvesting of competing conifers, converting competing conifers to snags and large woody material, precommercial thinning competing conifers less than 7 inches diameter at breast height (dbh), and fencing aspen stands for protection from ungulates. For specific information on these activities refer to Chapter 2 and Maps 11 and 12.

Caged Cottonwood Cutting
Silvies River RHCA

Restoration of site-specific riparian (spring) habitat is proposed for improvement of wildlife habitat and watershed enhancement. Restoration activities include juniper reduction, snag and large woody material creation as necessary to move toward Forest Plan standards, precommercial thinning of conifers, fencing to protect riparian vegetation, developing spring boxes to provide water for livestock where needed, and protection from commercial harvesting activities. For specific information on these activities refer to Chapter 2 and Map 24.

Restoration activities are needed to improve the conditions of cottonwoods, an important component of the ecosystem. There is just one remaining cottonwood stand within the watershed. Planting of cottonwood cuttings is currently occurring within the watershed on an ongoing basis. Specific actions proposed include fencing one historical cottonwood site (about ½ acre or less than 500 feet of fence) for protection, planting and protecting additional cuttings, and precommercial thinning of competing conifers or converting competing conifers to snags or large woody material. For specific information on these activities refer to Chapter 2 and Map 25.

Vegetation Condition Activities

A reduction of the numbers of juniper is proposed to move this species' densities and distribution toward historical conditions. Loewen (project files, April 2001) shows that before Euro-American settlement, most juniper stands were open, sparse, and savanna in nature. The rapid increase in juniper establishment occurred between 1885 and 1920, during a period of higher moisture along with reduced fire frequency and intensity. An estimated 95% of western juniper is less than 100 years old. Juniper reduction would be accomplished commercially (where economical) and non-commercially on 537 acres (Reference Maps 11 and 12).

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is not viable) are proposed on 13,222 acres. Approximately 50,000 hundred cubic feet (CCF) or 26 million board feet (MMBF) would be harvested on several timber sales over the course of several years (refer to Table 2-21 at the end of Chapter 2 for the proposed schedule of activities). Specifically, the Forest Service proposes to commercial thin 5885 acres, and intermediate thin 7216 acres. Commercial thinning removes commercial size trees (7 to 21" dbh) from a stand for the purpose of increasing the spacing between residual trees, while intermediate thinning removes commercial size trees for the purpose of improving the stand composition and increasing the spacing between the residual trees. In both cases, trees of undesirable species, form, and condition would be removed by cutting from below. Commercial harvest activities may take place in 121 acres of aspen stands to accomplish restoration objectives (Reference Maps 11 and 12).

Road maintenance and temporary road construction are necessary to access harvest units. Approximately 164 miles of road would have maintenance activities. For specific information on maintenance activities refer to Chapter 2. No new permanent road construction is proposed. Approximately 3.5 miles of temporary roads would be constructed and rehabilitated after use (Reference Maps 11 and 12 for proposed location of temporary roads).

Post and pole sales are proposed on 452 acres of lodgepole pine stands that are susceptible to mountain pine beetle (Reference Maps 11 and 12).

Precommercial thinning and associated fuels treatment activities are proposed for 15,109 acres. Fuels would be treated either mechanically or manually to reduce fuel accumulations for introduction of prescribed fire (Reference Maps 11 and 12).

Landscape scale fuels treatment activities are proposed on 39,277 acres within twelve fuel blocks. Prescribed fire would be the main tool in removing the excess fuel accumulations and reducing the risk of large stand-replacement fires. Some areas may require treatment prior to reintroducing fire into the area, or a combination of treatments. These treatments include commercial harvesting, precommercial thinning, juniper reduction, and post and pole sales as described above (Reference Map 23).

Twelve noxious weed sites, including five Canada thistle, three Russian knapweed, two spotted knapweed and two Dalmatian toadflax, would be treated under the action alternatives in this FEIS using manual methods (hand pulling and grubbing) (Reference Map 27).

Reconfiguration of Dedicated Old Growth Areas 02011, 02012, 02015, 02016, and 02039

Existing boundaries of dedicated old growths 02011, 02012, 02015, 02016, and 02039 would be adjusted to provide boundaries on logical breaks and where boundaries are easily identified on the ground. This action would not relocate existing DOGs or affect the existing DOG network.

Reconfiguration of Dedicated Old Growth Area 02017

Approximately 75 acres (16%) of DOG 02017, which is classified as young forest multi-stratum, would be reallocated as part of the corresponding proposed ROG.

Treatments of Dedicated Old Growth (DOG)

DOGs 02015 and 02039 would be precommercial thinned as a pretreatment for prescribed burning. Generated slash would be lopped, handpiled and later burned. Prescribed burning would be accomplished through limited ground creep between burn piles.

DOGs 02016 and 02017 have had prescribed fire introduced through the South Silvies Prescribed Burn CE. These DOGs would be burned under this project as part of Burn Block 6.

Designation and Treatment of Replacement Old Growth (ROG) and Pileated Woodpecker Feeding Areas

To meet Forest Plan direction of providing ROG and pileated woodpecker feeding areas for DOG units, ROG and feeding areas for DOGs 02011, 02012, 02016, 02017, and 02039 are proposed for designation. Long-term management strategies for each replacement area, which maintain or enhance the capability of timber stands to provide suitable old growth habitat in the future are also proposed. Management strategies include: Intermediate thinning of understory, PCT, handpile and burn activity slash. Treat aspen inclusions to stimulate suckering and protect from browsing. Natural fuels would also be reduced if the ROG areas were included in fuel blocks. For more information on these activities refer to Chapter 2.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of precommercial thinning of the understory on 144 acres and commercially thinning 29 additional acres within close proximity of the bald eagle nest. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see sections on Design Criteria and Mitigations in Chapter 2).

Public Involvement

Scoping

Scoping for this project began in the spring of 1999. The NEPA scoping process (40 CFR 1501.7) was used to invite public participation, to refine the scope of this project, and identify preliminary issues. The Forest Service sought information, comments, and assistance from Federal, State, and local agencies, American Indian Tribes, and from other groups and individuals interested in or affected by the Proposed Action. Approximately 25 groups or individuals responded during the scoping process up to the issuance of the DEIS. The following steps were included in the public scoping process:

Schedule of Proposed Actions

Public involvement for this project began in the spring of 1999 when the Silvies Canyon Watershed Restoration Project was included in the Forest Schedule of Proposed Actions (SOPA). This project has appeared quarterly in the SOPA since that issue.

Public Mailing

On November 29, 1999, a scoping letter seeking public comment was mailed to approximately 225 groups and individuals who had previously indicated interest in receiving notification of proposed activities on the Emigrant Creek Ranger District, Malheur National Forest. Thirteen groups or individuals responded directly to the scoping document and requested additional information.

Public Notice

On Wednesday, December 8, 1999, a notice of public comment was published in the *Blue Mountain Eagle*, John Day, Oregon; and the *Times Herald*, Burns, Oregon.

Notice of Intent (NOI)

On December 9, 1999, a Notice of Intent (NOI) was published in the Federal Register.

Public Mailing

Thirteen additional information packets were mailed to the groups or individuals that requested additional information.

Public Meeting

On December 13, 1999, a public meeting was held in conjunction with the National Roadless EIS public meeting held in Burns, Oregon at the Harney County Senior Center.

Meetings with American Indian Tribes, Other Agencies, Organizations, and Individuals

On December 15, 1999, Planning Assistant Joan Suther held a telephone conference with Elaine Somers of the Environmental Protection Agency (EPA). They discussed the EPA's scoping comments and specific concerns the EPA had regarding the project.

On the evening of January 18, 2000, Emigrant Creek District Ranger Jim Keniston and Planning Forester Lori Bailey met with the Harney County Watershed Council at the Eastern Oregon Agricultural Research Center to discuss the project. Topics included an overview, scoping process, and timelines.

On April 6, 2000, Emigrant Creek District Ranger Jim Keniston, Blue Mountain District Ranger Doug Robin, Public Affairs Officer Sharon Sweeney, and several members of the Silvies Canyon and Southeast Galena IDTs met with Ms. Linda Reed-Jerofke and other representatives of the Burns Paiute Tribe. Topics included an overview of each project, and alternatives and timelines for the Silvies Canyon Watershed Restoration Project EIS.

On April 21, 2000, representatives from the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of Warm Springs Reservation of Oregon, and the Columbia River Inter-Tribal Fish Commission met with Forest Service representatives at the Federal Building in John Day, Oregon. Topics included an overview of the project, and alternatives and timelines.

On July 21, 2000, representatives from the Southeast Oregon Resource Advisory Council met with Forest Supervisor Bonnie Wood, District Ranger Jim Keniston, Burns Paiute Tribal Member Cecil Dick and other Forest Service representatives to tour the watershed. Topics included vegetation and fuel conditions, roads and road closures, and grazing.

1 PURPOSE AND NEED

Draft Environmental Impact Statement

The Silvies Canyon Watershed Restoration Project DEIS was completed in February 2001, and was made available to the public the week of March 9, 2001. The 45-day review period began on March 9, 2001, the day the Notice of Availability was printed in the Federal Register. The review period ran through April 23, 2001. The DEIS was mailed to over 100 interested individuals, agencies, and groups. Additional copies were given to 10 individuals, agencies, and groups following the initial mailing. Comments on the DEIS were received from 18 individuals, agencies, and groups. These comments, with the agency responses, are located in Appendix D.

Additional Meetings with Burns Paiute Tribe

On April 27, 2001, Planning Forester Lori Bailey held a telephone conference with Ms. Linda Reed-Jerofke of the Burns Paiute Tribe to obtain clarification of comments. Ms. Reed-Jerofke requested a map of the Preferred Alternative Access and Travel Management proposal. The map was made available for the May 4, 2001, Elders Meeting.

On August 24, 2001, several members of the Burns Paiute Tribe joined Emigrant Creek Ranger District NEPA Coordinator Joan Suther, Malheur National Forest Archaeologist Don Hann, and Emigrant Creek Ranger District Archaeologist Roy Schroeder on a District field trip. Topics discussed regarding the project centered on motorized vehicle access to traditionally used plant and hunting areas.

Supplemental Draft Environmental Impact Statement

During comment review of the DEIS for Silvies Canyon, comments were received from the Burns Paiute Tribe concerning the lack of social and economic disclosure of effects to the Tribe and its use of the area. Additionally, concerns were raised over disclosure of effects to minorities, elderly, and other under-represented groups in order to comply with 40 CFR § 1598.14. On May 22, 2001, the Forest Supervisor decided to prepare a supplemental draft EIS. The supplement disclosed additional information not included in the DEIS. The supplement discloses a social assessment completed in response to public concerns. The Silvies Canyon Watershed Restoration Project SDEIS was completed in November 2001, and was made available to the public the week of November 9, 2001. The review period began on November 9, 2001, the day the Notice of Availability was printed in the Federal Register. The review period ran through December 31, 2001. The SDEIS was mailed to approximately 60 interested individuals, agencies, and groups. Comments on the SDEIS were received from nine individuals, agencies, and groups. These comments, with the agency responses, are located in Appendix D.

Proposed Wilderness Designation by the Oregon Wilderness Coalition

In the April 24, 2002 edition of the Blue Mountain Eagle, the Oregon Natural Resources Council (ONRC) and a coalition of 130 environmental groups announced their intention to designate as wilderness 4.8 million acres in Oregon. Proposed wilderness designations include the "Malheur Basin Wilderness" 143,000 acres located on portions of the Malheur and Ochoco National Forests and the Burns BLM District. This proposed wilderness area includes the Myrtle-Silvies Roadless Areas as well as adjacent areas the coalition refers to as "uninventoried roadless" which total about 15,097 acres (see Figure 1-5). However, recommendations for wilderness designation by the agency are done as part of the forest plan revision process (see 36 CFR 219.17). The Malheur National Forest will start the revision process in fiscal year 2004.

The Myrtle-Silvies Roadless Area is 11,776 acres (Forest Plan, Appendix C) and is fully described in Chapter 3. The Forest Plan divided National Forest Lands into Management Areas (MA), each with different management goals, resource potential, and limitations. The Forest Plan also identified roadless areas (see Management Areas on page 1-6). The Record of Decision for the Forest Plan states that the portion of the Myrtle-Silvies Roadless Area that is within the semi-primitive non-motorized MA (7,916 acres) is to be managed with no scheduled timber harvest and in an unroaded condition, but for multiple use. As per the Forest Plan, areas within the Myrtle-Silvies Roadless Area but outside the semi-primitive non-motorized MA as well as adjacent areas the coalition refers to as "uninventoried roadless" are assigned to a variety of management emphases as determined by the specific MA they fall under.

The activities proposed within the Silvies Canyon Watershed Restoration Project are consistent with the direction for Roadless Area Protection published in the *Federal Register* on January 12, 2001 (66 FR 3244) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). Specifically, this project does not propose road construction or reconstruction in unroaded portions of roadless areas. Additionally, this project does not propose commercial cutting, sale or removal of timber in roadless areas. Because of these reasons, implementation of activities proposed in this FEIS within the Myrtle-Silvies Roadless Area would not preclude the area's potential to be designated wilderness in the future. Figure 1-5 displays the area proposed for wilderness designation by the Oregon Wilderness Coalition.

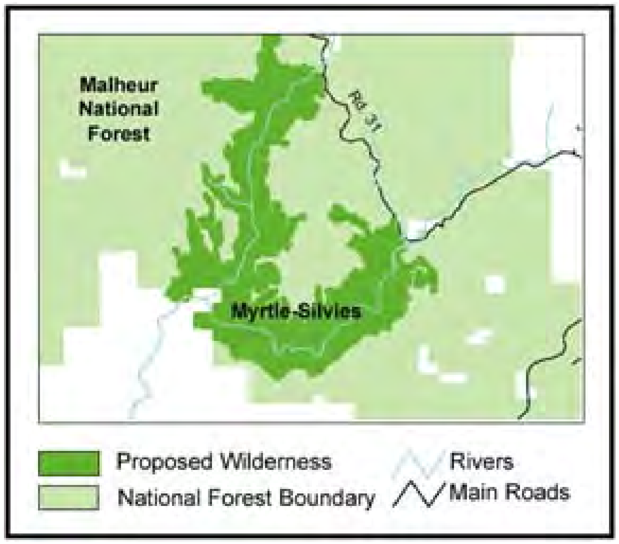


Figure 1-5. Area proposed for wilderness designation by the Oregon Wilderness Coalition.

Issues

Internal and public responses to the scoping document and Proposed Action, the DEIS, and the SDEIS were analyzed by the decision maker to define issues. Issues were identified based on the relevancy to the purpose and need (context), geographical distribution (extent), the length of time the issue is likely to be of interest (duration), and the level of interest or conflict generated (intensity). The significant issues have been revised since the completion of the DEIS and SDEIS. The decision maker determined the following concerns with the Proposed Action to be significant issues. The sources for each issue are located in the planning record.

Issue 1 - Access and Travel Management

Concern: Roaded access provides for recreational, commercial and management opportunities as well as access for traditional Tribal uses. Road densities within the Silvies Canyon Watershed are exceeding Forest Plan standards in both winter and summer range for big game. Additionally, there are almost 33 miles of roads within RHCA that cross or parallel several tributaries. Sixty-three miles of roads, identified as either previously closed, proposed to be closed under past environmental documents, historic closures, or those closures which have been breached, are contributing to road densities and impacts to watershed function.

Resolution: The Action Alternatives propose varying levels and types of road closures, decommissioning, road maintenance and reconstruction, and temporary road construction. Under the No Action Alternative, no additional roads would be reconstructed, no temporary roads constructed, no additional roads closed, or decommissioned. All alternatives would construct self-maintaining drainage structures and implement the closure of 63 miles of roads identified as either previously closed, proposed to be closed under past environmental documents, historic closures, or those closures which have been breached. None of the action alternatives proposes to designate additional roadless areas.

Measure: Miles of road reconstruction, temporary road construction, road closures, seasonal road closures, and road decommissions. Open road density compared to Forest Plan standards.

Issue 2 –Roadless Areas

Concern: The National Roadless Area EIS was completed in November 2000, and a final rule at 36 CFR 294 published in the Federal Register (66 FR 3244) on January 12, 2001. Other roadless area direction was published as part of the final planning regulations 36 CFR 219 (65 FR 67514) on November 9, 2000. During scoping for the Silvies Canyon EIS, some individuals felt roadless areas should not be logged or roaded; they should be set aside until a decision is made with the National Roadless Area EIS. One individual felt that these stands have some of the worst forest health issues on the District, and are prime candidates for stand replacement fires. This individual favored entering these stands on a light touch basis to improve forest health and reduce the risk of large-scale fires or insect and disease outbreaks. Recently, there has been interest expressed by environmental groups in designating the Myrtle-Silvies Roadless Area as wilderness. This issue was determined to be outside the scope of this analysis and is more appropriately addressed during the Forest Plan revision scheduled for 2004.

Resolution: All proposed activities within the Myrtle-Silvies Roadless Area are consistent with the National Roadless Area Conservation Policy and direction for Roadless Area Protection published in the *Federal Register* January 12, 2001 (66 FR 3244) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). No new road construction or reconstruction is proposed within the existing Myrtle-Silvies Roadless Area. No commercial harvest treatments are proposed within the existing Myrtle-Silvies Roadless Area.

Measure: Miles of proposed road closures within the existing Myrtle-Silvies Roadless Area. Acres and types of treatments proposed within the existing Myrtle-Silvies Roadless Area.

Issue 3 - Riparian Habitat, Water Quality, and Fish Habitat

Concern: Myrtle Creek is listed on the final 1998 303(d) list for not meeting temperature standards set by the federal CWA. Current USDA Forest Service data indicate the Silvies River does not meet the temperature standard. The Silvies River may be listed in the future as a 303(d) stream for not meeting the temperature standard and both Myrtle Creek and the Silvies River may be listed in the future because current sediment loads exceed standards of the CWA administered by the State of Oregon.

Stream data indicate roads or other types of disturbed ground are sources of sediment being routed into the streams. Specifically, twelve roads were identified during surveys in the watershed as contributing fine sediment directly to stream channels and degrading aquatic habitat. Additionally, there are almost 33 miles of roads within RHCAs that cross or parallel several tributaries within the Silvies Canyon Watershed. The potential is high for sedimentation from portions of these roads.

Quaking aspen and black cottonwood are special habitats that provide diversity and improve fish, amphibian and invertebrate habitat by reducing stream bank erosion and correlated siltation, increasing shade to maintain lower water temperatures, and by periodically contributing material to the stream channel. Aspen stands are isolated, declining, and smaller in number than they were historically. Aspen are declining generally due to competition; browsing of regeneration by ungulates and lack of regenerating disturbance, especially fire. Over 80% of the aspen surveyed in the watershed are classified as over mature to decadent and at risk of loss. Black cottonwood occurs on only two sites in the watershed and is declining due to competition and lack of reproduction. Lack of reproduction is due to changes in stream function, browsing pressure and lack of genetic exchange. Generally, the existing cottonwoods within the watershed are decadent and susceptible to disease, pests and wind damage.

Springs within the Myrtle Creek and upper Stancliffe areas connect to the stream network and augment flows and influence water temperatures. Several springs near Sage Hen and Little Sage Hen Creeks appear to be linked with roads and may be the result of intercepted subsurface flows brought to the surface by road cuts.

Resolution: Closing, decommissioning, or reconstructing roads within RHCAs would reduce road related impacts, specifically negative impacts to water quality, fish habitat, and wildlife habitat. Restoring aspen, cottonwood and springs would improve fish, amphibian and invertebrate habitat, augment flows and influence water temperatures. The Action Alternatives propose an array of aspen restoration methods, road closures, decommissioning and reconstruction. All Action Alternatives propose similar cottonwood and spring restoration activities. Under the No Action Alternative no activities are proposed.

Measure: Miles of road closures, decommissions and reconstruction within RHCAs. Number of the twelve roads identified as contributing sediment to streams closed. Acres of aspen and cottonwood restoration and number of springs treated.

Issue 4 - Vegetation Condition

Concern: Many forested stands in the watershed are outside HRV in terms of composition, density and structure. Tree vigor and health throughout the watershed are declining as overstocked conditions limit water and nutrients. Many stands are at risk of epidemic insect attacks and are vulnerable to disease. Fir species are now dominant in stands that were historically dominated by fire-resistant ponderosa pine and to a lesser extent, western larch. Conifer species are now dominant in stands that were historically dominated by aspen and to a lesser extent, cottonwood. Treatments would reduce stocking levels and move species composition towards historic levels and proportions.

The composition of non-forested vegetation within the watershed is the result of interactions among many factors including tree canopy cover, big game use, historical and current livestock use, management activities, and the presence or absence of fire in the ecosystem. Many of these factors have enabled conifer encroachment into meadows, riparian areas, and rangelands. This increase of woody vegetation reduces soil moisture, thereby causing an increase in annual species and a decrease in perennial species.

The Silvies Canyon Watershed is within the low-severity fire regime where fire is frequent (every 5-23 years) and of low intensity (Maruoka and Agee 1994). Past timber harvest activities and effective fire suppression have changed the forest ecosystems in the watershed generally from large open pine stands and grasslands to stands with dense understories and encroaching fir. This has created higher fuel loading and more ladder fuels, increasing the risk of stand-replacement fires above historic levels. These changes have radically changed the landscape ecology of the fire regime. Wildfires are now infrequent but much more intense, resulting in almost total tree mortality.

Resolution: The Action Alternatives propose varying levels of prescribed burning, commercial harvest treatments, post and pole sales, precommercial thinning treatments and associated fuels treatments to move stands toward HRV in terms of composition and density, to improve forest health and to reduce fuel loading, which would reduce the risk of stand-replacement fires. No commercial harvest activities would occur under Alternatives Three and Six. Under the No Action Alternative, no additional commercial, precommercial, or fuels treatments would occur.

Measure: Acres treated that move the areas closer to HRV by the implementation of commercial timber harvest, precommercial thinning, fuel treatments, post and pole, juniper reduction, noxious weeds, aspen restoration, cottonwood restoration and spring restoration.

Issue 5 - Big Game Habitat

Concern: Studies indicate that Rocky mountain elk and mule deer need a mixture of hiding and thermal cover as well as forage areas, calving/fawning and rearing areas. Forest Plan cover standards are specific to thermal cover. Harvesting timber could reduce thermal cover below Forest Plan standards. Hiding cover is important to reduce potential vulnerability to hunting and harassment. The habitat effectiveness index (HEI) model is used to analyze the arrangement and quality of cover and forage, and miles of open roads within the analysis area.

Resolution: All Action Alternatives include mitigations that reduce effects to hiding cover. The loss of cover would be mitigated by reducing road densities, which increases habitat effectiveness.

Measure: Effects to thermal and hiding cover and HEI.

Other Issues

Besides the significant issues, other concerns were identified by the responsible official as non-significant issues and were resolved without developing separate alternatives. The sources for each of these issues are located in the planning record.

Economics

Concern: Timber plays an important role in the economic stability of the local area. There is a need to make wood products available for local, regional, and national needs in the most cost-effective manner. Vegetation treatments are needed to reduce stocking levels and move conifer species composition towards historic levels (See Issue 4). Harvesting commercial timber on lands identified in the Forest Plan as suitable for harvest is an effective way of addressing the problem of overstocked forest conditions. Achieving some of the stocking level goals and moving species composition toward historic levels, through timber sales and other forest product sales, would reduce the need for appropriated funds from Congress to treat unsustainable vegetation conditions. Capturing the economic value of those trees that are surplus to other resource needs would provide raw materials to aid in community stability.

Resolution: The Proposed Action Alternative, The Preferred Alternative and Alternatives Four, Five and Seven-A would provide economic returns through service contracts and forest product sales. Alternatives Three and Six attempt to provide economic returns through service contracts only. The No Action Alternative would provide no economic return.

Measure: Present net value, and potential income and employment supported by contracting opportunities and timber harvesting.

Social Impacts

Concern: The Silvies Canyon watershed is a high use area for numerous recreation and resource extraction activities. The Burns Paiute tribe has traditionally used the Silvies Canyon Watershed for fishing, hunting, and gathering of terrestrial and aquatic resources. They have expressed concern regarding roaded access to resources within the area, especially for elders who may be mobility-impaired.

Other specific minority or disadvantaged groups, qualifying under the environmental justice executive order, were identified with potential to be impacted by various alternatives. These are: elderly people, especially those on low, fixed incomes, and low-income people in general.

Resolution: Items identified in proposed management alternatives that could potentially impact needs of elderly people, low-income people, and the Burns Paiute Tribe include the availability of firewood, level of motor vehicle access, level of restoration and sustainability work, and potential number of jobs provided. The action alternatives propose varying levels of activities that could potentially affect specific minority or disadvantaged groups.

Measure: Potential income and employment supported by contracting opportunities, timber harvesting, federal work force, livestock grazing, and recreation activities. Acres of firewood opportunity, miles of open roads, miles of road closures and decommissions, number of dispersed campsites available by motorized access, acres of restoration activities and potential number of jobs provided.

Cattle Grazing

Concern: Removal of cattle from the Silvies Canyon Planning Area needs to be analyzed since cattle would continue to impact plants and water quality. Keeping cattle out of riparian areas is a passive restoration measure. Cattle grazing is a component of the cumulative effects on resources in the area.

Resolution: Cattle grazing is a permitted use on the Malheur National Forest as documented in the Forest Plan. Changes to the permit, in the numbers, type, distribution, timing or duration of livestock grazed, are considered outside the scope of this project (40 CFR 1508.25). These activities are considered as part of NEPA for allotment management plans, which are tentatively scheduled for Silvies, Big Sagehen, Crooked Creek and Scotty allotments in 2005. Myrtle, West Myrtle and Scatfield allotments had grazing EAs completed in 1996; Rainbow allotment had a grazing EA completed in 1991. These actions were not considered in this analysis pursuant to 40 CFR 1502.4(c)(2). However, the effects of cattle grazing will be included in the cumulative effects analysis of this FEIS, located in Chapter 4.

Measure: No measure necessary because changes to existing livestock grazing permits are outside the scope of this project and are not being considered.

Air Quality

Concern: Air quality issues, especially the protection of human health and welfare, related to the use of wildland and prescribed fire should be disclosed in the EIS.

Resolution: Effects on air quality will be analyzed for all the alternatives.

Measure: PM 10 and PM 2.5 emissions by Alternative.

Clearcutting

Concern: Avoid clearcutting or any harvest method involving large canopy openings.

Resolution: None of the action alternatives propose clearcutting.

Measure: No measure necessary.

Proposed, Endangered, Threatened and Sensitive (PETS) Species and Management Indicator Species (MIS)

Concern: The proposed activities will jeopardize the viability of PETS and MIS species.

Resolution: The Forest Plan sets standards and guidelines for protection of PETS species and MIS. The alternatives will be analyzed and the effects on wildlife will be compared to the Forest Plan wildlife standards and guidelines. The Biological Assessment/Evaluation discloses more information regarding the potential impacts to PETS species. The Wildlife Analysis Report for the Silvies Canyon Watershed discloses more information regarding MIS. Chapter 4 discloses the effects for each alternative.

Measure: Comparative risk of effects to PETS species and MIS.

Soil Productivity

Concern: Soils and soil productivity are a concern, particularly nutrient cycling, microorganisms, mycorrhizae, soil compaction and displacement, erosion, and soil integrity.

Resolution: The Forest Plan standards and guidelines to manage soil and water resources to maintain or enhance the long-term productivity of the Forest will be met. The alternatives will be analyzed and the effects on soils will be compared to the Forest Plan standards and guidelines.

Measure: Comparative risk of effects to soil productivity.

Snags

Concern: Existing snag and down woody material levels are concerns, particularly levels remaining after proposed activities.

Resolution: The alternatives will be analyzed and the effects on snags will be compared to the Forest Plan standards and guidelines. Existing snags would be retained to provide foraging and nesting habitat for primary cavity excavators and secondary cavity users. Post-treatment snag surveys would be conducted as needed to determine the need to create additional snags. These surveys would be necessary to determine what action, if any, is needed to move the project area toward 100% potential population level (PPL) of management indicator species and secondary cavity excavators.

Measure: Comparative risk of effects to snag levels both present and future.

Non-Connected Actions

Concern: Including "non-connected actions" in one NEPA document makes it extremely difficult to understand and evaluate alternatives, effects, and the supporting analysis.

Resolution: The Silvies Canyon Watershed Restoration Project is a watershed restoration project, whose purpose was stated in the section titled "Purpose of and Need for Action" on page 1-11. The actions proposed were considered connected pursuant to 40 CFR 1502.4(c)(1) and 40 CFR 1502.4(c)(2) including actions occurring in the same general location, and relevant similarities, such as common timing, impacts, alternatives, methods of implementation, media, or subject matter.

Measure: No measure necessary.

Emphasize Timber Production on Management Area 1

Concern: The timber in MA 1 is not being managed in accordance with the Forest Plan.

Resolution: Management Area 1 primarily consists of forested lands. The management area goals (as amended by Regional Forester's Amendment #2) are to emphasize timber production on a sustained yield basis while providing for other resources and values. The intent of this project is to move vegetation toward a condition that can be sustained in the long term. The alternatives were designed through an interdisciplinary process to meet objectives for the different MAs, and watershed concerns where possible. Appropriate mitigation measures are addressed in Chapter 2.

Measure: No measure necessary.

Use of Herbicides, Pesticides, and Fertilizers

Concern: During scoping, some public comment indicated opposition to the use of toxic or lethal "animal damage control" and any use of herbicides, fertilizers or toxic chemicals.

Resolution: During the initial scoping period in December 1999, The Proposed Action, which was used to solicit comments, proposed the use of chemical methods to manage noxious weed infestations. Due to comments made and after further analysis, it was determined that chemical treatment was not warranted. Other methods such as manual control were considered for the twelve known noxious weed sites not analyzed under the Malheur National Forest Noxious Weed Control EA (April 2000). None of the action alternatives, including the Proposed Action, proposes the use of animal damage control, herbicides, pesticides or fertilizers.

Measure: No measure necessary.

Commercial Harvest Trees Greater Than 21 Inches DBH

Concern: There was both opposition to and support for the restriction of limiting commercial harvest to trees less than 21" dbh.

Resolution: Regional Forester's Amendment #2 sets standards and guidelines for harvesting trees greater than 21" dbh. Trees greater than 21" dbh would be maintained to provide large tree habitat for wildlife and late successional stand structure. Exceptions would be 1) trees considered hazardous to worker or public safety, and 2) trees considered to be inhibiting the restoration of identified aspen stands under Alternative Four, based upon biological or ecological urgency concepts (letters dated Oct. 2, 1997 and Dec. 23, 1997 from the Regional Forester to the Eastside Forest Supervisors concerning implementation of RF Amendment #2).

Measure: Acres of proposed harvest of trees greater than 21" dbh.

Project Record Availability

This FEIS with its Appendices provides adequate information for the Deciding Officer to make a decision. This EIS hereby incorporates by reference the Project Record (40 CFR 1502.21). The Project Record contains Specialist Reports and other technical documentation used in summary form to support the analysis and conclusions in this EIS. These Specialist Reports are for Access and Travel Management, Roadless Area, Watershed and Fish Habitat, Soils, Vegetation, Fuels, Air Quality, Sensitive Plants, Range Resources, Noxious Weeds, Socio-Economics, Wildlife, Recreation, Cultural Resources and Scenery Management for Silvies Canyon Watershed Restoration Project.

Relying on Specialist Reports and the Project Record helps implement the CEQ Regulations' provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), that EISs shall be analytic rather than encyclopedic, and that EISs shall be kept concise and no longer than absolutely necessary (40 CFR 1502.2). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere.

The Project Record is available to the public upon request under the Freedom of Information Act (FOIA) and can be reviewed at the Emigrant Creek Ranger District Office, 265 Hwy. 20 South, Hines, Oregon, 97738 Monday through Friday, 8 a.m. to 4 p.m.

Chapter 2 Alternatives

Introduction

Chapter 2 describes the alternatives and processes used to formulate or eliminate alternatives. The action alternatives meet the purpose and need to a varying scale. Some alternatives would initiate restoration activities on a larger scale than others (e.g., Alternative 4 covers more acres and closes more roads than any other action alternative). Should an action alternative be implemented, it would not bring full or immediate restoration to the entire project area by itself. Full and immediate restoration is not biologically feasible at one time. Future projects would need to be implemented. Maps of each alternative considered in detail are included at the end of this chapter. Specifically, this chapter provides a description of the following:

- The process used to formulate alternatives;
- Alternatives considered in detail;
- Items common to all action alternatives;
- Alternative comparison;
- A discussion of how each alternative addresses the significant issues identified for the project;
- Site-specific mitigation and monitoring plans proposed for the project, and
- Alternatives considered, but eliminated from detailed study, as well as reasons for elimination.

Process Used to Formulate the Alternatives

District and Forest resource specialists, using the Responsible Officials specific direction to define the scope of actions, developed the Proposed Action. This direction is found within the Project Initiation Letter, which was signed by District Ranger Jim Keniston (December 1999). Public scoping began in November 1999, when the Proposed Action was mailed to interested public, state and federal agencies for comments. The IDT reviewed each comment and identified significant issues. The significant issues (described in detail in Chapter 1) were used in combination with the purpose and need to formulate alternatives, develop mitigation, and monitor effects.

The No Action Alternative is required (40 CFR 1502.14d) and may be used as a baseline to compare the various action alternatives, although it does not meet the purpose and need for action. Current projects and activities authorized with other NEPA based decisions would continue as permitted; however, the stated purpose and need described in chapter 1 would not be achieved.

2 ALTERNATIVES

In January 2000, the IDT developed general themes that would best meet the significant issues identified through scoping. These themes were the framework for each alternative. In March 2001, the DEIS was mailed to members of the public who had expressed interest in this project. A 45-day review and comment period for the DEIS ran through April 23, 2001. Based on comments received on the DEIS, on May 22, 2001, the Forest Supervisor decided to prepare a Supplemental DEIS pursuant to 40 CFR 1502.9(c)(1)(ii). In November 2001, the SDEIS was mailed to interested publics. The review and comment period for the SDEIS ran through December 31, 2001. Comments received were analyzed for issues not addressed by the DEIS and SDEIS. In March 2002 the responsible official, IDT and supporting resource specialists refined and modified the Proposed Action and developed a seventh alternative (Alternative Seven-A) to the Proposed Action. Alternative Seven-A is a modified version of the Preferred Alternative. The responsible official approved the range of alternatives on March 28, 2002. The comments received and agency responses are located in Appendix D. Each action alternative presented in this FEIS is a different approach to meeting the purpose and need for action while addressing the significant issues identified in Chapter 1.

All proposed projects would meet existing laws, regulation, and policies. All known threatened, endangered, or sensitive plant or animal species would be protected from adverse impacts by any project. Wetlands would not be adversely impacted. Project activities would protect cultural resources in accordance with the National Historic Preservation Act, Executive Order 11593 Protection and Enhancement of the Cultural Environment, May 13, 1971, and other legislation and policy.

Alternatives Considered for Detailed Analysis

The IDT and responsible official in response to the issues that were discussed previously developed the alternatives described below. Eight alternatives are considered in detail: the No Action, the Proposed Action, the Preferred Alternative and five alternatives to the Proposed Action. Foldout maps of alternatives considered in detail are provided at the end of this chapter. Large-scale maps are available in the project planning record (located at the District Office). Appropriate mitigation measures have been developed as needed for the action alternatives.

In the DEIS alternatives considered for detailed analysis were numbered 1 thru 5, 10 and the Preferred Alternative. Due to confusion expressed by reviewers, alternatives considered for detailed analysis in this document are numbered sequentially (1 thru 7a). Alternative 10 in the DEIS is Alternative Six in this document. and the Preferred Alternative in the DEIS is Alternative Seven in this document; Alternative Seven is a combination of the vegetation treatments from DEIS Alt. 4 and the road package from DEIS Alt. 10. In the DEIS, alternatives were given short titles to give the reader a quick understanding of the key action or output for each alternative. However, because such general labels too clearly distort the nature of the multiple actions within each alternative, and comments suggested the names were misinterpreted, none of the alternatives are named except for No Action (Alternative One), the Proposed Action (Alternative Two) and the Preferred Alternative (Alternative Seven).

All acres and volumes listed herein are approximate. In most cases, units or stands have been delineated using the most up to date information available and acreages have been determined through computer analysis. Acreages are considered approximate until treatment units are actually laid out and verified on the ground.

Alternative One – No Action

Under this alternative, none of the specific management activities proposed in this document would occur. Activities already under permit or contract, or authorized under other NEPA based decisions, such as recreational use, firewood cutting, fire suppression, and livestock grazing would continue at current levels. Management activities such as prior road closures, reforestation, precommercial thinning, fuels treatments, and prescribed burning proposed by other environmental documents would be implemented as originally planned. The no action alternative provides a baseline against which effects of the action alternatives could be measured and compared. Under no action, environmental consequences would still occur because the existing environment is not static.

Access and Travel Management

Prior Environmental Assessments (EA) (Gold EA and Decision Notice November 8, 1990, Joaquin EA and Decision Notice April 14, 1992, Myrtle Park EA and Decision Notice August 13, 1993) have identified, analyzed and documented decisions on roads to be closed. One hundred seventy four roads, totaling 63 miles, were either previously identified as closed; proposed to be closed under past environmental documents; historic closures; or breached closures. The decision to close these roads has been made. Under the no action alternative, these roads would be treated to provide self-maintaining drainage structures to reduce sedimentation and closed. No additional roads would be closed or decommissioned. Temporary road construction, and road reconstruction, would not occur. Road maintenance operations would occur as funding permits.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Under the No Action Alternative, no additional activities would occur in the Myrtle-Silvies Roadless Area. No additional prescribed burning activities would occur within the Silvies River portion of the roadless area. No precommercial thinning and related fuel treatment activities would occur within the two potential bald eagle winter roost stands.

Riparian Habitat, Water Quality, and Fisheries Habitat Restoration Activities

Under No Action Alternative, no corrective actions would be applied towards restoring riparian areas.

Vegetation Condition Activities

No additional vegetation treatments would be implemented at this time. Prescribed fire would not be reintroduced to the watershed and fuel levels would continue to increase. Stands would continue to be at risk of stand-replacing wildfires.

Existing noxious weed populations identified and covered under the Forest Wide Noxious Weed EA, would be treated as authorized. The twelve new noxious weed sites would not be treated.

Projects Common to All Action Alternatives

The following projects are common to all action alternatives.

2 ALTERNATIVES

Restoration of Riparian (Springs) Habitat

Restoration of springs is proposed for improvement of wildlife habitat and watershed enhancement. All known springs (Reference Map 24) located within harvest units would be buffered from commercial harvesting activities for 100 feet around spring (for springs and wetlands less than 1 acre) or 150 feet around spring (for springs and wetlands greater than 1 acre) and 50 feet both sides of category 4 drainage originating from the spring.

Noncommercial activities proposed on 46 springs (Reference Map 24) to meet wildlife habitat objectives within the 100 or 150 foot buffer area around spring include:

- Reduction of juniper less than 18" dbh;
- Retention of old growth juniper greater than 18" dbh for future snag sources;
- Creation of snags as needed (pile and burn slash at base of junipers; conifers would be girdled or snags may be created by other means) to reach 1-2 snags per spring;
- Precommercial thinning of conifers less than 7" dbh (9" dbh for Alternatives Three and Six); and
- Leaving some slash on site to provide a barrier to ungulates.

Noncommercial activities proposed on five springs (Reference Map 24) to meet watershed objectives include fencing the riparian area of influence (generally the areas remaining in a green appearance during periods of drought) up to a maximum of approximately 150 feet from the wet area to protect riparian vegetation. About 10 acres on five springs would be fenced.

Mitigation measures described at the end of Chapter 2 state that if aspen stands or springs are fenced to exclude cattle and they contain the water source for the area, an alternate water source would be provided. Therefore, development of spring boxes and troughs are proposed on four springs (Reference Map 24) to meet watershed objectives.

Aspen Restoration

Aspen restoration activities are proposed on all known aspen stands totaling about 268 acres. See Appendix B for a complete list of aspen stands and proposed restoration activities. Specific actions common to all action alternatives include:

- Competing conifers of any size may be converted to snags or large woody material as needed.
- Competing conifers less than 7" dbh (9" dbh in Alternatives Three, Four and Six) may be precommercially thinned.
- Two hundred forty-five acres of aspen stands would be protected using one or more of the following methods: generally a 4-strand wire fence but occasionally an 8-foot fence, caging, slash barriers, buck and pole fence, or electric fence. Fencing generally would be 66 feet beyond the edge of the aspen. Protection methods would occur over five years.
- Protection methods would be monitored for effectiveness. When protection is determined to be unnecessary, protection methods would be removed.

Cottonwood Restoration

Cottonwood restoration activities are needed to restore this important component of the ecosystem (Reference Map 25). There are two historically remaining cottonwood sites within the watershed. Ongoing planting of cottonwood cuttings is occurring within the watershed. Specific actions proposed under all action alternatives includes:

- protection of the existing decadent stand in Sage Hen Creek (about 1 acre) with an 8-foot fence;
- planting cuttings in identified riparian areas and protect with 5-6 foot cages;
- disallowing commercial harvest in cottonwood stand;
- precommercial thinning of conifers less than 7" dbh (9" dbh for Alternatives Three and Six) competing with cottonwood;
- creation of snags and large woody material (LWM) where needed from competing conifers greater than 7 " dbh.

Noxious Weed Treatments

Twelve noxious weed sites, (five Canada thistle, three Russian knapweed, two spotted knapweed and two Dalmatian toadflax) in the watershed are proposed for manual methods of treatment (hand pulling and grubbing) (Reference Map 27).

Reconfiguration of Dedicated Old Growth Areas 02011, 02012, 02015, 02016, and 02039

Existing boundaries of dedicated old growths 02011, 02012, 02015, 02016, and 02039 would be adjusted to provide boundaries on logical breaks and where boundaries are easily identified on the ground. This action would not relocate existing DOGs or affect the existing DOG network (see Figure 2-1).

Reconfiguration of Dedicated Old Growth Area 02017

About 75 acres (16%) of DOG 02017, which is classified as young forest multi-stratum, would be reallocated as part of the corresponding proposed replacement old growth. This would move this acreage into active management for development of future old growth. This action would not result in any changes in total acres of functional old growth habitat currently available in DOG 02017 because it reallocates an area that does not meet current old growth standards.

Treatments of Dedicated Old Growth (DOG)

DOGs 02015 and 02039 would be precommercial thinned as a pretreatment for prescribed burning. Conifers 9" dbh and smaller would be thinned to 18'x18' spacing with retained wildlife cover clumps. Generated slash would be lopped, handpiled and later burned. Prescribed burning would be accomplished through limited ground creep between burn piles. Acres of thinning are included under the total acres thinned in each alternative.

DOGs 02016 and 02017 have had prescribed fire introduced through the South Silvies Prescribed Burn CE. These DOGs would be burned under this project as part of Burn Block 6.

Designation and Treatment of Replacement Old Growth (ROG) and Pileated Woodpecker Feeding Areas

To meet Forest Plan direction of providing ROG areas and feeding areas, ROG areas and feeding areas for DOGs 02011, 02012, 02016, 02017, and 02039 are proposed for designation. DOG 01101 (Blue Mountain Ranger District) has a ROG already established outside of the watershed. These designations are needed to counter the results of loss of habitat for old growth dependent species by having suitable replacement habitat. Long-term management strategies for each replacement area, which maintain or enhance the capability of timber stands to provide suitable old growth habitat in the future are proposed as follows:

ROG 02011

Acres: 170 acres (49% the size of corresponding DOG)
Seral Stage: Old Forest Multi Stratum (OFMS)
Treatment: Intermediate thin of the understory followed by a PCT to reduce competition stress on large tree component and move stand composition towards historic stand composition. Treat aspen inclusion to stimulate suckering and protect from browsing. Handpile and burn activity slash. A portion of this ROG is included in Burn Block 2, therefore natural fuels would also be reduced when the area is burned with landscape prescribed burning.

ROG 02012

Acres: 265 acres (55% the size of corresponding DOG)
Seral Stage: 50% OFMS, 50% Young Forest Multi Stratum (YFMS)
Treatment: Intermediate thin (168 acres) the understory and mid-canopy followed by a PCT (97 acres) of the understory to reduce competition stress on large tree component and move stand composition towards historic conditions. Treat aspen inclusion to stimulate suckering and protect from browsing. Handpile and burn activity slash. This ROG is included in Burn Block 2.

ROG 02015

These alternatives defer designation of a ROG for DOG 02015PW. No suitable adjacent areas exist within Silvies Canyon Watershed. In the future, planners should evaluate management opportunities when analyzing Silvies Valley Watershed.

ROG 02016

Acres: 267 acres (40% the size of corresponding DOG)
Seral Stage: 78% OFMS, 22% YFMS
Treatment: Commercial thinning of the mid-canopy ("thin from below") followed by a PCT of the understory to reduce competition stress on large tree component and improve the growth rates of retained trees to accelerate the development of old-growth structure. Handpile and burn activity slash. Portion of this ROG is included in Burn Block 6.

ROG 02017

Acres: 221 acres (77% the size of corresponding DOG)
Seral Stage: YFMS
Treatment: Commercial thinning ("thin from below") followed by a PCT of the understory to reduce competition stress on large tree component and improve the growth rates of retained trees to accelerate the development of old-growth structure. Handpile and burn activity slash. This ROG is included in Burn Block 7.

ROG 02039

Acres: 214 acres (55% the size of corresponding DOG)
Seral Stage: Stem Exclusion Closed Canopy (SEC)
Treatment: Commercial thinning ("thin from below") followed by a PCT of the understory to reduce competition between even-aged overstory trees, reduce stress on large tree component, and improve the growth rates of retained trees to accelerate the development of old-growth structure. Handpile and burn activity slash. This ROG is included in Burn Block 3.

Myrtle Creek Trail #308

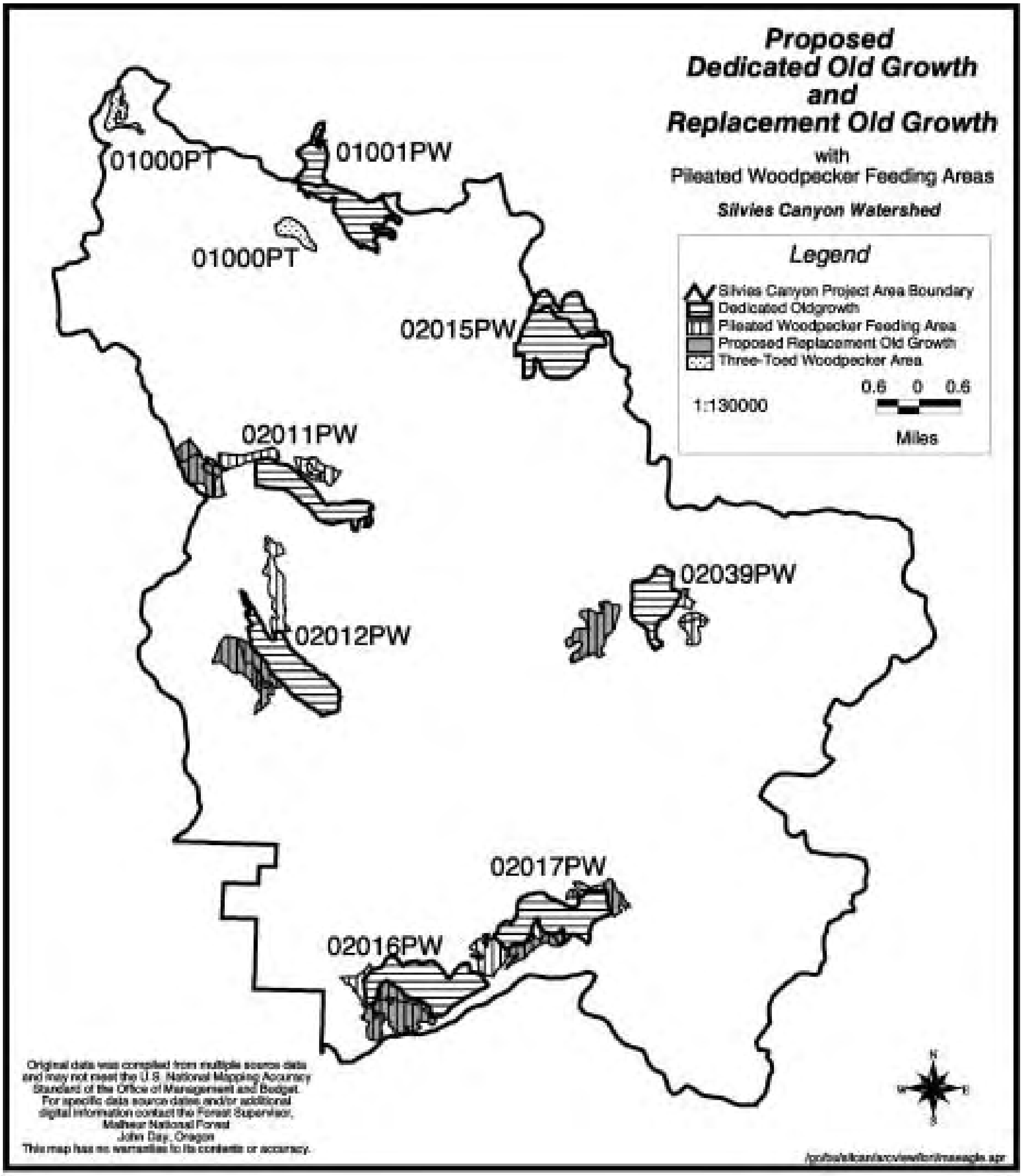


Figure 2-1. Silvies Canyon Proposed Dedicated Old Growth and Proposed Replacement Old Growth with Pileated Woodpecker Feeding Areas.

Alternative Two – The Proposed Action

The Proposed Action was developed to meet the purpose and need for the project. This proposal would move about 43,880 acres (67% of project area) in the project area towards historic ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 45% of current levels by closing and decommissioning one hundred forty-three miles.

The Proposed Action Alternative complies with the Malheur National Forest Land and Resource Management Plan except for the following:

- This alternative would require a non-significant, site-specific Forest plan amendment for reducing big game cover, habitat effectiveness index (HEI), and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- This alternative would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- This alternative would require a non-significant, site-specific Forest plan amendment for reconfiguration of Dedicated Old Growth areas (see section titled "Projects Common to All Action Alternatives").

Access and Travel Management

Roads selected for closure and decommissioning in this alternative are those roads that the IDT identified as needing to be closed to meet Forest Plan road density standards as well as address fish and wildlife habitat issues on specific roads. Three hundred six roads totaling 143 miles would be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned (Reference Maps 1 and 2).

Table 2-1. Proposed Action Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	212	75
Seasonal Closure	85	62
Decommission	5	3
Signed Year Round Closure	4	3
Total	**306**	**143**

Road reconstruction and temporary road construction activities are listed under vegetation condition activities because these activities are associated with proposed timber harvest.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5526 acres (Fuel Block 6),
- riparian habitat (spring) restoration activities on two springs,
- permanent closure of 10 roads totaling 1.51 miles
- Seasonal closure of 6 roads totaling 0.58 miles.

For more information on these activities please refer to the sections titled "Access and Travel Management," "Landscape Scale Fuels Treatment" and "Projects Common to All Action Alternatives."

Aspen Restoration

Aspen restoration activities common to all Action alternatives were listed in section titled "Projects Common to All Action Alternatives." Additional actions specific to this alternative include (Reference Maps 11 and 12):

Aspen stands located outside RHCAs (121 acres):

- Competing conifers less than 21" dbh may be commercially harvested where practical.
- Competing conifers of any size may be converted to snags or large woody material as needed.
- Competing conifers less than 7" dbh may be precommercially thinned.

Juniper Reduction

Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction would be accomplished commercially (where economical) and non-commercially on 537 acres (Reference Maps 11 and 12).

Commercial Harvesting and Associated Fuels Disposal Activities

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is determined non-viable by current market conditions) are proposed on 13,222 acres (Reference Maps 11 and 12 and Appendix B). Approximately 50,000 CCF or 26 MMBF would be harvested on six or more timber sales over three to five years. Specifically, the Forest Service proposes to commercial thin 5,885 acres, and intermediate thin 7,216 acres. Commercial harvest activities may take place within 121 acres of aspen stands outside RHCAs (see above) to accomplish restoration objectives. See Table 2-2.

Trees less than 21" dbh would be harvested to reduce stocking levels, reduce the incidence of disease and insect activity, and move species composition toward a historical range. Trees greater than 21" dbh would be maintained to provide large tree habitat for wildlife and late successional stand structure. Exceptions would be trees considered hazardous to worker or public safety. Within mixed conifer sites the main goal would be reducing the levels of white fir and Douglas-fir while increasing the growth of ponderosa pine. Within ponderosa pine sites the goal would be to increase the growth rates by reducing the number of trees on the site. Commercial harvest would take place in 2048 acres of LOS stands; however, stand structures would be maintained and viability would be enhanced. Commercial harvest would be accomplished using ground-based equipment such as a mechanical harvester, tractor or rubber-tired skidder. At least 80% of the harvest-generated logging slash would be removed to the landing for disposal by burning.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of precommercial thinning of the understory on 144 acres and commercially thinning 29 additional acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Road Maintenance and Temporary Access Roads

Road maintenance and temporary access roads are necessary to access proposed harvest units. Approximately 164 miles of road used for harvest activities would have road maintenance activities to varying degrees, dependent upon severity of road damage, erosion and sediment production, and designed maintenance level. Most commonly, maintenance would consist of hazard tree removal and brushing for sight distance, although some ground-disturbing activity would be necessary. Maintenance of existing drainage structures may be necessary to assure the integrity of their design function. Stricter measures (placement of rock, site specific drainage structures, and sediment fences) would be taken on specific roads with chronic sediment or erosion concerns to minimize water concentrations and related effects on surroundings.

No new permanent road construction is proposed. Approximately 3.5 miles of temporary access roads would be constructed (Reference Maps 11 and 12). These temporary access roads would be water barred and closed, and scarified and seeded with weed free seed as needed to meet NFMA requirements at the end of the project. The intent is to close these temporary access roads to motorized travel after harvest activities are completed.

Table 2-2. Proposed Action Commercial Harvest Acres By Treatment.

Treatment Prescription	Acres
Commercial Thin	5885
Intermediate Thin	7216
Aspen Restoration	121
Total	**13,222**

Post and Pole

Post and pole sales are proposed on 452 acres of lodgepole pine stands to reduce the risk of large scale insect outbreaks (Reference Maps 11 and 12). These lodgepole pine stands are susceptible to mountain pine beetle because the size of trees present in the stand and stand densities provide ideal beetle habitat. The purpose of this activity is to increase stand health by reducing the density of lodgepole pines.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 15,496 acres (Reference Maps 11 and 12 and Appendix B). The purpose of these activities is to reduce the number of trees less than 7" dbh, reduce the incidence and scale of disease and insect activity, and move species composition toward historical ranges. Within mixed conifer sites, the main goal would be the reduction in the proportion of white fir and Douglas-fir, while increasing the proportion and growth of ponderosa pine. Within ponderosa pine sites, the goal would be increasing the growth of ponderosa pine by reducing the number of trees on the site. These sites would be dominated by ponderosa pine but with more open tree spacing. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Landscape Scale Fuels Treatment

The Proposed Action proposes 39,277 acres within twelve fuel blocks for landscape scale fuels treatment activities (Reference Map 23).

Prescribed fire would be the main tool in removing the excess fuel accumulations and reducing the high risk of large stand-replacement fires. Underburning (the use of low intensity ground fire) would be common for managing mixed ponderosa pine and associated fir stands to reduce fire encroachment and perpetuate ponderosa pine. The objectives of fuels management are to reduce the fire hazard to a level where cost effective resource protection is possible should a wildfire ignite and to improve safety for firefighters.

Roads and natural boundaries would be the main fire control lines however, some areas may need hand- or plow-constructed line prior to ignition. Implementation of fuel treatments would occur over the next 15 years with periodic review as required by NEPA (see Chatper 2, Table 2-21 for the proposed implementation schedule). The exact timing and acreage would be determined by funding, availability of personnel and variations in weather patterns. Table 2-3 lists the acres by fuel block and burn priority.

Table 2-3. Proposed Action Fuel Blocks.

Fuel Block#	Acres	Priority
1	2484	6
2	5298	7
3	5023	3
4	2100	7
5	7798	5
6	5526	2
7	3988	1
8	940	2
9	895	1
10	3419	4
11	696	1
12	1110	2
Total	**39277**	

Alternative Three

This alternative was developed in response to an agreement made to analyze a non-harvest restoration alternative during an informal appeal resolution for the Crater Vegetation and Watershed Management Project EA and Decision Notice July 26, 1999, as well as comments made during the scoping process. Alternative Three proposes the greatest quantity of non-commercial restoration activities than any of the action alternatives. Alternative Three responds minimally to ecosystem health, watershed improvement, and economic objectives because it does not treat all sizes of trees. It treats those sizes of trees (less than 9 inches dbh) that are considered non-commercial.

This proposal would move about 43,212 acres (66% of the project area) in the project area towards historical ecosystem conditions with the use of noncommercial and precommercial activities. Stand compositions and densities of trees less than 9" dbh would move toward more resilient, historic levels. However, trees greater than 9" dbh would not be treated. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 41% of current levels by closing and decommissioning one hundred sixty miles.

Alternative Three complies with the Malheur National Forest Land and Resource Management Plan except for the following:

- This alternative may require a non-significant, site-specific Forest plan amendment for precommercial thinning trees greater than 7" dbh. This activity does not meet forest-wide standards for utilization (Standard #97).
- This alternative would require a non-significant, site-specific Forest plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Action Alternatives" on page 2-3).

Access and Travel Management

Roads selected for closure and decommissioning in this project are those roads that the IDT identified as needing to be closed to meet 1999 Forest Plan road density standards as well as to move towards the desired future condition road densities (1.0 mi/mi^2 on winter range and 1.5 mi/mi^2 on summer range) as described in the ROD for the Forest Plan (pg. 23). Additional specific roads having negative impacts on fish and wildlife habitat were also selected. Three hundred forty-five roads totaling 160 miles would be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned (Reference Maps 3 and 4).

Table 2-4. Alternative Three Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	273	105
Seasonal Closure	27	25
Decommission	35	25
Signed Year Round Closure	10	5
Total	**345**	**160**

Activities Proposed Within The Myrtle-Silvies Roadless Area
Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5526 acres within fuel block 6;
- precommercial thinning and associated fuels treatment on 729 acres of potential bald eagle winter roost areas;
- riparian habitat (spring) restoration activities;
- permanent closure of 18 roads totaling 2.56 miles;
- decommission of two roads totaling 0.30 miles; and
- seasonal closure of 2 roads totaling 0.16 miles.

For more information on these activities please refer to the following sections: Access and Travel Management, Riparian Habitat, Water Quality, and Fish Habitat, and Vegetation Condition.

Aspen Restoration
Aspen restoration activities are proposed on 268 acres (Reference Maps 13 and 14). Specific actions under this alternative were listed in section titled "Projects Common to All Action Alternatives" on page 2-3.

Juniper Reduction
Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction would be accomplished non-commercially on 515 acres by cutting and leaving, and lopping and scattering (Reference Maps 13 and 14.

Precommercial Thinning and Associated Fuels Treatment
Precommercial thinning and associated fuels treatment activities are proposed for 16,019 acres (Reference Maps 13 and 14). The purpose of these activities is to reduce the number of trees less than 9" dbh, reduce the incidence and scale of disease and insect activity, and move species composition toward historical ranges. The objectives for precommercial thinning are the same as those mentioned in the Proposed Action. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Within the two potential eagle roost stands, the main goal of precommercial thinning would be the reduction in the proportion of white fir and Douglas-fir, while increasing the proportion and growth of ponderosa pine. Fuels would be treated manually to reduce fuel accumulations.

Treatments in Silvies River Bald Eagle Management Area
To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of precommercial thinning of the understory on 173 acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Landscape Scale Fuels Treatment

Alternative Three proposes 39,277 acres within twelve fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives, project design and specific fuel blocks are the same as those in the Proposed Action.

Alternative Four

Alternative Four was developed in response to comments during the scoping process. Alternative Four would move about 44,450 acres (68% if the project area) in the project area toward historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 41% of current levels by closing and decommissioning one hundred sixty miles.

Alternative Four complies with the Malheur National Forest Land and Resource Management Plan except for the following:

- This alternative would require a non-significant, site-specific Forest plan amendment for reducing big game cover, habitat effectiveness index (HEI), and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- This alternative would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- This alternative would require a non-significant, site-specific Forest Plan amendment for cutting trees greater than 21" dbh within aspen stands.
- This alternative would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Alternatives").

Access and Travel Management

Roads selected for closure and decommissioning in this project are those roads that the IDT identified as needing to be closed to meet 1999 Forest Plan road density standards as well as to move towards the desired future condition road densities (1.0 mi/mi^2 on winter range and 1.5 mi/mi^2 on summer range) as described in the ROD for the Forest Plan (pg. 23). Additional specific roads having negative impacts on fish and wildlife habitat were also selected. Three hundred forty-five roads totaling 160 miles would either be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned (Reference Maps 3 and 4).

Table 2-5. Alternative Four Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	273	105
Seasonal Closure	27	25
Decommission	35	25
Signed Year Round Closure	10	5
Total	**345**	**160**

Road reconstruction and temporary road construction activities are listed under vegetation condition activities because these activities are associated with proposed timber harvest.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5526 acres within fuel block 6;
- precommercial thinning and associated fuels treatment on 729 acres of potential bald eagle winter roost areas;
- riparian habitat (spring) restoration activities;
- permanent closure of 18 roads totaling 2.56 miles;
- decommissioning of two roads totaling 0.30 miles; and
- Seasonal closure of two roads totaling 0.16 miles.

For more information on these activities please refer to the following sections, Access and Travel Management, Riparian Habitat, Water Quality, and Fish Habitat, and Vegetation Condition.

Aspen Restoration

Aspen restoration activities are proposed on 268 acres (Reference Maps 15 and 16). Aspen restoration activities common to all Action alternatives were listed in section titled "Projects Common to All Action Alternatives" on page 2-3. Additional actions specific to this alternative include:

Aspen stands outside RHCAs (121 acres):

- Competing conifers of any size may be converted to snags or large woody material as needed.
- Competing conifers of any size may be commercially harvested where practical.
- Competing conifers less than 7" dbh may be precommercially thinned.

Aspen stands inside RHCAs (147 acres):

- Competing conifers less than 9" dbh may be precommercially thinned.
- Competing conifers less than 21" dbh may be converted to large woody material and placed into RHCA.
- Competing conifers of any size may be converted into snags.

Juniper Reduction

Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction would be accomplished commercially (where viable) and non-commercially on 715 acres (Reference Maps 15 and 16).

Commercial Harvesting and Associated Fuels Disposal

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is not viable) are proposed on 15,701 acres (Reference Maps 15 and 16). Approximately 59,615 CCF or 31 MMBF would be harvested on several timber sales over several years. Specifically, the Forest Service proposes to:

- Commercial thin 7,107 acres, and intermediate thin 8,473 acres (commercial harvest would take place in 2,327 acres of LOS stands)

- Commercial harvest 121 acres of aspen stands outside RHCAs (trees greater than 21" dbh may be harvested)

Harvest activity details are the same as those related under the Proposed Action.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of commercial thinning of the understory on 173 acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Road Maintenance and Temporary Access Roads

Road maintenance and temporary access are necessary to access proposed harvest units.

- Approximately 192 miles of road used for harvest activities would have road maintenance activities.
- No new permanent road construction is proposed.
- Approximately 3.5 miles of temporary access roads would be constructed (Reference Maps 15 and 16).

Road maintenance and temporary access road details are the same as those described under the Proposed Action.

Table 2-6. Alternative Four Commercial Harvest Acres by Treatment.

Treatment Prescription	Acres
Commercial Thin	7107
Intermediate Thin	8473
Aspen Restoration	121
Total	**15,701**

Post and Pole

Post and pole sales are proposed on 452 acres of lodgepole pine stands (Reference Maps 15 and 16). The objectives are the same as those mentioned in the Proposed Action.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 16,725 acres (Reference Maps 15 and 16 and Appendix B). The purpose and objectives for precommercial thinning are the same as those mentioned in the Proposed Action. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Proposed precommercial thinning within the two potential eagle roost stands is the same as described in Alternative Three. Fuels would be treated manually.

Landscape Scale Fuels Treatment

Alternative Four proposes 39,277 acres within twelve fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives, project design and specific fuel blocks are the same as those in the Proposed Action.

Alternative Five

This alternative was developed in response to comments during the scoping process. This alternative would move about 35,248 acres (54% of the project area) in the project area towards historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Prescribed burning would be utilized on 25,311 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 74% of current levels by closing and decommissioning thirty-seven miles.

Alternative Five complies with the Forest Plan except for the following:

- This alternative would require a non-significant, site-specific Forest plan amendment for reducing big game cover and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- This alternative would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- This alternative would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Alternatives").

Access and Travel Management

Roads selected for closure and decommissioning in this project are those short spur roads no longer needed for management activities, and specific roads the IDT identified as needing to be closed to meet Forest Plan road density standards (Reference Maps 5 and 6). One hundred twenty-five roads totaling 37 miles would be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned.

Table 2-7. Alternative Five Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	104	23
Seasonal Closure	4	4
Decommission	16	9
Signed Year Round Closure	1	1
Total	**125**	**37**

Road reconstruction and temporary road construction activities are listed under vegetation condition activities because these activities are associated with proposed timber harvest.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5,526 acres within fuel block 6;

- precommercial thinning and associated fuels treatment on 729 acres of potential bald eagle winter roost areas;
- riparian habitat (spring) restoration activities;
- permanent closure of two roads totaling 0.09 miles; and
- decommissioning of two roads totaling 0.30 miles.

For more information on these activities please refer to the following sections: Access and Travel Management, Riparian Habitat, Water Quality, and Fish Habitat, and Vegetation Condition.

Aspen Restoration

Aspen restoration activities are proposed on 268 acres. Specific actions are the same as those in the Proposed Action.

Juniper Reduction

Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction would be accomplished commercially (where economical) and non-commercially on 535 acres (Reference Maps 17 and 18).

Commercial Harvesting and Associated Fuels Disposal

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is not viable) are proposed on 9,920 acres (Reference Maps 17 and 18 and Appendix B). Approximately 36,538 CCF or 19 MMBF would be harvested on several timber sales over several years. Specifically, the Forest Service proposes to:

- Commercial thin 4,411 acres, and intermediate thin 5,388 acres (commercial harvest would take place in 1,267 acres of LOS stands).
- Commercial harvest 121 acres of aspen stands outside RHCAs (trees greater than 21" dbh would not be harvested)

Harvest activity details are the same as those described under the Proposed Action.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of precommercial thinning of the understory on 144 acres and commercially thinning 29 additional acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Road Maintenance and Temporary Access Roads

Road maintenance and temporary access roads are necessary to access proposed harvest units.

- Approximately 163 miles of road used for harvest activities would have road maintenance activities.
- No new permanent road construction is proposed.

- Approximately 2.8 miles of temporary access roads would be constructed (Reference Maps 17 and 18).

Road maintenance and temporary access road details are the same as those described under the Proposed Action.

Table 2-8. Alternative Five Commercial Harvest Acres By Treatment.

Treatment Prescription	Acres
Commercial Thin	4411
Intermediate Thin	5388
Aspen Restoration	121
Total	**9,920**

Post and Pole

Post and pole sales are proposed on 452 acres of lodgepole pine stands (Reference Maps 17 and 18). The objectives are the same as those mentioned in the Proposed Action.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 13,733 acres (Reference Maps 17 and 18 and Appendix B). The purpose and objectives for precommercial thinning are the same as those mentioned in the Proposed Action. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Proposed precommercial thinning within the two potential eagle roost stands is the same as described in Alternative Three. Fuels would be treated manually.

Landscape Scale Fuels Treatment

Alternative Five proposes 25,311 acres within seven fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives and project design are the same as those mentioned in the Proposed Action. Table 2-9 lists the acres per fuel block. Burn priority is the same as listed under the Proposed Action.

Table 2-9. Alternative Five Fuel Blocks.

Fuel Block#	Acres
2	5298
5	7798
6	5526
7	3988
9	895
11	696
12	1110
Total	**25,311**

Alternative Six

This alternative was developed in response to management concerns over availability of appropriated funding. In the DEIS this alternative was number Ten. This proposal would move about 38,300 acres (58% of the project area) in the project area towards historical ecosystem conditions with the use of noncommercial and precommercial activities. In ponderosa pine stands, the goal of moving stand compositions and densities of smaller diameter trees (less than 9" dbh) toward more resilient, historic levels would be attempted with the use of prescribed fire. Prescribed burning would be utilized on 36,454 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of large stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 61% of current levels by closing and decommissioning eighty-seven miles. Roads identified as contributing sediment to streams that are not closed would be reconstructed.

Alternative Six complies with the Forest Plan except for the following:

- This alternative may require a non-significant, site-specific Forest Plan amendment for precommercial thinning trees greater than 7" dbh. This activity does not meet forest-wide standards for utilization (Standard #97).
- This alternative would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Action Alternatives").

Access and Travel Management

Roads selected for closure, decommissioning or reconstruction in this project are those roads that the IDT identified as having a negative impact on fish and wildlife habitat, and where actions would be necessary for restoration of watersheds. Additional roads determined unnecessary for management activities or that need to be closed to meet 1999 Forest Plan road density standards (Reference Maps 7 and 8) were also selected. Two hundred forty-seven roads totaling 87 miles would either be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned.

Table 2-10. Alternative Six Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	222	69
Seasonal Closure	7	10
Decommission	16	7
Signed Year Round Closure	2	1
Total	**247**	**87**

Road maintenance activities are proposed for portions of Forest Roads 3100286 (0.83 miles), 3100860 (2.33 miles), 3125971 (1.81 miles), and 3130129 (2.72 miles). These specific roads were identified as contributing sediment to streams and are proposed for maintenance because they were determined necessary for access. Forest Road 3100860 would be seasonally closed during the wet season to protect the road from further damage.

Roads would have road maintenance activities to varying degrees, dependent upon severity of road damage, erosion and sediment production, and designed maintenance level. Some ground-disturbing activity would be necessary. Maintenance of existing drainage structures may be necessary to assure the integrity of their design function. Stricter measures (placement of rock, site specific drainage structures, and sediment fences) would be taken on specific roads with chronic sediment or erosion concerns to minimize water concentrations and related effects on surroundings.

Road reconstruction activities are proposed for Forest Road 3125912 (2.12 miles). This specific road was identified as contributing sediment to a stream and is proposed for reconstruction because it requires realignment and was determined necessary for access.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5,526 acres within fuel block 6;
- precommercial thinning and associated fuels treatment on 729 acres of potential bald eagle winter roost areas;
- riparian habitat (spring) restoration activities;
- permanent closure of 10 roads totaling 1.51 miles; and
- decommissioning of two roads totaling 0.30 miles.

For more information on these activities refer to the following sections: Access and Travel Management, Riparian Habitat, Water Quality, and Fish Habitat, and Vegetation Condition.

Aspen Restoration

Aspen restoration activities are proposed on 268 acres (Reference Maps 19 and 20). Specific actions under this alternative are the same as those listed under Alternative Three.

Juniper Reduction

Juniper reduction is proposed to reduce juniper (less than 18" dbh) densities and distribution towards historical levels (Reference Maps 19 and 20). Juniper reduction would be accomplished within fuel blocks using prescribed fire.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 10,738 acres (Reference Maps 19 and 20 and Appendix B). The purpose and objectives for precommercial thinning are the same as those mentioned in Alternative Three. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Proposed precommercial thinning within the two potential eagle roost stands is the same as described in Alternative Three. Fuels would be treated manually.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of precommercial thinning of the understory on 173 acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Landscape Scale Fuels Treatment

Alternative Six proposes 33,374 acres within ten fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives and project design are the same as those mentioned in the Proposed Action. Table 2-11 lists the acres per fuel block. Burn priority is the same as listed under the Proposed Action.

Table 2-11. Alternative Six Fuel Blocks.

Fuel Block#	Acres
2	5298
3	5023
4	2100
5	7798
6	5526
7	3988
8	940
9	895
11	696
12	1110
Total	**33,374**

Alternative Seven - The Preferred Alternative

The Preferred Alternative was developed in response to management concerns on the issues presented in Chapter 1. The Preferred Alternative would move about 44,450 acres (68% of the project area) in the project area toward historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Prescribed burning would be utilized on 39,277 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 61% of current levels by closing and decommissioning eighty-seven miles. Roads identified as contributing sediment to streams that are not closed would be reconstructed.

Alternative Seven complies with the Forest Plan except for the following:

- This alternative would require a non-significant, site-specific Forest plan amendment for reducing big game cover, habitat effectiveness index (HEI), and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- This alternative would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- This alternative would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Action Alternatives").

Access and Travel Management

Roads selected for closure, decommissioning or reconstruction in this project are those roads that the IDT identified as having a negative impact on fish and wildlife habitat, and where actions would be necessary for restoration of watersheds. Additional roads determined unnecessary for management activities or that need to be closed to meet 1999 Forest Plan road density standards were also selected. Two hundred forty-seven roads totaling 87 miles would be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned (Reference Maps 9 and 10).

Table 2-12. Preferred Alternative Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	222	69
Seasonal Closure	7	10
Decommission	17	11
Signed Year Round Closure	2	1
Total	**247**	**87**

The Preferred Alternative also proposes to decommission about 4 miles of Forest Road 3100035. This is the portion of the 3100035 road that was closed under the Forest Plan, breached, and closed again in 2001. Currently this road is closed to motorized access. However the mere presence of the road encourages motorized vehicles to ford the Silvies River and travel into the Myrtle-Silvies Roadless Area. Additionally, the southwest portion of the road accesses the Myrtle-Silvies Roadless Area from private property. This alternative would decommission about 2 miles on both ends of the 3100035 road to discourage motorized vehicles from entering the Myrtle-Silvies Roadless Area.

Road maintenance activities are proposed for portions of Forest Roads 3100286 (0.83 miles), 3100860 (2.33 miles), 3125971 (1.81 miles), and 3130129 (2.72 miles). These specific roads were identified as contributing sediment to streams and are proposed for maintenance because they were determined necessary for access. Forest Road 3100860 would be seasonally closed during the wet season to protect the road from further damage.

Road reconstruction activities are proposed for Forest Road 3125912 (2.12 miles). This specific road was identified as contributing sediment to a stream and is proposed for reconstruction because it requires realignment and was determined necessary for access.

Additional road maintenance activities (associated with proposed timber harvest) as well as road maintenance activity details are disclosed in the vegetation condition activities.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- prescribed burning activities on 5,526 acres within fuel block 6;
- precommercial thinning and associated fuels treatment on 729 acres of potential bald eagle winter roost areas;
- riparian habitat (spring) restoration activities;
- permanent closure of 10 roads totaling 1.51 miles; and
- decommissioning of three roads totaling 4.30 miles.

For more information on these activities please refer to the following sections: Access and Travel Management, Riparian Habitat, Water Quality, and Fish Habitat, and Vegetation Condition.

Aspen Restoration

Aspen restoration activities are proposed on 268 acres (Reference Maps 15 and 16). Aspen restoration activities common to all Action alternatives were listed in section titled "Projects Common to All Action Alternatives." Additional actions specific to this alternative include:

Aspen stands outside RHCAs (121 acres):

- Competing conifers greater than 21" dbh may be converted to snags or large woody material as needed.
- Competing conifers less than 21" dbh may be commercially harvested where practical.
- Competing conifers less than 7" dbh may be precommercially thinned.

Aspen stands inside RHCAs (147 acres):

- Competing conifers less than 9" dbh may be precommercially thinned.
- Competing conifers less than 21" dbh may be converted to large woody material and placed into RHCA.
- Competing conifers of any size may be converted into snags.

Juniper Reduction

Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction will be accomplished commercially (where viable) and non-commercially on 715 acres (Reference Maps 15 and 16).

Commercial Harvesting and Associated Fuels Disposal

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is not viable) are proposed on 15,701 acres (Reference Maps 15 and 16 and Appendix B). Approximately 59,615 CCF or 31 MMBF would be harvested on several timber sales over several years. Specifically, the Forest Service proposes to commercial thin 7,107 acres, and intermediate thin 8,473 acres. Commercial harvest activities would take place in 121 acres of aspen stands to accomplish restoration objectives (see Table 2-13). Commercial harvest would take place in 2,327 acres of LOS stands; however, stand structures would be maintained and viability would be enhanced. Harvest activity details are the same as those related under the Proposed Action.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of commercial thinning of the understory on 173 acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Road Maintenance and Temporary Access Roads

Road maintenance and temporary access roads are necessary to access proposed harvest units.

- Approximately 192 miles of road used for harvest activities would have road maintenance activities.
- No new permanent road construction is proposed.
- Approximately 3.5 miles of temporary access roads would be constructed (Reference Maps 15 and 16).

Road maintenance and temporary access road details are the same as those described under the Proposed Action.

Table 2-13. Preferred Alternative Commercial Harvest Acres By Treatment.

Treatment Prescription	Acres
Commercial Thin	7107
Intermediate Thin	8473
Aspen Restoration	121
Total	**15,701**

Post and Pole

Post and pole sales are proposed on 452 acres of lodgepole pine stands (Reference Maps 15 and 16). The objectives are the same as those mentioned in the Proposed Action.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 16,723 acres (Reference Maps 15 and 16 and Appendix B). The purpose and objectives for precommercial thinning are the same as those mentioned in the Proposed Action. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Proposed precommercial thinning within the two potential eagle roost stands is the same as described in Alternative Three. Fuels would be treated manually.

Landscape Scale Fuels Treatment

The Preferred Alternative proposes 39,277 acres within twelve fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives, project design and specific fuel blocks are the same as those in the Proposed Action.

Alternative Seven-A

Alternative Seven-A was developed in response to comments made on the DEIS. Specifically, comments were made on proposed activities within the Myrtle-Silvies Roadless Area. Generally, public comments were opposed to any activities within the Myrtle-Silvies Roadless Area. Alternative Seven-A was developed by the IDT to respond to these comments. Alternative Seven-A is similar to the preferred alternative with no activities proposed in the Myrtle-Silvies Roadless Area except for road closures and decommissioning. Alternative Seven-A would move about 39,144 acres (60% of the project area) in the project area toward historical ecosystem conditions with the use of commercial, noncommercial and precommercial activities. Prescribed burning would be utilized on 33,751 acres to move the area towards HRV (5-23 year fire cycle) and reduce the risk of stand-replacement wildfires. Miles of open roads in the watershed would be reduced to 61% of current levels by closing and decommissioning eighty-seven miles. Roads identified as contributing sediment to streams that are not closed would be reconstructed.

Alternative Seven-A complies with the Forest Plan except for the following:

- This alternative would require a non-significant, site-specific Forest plan amendment for reducing big game cover, habitat effectiveness index (HEI), and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- This alternative would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- This alternative would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas (see section titled "Projects Common to All Action Alternatives").

Access and Travel Management

Roads selected for closure, decommissioning or reconstruction in this project are those roads that the IDT identified as having a negative impact on fish and wildlife habitat, and where actions would be necessary for restoration of watersheds. Additional roads determined unnecessary for management activities or that need to be closed to meet 1999 Forest Plan road density standards were also selected. Two hundred forty-seven roads totaling 87 miles would be permanently closed with an earth berm, sign, or gate; seasonally closed with a sign; or decommissioned (Reference Maps 7 and 8).

Table 2-14. Alternative Seven-A Road Closures.

Type of Closure	Roads	Miles
Permanent Closure	222	69
Seasonal Closure	7	10
Decommission	16	7
Signed Year Round Closure	2	1
Total	**247**	**87**

Road maintenance activities are proposed for portions of Forest Roads 3100286 (0.83 miles), 3100860 (2.33 miles), 3125971 (1.81 miles), and 3130129 (2.72 miles). These specific roads were identified as contributing sediment to streams and are proposed for maintenance because they were determined necessary for access. Forest Road 3100860 would be seasonally closed during the wet season to protect the road from further damage.

Road reconstruction activities are proposed for Forest Road 3125912 (2.12 miles). This specific road was identified as contributing sediment to a stream and is proposed for reconstruction because it requires realignment and was determined necessary for access.

Additional road maintenance activities (associated with proposed timber harvest) as well as road maintenance activity details are disclosed in the vegetation condition activities.

Activities Proposed Within The Myrtle-Silvies Roadless Area

Proposed activities within the Myrtle-Silvies Roadless Area include:

- permanent closure of 10 roads totaling 1.51 miles; and
- decommissioning of two roads totaling 0.30 miles.

For more information on these activities please refer to the Access and Travel Management section.

Aspen Restoration

Aspen restoration activities are proposed on 268 acres (Reference Maps 21 and 22). Aspen restoration activities common to all Action alternatives were listed in section titled "Projects Common to All Action Alternatives." Additional actions specific to this alternative include:

Aspen stands outside RHCAs (121 acres):

- Competing conifers greater than 21" dbh may be converted to snags or large woody material as needed.
- Competing conifers less than 21" dbh may be commercially harvested where practical.
- Competing conifers less than 7" dbh may be precommercially thinned.

Aspen stands inside RHCAs (147 acres):

- Competing conifers less than 9" dbh may be precommercially thinned.
- Competing conifers less than 21" dbh may be converted to large woody material and placed into RHCA.
- Competing conifers of any size may be converted into snags.

Juniper Reduction

Juniper reduction is proposed to reduce juniper densities and distribution towards historical levels. Some trees 12-18" dbh with old growth characteristics and all trees over 18" dbh would be left. Juniper reduction would be accomplished commercially (where viable) and non-commercially on 715 acres (Reference Maps 21 and 22).

Commercial Harvesting and Associated Fuels Disposal

Commercial harvesting and associated fuels disposal activities (and precommercial thinning where commercial harvesting is not viable) are proposed on 15,701 acres (Reference Maps 21 and 22 and Appendix B). Approximately 59,615 CCF or 31 MMBF would be harvested on several timber sales over several years. Specifically, the Forest Service proposes to commercial thin 7,107 acres, and intermediate thin 8,473 acres. Commercial harvest activities would take place in 121 acres of aspen stands to accomplish restoration objectives (see Table 2-15). Commercial harvest would take place in 2,327 acres of LOS stands; however, stand structures would be maintained and viability would be enhanced. Harvest activity details are the same as those related under the Proposed Action.

Treatments in Silvies River Bald Eagle Management Area

To protect and maintain stand characteristics in the Silvies River Bald Eagle Management Area (BEMA), silvicultural treatments would consist of commercial thinning of the understory on 173 acres within close proximity of the bald eagle nest. Acres of thinning are included under the total acres thinned in each alternative. Fuels management would consist of introducing low intensity prescribed fire into about 174 acres of forest habitat within the BEMA. These acres are a portion of Burn Block 12. All activities would be done outside of the bald eagle nesting season (see section on Design Criteria and Mitigation).

Road Maintenance and Temporary Access Roads

Road maintenance and temporary access are necessary to access proposed harvest units.

- Approximately 192 miles of road used for harvest activities would have road maintenance activities.
- No new permanent road construction is proposed.
- Approximately 3.5 miles of temporary access roads would be constructed (Reference Maps 21 and 22).

Road maintenance and temporary access road details are the same as those described under the Proposed Action.

Table 2-15. Alternative Seven-A Commercial Harvest Acres by Treatment.

Treatment Prescription	Acres
Commercial Thin	7107
Intermediate Thin	8473
Aspen Restoration	121
Total	**15,701**

Post and Pole

Post and pole sales are proposed on 452 acres of lodgepole pine stands (Reference Maps 21 and 22). The objectives are the same as those mentioned in the Proposed Action.

Precommercial Thinning and Associated Fuels Treatment

Precommercial thinning and associated fuels treatment activities are proposed for 16,047 acres (Reference Maps 21 and 22 and Appendix B). The purpose and objectives for precommercial thinning are the same as those mentioned in the Proposed Action. Fuels would be treated either mechanically or manually to reduce fuel accumulations, allowing for the use of prescribed fire.

Proposed precommercial thinning within the two potential eagle roost stands is the same as described in Alternative Three. Fuels would be treated manually.

Landscape Scale Fuels Treatment

Alternative Seven-A proposes 33,751 acres in eleven fuel blocks for landscape scale fuels treatment activities (Reference Map 23). The objectives and project design are the same as those mentioned in the Proposed Action. Table 2-16 lists the acres by fuel block. Burn priority is the same as listed under the Proposed Action.

Table 2-16. Alternative Seven-A Fuel Blocks.

Fuel Block#	Acres
1	2484
2	5298
3	5023
4	2100
5	7798
7	3988
8	940
9	895
10	3419
11	696
12	1110
Total	**33,751**

Road Closure Definitions Common to All Action Alternatives

Permanent, Seasonal and Signed Year Round Closures

Permanent, seasonal and signed yearlong closures are roads on which motorized traffic has been excluded by regulation, barricade, and blockage or by obscuring the entrance. Permanent, seasonal and signed year round closures are closed roads. A closed road is still an operating facility on which motorized traffic has been removed (year long or seasonal) until needed for resource management and remains on the Forest Road Transportation System. The following will be considered for closed roads:

1) Yearlong and seasonal road closures would leave the road in a stable, drivable, condition with the road closed to vehicles except for emergency or permitted use. Administrative use would be limited and/or restricted.

2) One objective is to limit motorized vehicle traffic on native surface roads to reduce erosion. The roads would be left in a stable condition and maintained. The closed roads would reduce wildlife disturbance.

3) Closed roads would be closed with closure signs, or earth berms, and to a lesser extent, pole or steel gates, as applicable for effective closures.

Decommissioned Road

Decommissioned roads are roads whose function has been terminated and impacts to forest resources in the process of termination have been mitigated. A decommissioned road is removed from the Forest Development Transportation System inventory and is no longer part of the forest road system.

Activities that terminate the function of a road and mitigate any adverse impacts to forest resources may include:

- blocking the entrance;
- scattering wood or other material on the roadbed;
- re-vegetating;
- closing the "area" to motorized use until the former road re-vegetates;
- water barring and removing fills and culverts;
- reestablishing drainage-ways; and
- pulling back unstable road shoulders.

Existing Pole Barrier Road Closure in Myrtle Park Area

Design Features, Management Practices and Mitigation Measures

Design features, management practices and mitigation measures are site-specific management activities designed to reduce the adverse impacts of proposed activities. They would be implemented to avoid, minimize, reduce, or eliminate impacts caused by implementation of the action alternatives. These practices would be applied to project design and layout, in contracts, and permit requirements. The design features, management practices and mitigation measures listed below are in addition to standard management direction in the Forest Plan. Design features, management practices and mitigation measures are applied to all alternatives where applicable. For example, design features, management practices and mitigation measures specific to harvest related activities would not be applicable to Alternatives Three and Six because they do not propose harvest activities.

Design Features to Protect Soils and Water Quality

Road Closures and Decommissioning

Closed roads would have drainage features and running surface restored and maintained to a functional level.

All drainage structures (stream crossings and relief culverts) on roads that are being decommissioned would be removed, natural drainage re-established and left in a self-maintaining condition. Sites would be stabilized and seeded in a manner to prevent erosion, and drainages would be constructed to prevent erosion.

Road decommissioning within RHCAs would take place only during dry conditions (summer/fall) to reduce erosion potential.

The following best management practices should reduce the quantity of sediment delivered to stream channels.

For culvert removals:

- Observe ODFW in channel work period (October 1 through March 31) for work in live channels to reduce effects on fish. Remove culverts on intermittent channels when channels are dry.
- Use silt fences and straw bales where needed to prevent sediment from reaching stream channels.
- Place fill material excavated during removal of culverts in stable areas away from stream channels.
- Re-contour road ingress and egress to the natural grade of the hill slope. Re-establish the natural longitudinal profile and gradient of the stream within the confines of the road right-of-way.

For scarification/ripping of road surfaces:

- Use filter cloth fences, terre matting or straw mulch (certified weed free) to prevent transport of fine sediment to stream channels where scarified or ripped road surfaces are adjacent to stream channels.

Responsible Specialists: Sale Administrator or Engineer.

Harvest Related Activities

Design Criteria to minimize impacts to Riparian Habitat Conservation Areas (RHCAs)
INFISH buffers, for the purpose of managing streamside vegetation and habitat to maintain or improve water quality (RHCAs), would be employed on all streams, ponds, reservoirs, springs, seeps, bogs, and wetlands. INFISH buffers are defined as 300 feet each side of fish-bearing streams (Category 1), 150 feet each side of nonfish-bearing perennial streams and wetlands greater than 1 acre (Category 2 and 3), and 50 feet each side of nonfish-bearing intermittent streams and wetlands less than 1 acre (Category 4). The following design criteria allow aspen restoration within RHCAs while meeting riparian management objectives.

There would be no skidding across Category 1 through 4 streams and RHCAs.

There would be no use of existing landing(s) and no creation of new landings within Category 1 through 4 streams.

Hazard trees within or adjacent to RHCAs would be felled towards streams or draws when possible and left for large woody debris. Trees that fall across the road will be moved off the road and become part of the LWD component in the RHCA.

Trees felled for timber harvest and removal near RHCAs would be directionally felled away from stream buffers when possible to prevent disturbance.

No precommercial thinning or slash treatment would occur within 50 feet of the outer edge of the riparian vegetation along Category 1 and 2 streams or within 50 feet of the streambank, whichever is greater. Precommercial thinning slash in the RHCAs would be handpiled on dry ground and in piles no larger than a Volkswagen beetle, thus reducing fire intensity and subsequent soil damage and erosion.

Responsible Specialist: Project Coordinators, Sale Administrator, Logging Systems Specialist, Marking Crew, Silviculturist, and Fisheries Biologist/Hydrologist.

Design Criteria for Logging and Slash Piling Operations
To lessen soil disturbance, all ground-based logging equipment would be restricted to slopes under 35%. Slopes over 35% would require use of cable line to pull in logs.

Winter Logging: Suitable conditions to meet winter logging objectives are defined as either of the below conditions:

- Frozen ground conditions (frozen to a minimum of four inches).
- One foot of packed snow.

- Dispersed skidding would occur only when the above conditions are met. The objective of these requirements is to prevent tires and/or tracks from breaking through the snow pack or frozen ground to the soil below or riding over unfrozen ground conditions, resulting in detrimental compaction, puddling or displacement. If these detrimental impacts are observed, work shall cease, regardless of snow or ice depth. Winter logging under closely monitored winter logging specifications would help reduce detrimental compaction and displacement.

Dry Soil Conditions: Dry soil operating requirements are for the purpose of reducing soil compaction, limiting soil displacement and restricting the area of detrimental effects to 20% or less. These requirements are as follows:

- Skidding would be restricted to existing or designated skid trails at approximately 100-140 foot spacing; using existing skid trails whenever possible and operating during the dry season (generally July 1 - Oct. 15) using Best Management Practices (BMP's).
- Mechanized harvest equipment (i.e. feller-bunchers) would be restricted to existing skid trails whenever possible. Off-trail travel would be restricted to the minimum number of passes required (typically three passes or fewer) to remove the designated trees.
- The use of low static ground pressure equipment with less than 7.5 pounds per square inch.
- Operating during the dry season (generally July 1 - Oct. 15) with observations and/or measurements made of soil moisture levels to minimize soil compaction, displacement and puddling. Operations off skid trails should be confined to periods when soil moisture contents are less than 18 % for all soils except volcanic ash soils. Moisture contents for volcanic ash soils should be at least 10% to avoid excessive displacement and less than 30 % to minimize compaction. Puddling occurs when soil moisture levels are high, and when soil moisture conditions result in detrimental rutting (soil becomes molded and vehicle tracks cause rutting depths of 6 inches or more) logging shall be stopped.

Grapple-piling would require dry soil conditions as discussed above when operating off skid trails and the use of low ground pressure equipment (less than 7.5 lbs./sq. in. static). Equipment used to grapple pile precommercial thinning slash would be required to stay on existing skid trails, as much as possible, in order to reduce soil compaction or displacement. Single passes of grapple piling equipment off skid trails would be permitted when necessary to reach slash. The boom length would be specified as having a 20-foot minimum reach to enable grapple-piling equipment to reach slash from the skid trails as much as possible.

Harvest operations and/or grapple piling occurring outside the snow-covered/frozen soil provisions would not be permitted if soil conditions become wet enough to cause puddling and standing water.

Temporary roads opened to access harvest units would be scarified and seeded after use as needed, and water-barred and blocked.

Harvest equipment would be restricted to roads, landings, and skid trails except for feller bunchers. Roads, temporary access, landings, and skid trails would be confined to 20% or less of the activity area for all timber harvest practices (including disposal of slash) as specified in the Forest Plan.

Approved designated skid trails would be required on all harvest units to reduce soil compaction and displacement. Existing skid trails would be used whenever possible; however, no skid trails would be used within RHCAs. Skidding equipment would be restricted to skid trails. Tractor trails would not exceed approximately 14 feet in total width over 90% of the length except where otherwise authorized. Skid trail and trail spacing would not generally be closer than 120 feet center to center, where parallel trails are used and 90 feet, center to center at midpoint when radial trails are used. Exceptions would exist where skid trails converge at landings. Water-barring and/or slash placement on skid trails would be required where the potential for erosion exists. Forest Service Manual direction and the Forest Plan recommend that skid trails over 20% gradient and areas of disturbed soil within 200 feet of streams be erosion control seeded and that these skid trails be water barred.

Subsoiling of skid trails and compacted areas to restore infiltrative capacity and reduce potential for surface flow, as well as scattering woody material over disturbed sites to provide enhanced surface cover, dissipate velocities, and trap sediment on the slope, would be implemented on a site specific basis as needed as determined by hydrologist or soil scientist.

When subsoiling is determined necessary, it would occur when soil moisture conditions are less than 20% at depths of 4-16 inches. Subsoiling volcanic ash soils may occur at soil moisture levels up to 30% with recommendation by a hydrologist or soil scientist. Subsoiling within 66 feet of springs and seeps and within 33 feet of the bottoms of draws would be avoided.

Subsoil landings where compaction and potentially hydrophobic soil exist, if soil depth and rock content permit subsoiling. Landings would be seeded with local native seed or non-persistent non-native species, or planted with conifers where appropriate.

Native grass seeding would be used where ground-disturbing activities (temporary road construction and road reconstruction, decommissioned roads, skid trails, and landings) have exposed the soil and the establishment of vegetative cover is needed to minimize erosion and protect water quality. Grass seed would be "local" native seed or non-persistent non-native species.

Infiltration buffers (areas off limits to machinery to prevent compaction and allow water infiltration) of at least 50 feet would be used at interfaces of timber with sage steppe and scablands to avoid channelizing and disturbing these areas. Boomed yarders and boomed feller bunchers can help in reducing disturbance within these buffers.

For all activities, no decking of logs or parking of equipment would be permitted in scab flats or meadows in order to protect these areas from resource damage. Scab and rock flats would be avoided and not utilized for landings and skid trails because of soil characteristics and difficulties with restoration and mitigation.
Responsible Specialist: Sale Administrator and Soil Scientist/Hydrologist.

Prescribed Burning Activities

Constructed fire lines would be water barred at locations where erosion is likely. Fire lines that could create motorized vehicle access would either be obliterated or camouflaged. Incidental transportation system developed during firing or suppression activities would have erosion control measures implemented and be obliterated or camouflaged.

No direct lighting would take place in Category 1 and 2 RHCA. Incidental ignition may take place within Category 4 RHCA. Incidental ignition may occur during aerial ignition, however, the intent is no direct lighting in RHCA.

To reduce impact to shade, all category 1 streams within Fuel Blocks 1 and 10 must be spring burned to black line RHCA to avoid any additional burning in riparian area during fall burns. Burning within fuels block 10 must be in coordination with a wildlife biologist in order to protect Goshawk Nest Areas.

To avoid destruction of riparian hardwoods, water dependent vegetation, and LWM, direct lighting would not occur within RHCA. If portions of an RHCA are inadvertently burned too hot and LWM is consumed or riparian hardwood roots are killed, snags in excess of 100% PPL, may be felled to provide down wood and willow, alder, and aspen would be planted where necessary. If excess snags are not available, Type 1 - Reserve Trees (live trees that are defective or deformed) would be felled to provide uncharred down wood. Planting of willow, alder, and aspen would be protected from browsing damage by cattle and big game by fencing, slash placement, and/or caging where appropriate.

Unrecorded or isolated aspen stands that are inadvertently burned during prescribed burning activities would be monitored for regeneration and to determine if protection measures need to be installed.

Responsible Specialists: Fuels.

Mitigation Measures to Protect Soils and Water Quality

The following mitigation measures are required to aid in minimizing, reducing, or eliminating impacts caused by implementation of the Proposed Action or any action alternative. The mitigation measures reflect, or are in addition to, standard management direction in the Forest Plan. BMPs will be included to insure minimal ground disturbance and to provide adequate mitigation (see Appendix 1). Effectiveness/implementation monitoring will be performed by TMA/resource personnel (the presale technician will assure BMPs are met during sale preparation and the sale administrator will assure BMPs are met during timber sale operations). Designated skid trails or the use of low ground-pressure mechanical harvesting systems will be utilized to protect soils from excessive disturbance. Regional Standards require that a C clause be included to prevent adverse cumulative soil impacts (<20%) and protect soils. To meet these standards, it will be necessary to harvest during dry or winter (frozen or snow covered) conditions, and use designated skid trails and landings.

Logging slash should be left and scattered on skid roads, landings and throughout the harvested area to meet Forest Plan Guidelines.

Soils/Water Quality Mitigation

All skid trails would be closed at the conclusion of harvest activities using Best Management Practices and applicable timber sale contract provisions. Skid trails would be waterbarred and seeded to minimize erosion and reduce the likelihood of noxious weed establishment. All landings and other disturbed areas would be tilled and seeded with either native or desirable introduced grasses and covered with mulch or small coarse woody debris after completion of logging.

Energy dissipaters such as waterbars would be installed on all native surface roads used for log hauling to reduce soil erosion and potential sedimentation into streams. This would be done after hauling is completed. During construction of waterbars, machinery would be restricted to the road prism and utilize an angled blade.

All temporary access roads would be checked for ground disturbance, compaction, and drainage problems and treated if necessary. If deemed necessary by the Sale Administrator, Hydrologist or Soil Scientist, treatment could include subsoiling, seeding, and mulching and drainage structures.

Disturbed soil that occurs 100-200 feet from a stream would be seeded (certified weed free) or have mulching applied to prevent sediment transport into the stream. This would apply to soil disturbance greater than 200 feet from a stream where there is risk of transport of sediment into the stream. Seeding would be done on all skid trails with slopes greater than 20% where there is soil disturbance.
Responsible Specialists: Sale Administrator, Soils Scientist, Silviculturist, Hydrologist and/or Fisheries Biologist, Fuels Specialist and Engineer.

Best Management Practices

Best Management Practices (BMPs) are the primary mechanisms to enable the achievement of water quality standards (Environmental Protection Agency, 1987). BMPs have been selected and tailored for site-specific conditions to arrive at the project level BMPs for the protection of water quality. BMPs are a supplement to the General Water Quality Best Management Practices, Pacific Northwest Region, 1988. See Appendix F for complete documentation of BMPs.

Design Features to Protect Wildlife

PETS (Proposed, Endangered, Threatened, and Sensitive) Species

Goal: All Proposed, Endangered, Threatened, and Sensitive species would be protected so as not to:

- *likely jeopardize the continued existence, or cause adverse modification of habitat of proposed, endangered or threatened species or*
- *contribute to the loss of viability of sensitive species.*

If any new occurrences of listed species are found during project implementation, these species would be protected as described in the policy guidelines found in FSM 2670 and timber sale contract.
Responsible Specialists: Wildlife Biologist.

Spotted Frog Hibernation Habitat

Goal: Avoid changing or reducing potential frog hibernation sites around/near springs.
Water developments for livestock would be designed so they do not dewater spring sites.
Responsible Specialists: Rangeland Management Specialist, Fisheries and Wildlife Biologist.

Snags/Down Wood

Goal: Provide dead and defective tree habitat at levels capable of supporting viable population of associated wildlife (Regional Forester's Forest Plan Amendment #2).

Snags - Retain all snags to provide for Forest Plan standard levels of primary cavity excavators. Snags, which are deemed a hazard to operations, may be felled, but would be left to provide down logs as identified below.

Down logs - Maintain down logs for wildlife habitat and long-term site productivity by providing the levels indicated below. Any snags 150 feet away from the edge of an open road that are cut because they pose a hazard to operations would be left to remain as down logs to meet Forest Plan standards, unless a wildlife biologist approves removal.

Table 2-17. Down Wood Requirements.

Species	Pieces per acre	Minimum Diameter at Small End (inches)	Minimum Piece Length	Total Length feet/acre
Ponderosa Pine	3 - 6	12"	> 6 feet	20 – 40
Mixed Conifers	15 - 20	12"	> 6 feet	100 - 140

To reduce the impact of burning on snags and down logs, hand and grapple piles would be built at least 30 feet away from 12-inch DBH or larger snags and 10 feet away from down logs that meet the Forest Plan standards above (Tiedemann et al. 2000).

Direct ignition of snags and down wood would not occur. Prescribed burning should not eliminate or consume existing down wood pieces in excess of 3 inches total diameter or 1 1/2 inch per side.

Responsible Specialists: Fuels, Sale Administrator, and Wildlife Biologist.

Wildlife Connectivity Corridors

Goal: Maintain or improve connectivity between blocks of LOS by perpetuating stand structures and canopies used by animals as movement corridors.

Mechanical and prescribed burn treatments within connectivity corridors (Reference Map 28) would be conducted so as to maintain canopy closures within the top one-third of their site potential. Corridors will be at least 400 feet wide at their narrowest point. Treatments would maintain medium diameter or larger trees so that they remain common. Patches of, or scattered, understory vegetation will be retained where an understory exists in the corridors (Forest Plan Amendment #2).

In connectivity corridors, 50% of the area would not have PCT treatment leaving a mosaic pattern of trees and openings distributed throughout the unit to provide diversity, continuity, and hiding cover.

While fire would be allowed to creep into corridors, no direct ignition would occur within corridors to help maintain understory vegetation and other forest characteristics in corridors.

Responsible Specialists: Fuels, Sale Administrator, and Wildlife Biologist.

Hiding Cover (for Big Game and Other Species)

Forest Plan Standard 28 (IV-28) states retain sufficient hiding cover to mitigate [any cover] shortage. To provide additional hiding cover for big game and therefore partially mitigate the loss of [thermal] cover, 5-20% of the areas designated for precommercial thin would not be treated leaving pockets of hiding cover. Retaining cover would also benefit goshawk prey species. On north slopes, wetter mixed conifer sites, and in goshawk PFAs, approximately 10-20% of the area would not be treated, whereas in south slopes or drier sites approximately 5-15% would be left un-thinned. Prescribed burning would be allowed to occur in and remove up to 50% of these patches of hiding cover (post-fire hiding cover would be expected to be left on 5-10% or more of the pre-treatment hiding cover area for each of these stands). Design criteria that include an annual pre-treatment review of monitoring (see migratory bird and hiding cover design criteria below) would be used to adjust burning methods to reach these goals.
Responsible Specialists: Fuels, Sale Administrator, and Wildlife Biologist.

Big Game Winter Range (MA-4A)

Goal: Avoid disturbing wintering big game in a significant or prolonged manner.
From **December 1 through April 1,** management activities that could disturb wintering big game in a significant or prolonged manner would not be allowed. If proposed activities are determined to have little or no affect on wintering big game this restriction would be waived.
Responsible Specialists: Wildlife Biologist.

Big Game Calving/Fawning Habitat

Goal: Avoid disturbing calving/fawning big game in a significant or prolonged manner.
From **May 1 to June 30**, burning crews will watch for lone female elk, deer, or antelope. If crews see any of these animals, they will search the immediate area for calves or fawns and avoid lighting where young animals are hiding. Burning crews do not need to monitor elk and deer outside the May 1st to June 30th window.
Responsible Specialists: Wildlife Biologist.

Raptor Nests (General)

Goal: Protect known active nests and future nest sites and avoid disturbing breeding birds by using spatial buffers and seasonal restrictions.
District wildlife personnel would be contacted for up-to-date raptor nest locations and activity status before implementation of timber harvest or prescribed burning activities. Existing raptor nests or raptor nests discovered during project implementation will be protected from disturbance and alteration of nesting structure by adhering to Forest Plan standards restricting such disturbance or alteration (Forest Plan IV-32). Known occupied raptor nest sites (See Table 2-18 and goshawk, osprey, and bald eagle below) would be protected based on site characteristics and biological needs of the species with period of use restrictions. If new raptor nests were identified during layout, marking or cruising, they would be protected accordingly.

Table 2-18. Timing Restrictions for Raptor Nests (General).

Description	Timing – Activities Permitted*	Timing – Activities Prohibited**	Notes
Occupied *Prairie Falcon* nest sites (within ½ mile of nest sites)	Activities can occur: August 1 – February 28	Activities are prohibited: March 1 – July 31	Known nest sites in project area
Occupied *red-tailed hawk* nest sites (within 600 feet)	Activities can occur: August 1 - February 28	Activities are prohibited: March 1 – July 31	Known nest sites in project area
Occupied *Cooper's Hawk* nest sites (within ½ mile of nest sites)	Activities can occur: September 1 – March 31	Activities are prohibited: April 1 – August 31	Known nest sites in project area
* Activities are permitted in all locations during these periods except within prescribed roosting stands or nesting areas, i.e., for goshawks, no activities within 30-acre nesting area; for all other raptors, no activities within 100 feet of nest trees/sites. ** Activities are only prohibited within distances specified in Column 1 for each species.			

Responsible Specialists: Logging Systems Specialist or Marking Crew Foreman, Sale Administrator, Fuels, and Wildlife Biologist.

Goshawk Nests

Goal: Avoid disturbing breeding birds by using spatial buffers and seasonal restrictions. Protect goshawk post-fledging areas.

Active Nests: Harvest in and adjacent to active goshawk core areas (within about 0.5 miles of the nest tree) would be prohibited from March 1 - September 30 for nests in general forest and December 1- September 30 for goshawk nests located in Big Game Winter Range (Reynolds et al. 1992).

Vegetation Management:

If new goshawk nests are located during layout, marking or cruising, they would be protected with a 30-acre no treatment buffer and seasonal restrictions would be applied to avoid impacting breeding birds. If new goshawk nests are found during treatment implementation, nests would be protected to the degree possible.

Responsible Specialists: Sale Administrator and Wildlife Biologist.

Fuels Management:

Fuel blocks 3, 5, 6, 7, 10, and 12 have known goshawk nest sites within their boundaries.

All Nests: No direct ignition within core nest stands, approximately 30 acres. Seasonal restriction for all activities (as per Forest Plan direction) adjacent to core areas is March 1 - September 30. For active nests within Big Game Winter Range the seasonal restriction is December 1 through September 30.

Minor fire creep (< 10% of core area) into core nest stand is allowable but should be avoided if possible. To avoid disturbance in active core areas, there would be no lighting within ¼ to ½ mile of the core area boundary if hand burning, and ½ to 1 mile if helicopter burning. Burning outside of these spatial buffers can occur in accordance with other mitigation measures, restrictions, and logistics.
Responsible Specialists: Fuels and Wildlife Biologist.

Table 2-19. Goshawk Nest Sites.

Nest Site	Burn Block	Other Restrictions	Seasonal Restrictions on Management Activities
HJ Spring	3	N/A	April 1-August 31
Bellows Spring	3	N/A	April 1-August 31
Van Zandt	7	N/A	April 1-August 31
Crane Spring	10	N/A	April 1-August 31
Myrtle Park	N/A	N/A	April 1-August 31
Myrtle Creek	N/A	N/A	April 1-August 31
FL Spring	5	Winter Range	December 1- August 31
Bennett	6	Winter Range	December 1- August 31
South Fawn	12	Winter Range	December 1- April 1
Ranger Spring	12	Winter Range/Bald Eagle Habitat	December 1- August 31

Osprey Habitat

Goal: Protect known nests and avoid disturbing breeding birds by using seasonal restrictions.
To prevent disturbance during the nesting and fledging period for osprey, management activities within ½ mile of known occupied nest sites or new nest sites cannot occur from April 1 through August 31. No activities will be done within 100 feet of the nest tree/site.
Responsible Specialists: Fuels and Wildlife Biologist.

Bald Eagle Habitat

Goal: Protect known nest and avoid disturbing breeding birds by using seasonal restrictions.
There is a known bald eagle nest site near Fuel Block 12. The Silvies River Nest Site Management Plan allows prescribed burning and other management activities to occur near the nest area when the nest site is not in use. The nest occurs in Big Game Winter Range therefore, the combined seasonal restriction period would be December 1 to August 31 within 1 mile of the nest.

A potential bald eagle winter roost is located within Fuel Block 6. Use by eagles would be determined prior to implementation of silvicultural treatments or prescribed burning. A wildlife biologist or delegate would determine if site is active or abandoned. If site were active, any disturbing activities would be seasonally restricted from about November 15 to April 15 within and adjacent to roost sites. The District Wildlife Biologist would make the determination on the degree of disturbance of an activity and what is “adjacent” to the roost. If eagle activity expands to outside the designated roost area, planned activities would be modified to limit disturbance during the period of activity.
Responsible Specialists: Fuels Specialist and Wildlife Biologist.

Sage Grouse and Sage Grouse Habitat

Goal: Assure protection of breeding sage grouse and potential nesting sage grouse.
During burning operations, firefighters would actively suppress any prescribed fire spread along the southern border of Burn Block 7 (using methods such as an ATV-mounted sprayer) to assure that prescribed fire does not spread into the sagebrush habitat that is south of the project area.

If nesting is determined to be occurring in the project area, the following design criteria would apply: Conduct prescribed burning in Burn Block 6 and in any areas with known nesting sage grouse during the fall to eliminate the potential to affect nesting sage grouse. Within two miles of the reported lek (that occurs south of the southern border of the project area) and in any areas with known nesting sage grouse, no hand lighting would occur in sagebrush habitats 1/4 acre or larger. In aerial ignition, sagebrush stands of 2 acres and larger would be identified and attempts would be made to not put any direct ignition into them. Fire would be allowed to back or creep into up to 15% (in area) of these stands (Kilpatrick no date).
Responsible Specialists: Fuels Specialist and Wildlife Biologist.

Blue Grouse Winter Habitat

Goal: Provide blue grouse winter roost sites.
Retain large mistletoe infested or "wolfy" Douglas-fir trees along tops or upper third of ridges and large scab openings, where available (Forest Plan IV-30).
Responsible Specialists: Sale Administrator, Fuels, And Wildlife Biologist.

Migratory Bird Habitat

Goal: Protect nesting migratory birds and protect gray flycatcher (a sensitive species).

No more than 2,500 acres of precommercial thinning would be allowed during the spring breeding season (between April 15 and July 15) inside the project area (Altman 2000). Juniper removal would occur outside the spring breeding season. Juniper reduction could be done during the breeding season, but prior to treatment a nest search for breeding gray flycatchers must be conducted and trees used by flycatchers for nesting would be marked for protection (known nests and nest trees would be protected).
Responsible Specialists: Post Sale Forester and Wildlife Biologist.

Migratory Bird Habitat and Elk Cover

Goal: Assure protection of nesting migratory birds and elk cover.
Prescribed burn plans and mechanical treatment plans, as well as prescribed burn monitoring results would be reviewed annually prior to spring treatments. Habitat treatments would be coordinated to assure nesting and foraging habitat and elk cover are maintained during implementation of this project at the levels described in Design Features above and in Chapter 4.
Responsible Specialists: Sale Administrator, Fuels Specialist, and Wildlife Biologist.

Measures to Protect Shrub and Scabland Habitats

Goal: Protect and maintain mountain mahogany shrublands, scabland habitats, and associated species.
No hand lighting would occur in mountain mahogany stands or scablands 1/4 acre or larger. In aerial ignition, scablands and mahogany stands of two acres and larger would be identified and attempts would be made to not put any direct ignition into them. Fire would be allowed to back or creep into these stands.
Responsible Specialists: Fuels and Wildlife Biologist.

Unique and Sensitive habitats

Goal: Maintain the integrity of unique and sensitive habitats.

Protect elk wallows, animal dens, cliffs, talus slopes, and other unique and sensitive habitats not covered by other design elements with a 100-foot wide buffer.
Responsible Specialists: Wildlife Biologist, Sale Administrator.

Mitigation Measures to Protect Wildlife

Snags/Down Wood

Goal: Provide dead and defective tree habitat at levels capable of supporting viable population of associated wildlife (Regional Forester's Forest Plan Amendment #2).
In Replacement Old Growth stand 02011 and LOS portions of Replacement Old Growth stands 02012 and 02016, and in spring, cottonwood, and aspen restoration areas - if the historical level of snags (1-1.8 12" dbh snags per acre) were not present upon completion of treatments, additional snags would be created:

- The number and location of created snags would be determined during post-treatment monitoring efforts (since the number of snags remaining can't be determined until after treatments are completed).
- Snags would be created mainly out of codominant and intermediate trees, and with an occasional dominant tree. This would allow the Forest Service to create snags on a sustainable basis by not removing the largest and healthiest trees, and would allow the stand to progress towards old growth structure.
- Snag size will vary in each unit and even within a unit, but the snag density goal for creation would be 1 to 1.8 snags/acre (i.e. if there is already 1 snag per acre larger than 12", no more would be created).
- Snags would generally be created out of 12-inch dbh and larger live trees, preferably with split or broken tops and/or other defects. Where available and sustainable, 21" snags would be created.
- Created snags would be 150 feet or more from open roads, and would be ponderosa pine, western larch, Douglas fir, or white fir.
- Snag creation could be accomplished with fire, cambium girdling, inoculation of cavity creating agents (heart rot fungus), or removal of crowns.

If post-treatment down wood levels do not meet Forest Plan standards, down wood may be created based on post-treatment monitoring. Where snags are in excess of Forest Plan standards, they may be felled to provide down wood. If excess snags are not available, Type 1 - Reserve Trees (live trees that are defective or deformed) could be felled to provide uncharred down wood at the following rate:

- In ponderosa pine sites, 1 excess snag or 1 reserve tree could be felled to provide at least 3 uncharred pieces per acre. Each would be > 12 inch diameter small end and ≥ 20 foot total lineal length when felled.
- In mixed conifer sites, 1 to 2 excess snags or reserve trees could be felled to provide at least 15 uncharred pieces per acre. Each would be > 12 inch diameter small end and >100 foot total lineal length when felled.

The amount needed would be determined during monitoring.
Responsible Specialists: Fuels, Sale Administrator, and Wildlife Biologist.

Design Features to Protect Forest Health

Measures for disease prevention include:

- Apply borax to all ponderosa pine stumps 12" in diameter and greater within 48 hours of creation to reduce the potential spread of Annosus root disease.

Responsible Specialists: Sale Administrator and Silviculturist.

Design Features to Protect Sensitive Plants

A 50-foot area to protect (ATP) would be established around the outer extent of all documented/mapped sensitive plant sites. Vehicles, equipment, and operations that would displace soils or damage plants, would not be permitted in the ATP. All trees would be directionally felled away from the ATP. Activity created slash would not be piled in ATPs. Seeding of decommissioned road segments within documented ATP sites would not occur. Before any road reconstruction occurs, the reconstruction plan would be reviewed by the botanist to ensure that sensitive plant populations are not inadvertently impacted or impacts are minimized. During prescribed burning, fire line construction and fire suppression equipment use would not occur within documented ATP sites. Any exceptions would have to be evaluated for compatibility by a botanist prior to implementation.
Responsible Specialists: Botanist, Sale Administrator, Fuels Specialist, Engineer, and Post Sale Forester

Design Features to Protect Air Quality

Prescribed burning would follow the *Memorandum of Understanding between Oregon Department of Environmental Quality and Oregon Department of Forestry, and The United States Department of Interior Bureau of Land Management and The United States Department of Agriculture Forest Service* (1994).
Responsible Specialists: Fuels Specialist.

Design Features to Protect Range Resources

If prescribed burning has created over 50% blackened ground in a pasture, cattle would not be permitted to graze before August 1st in that pasture. Allowing one growing season of rest would provide for reproduction of grasses by promoting seed production and building up reserves in roots.

District range personnel would contact permittees to coordinate cattle movement before burning operations.

Fences and range improvements would be protected where feasible.

To minimize disruption of the grazing systems on the affected allotments, the timing of felling and skidding timber through fences would be coordinated with District range personnel.
Responsible Specialists: Rangeland Management Specialist.

Mitigation Measures to Protect Range Resources

Any damaged fences and range improvements would be promptly repaired or replaced by whoever causes the damage.

When aspen stands or springs are fenced to exclude cattle and they contain the water source for the area, an alternate water source would to be provided prior to commencement of fence building.
Responsible Specialists: Rangeland Management Specialist.

Design Features for Noxious Weed Control and Prevention

In order to prevent further spread of noxious weeds within the watershed, whenever possible:

- Include a noxious weed locator map in the project file to facilitate avoidance and monitoring.
- Avoid or minimize disturbances within or adjacent to existing noxious weed infestations.
- Existing noxious weed sites would be treated prior to any site-disturbing activities proposed in this document.

Whenever possible, noxious weed sites along primary haul routes would be treated prior to commencement of logging activities in order to prevent existing noxious weeds sites along roads from spreading or establishing new sites within and outside the watershed.

Whenever possible, gravel sources containing noxious weed sites would be treated prior to use in order to prevent existing noxious weeds sites in gravel sources from expanding or establishing new sites through spreading of contaminated gravel.
Responsible Specialist: Noxious weed coordinator.

In order to prevent establishment of new noxious weed sites on disturbed ground within the watershed, timber sale contract provisions for requiring all off road logging and construction equipment to be free of noxious weeds when moving onto the sale area and/or moving between units on the sale area that are known to contain noxious weeds. Specifically, Use CT6.35 - Equipment Cleaning. In this provision the purchaser has to certify that his equipment is weed free. The Forest Service would reserve the right of inspections prior to the equipment's use and to verify that each piece operating in the woods is clean.
Responsible Specialists: Noxious weed coordinator and contracting officer representative.

Mitigation Measures for Noxious Weed Control and Prevention

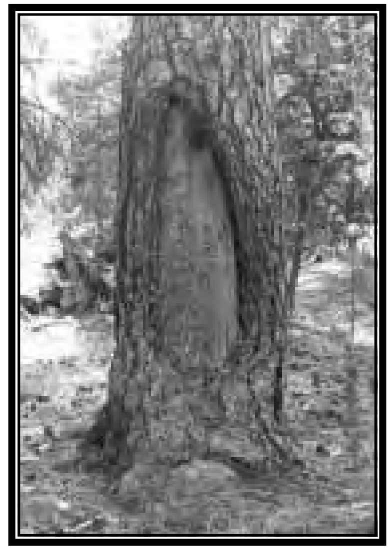
In order to prevent establishment of new noxious weed sites within the watershed, grass seeding would be utilized where ground-disturbing activities (temporary road construction and reconstruction, decommissioned roads, skid trails, and landings) have exposed the soil. Grass seed would be "local" native seed or certified weed-free non-persistent non-native seed.
Responsible Specialist: Noxious weed coordinator.

Design Features to Protect Recreation Resources

All activities would be designed to minimize impacts within and adjacent to identified dispersed recreation sites.

Responsible Specialist: Recreation Specialist.

Design Features to Protect Cultural Resources



Ponderosa pine cambium peel tree, Myrtle Park, October 1992

Harvest Related Activities

If dry ground logging is to occur, sites must be avoided. If the logging is to take place over snow, heritage sites may be logged over, provided conditions meet forest standards for over snow logging - throughout the duration of the operations. Landings must not be located over heritage sites, regardless of season or conditions. Prior to layout and marking of units, specialists would coordinate with the archaeologist, to ensure heritage site locations are taken into account. Over-snow operations during which logging over sites may be approved, must be conducted within an environment of active and continuous consultation with the Oregon State Historic Preservation Office (SHPO), by the archaeologist. Also, the archaeologist would monitor any over-snow logging operations. If, at anytime, it was determined by the archaeologist that damage was occurring to sites, operations over sites would cease, and a policy of strict avoidance would begin. Follow-up monitoring, after snowmelt, would take place after any over-snow logging operations. Finally, observations made during all monitoring would be reported to SHPO.

Responsible Specialists: Sale Administrator, Logging Systems Specialist or Marking Crew Foreman, and Archaeologist.

Precommercial Thinning Activities

Thinning would be allowed over most heritage sites; however, no machine piling (grapple piling) would occur within site boundaries. Thinning slash within sites would be either lop-and-scatter, or slash would be hand-piled outside the site boundaries. No pile burning would occur within site boundaries. Prior to layout of thinning units, and implementation of thinning operations, the responsible specialist would coordinate with the archaeologist to ensure thinning would not occur over sensitive heritage sites. Prior to both piling and burning activities, specialists would coordinate with the archaeologist to ensure that machine piling and pile burning would not occur within site boundaries.

Responsible Specialist: Thinning COR or technician, Fuels Specialist, and Archaeologist.

Road Closures, Decommissioning and Temporary Road Construction

Specialists would coordinate with the archaeologist prior to road closure, decommissioning and temporary road construction activities take place, to ensure that heritage sites are avoided by ground disturbing equipment or activities.

Responsible Specialist: Sale Administrator, Engineering, and Archaeologist.

Prescribed Burning Activities

Specialists would coordinate with the archaeologist prior to burning preparation to ensure that heritage sites are either avoided or, in the case of some lithic scatter sites, are burned over with the appropriate low temperatures and short exposure times. Heritage sites would be avoided during fire line construction and by motorized vehicles used for layout and monitoring. Burning of slash piles must not occur within heritage site boundaries. Sites located within traditional root-gathering areas must be fall burned to avoid damage to sensitive cultural plants.
Responsible Specialists: Fuels Specialist and Archaeologist.

Restoration of Riparian (Spring) Habitat Activities

Prior to layout of fence lines, specialists would coordinate with the archaeologist to ensure protection of heritage sites near or around springs.
Responsible Specialists: Wildlife Biologist and Archaeologist.

Aspen and cottonwood Restoration Activities

Prior to thinning operations, specialists must coordinate with archaeologist to ensure protection of heritage sites in the area. Extreme care should be taken so as to not allow falling conifers, or those being skidded, to scrape against aspen trees bearing dendroglyphs. If a lithic site is located in the area of activity, mechanized vehicles should be kept out.
Responsible Specialists: Silviculturist and Archaeologist.

Juniper Reduction, Post and Pole

Mechanized vehicles must not operate within sites during these activities. Prior to operations, specialists must coordinate with the archaeologist to ensure protection of heritage sites in the area.
Responsible Specialists: Thinning COR or technician, Sale Administrator, Presale Technician and Archaeologist.

Monitoring

Resource monitoring of project work would be implemented with the action alternatives. The objectives are to determine if management activities are moving resources toward desired management objectives. In addition to any monitoring requirements that may apply from the Malheur National Forest Monitoring Plan, monitoring activities would include the following:

1. Post treatment soil monitoring will be conducted in stands that are expected to have detrimental soil impacts at or above 20% (see appendix E).
2. Post-treatment snag and down wood surveys would be conducted as needed to determine the need to create additional snags and down wood. Treatment activities may increase or decrease snag and down wood densities. These surveys would be necessary to determine what action, if any, is needed to move the project area toward Forest Plan standard levels for snags and down logs.
3. Roads that have been closed or decommissioned would be monitored over a five-year period to inspect the effectiveness of the closure or decommissioning and hydrologic function of the remaining roadway. If monitoring determines the closure or decommissioning is not effective, it would be corrected to meet objectives.

4. Noxious weeds would be monitored for changes in populations. Annual monitoring of landings would continue for a minimum of four years following activity.
5. Monitoring of fuels treatment areas would occur pre-treatment, during treatment, and for five years post-treatment, as follows. Prior to implementation of the project, fuel loading information would be gathered by the use of photo series books. Fuels personnel would monitor during implementation of mechanical slash treatment and prescribed fire treatments to assure adequate reduction of fuel loadings and ladder fuels. Fuels personnel would also monitor after the fuels treatments have been accomplished to determine if fuel loadings have been moved towards historic levels.
6. Stream temperature, sediment monitoring and fish surveys would continue at established sites.
7. Aspen protection measures (4-foot and 8-foot fences, and cages) for protection of regeneration would be monitored for effectiveness.
8. Post-harvest monitoring of active goshawk nest sites would be accomplished to determine how nesting territories are affected.
9. Post-harvest canopy cover monitoring would occur in 5% of commercially treated acres in goshawk post-fledging areas to determine if remaining cover provides recommended canopy closure for fledgling goshawks. Methods of cover analysis may range from satellite imagery analysis to field surveys with a densiometer.
10. Prior to any treatments, surveys would be conducted for nesting gray flycatchers and sage grouse in sagebrush/juniper habitats that have activities planned during the springtime.
11. If treatments (harvest, precommercial thin, prescribed burning) are proposed to occur during prohibited times in raptor disturbance buffer zones, known raptor nests, and those discovered during implementation, would be monitored prior to treatment to determine whether nests are active, and therefore would determine if treatments can occur during the proposed time frame.
12. The condition of grazing allotment fences and trails would be monitored during prescribed burning, precommercial thinning, and timber activities to identify damage or destruction of fences and trails.
13. Range Forest Officer in Charge and grazing permittees would monitor livestock distribution and location during commercial operations.
14. The four springs that would have water developments for livestock would be monitored to assure that spring dewatering does not take place during periods of livestock use.
15. Pastures would be monitored annually following prescribed burning activities to determine the amount of area burned and intensity of burn.
16. Stands identified for treatment would be monitored following marking to ensure that they comply with the marking instructions.

17. Sale administrators would monitor timber harvest to ensure that harvest activities comply with all design criteria and mitigation measures.

18. Following commercial treatment, a silviculturist would monitor the resulting stand conditions to determine if treatment objectives were met, and to determine if secondary treatments are still necessary or need to be modified.

19. Following secondary and tertiary treatments, a silviculturist would monitor the resulting stand conditions to determine if treatment objectives were met, and to determine if any additional treatments are necessary.

20. Where precommercial thinning is to be the primary treatment, the treatments would be monitored by Contracting Officer's Representatives. Following precommercial treatment, a stand exam would be done to ensure that objectives were met.

21. ·Prior to layout and marking of commercial harvest units, layout and implementation of thinning units, piling and burning activities, road closure, decommissioning and temporary road construction, burning preparation, layout of fence lines, an archaeologist would monitor to ensure cultural resource sites are protected.

22. ·The archaeologist would monitor any over-snow logging operations. Over-snow operations during which logging over sites may be approved, must be conducted within an environment of active and continuous consultation with the Oregon State Historic Preservation Office (SHPO), by the archaeologist.

23. Known sensitive plant sites would be monitored for changes in populations.

Alternatives Eliminated From Detailed Analysis

The following are alternatives that were considered but eliminated from detailed analysis and the reasons for elimination. In the DEIS these alternatives were numbered 6 thru 9. In this document, alternatives eliminated from detailed analysis are numbered A thru G, and alternatives considered for detailed analysis are numbered sequentially (One through Seven-A).

Preliminary Alternative A

An alternative that combined activities within the proposed action with additional prescribed burning within the Myrtle Creek portion of the Myrtle-Silvies Roadless Area was considered but eliminated from detailed analysis because:

- a high risk of prescribed burn escapement and potential for stand replacement fire exists due to the amount of fuel present and topography of area,
- the amount of prescribed burning being proposed (almost 54,000 acres) made accomplishment with current staffing unlikely,
- the cost of removing excessive dead, downed and green trees prior to ignition would be excessive,

- there would be a need to establish "control areas" surrounding Myrtle Creek canyon prior to any burning in the canyon (design of Fuel Blocks 2, 3, 4, 5, and 10), and
- there is a desire to maintain some areas in current conditions, especially concerning pileated woodpecker habitat.

Preliminary Alternative B

An alternative to restore the watershed to a condition that approximates HRV circa 1860-1900 was considered but eliminated from detailed analysis. This alternative would restore the watershed to a condition resembling "park-like" stands of ponderosa pine consisting of clumps of 2 to 10 large trees with single large trees spaced at 80 to 300 feet surrounding these clumps and no roads. This alternative was eliminated from detailed analysis because:

- it wouldn't provide roaded access if all or most roads were closed, increasing fire suppression and other management costs,
- removing and restoring 312.5 miles of roads is beyond present budget expectations,
- conversion of 2,500-5,000 acres of newly forested areas back to non-forest (savannah or seed tree) and 8,000-15,000 acres of mixed conifer stands back to ponderosa pine dominated stands would have an impact on other resources, especially wildlife and water quality
- Drastically reducing stocking levels on 15,000-20,000 acres would have an impact on wildlife and water quality as well as other resources.

Preliminary Alternative C

An alternative that combined activities in Alternative Four with additional commercial harvest treatments within the Myrtle Canyon portion of the Myrtle-Silvies Roadless Area was considered but eliminated from detailed analysis. With the uncertain situation of management for roadless area conservation, the responsible official deferred taking actions at this time that may preclude that implementation (also wilderness concern) at a future date. Additionally,

- some of the individual resource data within the roadless area was not readily available;
- the time to adequately produce and analyze this alternative was excessive to timelines set for the EIS; and
- helicopter or cable logging could be cost-prohibitive considering the value of product that would result.

Preliminary Alternative D

An alternative that proposed designating replacement old growth for Old Growth Area 02017 based on the ecological stand boundaries was considered but eliminated from detailed analysis. This alternative would designate ROG 02017 on the ecological stand boundary as opposed to forest road 3120. This alternative was eliminated from detailed analysis because:

- The designated ROG area would be substantially larger (well over 100% of the corresponding DOG) than the Forest Plan recommends,
- Forest road 3120 provided a logical identifiable boundary where it would be easily located on the ground, and

- The replacement old growth for Old Growth Area 02017 proposed under all action alternatives provides the recommended habitat size.

Preliminary Alternative E

An alternative that proposed treatments on public lands administered by the BLM and to a lesser extent private property was considered but eliminated from detailed analysis because funding priorities did not match and there was a lack of interest with potential partners.

Preliminary Alternative F

An alternative that proposed utilizing prescribed fire for fuel reduction without thinning, similar to the Sand Creek Ecosystem Restoration Project and the Dry Forest Strategy by the Wenatchee National Forest, was considered but eliminated from detailed analysis because:

- The Malheur National Forest does not have a Dry Forest Strategy in place,
- Fire alone can create a great number of small snags that would not meet visual objectives,
- Heavy fuel loading, especially ground fuels may create soil heating and root damage to residual trees causing high levels of tree mortality
- Multiple fire entries would be needed and funding levels are not expected to meet need
- Limited opportunities to reduce fuel loadings at this level while meeting smoke management standards
- Social and economic benefits from commercial harvesting are not realized
- Manual thinning (commercial and precommercial) can provide more precision and remove specific size classes more safely and cost effectively than can prescribed fire alone.

Preliminary Alternative G

An alternative that combined activities within the proposed action with the use of chemical methods to manage noxious weed infestations was considered but eliminated from detailed analysis because:

- Comments made on the Proposed Action showed opposition to the use of toxic chemicals to control noxious weeds, and
- Further analysis determined chemical treatment was not warranted at this time. Manual control was considered adequate for the twelve new noxious weed sites.

Table 2-20. Issue Comparison.

Issue	Activity	Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Access & Travel Management	Open Roads	314 miles	171 miles	154 miles	154 miles	277 miles	227 miles	227 miles	227 miles
	Permanent Closures	None	212 roads for 75 miles	273 roads for 105 miles	273 roads for 105 miles	104 roads for 23 miles	222 roads for 69 miles	222 roads for 69 miles	222 roads for 69 miles
	Seasonal Closures	None	85 roads for 62 miles	27 roads for 25 miles	27 roads for 25 miles	4 roads for 4 miles	7 roads for 10 miles	7 roads for 10 miles	7 roads for 10 miles
	Signed Yr Round Closure	None	4 roads for 3 miles	10 roads for 5 miles	10 roads for 5 miles	1 roads for 1 miles	2 roads for 1 miles	2 roads for 1 miles	2 roads for 1 miles
	Decommission	None	5 roads for 3 miles	35 roads for 25 miles	35 roads for 25 miles	16 roads for 9 miles	16 roads for 7 miles	17 roads for 11 miles	16 roads for 7 miles
	Previously Closed	63 miles	63 miles	62[1] miles	62[1] miles	63 miles	63 miles	63[2] miles	63 miles
	Temporary Road Construction	None	3.5 miles	None	3.5 miles	2.8 miles	None	3.5 miles	3.5 miles
	Road Maintenance	None	164 miles	None	192 miles	163 miles	7.69 miles	192 + 7.69 miles	192 + 7.69 miles
	Road Reconstruction	None	None	None	0 miles	0 miles	2.12 miles	2.12 miles	2.12 miles

[1] 1 mile of previously closed road is proposed to be decommissioned
[2] 0.69 miles of previously closed road is proposed to be decommissioned

Table –2-20. Issue Comparison (Continued).

Issue	Activity	Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Activities Proposed in Roadless Area	**PCT, Pile & Burn**	None	None	729 acres	729 acres	729 acres	729 acres	729 acres	None
	Landscape Scale Fuels Treatment	No additional	5526 acres	5526 acres	5526 acres	5526 acres	5526 acres	5526 acres	No additional
	Spring Restoration	None	2 springs	2 springs	2 springs	2 springs	2 springs	2 springs	None
	Permanent Closures	None	10 roads for 1.51 miles	18 roads for 2.56 miles	18 roads for 2.56 miles	2 roads for 0.09 miles	10 roads for 1.51 miles	10 roads for 1.51 miles	10 roads for 1.51 miles
	Seasonal Closures	None	6 roads for 0.58 miles	2 roads for 0.16 miles	2 roads for 0.16 miles	None	None	None	None
	Decommission	None	None	2 roads for 0.30 miles	2 roads for 0.30 miles	2 roads for 0.30 miles	2 roads for 0.30 miles	3 roads for 4.30 miles	2 roads for 0.30 miles

Table –2-20. Issue Comparison (Continued).

Issue	Activity	Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Riparian Habitat, Water Quality, and Fish Habitat	**Aspen Restoration**	None	Commercial Removal 121 acres conifers < 21" outside RHCA; PCT; create snags & LWM on 268 acres; Protect and Monitor 245 acres	PCT, Create snags and LWM on 268 acres; Protect and Monitor 245 acres	Commercial Removal 121 acres conifers of all sizes outside RHCA; PCT; create snags & LWM on 268 acres; Protect and Monitor 245 acres	Commercial Removal 121 acres conifers < 21" outside RHCA; PCT; create snags & LWM on 268 acres; Protect and Monitor 245 acres	PCT, Create snags and LWM on 268 acres; Protect and Monitor 245 acres	Commercial Removal 121 acres conifers < 21" outside RHCA; PCT; create snags & LWM on 268 acres; Protect and Monitor 245 acres	Commercial Removal 121 acres conifers < 21" outside RHCA; PCT; create snags & LWM on 268 acres; Protect and Monitor 245 acres
	Riparian Habitat (Spring) Restoration	None	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 46 springs; Fence 5 springs; Develop troughs on 4 springs	Vegetation treatment on 44[3] springs; Fence 4 springs; Develop troughs on 3 springs
	Cottonwood Restoration	None	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect	Reduce competing conifers; create snags & LWM; Fence; plant & protect

[3] Two springs within the Roadless Area are not proposed for treatment.

Table –2-20. Issue Comparison (Continued).

Issue	Activity	Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Vegetation Condition	Landscape Scale Fuels Treatment	None	39,277 Acres; Blocks 1-12	39,277 Acres; Blocks 1-12	39,277 Acres; Blocks 1-12	25,311 Acres; Blocks 2, 5-7, 9,11,12	33,374 Acres; Blocks 2-9, and 11-12	39,277 Acres; Blocks 1-12	33,751 Acres; All Blocks except 6
	Commercial Thin	None	5885 Acres	None	7107 Acres	4411 Acres	None	7107 Acres	7107 Acres
	Intermediate Thin	None	7216 Acres	None	8473 Acres	5388 Acres	None	8473 Acres	8473 Acres
	Harvest in LOS[4]	None	2048 Acres[4]	None	2327 Acres[4]	1267 Acres[4]	None	2327 Acres[4]	2327 Acres[4]
	Post & Pole Sales	None	452 Acres	None	452 Acres	452 Acres	None	452 Acres	452 Acres
	Juniper Reduction	None	537 Acres	515 Acres	715 Acres	535 Acres	By Fire	715 Acres	715 Acres
	Precommercial Thin	None	15109 Acres	16,060 Acres	16,186 Acres	13,733 Acres	10,799 Acres	16,186 Acres	16,186 Acres
	Noxious Weeds Treatments	No additional	Manually treat 12 sites	Manually treat 12 sites	Manually treat 12 sites	Manually treat 12 sites	Manually treat 12 sites	Manually treat 12 sites	Manually treat 12 sites

[4] Acres of Harvest in LOS are included in commercial and intermediate thinning acres.

Table –2-20. Issue Comparison (Continued).

Issue	Affected Item		Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Economics[5]	Estimated Potential Income	Federal Contracts	$0	$5,489,680	$3,604,075	$6,172,420	$5,163,970	$2,448,370	$6,135,020	$6,062,710
		Federal Salary Support	$5,365	$5,342,980	$4,657,820	$5,858,950	$4,179,340	$3,404,220	$6,067,880	$5,878,670
		Wood Products (Sawtimber)	$0	$8,642,418	$0	$10,031,806	$6,661,282	$0	$10,031,806	$10,031,806
	Estimated Potential Jobs	Federal Contracts	0	45	20	55	45	15	55	55
		Federal Salary Support	0	35	15	40	30	15	40	30
		Wood Products (Sawtimber)	0	300	0	355	235	0	355	355
	Present Net Value (PNV)[6]		$0	-4.1 million	-2.9 million	-4.5 million	-3.3 million	-2.4 million	-4.5 million	-4.4 million

[5] Potential income (rounded to the nearest 10) and employment (rounded to the nearest 5) is based on proposed management actions. Discounting at 4%/year has been applied to result in 2002 dollars.

Federal Contracts: The value of potential contracts was derived from proposed restoration work (acres and structures) and average costs per unit. The results were discounted at 4% to the present from the year the activity would occur.

[6] Present net value is defined as the present (discounted) net value of project benefits minus the present (discounted) net value of project costs. All PNVs are negative due to the cost of restoration activities associated with fuels reduction and thinning.

Table –2-20. Issue Comparison (Continued).

Issue	Affected Item	Alt. One No Action	Alt. Two Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven Preferred	Alt. Seven-A
Big Game Habitat[7]	Thermal Cover (summer range)	24%	14%	24%	13%	18%	24%	13%	13%
	Thermal Cover (winter range)	36%	32%	36%	31%	34%	36%	31%	31%
	HEI (summer range)	.42	.45	.48	.45	.43	.45	.43	.43
	HEI (winter range)	.49	.52	.52	.52	.50	.50	.50	.50

[7] Numbers in this section of the table are watershed averages. See Chapter Four for subwatershed values.

Table 2-21. Proposed Implementation Schedule.

		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12
Harvesting	Includes Aspen stands with harvest. If pct is secondary treatment, it should be accomplished within a year of when the unit is released from contract.												
	Burnt	Offer											
	Curry	Offer											
	Curry II	Offer											
	Curry III		Offer										
	Curry IV		Assuming salvage sales would be offered and priority this year.	Offer									
	Dry			Offer									
	Mud			Offer									
	Burnt II				Offer								
Precommercial Thinning	Burn Block	Areas where PCT is the primary treatment. Priority by burn block. PCT in Myrtle-Silvies Roadless and Fuel block 11 are funded by wildlife.											
	1						X						
	2					X							
	3				X								
	4					X							
	5			X	X								
	6			X	X								
	7		X	X									
	8				X	X							
	9		X	X									
	10						X						
	11				X	X							
	12				X	X							
	Myrtle Ck		X	X									

Table 2-21. Proposed Implementation Schedule (cont).

		YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12
Prescription Burning	Burn Block	Rx burn would occur when an entire burn block is available to burn. This is the general sequence of burns blocks as they relate to harvesting and pastures.											
		Burning of burn blocks must be coordinated with range and tribe prior to implementation.											
	1										X		
	2											X	
	3							X					
	4												X
	5									X			
	6						X						
	7					X							
	8						X						
	9					X	X						
	10								X				
	11					X	X	X					
	12						X						
	Myrtle Ck Piles				X	X							
Aspen	PCT and fencing would occur the same year as commercial treatment.												
	In aspen units with no commercial treatment, PCT and fencing would occur in the order of Burn blocks listed above.												
Post and Pole	Depends on market but could begin as early as 2004.												
Road Activities	Would occur after sales are released.												
Cotton-wood	PCT and fencing can occur any time.												
Springs	PCT of springs can be included in PCT above where practical and fencing/development can occur any time after PCT.												
Juniper	Can be included in PCT above where practical otherwise do in order of fuel blocks.												

Chapter 3
Affected Environment

Introduction

Chapter 3 examines the existing environment in the Silvies Canyon Watershed Restoration Project Area that might be affected by implementing the proposed EIS alternatives. It is a summary of the physical and biological setting of the project area, its social and economic characteristics, and factors affecting its resources. The following resources are discussed:

- Access and Travel Management
- Roadless Area
- Watershed/Fish Habitat
  - Soils
- Vegetation
  - Fire and Fuels
  - Sensitive Plants
  - Range Resources
  - Noxious Weeds
- Socio-Economics
- Wildlife Habitat
- Recreation
- Cultural Resources
- Scenery Management

Silvies River

Access and Travel Management

There are approximately 375 miles of roads within the Silvies Canyon project area. Of these, approximately 63 miles were either previously identified as closed, proposed to be closed under past environmental documents, historic closures, or breached closures. Decisions to close these 63 miles of roads have already been made. These roads will be treated for self-maintaining drainage structures and closed.

Most of the existing roads were constructed during timber sale entries since the 1940s. Some of these roads have subsequently been reconstructed to higher standards. Most roads are in good to fair condition. There are a few roads or portions of roads in poor condition and some are contributing sediment to streams.

The primary uses of roads in the project area have been logging or logging-related activities, hunting, sightseeing, and administrative uses. The open road densities within the project area are currently above Forest Plan standards, averaging 2.4 mi/mi² in big game winter range, and 3.7 mi/mi² in summer range.

Table 3-1. **Road Densities.**

Subwatershed	Summer Range (mi/m²)	Winter Range (mi/ m²)
Boulder Cr./Fawn Cr.	2.8	2.1
Burnt Mountain	3.9	2.2
Myrtle Creek	5.2	1.9
Myrtle Park	4.0	<0.1
Red Hill (project area only)	3.8	2.9
Sage Hen Creek	3.1	2.9
Stancliffe Creek	3.0	3.7
Project Area TOTAL	3.7	2.4
Forest Plan Standard*	**3.2**	**2.2**

Does not meet Forest Plan standards

* Forest Plan does not have a standard for road densities by subwatershed, however, these are above the watershed standard.

Riparian Habitat Conservation Areas and Roads

There are approximately 33 miles of roads that are within riparian habitat conservation areas. These roads cross or parallel several tributaries within the Silvies Canyon project area. There is potential for sedimentation from portions of these roads, because of the lack of vegetative cover between the road and stream, grade of road, or lack of adequate drainage. Table 3-3 lists 12 roads that are impacting aquatic habitat.

Remaining roads are located mid-slope or on ridge tops and are not actively contributing sediment to the streams. However, due to the type of soils present in the project area and that most roads are native surfaced and receive limited road maintenance, soil run-off is occurring.

Maintenance Levels

Road maintenance on the Malheur National Forest is based on traffic use. Out of the five road maintenance levels currently in use, four levels apply within the Silvies Canyon project area:

- **Maintenance Level 1:** Basic custodial care as required to protect the road investment and to see that damage to adjacent land and resources are held to a minimum. The road is not open to traffic.
- **Maintenance Level 2:** Same basic maintenance as Level 1, plus logging out, brushing out, and restoring the road prism as necessary to provide passage for high clearance vehicles. Route markers and regulation signs are in place and useable. Road is open for limited passage of traffic, which is usually administrative use, permitted use, and/or specialized traffic.
- **Maintenance Level 3:** Road is maintained for safe and moderately convenient travel suitable for passenger cars. Road is open for public travel, but has low traffic volumes except during short periods of time, such as hunting season.
- **Maintenance Level 4:** At this level, more consideration is given to the comfort of the user. Road is usually surfaced with aggregate or is paved and is open for public travel.

Traffic Service Levels

Traffic service levels describe a road's significant characteristics and operating conditions. These levels are identified as a result of transportation planning activities. Traffic service level characteristics include the road width, shoulders, curve widening, sight distance, turnout spacing, design speed, surface type, restrictions, and future maintenance level (FSH 7709.56, section 4.14). Most roads within the project area are traffic service level D, which is inclusive of most Maintenance Level 2 roads. These roads were built for high clearance vehicles with little mixed vehicle traffic. They are single lane with limited turnouts, designed for slow vehicle speeds. Forest Roads 31, 3125, 3140, 37, 3765, 3746, and a portion of the 3130 are traffic service level C, which is inclusive of all the Maintenance Level 3 and 4 roads. These roads were built for more mixed vehicle traffic with more turnouts and generally better alignment.

Myrtle-Silvies Roadless Area

The Myrtle-Silvies Roadless Area was inventoried in the Roadless Area Review and Evaluation (RARE) process (RARE Final Environmental Impact Statement, October 1973) and again in RARE II (Final Environmental Impact Statement, January 1979). The Forest Plan reevaluated the Myrtle-Silvies Roadless Area and, after considering the area's capability as wilderness, recommended the area for non-wilderness management. The Forest Plan modified the Myrtle-Silvies Roadless Area boundary to those areas that still conform to wilderness definitions (Figure 3-1) and allocated the area for management as follows:

- 9855 Acres in MA 10 – Semi-Primitive Non-Motorized Recreation Areas
- 1067 Acres in MA 1/2 - General Forest/Rangeland
- 93 Acres in MA 3A – Non-Anadromous Riparian Areas
- 590 Acres in MA 4A – Big Game Winter Range Maintenance
- 142 Acres in MA 16 – Minimum Level Management

The Record of Decision for the Forest Plan states that the portion of the Myrtle-Silvies roadless area that is within the semi-primitive non-motorized area is to be managed with no scheduled timber harvest and in an unroaded condition, but for multiple use.

Besides the Myrtle-Silvies Roadless Area, there are no contiguous 1000-acre or greater blocks of unroaded area within the project area.

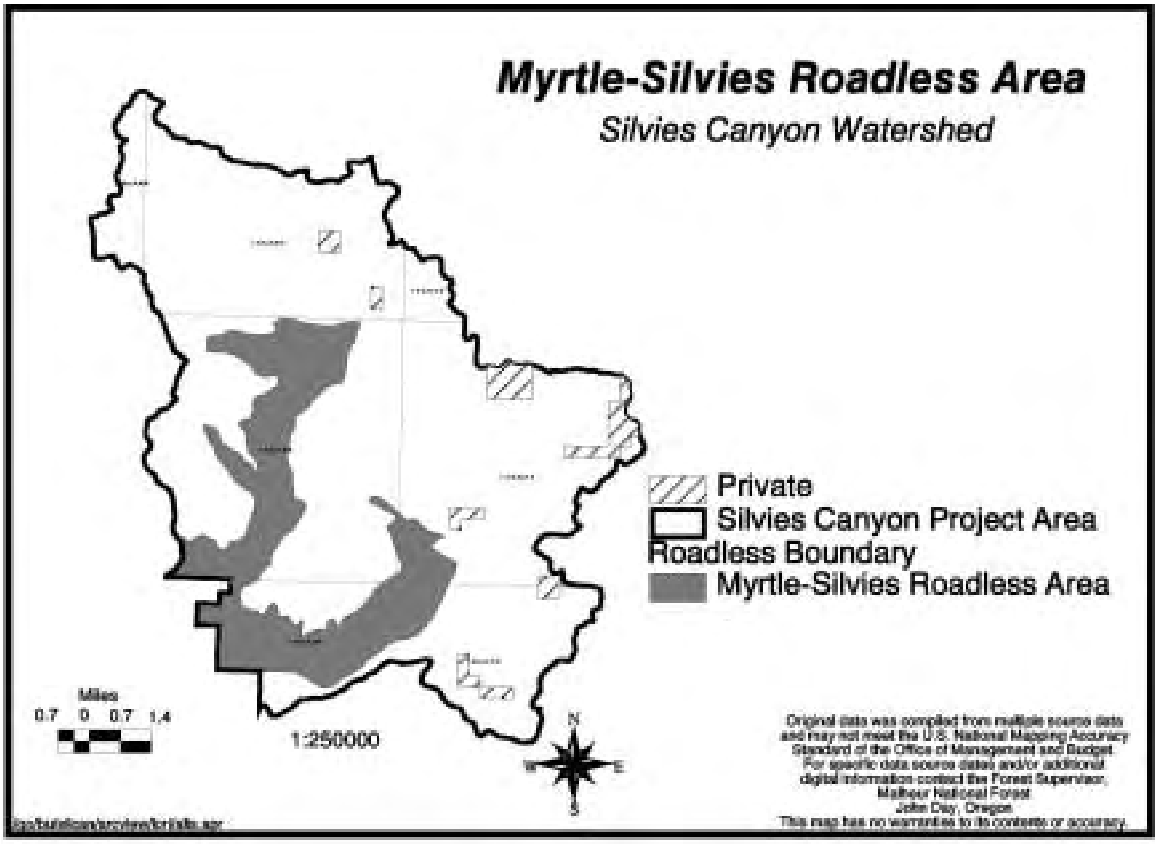


Figure 3-1. Myrtle-Silvies Roadless Area – Location of the Myrtle-Silvies Roadless Area and Former RARE II Study Area 6232.

Historic and Current Uses

Historic activities in the Myrtle-Silvies Roadless Area included homesteading, mining, grazing, timber harvest, and road construction and use.

Big-game hunting and fishing are currently the primary recreational uses of the area. Other uses include Silvies river rafting or canoeing during the spring high water periods, picnicking, camping, horseback riding, hiking, recreational gold panning, photography, and nature study. All recreational use in the area is light. Access is limited to trails that follow the stream courses; these are generally at a gentle grade and suitable for an average hiker. For more information on recreational use refer to the section titled "Recreation."

This area provides year round Rocky Mountain elk habitat with winter range encompassing the entire area. Mule deer are in the area during spring, summer, and fall. The canyon rims provide habitat for black bear, bobcat, Canada geese, prairie falcon, and turkey vulture. The area provides for a wide spectrum of wildlife viewing, as the canyons support riparian, cliff, and montane habitat in close proximity. Most bird and mammal species associated with the southern Blue Mountains can be found in the area.

3 AFFECTED ENVIRONMENT

The Myrtle-Silvies Roadless Area lies within four grazing allotments, West Myrtle, Rainbow, Scatfield and Myrtle. For more information on grazing allotments refer to the section titled "Range Resources."

The major attraction of this area, in addition to hunting and fishing opportunities, is simply a place to "get away from it all" and enjoy "peace and quiet without motorized intrusions."

Natural Integrity

Within the river canyons, natural integrity of the area is extremely high. Natural processes have been virtually unhampered by human activities with the exception of trail maintenance, livestock grazing, fire management, a few unimproved roads, and camping and associated activities. Recently, off highway vehicle (OHV) use has become a concern. Not only is this type of use inconsistent with the Forest Plan, but also a cause of soil erosion and sedimentation.

Fire suppression in the area has caused a gradual change in the understory vegetation from ponderosa pine to white fir and other tree species. Under natural conditions, low intensity wildfires would have selectively maintained ponderosa pine in the understories.

The effects of grazing in the area are mostly concentrated along streams. They include fences, salt grounds, cattle trails, some compaction and vegetation trampling, dust beds, and presence of cattle along the streams.

There is one unimproved road (Forest Road 3100035) for several miles along the Silvies River. This is utilized for one mile until after spring runoff, at which time it is possible to ford the Silvies River and travel an additional two miles with OHVs. This road was identified for closure in the Forest Plan. This closure was breached, and then closed again in 2001. There are two other unimproved roads (Forest Roads 3110224 and 3110111) in the southwest corner of the roadless area that provide access to private property.

Naturalness

Overall, the area appears extremely natural to the average user. Most users would not normally notice the effects of fire suppression. The impacts of the unimproved roads are localized to those two areas. Foot trails along streams are maintained to a fairly low standard.

The evidence of livestock grazing and OHV use remain the most intrusive activities. Cattle grazing appears unnatural to some visitors and would be extremely difficult to mitigate unless grazing were eliminated. Livestock grazing occurs in the portion of the area most likely to receive a majority of visitor use. OHV use is a recent development and can cause resource damage; this use is inconsistent with management direction for the area.

Opportunity for Solitude

Within the canyons, opportunities for solitude are very high, especially along stream bottoms. The depth of the canyons and the vegetative cover provide excellent screening. Rim tops offer limited opportunity for solitude and viewing the canyons. The views give an impression of a vast, unspoiled canyon area, but intrusions from the adjacent tablelands occur, especially during hunting season.

Primitive Recreation and Challenge

Overall, Primitive recreation opportunities are limited by the narrowness and irregular shape of the area. Topographic and vegetative cover are significant over much of the area, and trails tend to concentrate users in stream bottoms or on canyon rims. Trails are the only recreation facility present and they are low standard. They are not difficult, however, as they follow the moderate stream grade.

The lack of facilities and access tends to increase opportunities for solitude and unconfined recreation. Challenge to physical ability would be classified as moderate to high, particularly for the areas with rock cliffs and very steep slopes.

Special Features

There is scenic variety both vertically, from rim tops to canyon bottoms, and horizontally as the scene changes between microhabitats.

Much of the forest in the canyons provides old growth. Bald eagles forage along Silvies River but no other threatened or endangered species are known to use the area. There is potential for bald eagle winter roosts at the mouth of both Silvies and Myrtle Canyons, and low potential for peregrine falcon nest sites. Redband trout, a sensitive species, is known to occur in the area.

American Indians occupied Myrtle and Silvies Canyons at various times. A cultural resource survey was conducted in Myrtle Canyon in 1980; isolated chips and flakes were found. No historic sites were found. A cultural resource survey was conducted in the Silvies River Canyon in 1995; numerous prehistoric, historic, and isolates were found.

Watershed/Fish Habitat

The Silvies Canyon project area is in the semiarid rain shadow of the Cascade Mountains. Elevations range from 5,000 to 6,400 ft above sea level. The area has both marine and continental climate patterns with most of its precipitation occurring from November through March, primarily in the form of snow. Precipitation ranges from 20 to 30 inches per year. Thunderstorms provide some rain in the summer, although the summers are relatively dry and have periods of no measurable precipitation.

The streams in the project area fall within Management Area 3A, Non-anadromous riparian areas. Streams include Myrtle Creek, North Fork Myrtle Creek, South Fork Myrtle Creek, West Myrtle Creek, Sage Hen Creek, Stancliffe Creek, Cooley Creek, and the Silvies River. Stream surveys have been completed on a little more than half of the fish bearing streams in the project area. Surveys have determined the presence of eleven native and seven introduced fish species in the project area.

Native Species:

- Redband trout
- Redside shiner
- Longnose dace
- Speckled dace
- Chiselmouth chub
- Tui chub
- Northern pikeminnow
- Columbia mottled sculpin
- Malheur mottled sculpin
- Largescale sucker
- Bridgelip sucker

Introduced Species:

- Rainbow trout
- Brook trout
- Brown bullhead
- Carp
- Pumpkinseed
- Small mouth bass
- Yellow perch

Proposed, Endangered, Threatened or Sensitive Fish Species

Redband trout are a Region 6 sensitive species and a Malheur NF management indicator species. Redband trout were petitioned to be listed as a threatened or endangered species under the Endangered Species Act in 1998. The U.S. Fish and Wildlife Service determined on March 20, 2000, that they were not warranted for listing as a threatened or endangered species. Redband trout are widely distributed in the project area, occupying both perennial and intermittent streams.

Malheur mottled sculpin is a Federal Species of Concern, a Region 6 sensitive species, and a Malheur NF management indicator species. This species is currently present in the Silvies River.

Existing Habitat Conditions

Riparian management objectives (RMOs) are identified in Amendment 29 to the Forest Plan for attaining desired future conditions for aquatic habitat on the Malheur NF. The Forest Plan was subsequently amended by INFISH in 1995. However, Forest Plan RMOs were retained whenever they were more protective and/or more site specific. For this analysis the appropriate RMOs are identified as either Forest Plan Amendment 29 or INFISH. Amendment 29 identifies the following aquatic habitat elements.

Water Quality

Within the project area, on-site uses of water are for fisheries (redband trout) and other aquatic species, terrestrial wildlife, livestock and road watering. Downstream uses are similar, but also include habitat for sculpin and irrigation for agricultural purposes. Myrtle Creek, West Myrtle Creek, Sage Hen Creek, Stancliffe Creek, and the Silvies River are the primary perennial fish-bearing streams in the project area.

Water Temperature

Stream temperatures are out of compliance with the State standards when any maximum 7-day temperature average exceeds 64.0°F. Myrtle Creek, Stancliffe Creek and the Silvies River have been monitored for water temperature and all have exceeded the maximum water temperature standards established by ODEQ at least once during the period of 1995-1999. To date, Myrtle Creek is listed on the 303(d) list for not meeting temperature standards (Reference Map #29).

The 2000 Silvies Canyon Watershed Analysis identified elevated water temperatures associated with streams that are wider and shallower than they were historically. This is a result of past heavy livestock grazing during the first part of the 20th century, road building which has affected the hydrologic and sediment regimes, and past logging within riparian areas. Current grazing management has allowed some reaches to improve and develop an upward trend; however, more than half of the reaches are still classified as functioning-at-risk (FAR) (Silvies Canyon WA 2000) and contribute to higher stream temperatures due to lack of shade.

Sediment/Substrate

A high degree of embeddedness is a sign that the watershed is producing an excessive amount of sediment to the stream system. Sediment reduces a stream's ability to provide important aquatic insect and fish spawning habitat. Results of past stream surveys within the Silvies Canyon project area show that some sections of streams have appropriate levels of substrate embeddedness, while others were found to have a high degree (>30%) of embeddedness. Streams with reaches found to have a high degree of embeddedness based on pebble count data include Sage Hen Creek, West Myrtle Creek and Myrtle Creek.

Channel Stability

Stream bank stability ratings from contracted level II stream surveys documented relatively stable streambanks (generally over 80% stable), whereas field observations by Forest Service hydrologists and fisheries biologists indicate that stream bank stability ratings from contracted stream surveys are overestimated. High embeddedness levels from pebble count data supports USFS field observations. Roads and other types of disturbed ground (such as skid trails, landings, and dispersed campgrounds), as well as documented unstable banks, are all contributing to current sediment levels in streams.

Channel Morphology/Large Woody Material

Forest Plan Amendment 29 sets RMOs for large wood in streams by ecosystem. Three ecosystems are used to classify stream reaches: ponderosa pine, mixed conifer, and lodgepole pine. In addition to these three ecosystems, stream reaches also occur in meadow ecosystems where potential recruitment of large wood from the adjacent riparian area is low. For stream reaches that occur in meadow ecosystems the default INFISH RMO for large wood was used. For stream reaches that occurred in a combination of ecosystems, the dominant ecosystem RMO was used. Large wood is defined as >12" diameter and >35' long. Three of the 28 surveyed stream reaches meet Forest Plan RMOs for large wood (see Table 3-2 and Reference Map #33).

Large wood in streams in the Silvies Project Area is naturally low and generally does not meet Forest Plan RMOs due to two factors:

- Much of the riparian areas are meadows where the potential for recruiting large wood into the channel is low and large wood must be recruited from forested areas upstream. Approximately 59% of the surveyed stream reaches in the project area are within meadows or meadows are the predominant riparian ecosystem type.

- Large wood RMOs in Forest Plan Amendment 29 may overestimate the potential for large wood in the Silvies Canyon project area. Forest Plan Amendment 29 RMOs for large wood were developed using data from research papers, local research in the upper M.F. John Day River watershed, and professional judgment of Forest staff (R. Gritz pers. com.). However, the southern portion of the Malheur Forest has historically been less productive than the northern portions. The area was historically (prior to 1900) less forested than presently. Approximately 20,000 acres were non-forested in the project area compared to the approximately 15,000 acres that are presently classified as non-forested. Trees 80 to 100 years old that correspond to the expansion of forested areas in the project area are currently 10 to 16" dbh (R. Schwenke pers. comm.). These trees are now just reaching the size class to be considered as potential large wood.

Table 3-2. **Existing large woody material per mile by stream reach[1].**

Stream	Reach	Ecosystem[2]	**Existing LWM** pieces/mi	**Amendment 29 RMO** pieces/mi	**INFISH RMO** pieces/mi
Silvies River	Silv-1	Meadow/P-Pine	No Data	20 -70	20
	Silv-2	Meadow/P-Pine	No Data	20 -70	20
	Silv-3	Meadow/P-Pine	0	20 -70	20
	Silv-4	Meadow/P-Pine	3	20 -70	20
	Silv-5	Meadow/P-Pine	0	20 -70	20
Stancliffe Ck.	Stan-1	Mixed Conifer	8	80 -120	20
	Stan-2	Meadow/P-Pine	17	20 -70	20
	Stan-3	Meadow/P-Pine	0	20 -70	20
Sage Hen Ck.	Sage-1	Meadow	3	No Standard	20
	Sage-2	Meadow	0	No Standard	20
	Sage-3	P-Pine	3	20 -70	20
	Sage-4	Meadow/P-Pine	4	20 -70	20
	Sage-5	P-Pine	16	20 -70	20
Myrtle Ck.	Myrt-1	Mixed Con/Meadow	12	80 -120	20
	Myrt-2	Mixed Conifer	20	80 -120	20
	Myrt-3	Mixed Conifer	20	80 -120	20
	Myrt-4	Mixed Conifer	16	80 -120	20
	Myrt-5	Meadow	3	No Standard	20
	Myrt-6	Meadow/ Mixed Con	**25**	80 -120	20
	Myrt-7	Meadow	0	No Standard	20
	Myrt-8	Meadow/ Mixed Con	**20**	80 -120	20
N.F. Myrtle Ck.	MyrNF-1	Meadow/ Mixed Con	17	80 -120	20
	MyrNF-2	Meadow/ Mixed Con	3	80 -120	20
S.F. Myrtle Ck.	MyrSF-1	Mixed Con/Meadow	24	80 -120	20
	MyrSF-2	Mixed Con/Meadow	75	80 -120	20
West Myrtle Ck.	WMyr-1	Mixed Conifer	71	80 -120	20
	WMyr-2	Meadow/ Mixed Con	**99**	80 -120	20
Cooley Ck.	Cool-1	Mixed Conifer	77	80 -120	20

[1]Numbers in bold indicate reaches which are meeting or exceeding RMOs.
[2]Where two ecosystems are listed, the dominant ecosystem is listed first.

Pool Frequency

Forest Plan Amendment 29 RMOs for pools per mile were developed from Rosgen (1994). These RMOs reflect the potential for pools per mile based on channel morphology. Many of the stream reaches in the project area are 'C' type channels, where the primary pool forming process is fluvial and pools are formed at meander bends (Rosgen 1996). Reduction in pools reflects loss of sinuosity of 'C' type channels. Six of the 28 surveyed stream reaches meet Forest Plan RMOs for pool frequencies (See Table 3-3 and Reference Map #34).

The low number of stream reaches meeting RMOs indicates that management activities have reduced the quantity of pool habitat in the project area. Management activities that have reduced pool habitat include livestock grazing and road construction along 'C' and 'E' type channels.

Many of the stream reaches that are currently 'C' type channels were probably historically 'E' type channels. These channels have shifted to 'C' type channels in response to management activities, including, timber harvesting, road construction and grazing. 'C' type channels have a lower potential for pool habitat because they are less sinuous than 'E' type channels, and have larger width to depth ratios which can result in shallower pools compared to 'E' type channels.

Many channels in the project area have been rated on their channel stability, sensitivity to disturbance, streambank erosion potential and vegetation influence. Table 3-4 describes these data.

Table 3-3. **Comparison of existing pools per mile to Forest Plan Amendment 29 RMOs[1].**

Stream	Reach	Channel Type	Existing Pools/mi	Amend 29 RMO (pools/mi)
Silvies River	Silv-1	C	No Data	15 - 26
	Silv-2	C	No Data	15 - 26
	Silv-3	C	**15**	15 - 26
	Silv-4	C	14	15 - 26
	Silv-5	C	**18**	15 - 26
Stancliffe Ck.	Stan-1	C	108	151 - 264
	Stan-2	B	**162**	151 - 264
	Stan-3	C	115	151 - 264
Sage Hen Ck.	Sage-1	C	**84**	38 - 66
	Sage-2	C	29	38 - 66
	Sage-3	B	20	38 - 66
	Sage-4	C	19	38 - 66
	Sage-5	C	54	75 - 132
Myrtle Ck.	Myrt-1	B	**22**	15 - 26
	Myrt-2	B	14	15 - 26
	Myrt-3	B	10	38 - 66
	Myrt-4	B	10	38 - 66
	Myrt-5	C	8	38 - 66
	Myrt-6	G	0	75 - 132
	Myrt-7	E	0	75 - 132
	Myrt-8	C	12	75 - 132
N.F. Myrtle Ck.	MyrNF-1	C	14	75 - 132
	MyrNF-2	C	9	15 - 26
S.F. Myrtle Ck.	MyrSF-1	B	24	75 - 132
	MyrSF-2	G	33	151 - 264
West Myrtle Ck.	WMyr-1	B	**50**	38 - 66
	WMyr-2	E	30	75 - 132
Cooley Ck.	Cool-1	A	47	75 - 132

[1] Numbers in bold indicate reaches that are meeting or exceeding RMOs.

Table 3-4. **Channel stability, sensitivity to disturbance, streambank erosion potential and influence of vegetation for channel types present in Silvies Canyon Watershed Restoration project area. Adapted from Rosgen 1996.**

Channel Type[1]	Channel Stability	Sensitivity to Disturbance	Streambank Erosion Potential	Vegetation Influence[2]
A (3)	Stable/Unstable	Very high	Very high	Negligible
B (3-5)	Stable	Low to moderate	Low to moderate	Moderate
C (3-5)	Stable/Unstable	Moderate to very high	Moderate to very high	Very high
E (3-6)	Stable	High to very high	Moderate to high	Very high
G (3-5)	Unstable	Very high to extreme	Very High	High

1) Number in parenthesis are the range of channel subtypes potentially present in the project area.
2) Influence of vegetation on controlling w/d ratios.

- The A stream type is a steep, deeply entrenched and confined stream channel with cobble or gravel-dominated substrates. A stream types have low sinuosity (<1.2), low width/depth ratio (<12), and slopes ranging from 0.04 to 0.09.

- The B stream type is a moderately entrenched channel in cobble or gravel-dominated substrates with moderate width/depth ratio (>12) and sinuosity (>1.2). B type stream gradients generally range from 0.02 to 0.04.

- The C stream type is a slightly entrenched, riffle/pool meandering system with high sinuosity (>1.2), gravel or cobble-dominated channel with a well-developed floodplain. Width/depth ratios are moderate to high (>12) in C type streams, and slopes range from 0.001 to 0.02.

- The E stream types are slightly entrenched channel systems with high sinuosity (>1.5), gentle to moderately steep channel gradients (<0.02), and very low width/depth ratios (<12) commonly found in broad valleys where the dominant substrate is gravel.

- The G stream type is deeply incised in depositional material primarily composed of an unconsolidated, heterogeneous mixture of cobble, gravel, and sand, thus is inherently unstable. G type streams have low width/depth ratios (<12), moderate sinuosity (>1.2), and slopes ranging from 0.02 to 0.04.

Roads and Related Problem Areas

There are nearly 375 miles of road within the project area, including 33 miles of roads in RHCAs. Many of these roads are currently in a deteriorating condition, based on information from the Silvies Canyon Road Analysis. Observations during the field review for this analysis identified two major sources of stream sediment, roads and excessive livestock grazing in the riparian area. Most roads are hydrologically connected to the stream channel via ditches and overland flow. Water, sediment, and chemical runoff generated from the road prism can enter the natural stream channel network when the road is hydrologically connected to the stream channel.

Road treatments to "disconnect" roads from streams to reduce the amount of hydrologically connected roads are usually simple and inexpensive, and effective in reducing road effects and risks to water quality and aquatic habitats. Specific roads identified for drainage improvements or other treatment to reduce erosion and sediment transport are listed in Table 3-5 (also see Map #31).

Table 3-5. **Roads Impacting Aquatic Habitat.**

Subwatershed	Forest Road	Segment	Reason
Myrtle Park 60905	3100286	31 Rd to 3100982 Rd	Contributing sediment to Heifer Cr
Myrtle Park 60905	3100864	31 Rd to 3100241 Rd	Contributing sediment to Heifer Cr
Myrtle Park 60905	3700117	3700275 Rd to 37 Rd	Contributing sediment to S.F. Myrtle Cr
Myrtle Park 60905	3700167	Entire road	Degrading wet meadow (S.F. Myrtle Cr)
Myrtle Park 60905	3700275	Entire road	Contributing sediment to S.F. Myrtle Cr
Myrtle Park 60905	3700294	Upper portion	Contributing sediment to Myrtle Cr tributary
Myrtle Park 60905	3700379	Junction of 3700187 Rd	Contributing sediment to Gribble Spr
Burnt Mtn 60913	3100035	South of Bennett Cabin	Contributing sediment to Silvies River
Sage Hen Creek 60907	3100860	31 Rd to 3100844 Rd	Contributing sediment to Sage Hen Cr
Sage Hen Creek 60907	3125244	East of L. Sagehen Flat	Contributing sediment to Little Sage Hen Cr
Sage Hen Creek 60907	3125912	3125920 Rd to 3125914 Rd	Contributing sediment to Little Sage Hen Cr
Boulder/Fawn Cr 60909	3130129	NW of Aspen Spring	Contributing sediment to Fawn Cr

Passage Barriers

The forest wide culvert survey is not scheduled for this area until after 2003, but one culvert on the 3700440 Rd was identified during stream surveys as a passage barrier for fish on Cooley Creek. This culvert may block passage to approximately ¼ mile of potential habitat on Cooley Creek.

Livestock Grazing

Livestock grazing is a contributing factor in preventing the obtainment of INFISH RMOs (pool frequency, water temperature, bank stability, lower bank angle and width/depth ratios) and Forest Plan Amendment 29 Standards (cobble Embeddedness, riparian vegetation and shade/canopy cover) on Myrtle Creek, North Fork Myrtle Creek, West Myrtle Creek, South Fork Myrtle Creek, Stancliffe Creek, Sage Hen Creek, Cooley Creek and the Silvies River. Utilization of riparian vegetation and stream bank damage from cattle grazing has contributed to the current condition on these stream reaches. Impacts from elk have been documented across the project area but not to the degree of livestock.

Cumulative Watershed Condition

The standard CWE (Cumulative Watershed Effects) methodology in use on the Malheur National Forest is the ERA (Equivalent Road Area) model. This model is based on, and modified from, the model that was created by the Eldorado National Forest in California. This model evaluates risk as a percentage of the project area that is occupied by roads by calculating the area for each activity that occurs in the project area as an equivalent road area. Actual areas of an activity (past, proposed, or future) are converted to an equivalent road area through the use of adjustment coefficients. Coefficients for past activities are adjusted downward with age to allow for natural recovery. Different activities recover at various rates and some activities do not recover at all. Coefficients and recovery rates were developed for activities that occur on the Malheur National Forest and adjusted for local climate, geomorphology, and soil characteristics.

After all activities are converted to ERAs, they are totaled by alternative and expressed as a percentage of the project area. This percentage is then compared to a threshold of concern, which is based on the natural sensitivity of the project area. The thresholds are based upon four criteria: surface soil erosion, detrimental compaction, hydrologic group, and vegetative cover.

The ERA model does not give a quantifiable number (output) for sedimentation, tons of soil eroded/detached, or any other similar item. This model does generate a risk index value that can be used to compare alternatives to each other and against the current condition. The impacted area is converted to a linear length and then multiplied by the average width of the road (including cut and fill slopes) to arrive at an acreage figure.

The total ERA for each subwatershed is divided into the total subwatershed acres, to determine what percentage of the watershed is in an ERA. This percentage is then compared to the Threshold of Concern (TOC), also a percentage of the watershed. If the ERA for each subwatershed is below the TOC, then the cumulative effects of the proposed action are not anticipated to be a problem. If the ERA approaches the TOC then cumulative effects may be of issue. If the ERA is above the TOC, then cumulative effects are anticipated to be a concern and various measures may be taken to lower the ERA. This may include: decommissioning roads, delaying proposed harvest activities to let the subwatershed recover.

The following table summarizes the existing conditions for each of the seven subwatersheds as defined by the ERA watershed cumulative effects model:

Table 3-6. **Existing Equivalent Roaded Area and Threshold of Concern.**

Subwatershed	Threshold of Concern	Existing Equivalent Roaded Area
Boulder Ck, Fawn Ck	12%	1.9%
Burnt Mountain	12%	1.4%
Myrtle Creek	14%	3.5%
Myrtle Park	16%	5.7%
Red Hill	12%	4.1%
Sage Hen Creek	12%	3.9%
Stancliffe Creek	14%	3.5%

Aspen Stand with Conifer Encroachment

Soils

Topography

The Silvies Canyon project area generally has a south aspect. The topography varies from flats (generally dry, moist, or wet meadows) to slopes of varied steepness. Elevations range from 5,000 to 6,400 ft above sea level.

Soil Types

The best soil description and map available is the Soil Resources Inventory (SRI) (Carlson 1974). Information about soil types from the SRI forms the basis for the following discussion. However, this map and report was made for large-area planning. A sample of field observations and aerial photos indicates the SRI map is generally correct, but not in all cases. For instance field observations in the project area, by the Blue Mountain District soils specialist, documented one areas mapped as non-forest or marginal forest soil that is are, in fact, forested.

Generally, the accuracy of the SRI for determining soil texture, or whether a site supports forest or non-forest is probably 80% or more accurate. For determining suitability for subsoiling, the SRI may only be 60% accurate because there is a lot of site-specific variability that is not captured in the broad landtypes in the SRI. For determining slope (and thus erodibility), the SRI is probably 80% or more accurate for soils mapped as less than 30% slope, but only 50% accurate for soils mapped as steeper than 30%. The Silvies Canyon project area may be more accurate, because of its canyon/plateau topography. These estimates of the accuracy of the SRI are based on several years experience of using the Malheur National Forest SRI by the Blue Mountain District soils specialist.

The SRI gives a broad overview of the soils and their hazards, limitations, and productivity potentials. A complete list of soils that occur in the project area is in the analysis file. The following is a general characterization of the soils, including a description of their occurrence on the landscape, some key soil properties, capabilities, qualities, and hazards. Landtypes marked with * are the most extensive within the group and within the Silvies Canyon Project area.

Valley Floor and Meadow Soils

The soils in this group are mostly deep and moderately deep, silty to clayey, moderately well to poorly drained and are on gentle (less than 15%) slopes. They are forming in valley fill materials. Water holding capacity is about 20 to 25 inches. These soils have a high hazard for compaction and are highly susceptible to gully and streambank erosion. These soils are not extensive, but are highly productive and support a dense cover of grasses and sedges. (Landtypes 1 and 3).

Soils with Sage Plant Communities Dominant

Soils in this group are mostly very shallow and are very gravelly and cobbly loams. These soils have more than 40% surface stones and are excessively drained. Plant-available water holding capacity is less than one inch. These soils are on upland flats and gentle slopes of less than 30%, and are dominantly on rhyolite, basalt and andesite bedrock. These soils are not extensive and are largely in the southern part of the project area. They support discontinuous cover of low sage, stiff sage and grasses. Soil compaction, displacement, and erosion hazards are mostly low, but are moderate in some locations. (Landtypes 47 and 77).

Soils with Juniper Plant Communities Dominant

Soils in this group are mostly shallow and very shallow, are very to extremely gravelly loams and some clay loams, with more than 35% surface stones. They are well to excessively drained on upland flats nearly zero to more than 70% southerly slopes. Rhyolite is the dominant bedrock, but a few areas are underlain by basalt, tuff and breccia. These soils support mostly juniper plant communities with significant components of mahogany and bitterbrush, with a few scattered ponderosa pine. Surface erosion hazard is mostly moderate to high. Compaction hazard is mostly low, but is high in some areas. Soil displacement hazard is mostly moderate. Plant-available water holding capacity is generally less than two inches. (Landtypes 7*, 44, 46, 73, 74* and 85*)

Soils with Ponderosa Pine Communities Dominant

This group of soils is the most extensive in the project area. They are shallow and moderately deep, with loam and clay loam surface layers and clay loam and clay subsoils. They are mostly very gravelly and cobbly and usually have less than 20% stones on the surface, but there are inclusions of very stony and rocky, non-forested, areas referred to as "scabs." Most of the soils are well drained, but a few areas are somewhat poorly to poorly drained. The bedrock is mostly rhyolite and altered tuff and breccia, with small areas of basalt and andesite. These soils are mostly on upland flats and gentle slopes (0 to 30 %) with a southerly exposure, and on slopes of 30 to 70 % adjacent to the major drainage systems. Surface erosion hazard is low to moderate, except on slopes steeper than 45%, where it is high. When runoff does occur, the potential for downstream turbidity is relatively high. Compaction hazard is quite variable in this extensive group. There are significant areas that have a low compaction hazard, but significant areas of high hazard also are present. Soil puddling (loss of structure by shearing forces) is a hazard when these soils are wet. These soils generally have high strength when dry. Displacement hazard is mostly low to moderate. Plant-available water holding capacity is mostly less than three inches and productivity potential is relatively low. Some of the soils have moderate productivity potential. There are inclusions of moderately deep and deep alluvial soils in draws, toe slopes and along streams. (Landtypes 8*, 41*, 43, 68, 71* and 81*).

Soils with Mixed Conifer Plant Communities Dominant

These soils typically have an 8 to 15" surface layer of volcanic ash over a gravelly clay loam subsoil and are moderately deep or deep. Some have clay subsoils. The surface layers have low bulk density and relatively high infiltration rates. The soils are mostly on gentle to moderate slopes (0 to 50%), with some steep slopes along the major stream systems. While the general aspect is variable, northerly exposures are common. These soils are underlain by rhyolite, basalt, andesite and tuff. These soils have the highest waterholding capacities in the project area, 12 to 25", and they retain significant amounts of moisture throughout most of the summer. Plant-available water holding capacity is about 6 to 8" in some of these soils. The soils have a relatively thick litter layer, but are susceptible to displacement and dustiness when disturbed. Surface erosion hazard is mostly moderate to high and very high. The volcanic ash soils are susceptible to hydrophobicity (water repellency) when burn intensities are moderate to severe. These are the most productive soils in the project area. (Landtypes 9*, 42*, 48, 58, 65*, 75*, 82 and 83).

Existing Soil Conditions

An assessment of current soil condition classes was conducted on 274 units in the project area. All of the units were sampled between September 27 and November 14, 2002. The Blue Mountain District soils specialist trained technicians to collect data on existing condition. Technicians inspected almost all stands proposed for commercial harvest (about 580 acres were inadvertently missed) to see if detrimental impacts were clearly less than 10%. On most areas that had been logged in the last 30 years, and on areas that may have 10% or more detrimental impacts (excluding roads and landings), quantitative data was taken on transects, using the protocol in Appendix E. All of the data forms were analyzed and interpreted by an experienced senior soil scientist.

Soil assessment replications were conducted, in a few stands, by the Blue Mountain District soils specialist to determine the accuracy of the assessments. All estimates made by trained technicians were higher than estimates by the Blue Mountain District soils specialist. Additionally, several stands were assessed two or more times by different technicians. This also confirms accuracy of assessments. Four soil condition classes were defined for the field sampling. The soil condition classes are as follows:

- Class 0—Undisturbed natural state
- Class 1—Low soil disturbance
- Class 2—Moderate disturbance
- Class 3—High disturbance

Classes 2 and 3 are considered to be detrimental conditions that may measurably affect soil quality, especially productivity and hydrologic function. The detrimental conditions may be due to soil compaction, displacement, puddling or rutting, erosion, and severe burns. Standards for these conditions are described in FSM 2520, R-6 Supplement No. 2500.98-1.

Past management practices have affected the current soil conditions. Decades of fire suppression have resulted in a dense cover of vegetation on some of the soils. On these sites, the long-term carrying capacity is exceeded because of the inability of the soils to supply adequate soil moisture and nutrients for sustaining healthy forest communities and vigorous tree and other vegetative growth. Many of the soils have been impacted by livestock and other hoofed animals, so that soil structure has been altered. Also, microbiotic crusts, important for erosion protection and nutrient supply on some soils in the sage and juniper communities, may have been broken or destroyed. Soils in most of the forested units have had one or more prior entries for timber harvest and skid trails remain visible. Soil compaction and displacement by equipment occurs to varying degrees. Soil erosion has and continues to occur on some sites, especially where roads aren't adequately maintained and skid trails are on steep slopes. Several stands (about 4.5%) have deep ruts in the skid trails. These are potential sources of chronic erosion. The stands with notable ruts are 6.01, 6.27, 10.07, 11.01, 11.08, 11.09, 11.11, 11.12, 12.01, 12.02, 21.05, 21.06, 23.06, 23.07, 26.06, 27.04, 30.05, 31.01, and 38.01 (also see Appendix E).

On the forested soils, the increased stand densities and the relative increase of Douglas-fir and white fir in both ponderosa pine and mixed conifer stands have resulted in thicker litter layers than occurred historically. This leads to more of the fine tree roots occupying the near surface layers of soil (Harvey et al. 1999). Soil nutrients become more concentrated at or near the surface under these conditions. When moderate and severe fires occur, there is a likelihood of greater consumption of organic materials and loss of nutrients through volatilization or runoff, and fine root mortality. Thus, there is a potential for loss of nutrients at an increased rate over background or long-term rates.

About one percent of the stands have detrimental soil compaction, displacement, or erosion in excess of the Forest and Regional Soil Quality Standards, according to the sample estimates. That is, more than 20% of the area within those units is damaged to a degree that productivity is likely affected and/or soil hydrologic functions are degraded. The stands currently exceeding soil quality standards on more than 20% of the area are 11.08, 11.09, 31.04 and 32.02. A cumulative total of approximately 3.4% of the stands have 15% or more of their area in detrimental conditions according to the sample estimates. The stands are 18.01, 24.09, 33.02, 33.16, 26.06, 27.14, 27.15 and 30.03, in addition to the stands previously identified as exceeding 20% of the area. There is a cumulative total of about 10% of the stands that have 10% or more of their area in detrimental conditions. The greatest amount of detrimental conditions is compacted and/or displaced soil. About 90% of the stands have less than 10% of their area in detrimental conditions.

Soil displacement and evidence of burning were recorded together in a few stands. This was usually noted where machine piling of slash had occurred. Examples of this are stands 33.05, 31.07 and 30.3. Underburning was recorded as "less than 20% detrimental," in stands 6.03, 6.09, 6.10 and 6.12.

Visible evidence of skid trails, roads, landings, or burn areas was observed by field sampling in most of the stands. Also, it was noted that in many stands skid trails exhibit low impact and little or no off-trail disturbance. Sites that have been occupied by hunter camps and the associated vehicle tracks were observed in a few units.

Roads and landings average approximately 2% of the area on the units that have had prior entries. The amount of roads and landings are variable and the sample estimates range from none to approximately 10% of a unit.

In most stands, the samplers indicated that existing skid trails and landings could be used again as needed. In some cases, it was noted that there were few trees, or trees were small, in trails after 30 years. Examples of this are in stands 18.04 and 30.01. In some units, accumulations of down woody debris and scattered slash were observed. In general, the field sampling appears to confirm that the soils are generally stony, and relatively shallow where juniper and scattered pine occur. Where mixed conifer and more dense stands of pine occur, the soils generally are observed to be moderately deep or deep. But field observations also note that these soils are often stony or have rock exposures on the surface. For more site-specific information on soils refer to Appendix E.

Vegetation

The vegetation patterns in the Silvies Canyon project area vary from forested stands of ponderosa pine, Douglas-fir, white fir, lodgepole pine, western larch, aspen, and juniper to non-forested areas of grass, forbs, brush, and scattered ponderosa pine and/or juniper. Principal human activities that have altered the natural succession of the project area include fire suppression, grazing, timber harvesting, fuels management, and road construction.

Potential Vegetation Groups

Specific plant species tend to be found together in a characteristic set of ecological conditions. The unit of classification based on the probable, or projected, climax plant community type is defined as the "plant association" (USFS R-6 Ecology Glossary committee, 1989) and may be used to describe and classify sets of ecological conditions. For purposes of classification and analysis, plant associations may be grouped into areas with like temperature/moisture and fire disturbance regimes called Potential Vegetation Groups (PVG) (Interior Columbia Basin Supplemental Draft Environmental Impact Statement, 2000). Within the project area there is one Forested PVG (Dry Upland), two Woodland (Dry and Moist) PVGs, and numerous Shrublands, Herblands, Riparian Forests, Riparian Shrublands, and Riparian Herblands PVGs (Blue Mountain National Forests Forest Planning Decision Document dated July 18, 2002, file code 1920; *Establishment of a potential vegetation hierarchy for forest planning*). Only the Forested PVG will be analyzed for HRV (Historical Range of Variability), which is required by Regional Foresters Amendment # 1 and #2. For the purposes of analysis, the Woodlands, Shrublands, Herblands, Riparian Shrubland and Riparian Herblands will all be grouped together and categorized as Non-forest. A small part of the Riparian Forest (Aspen Stands and Cottonwood) maybe included in the Forested PVG.

Dry Upland Forest PVG

The Dry Upland Forest PVG has been further subdivided into Hot Dry, Hot Moist, and Warm Dry Plant Association Groups (PAG). There is no Hot Moist PAG in Silvies Canyon Watershed. Both the Hot Dry and the Warm Dry PAGs are very moisture-limited environments. Historically the predominant forest species was ponderosa pine, and stands were typically open and of variable stocking and structure (see Table 3-7).

Table 3-7. **Historic Stocking Levels (Munger 1917; Erickson and Conover 1918).**

DBH	Typical Trees/Acre	Range
1-10	22-38	2-44
10-20	17-23	2-23
20+	7-17	4-17

The fire regime in most of the forested area in this project area from 1752 to 1890 was approximately 15.3 years with a range of 5 to 23 years (Maruoka and Agee, 1994). When forest fires occurred they would creep into the other PVGs in a mosaic fashion before going out. Mortality from fire was light and patchy, and rarely was the whole stand killed (Munger, 1917).

In these forested stands there are a variety of understory shrubs, forbs and grasses that grow in conjunction with trees. With increased stocking of trees there has been a decrease in the stocking of shrubs, forbs, and grasses in these stands, and also a decrease in the plant species diversity with a corresponding change in the wildlife species that used the area. With the invasion of trees into nonforested areas there has been a decrease in the total number and the diversity of plant species that inhabited the former nonforested site. Finally with increased diversity and stocking of trees (stands that were once dominated by ponderosa pine that have now converted to mixed conifer) there has been a decreased diversity and total number of plants in these stands.

Hot Dry PAG

This PAG covers approximately 6,508 acres (10%), primarily in the southern 1/3 of the project area. Historically, trees typically grew in clumps of 2 to 10 trees, surrounded by single trees unevenly spaced at 80 to 300 feet. Tree density was low, resulting in open stands and good tree vigor. Mortality from fires was light and patchy. Natural reforestation of small patches was infrequent. Seed usually came from nearby trees, since large seeds do not disperse widely with the wind. Survival of the seedlings was low because of the frequent fires, which usually killed most of the seedlings.

This PAG is now composed of three types of stands: 1) ponderosa pine and juniper, 2) predominantly even aged ponderosa pine stands, and 3) two storied stands. The predominant tree species in this group is ponderosa pine with smaller amounts of juniper. Occasionally Douglas-fir may grow in some stands but these are small inclusions of the Warm Dry PAG. This PAG is commonly intermixed with the Non-forested PVGs.

The stands composed of ponderosa pine and juniper generally represent invasions of these species into non-forested areas, or the most moisture limited sites. Juniper is now very common throughout the project area, including riparian areas. The even aged ponderosa pine stands appear to be second growth plantations, but most are a result of ponderosa pine invading non-forested areas or areas that were open savannahs with 2 to 5 trees per acre.

The two storied stands are usually composed of scattered large over-story ponderosa pine with a second story of ponderosa pine that have come in since the advent of grazing and fire suppression. These stands were historically uneven age forested stands but past timber harvests have removed most of the large trees leaving scattered smaller trees that have now grown. This opened up growing space for regeneration and converted the stands to two-storied stands. Historically in this PAG the average number of large (over 21" DBH) trees varied from 0 to 9 trees per acre.

Most of the stands in this PAG are heavily overstocked and growth has declined in recent years making them susceptible to mountain pine beetle and western pine beetle. There are scattered pockets of annosus and black stain root disease.

The historic snag (>12" dbh and 16' height) level was 0.85 per acre (Schwenke, 2003; Erickson and Conover, 1918). A breakdown in snag size is shown in Table 3-8.

Table 3-8. **Historic Snag Levels per acre for Ponderosa Pine Plant Associations.**

Snag Size (dbh)	Average Snags per Acre	Range of Snags per Acre
12-20"	.35	0-.43
21-30"	.47	.34-1
30"+	.03	0-.11

Warm Dry PAG

This PAG covers approximately 43,527 acres (67%), primarily in the northern 2/3 of the project area. Although ponderosa pine historically was the dominant tree species in this potential vegetation group, in most of the plant associations Douglas-fir or white fir is the climax species. Dominance of ponderosa pine was maintained by periodic fire. Ponderosa pine trees typically grew in clumps of 2 to 10 trees, surrounded by trees evenly spaced at approximately 80 to 100 feet. Tree density was low, resulting in open stands with good tree vigor. Natural reforestation of small patches in openings created when one to two trees were killed was good but infrequent (30 year intervals with a normal range of 10 to 50 years). Seed usually came from nearby trees. Seedling survival was low because of frequent fires that killed most of the seedlings. Historically the average number of large (over 21" DBH) trees per acre would have varied from 9 to 17.

In the stands of the northern 1/3 of the project area, western larch probably occurred quite frequently as did stands of pure lodgepole pine and stands in which lodgepole grew in conjunction with ponderosa pine and western larch. White fir and Douglas-fir occurred throughout the northern 2/3 of the project area but were generally maintained by fire on the cooler northern and eastern aspects.

With the advent of fire suppression, and past timber harvesting practices, the composition of these stands has radically changed and moved towards the climax species. The stocking has increased two to four fold (basal area) and up to 10 times (trees per acre). The subsequent changes in continuity, arrangement and loading of fuels have resulted in a changed fire regime. With the increased density and shading the composition and abundance of shrubs, forbs, and grasses have decreased.

Stands in the middle 1/3 of the project area are composed of: 1) ponderosa pine, or 2) mixed conifer (Douglas-fir and ponderosa pine with a minor amount of white fir). Most of these stands have a scattered component of large ponderosa pine. The ponderosa pine stands are overstocked and highly susceptible to mountain pine beetle and western pine beetle. The mixed conifer stands are multistoried and all-aged. The white fir and Douglas-fir are highly susceptible to Douglas-fir tussock moth, spruce budworm, dwarf mistletoe and annosus root disease. The Douglas-fir is also susceptible to Douglas-fir bark beetle, and the white fir to fir engraver and Indian paint fungus. Clumps or stringer stands of aspen have begun to appear in the riparian areas.

The northern 1/3 of the project area consists of stands of: 1) ponderosa pine, 2) mixed conifer, and 3) lodgepole. Many stands of ponderosa pine or mixed conifers have a scattered component of large ponderosa pine and numerous understories. Ponderosa pine stands are overstocked and highly susceptible to mountain pine beetle and western pine beetle. Mixed conifer stands are multistoried and all-aged and include ponderosa pine, Douglas-fir, white fir, lodgepole pine, and western larch. White fir and Douglas-fir in these stands are highly susceptible to Douglas-fir tussock moth, spruce budworm, dwarf mistletoe, and Annosus root disease. Douglas-fir is also susceptible to Douglas-fir bark beetle, and white fir to fir engraver and Indian paint fungus. Lodgepole stands have probably increased due to harvesting of the large ponderosa pine, especially in cold pockets. The lodgepole pines are large enough that they are now susceptible to mountain pine beetle. Western larch is found in only a few locations and has decreased in frequency. Aspen occurs as stringer stands in riparian areas but has decreased in frequency. Juniper is less common in the northern 1/3 of the project area.

Aspen was once quite common throughout the northern 2/3 of this project area and occurred generally in the riparian areas as uneven age stringer stands. Cadastral surveys conducted in the mid-1800s recorded "jungles of aspen" in some meadows on the Malheur National Forest. Today, most aspen stands found within the project area are small and occur as a few old decadent stems with little or no viable regeneration. This has occurred because they are being overgrown by conifers, disturbances that could regenerate the clones are lacking; ungulates browse the few new sprouts that do occur, and stream downcutting has lowered water tables. Without protection from ungulates, aspen sprouts often are prevented from maturing by browsing.

Historically most aspen stands were fire resistant due to the higher moisture of the "riparian" vegetation often associated with aspen. When periodic fires occurred they would burn up to the edge of aspen stands in a mosaic fashion and kill a few trees, seldom burning through the whole stand. Where the few trees were killed regeneration would occur in dense clumps. This regenerated the stand in uneven age phases or groups of trees. With effective suppression of natural fire, beginning in the early 1900's the older structure of these stands have died off and were replaced by conifers. The present aspen stands are the remnants of these much larger stands and are composed of the regeneration that was present when fire suppression began.

In most cases, succession to conifers has led to diminished patch size, loss of vertical structural diversity, and loss of this species from most riparian corridors. The lack of stand regeneration has resulted in a decline of aspen acreage in the project area and the competitive capabilities of aspen to regenerate and maintain vigor. Aspen can produce viable seed but usually regenerate vegetatively through root suckers (adventitious shoots that sprout from the shallow lateral roots of the parent tree if apical dominance does not inhibit suckering). This process is accelerated when the parent tree is stressed or killed. The result is a clump (clone) of trees identical in genetic composition, which can cover many acres under the right conditions. Although the physiological age of individual mature trees varies from 60 to 120+ years, the clone itself may be hundred or thousands of years old. Research suggests that some clones in the Great Basin are at least 8,000 years old.

Disturbances such as prescribed fire and vegetation treatments, as well as protection from browsing are necessary to perpetuate aspen. Where aspen stands have been treated, either with fire (natural or prescribed) or by removal of overstory vegetation, and protected to exclude or restrict browsing, regeneration has been successful and vigorous.

The present source of most of the perennial water sources in this area originates in our present aspen stands. This could be due to there being more moisture available and aspen being able to out compete conifers at these sites. Aspen roots also alter the ground water holding capacity by creating a "fibrous sponge" that is more effective in holding soil moisture during early spring and slowly releasing the moisture over a longer period of time through the summer period.

Most of our present known aspen stands were inventoried in either 1998 or 1999. These stands ranged in size from single trees, to up to 40 acres in size. Approximately 50% of the stands were less than an acre in size and about 30% of the stands were ½ acre or less in size. Within these stands the large conifer (over 21" dbh) ratio to large aspen (over 12" dbh) is 3 to 1. In the mid summer of 2002, approximately 20 stands were revisited. Approximately 10% of the smallest stands inventoried in 1998 and 1999 could not be located.

The historic snag (12" dbh and 16' height) level in this PAG varied widely based on presence of lodgepole pine in the stands (Schwenke, 2003; Erickson and Conover, 1918). These differences are shown in Table 3-9.

Table 3-9. **Historic Snag Level per acre for Mixed Conifer Plant Associations with and without Lodgepole Pine.**

Snag Size (dbh)	Average Snags per Acre in Stands With Lodgepole Pine	Average Snags per Acre in Stands Without Lodgepole Pine
12-20"	1.42	.19
21-30"	.33	.30
30"+	.09	.07

Non-Forest PVG

Non-forest potential vegetation groups cover about 15,201 acres (23%) of the project area. Non-forested potential vegetation groups include woodlands, aspen, shrublands, grasslands, wet, moist and dry meadows PVGs, and other non-vegetated lands. Non-forested PVG sites are composed of plant associations in which trees are generally absent. Vegetation on these sites historically was dominated by a variety of perennial grasses, forbs, and shrubs. Due to past grazing practices, the exclusion of fire, and the invasion of introduced species there has been an increase in annual species and a decrease in perennial species.

The natural fire regime is one of frequent (5-23) low intensity fires except for the scab flats and rocky ridges where large old growth juniper was predominantly located. Most historical perennial species were adapted to these fire regimes. Some introduced annual species such as cheatgrass are also well adapted to fires. Depending upon the frequency and timing of burning these species could either be favored or selected against.

Starting approximately 130 years ago there has been a dramatic decrease in riparian shrub species (such as alder, willow, dogwood, and maple) due to increased browsing by ungulates and competition from conifers. These changes in vegetation, along with increased trampling of banks, and changes in hydrological conditions due to roads have changed the stream structure, resulted in downcutting, which has lowered the water table in many areas. This has caused a further decrease in other riparian vegetation such as forbs and shrubs, and a decrease in the width of the riparian vegetation along the streams in this area.

Woodlands PVG

Most of the woodlands PVG are juniper climax plant associations that were historically dominated by a low stocking of either juniper or scattered ponderosa pine with grasses, forbs, and shrubs. The trees in these plant associations were kept at a low stocking in this early seral stage by frequent low intensity fires. Juniper was more prominent on scab flats and rocky ridges where there was not enough vegetation to support fires. With the advent of fire control and grazing, stocking of tree species has increased on these sites and areas that were formerly non-forested have been converted to woodlands (Skovlin and Thomas, 1995). With the increase in juniper there is usually a decrease in other vegetation and an increase in fire interval. Prior to the effective control of fire, juniper stands in the project area were dominated by seedlings and saplings stages with very few pole and larger sizes, except for isolated or small pockets of mature trees. The mature juniper trees were generally confined to areas not prone to frequent fire, such as rock-dominated areas. Once established, juniper will utilize a majority of the available soil moisture which causes shrubs to decline, converts shrubland to pure juniper stands, and leaves bare ground that is susceptible to erosion and weed invasion (Loewen and Schwenke, 2003).

Moist Upland and Dry Upland Shrubland PVGs

Moist upland and dry upland shrublands cover about 15% of the project area. Representative shrub species of these PVGs include mountain big sagebrush, low sagebrush, stiff sagebrush, rabbitbrush, bitterbrush, and mountain mahogany. Representative grass species include the native grasses bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, Sandberg's bluegrass and prairie junegrass; and seeded domestic grasses such as orchard grass. These associations are usually found on well-drained and dry soils. This group provides the bulk of the non-forest rangeland forage for ungulates.

About 176 acres of these shrublands are classified as mountain mahogany dominated stands. These small, dispersed stands of mountain mahogany can be found on open slopes, especially along rocky dry ridges and poor soil sites in portions of the project area. It also occurs on dryer south aspect dry pine and mixed conifer stands.

Mountain mahogany found during fieldwork showed sign of prolonged heavy utilization and were hedged, highlined, or declining in health. With effective fire suppression, conifers have invaded these patches of mahogany and are competing for growing space, water, and nutrients. Mountain mahogany is decadent and declining, and little natural regeneration was observed.

Dry Upland Herbland PVG

Dry upland herblands cover about 1% of the project area. Herblands occur as small meadows throughout the forested plant associations of the project area. They occupy drier, shallow soil areas and frost pockets. Representative grass species are bluebunch wheatgrass, Sandberg's bluegrass and Idaho fescue.

Riparian Herbland PVG

Riparian herblands cover about 3% of the project area. Representative shrub species of these PVGs include willows, alders, currants, common snowberry, and red-osier dogwood. Sedges and rushes are the dominant graminoids in these PVGs. Kentucky bluegrass and common timothy were planted (prior to 1970s) as forage species in meadow-like areas. These species are also abundant on sites where disturbances have degraded the native vegetation thus allowing Kentucky bluegrass and common timothy to maintain composition or increase.

Current Conditions

Past management practices that have affected the current condition of vegetation within the project area are fire suppression, grazing, timber harvesting, fuel management, and road construction. Historically the project area was maintained by periodic, low intensity fire, caused either by lightning or by American Indians. With the advent of European descendent settlers (1860s to 1900s) grazing of sheep and cattle began along with fire control. With the lack of fire, Douglas-fir and white fir began invading areas dominated by ponderosa pine, and ponderosa pine and juniper began invading areas that were formerly non-forested. This has changed the large open pine stands and grasslands to stands with dense understories, brush, and encroaching fir and juniper. These conditions have created higher fuel loading and more ladder fuels, increasing the risk of high severity wildfires to 68% and moderate severity wildfires to 21%, while reducing the low severity wildfires to 11% (Johnson 1998).

Stand Structure

PONDEROSA PINE

Large ponderosa pine has decreased in percent stand composition throughout the project area. This is generally due to past harvesting of the large pines and lack of treatment of the understory. The existing large pines often have a dense understory competing with them for water, the limiting factor in this ecosystem. This has caused decreased growth and increased stress on the large trees. This stress on the large trees has allowed them to become susceptible to drought and pests such as western pine beetle. Increased stocking levels have increased the potential fuel and changed the type and intensity of fire that occur in this forest type.

MIXED CONIFER

In the mixed conifer stands there is a much higher component of white fir and Douglas-fir than was present historically. The white fir and Douglas-fir have greatly increased in percent composition while ponderosa pine has decreased drastically. This is due to past harvesting of the large ponderosa pine and fire control which allowed the more shade-tolerant Douglas-fir and white fir to survive and flourish in the understory. This understory in most areas is generally unmanageable due to stunting and unacceptable growth rates. Most of the white fir has been inoculated with Indian paint fungus. Dwarf mistletoe in Douglas-fir is widely spread in most of the project area. The increased stocking of species that have a greater amount of foliage has increased the fuel and changed the type and intensity of fire that now occurs in this forest type.

WESTERN LARCH

Western larch occurs in patches throughout the northern 1/3 of the project area. Only a few large (greater than 21" dbh) trees were noted during field reconnaissance although numerous large stumps were noted. Western larch appears to have decreased in frequency due to past harvesting and lack of burning.

Non-forest Vegetation

Non-forested vegetation within the project area is dominated by a variety of perennial grasses, forbs, and shrubs. Non-forest vegetation includes juniper, grass, aspen, meadow vegetation, sagebrush, mountain mahogany and riparian shrubs. The composition is the result of interactions among several factors: soil type, soil moisture, aspect, tree canopy cover, big game use, historical livestock use, forest management activity, and the presence or absence of fire in the ecosystem. Many of these factors have enabled conifer encroachment and conversion of meadows, riparian areas, and rangelands into forested lands. Due to these factors, there has been an increase in annual species and a decrease in perennial species.

ASPEN

There are approximately 268 acres of located aspen stands in Silvies Canyon, with an estimated total acreage (inventoried and uninventoried) of 400 acres. Aspen occurs in riparian areas as stringer stands, and has generally declined due to competition and lack of periodic disturbance. These stands were once more extensive which may be observed from the numbers of remnant snags and downed aspen logs. Stands are generally late to old structure with very few stands having a young component. This is mainly due to browsing of regeneration by ungulates. The water table in these stands may have also been altered due to harvesting of beaver in the past, disruption of the water flow due to construction of roads and ponds, and the greater intake of water by upland plants such as the increased stocking of conifers. Mortality rate of large aspen in these stands is estimated at 31%.

COTTONWOOD

Not much is known about the historical occurrence of cottonwood in this project area or the Emigrant Creek Ranger District. It is surmised from looking at the distribution of the known sites, and the frequency that maps refer to cottonwood, that it once was more common. There are two known sites where cottonwood exists in the project area, Sage Hen Creek and along Forest Road 3100. The Sage Hen site has approximately a dozen large decadent and declining cottonwood trees. The Forest Road 3100 site is a lone young cottonwood that is growing in the road fill. Throughout the whole Emigrant Creek District, cottonwood is very rare, generally decadent, seldom reproducing, and susceptible to disease, pests and wind.

JUNIPER

Juniper has been an invading species for the last 120 years throughout the project area. Effective fire control and grazing have allowed this species to increase. Juniper is now very common throughout the project area, including riparian areas, shrub lands and forested lands where it did not previously occur.

Natural Fuels

Large amounts of fuels have built up in some areas due to years of effective fire suppression, insect and disease outbreaks, and localized storm events. Fuel conditions in this area are becoming increasingly hazardous. Increased tree densities, subsequent increased fuel loading, and increased fuel continuity across the landscape have also contributed to this hazard. These conditions result in larger and more severe wildfires, especially within ecosystems in which frequent fire has been excluded. The 1995 Federal Wildland Fire Management Policy and Program Review (signed by the secretaries of Agriculture and Interior) attempts to address the fire hazard situation nationally. This policy directs federal wildland fire agencies to achieve a balance between fire suppression and fuels management to sustain healthy ecosystems (Beighley et al. 1999). The potential for large fires on the district is the result of several factors:

- Effective fire suppression and lack of prescribed fire has resulted in increased fuel loading, increased fuel laddering and modified fuel composition and density.
- Slash created by past timber harvesting activities was not adequately disposed of.
- Timber stand composition and structure has changed due to past harvest activities and the exclusion of fire. White fir and Douglas-fir have encroached into stands that were historically dominated by ponderosa pine. Juniper has increased due to the suppression of fires.
- Most stands are overstocked when compared with site capabilities. Increased competition for water, the limiting resource in this ecosystem, results in stressed trees reduced growth and increased mortality from insects and disease.
- In recent years, drought has lowered the moisture content of the litter and slash layer and caused the standing green trees to cast off more needles. This results in a deeper litter layer, resulting in flashy fuels.

Currently many of the stands are a Fire Behavior Fuel Model 10 or 11. These models are illustrated in *Photo Series Quantifying Natural Forest Residues in the Ponderosa Pine Type, Ponderosa Pine and Associated Species Type, and Lodgepole Pine Type, USDA Forest Service General Technical Report, PNW-52, 1976*. Fire Behavior Fuel Model 10 is a litter model and Fire Behavior Fuel Model 11 is a slash model. These fuel models represent fuel loading that is heavier than historical conditions. These heavy fuel loadings create fire control difficulties. Both of these fuel models have a higher fire intensity level than historic or desired and large stand-replacement wildfires will eventually occur. Table 3-10 discusses the amount of fuel currently within the fuel blocks.

Table 3-10. **Current condition of natural fuels within fuel blocks.**

Fuel Block and Total Acres	Vegetation Types	Photo Series[1]	Fuel Model[2]	Tons per Acre[3]	Fuel Bed Depth (inches)[3]
Fuel Block 1 2,484 ac	Mixed Conifer (99%)	PMS-830 pg 17	10	17.1	1.6
	Juniper/Non-Forest (1%)	PNW-105 pg 228	2	.24	.1
Fuel Block 2 5,298 ac	Mixed Conifer (89%)	PNW-105 pg 101	9	11.1	1.0
	Ponderosa Pine (8%)	PNW-105 pg 183	9	8.3	1.6
	Juniper/Non-Forest (3%)	PNW-105 pg 223	2	.24	.1
Fuel Block 3 5,023 ac	Mixed Conifer (69%)	PMS-830 pg 15	9	9.7	1.3
	Juniper/Non-Forest (22%)	PNW-105 pg 223	6	1.4	.3
	Ponderosa Pine (9%)	PNW-105 pg 183	9	8.3	1.6
Fuel Block 4 2,100 ac	Mixed Conifer (88%)	PMS-830 pg 19	10	18.6	1.9
	Juniper/Non-Forest (9%)	PNW-105 pg 223	6	1.4	.3
	Ponderosa Pine (3%)	PNW-105 pg 171	9	8.5	1.2
Fuel Block 5 7,798 ac	Mixed Conifer (67%)	PMS-830 pg 15	9	9.7	1.3
	Juniper/Non-Forest (19%)	PMS-830 pg 51	6	2.9	0
	Ponderosa Pine (14%)	PNW-105 pg 183	9	8.3	1.6
Fuel Block 6 5,526 ac	Juniper/Non-Forest (39%)	PMS-830 pg 55	6	.1	0
	Mixed Conifer (35%)	PMS-830 pg 15	9	9.7	1.3
	Ponderosa Pine (26%)	PNW-105 pg 181	9	6.4	3.2
Fuel Block 7 3,988 ac	Ponderosa Pine (47%)	PNW-105 pg 183	9	8.3	1.6
	Mixed Conifer (31%)	PNW-105 pg 52	10	23.7	2.3
	Juniper/Non-Forest (22%)	PMS-830 pg 53	6	.8	0
Fuel Block 8 940 ac	Juniper/Non-Forest (57%)	PMS-830 pg 53	6	.8	0
	Ponderosa Pine (22%)	PNW-105 pg 183	9	8.3	1.6
	Mixed Conifer (21%)	PMS-830 pg 15	9	9.7	1.3
Fuel Block 9 895 ac	Ponderosa Pine (38%)	PNW-105 pg 183	9	8.3	1.6
	Juniper/Non-Forest (35%)	PMS-830 pg 53	6	.8	0
	Mixed Conifer (27%)	PNW-105 pg 25	10	23.7	2.1
Fuel Block 10 3,419 ac	Mixed Conifer (96%)	PMS-830 pg 17	10	17.1	1.6
	Juniper/Non-Forest (4%)	PNW-105 pg 228	2	.24	.1
Fuel Block 11 696 ac	Mixed Conifer (91%)	PMS-830 pg 17	10	17.1	1.6
	Juniper/Non-Forest (7%)	PMS-830 pg 51	6	2.9	0
	Ponderosa Pine (2%)	PNW-105 pg 183	9	8.3	1.6
Fuel Block 12 1,110 ac	Ponderosa Pine (39%)	PNW-105 pg 183	9	8.3	1.6
	Mixed Conifer (36%)	PMS-830 pg 17	10	17.1	1.6
	Juniper/Non-Forest (25%)	PNW-105 pg 220	2	.9	.2

[1] This information is taken from Stereo Photo Series for Quantifying Natural Fuels (Ottmar et al) and Photo Series For Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest (Maxwell et al).

[2] Fuel models were taken from the publication Aids to Determining Fuel Models For Estimating Fire Behavior (Anderson).

[3] Tons per Acre and Fuel Bed Depth data were taken from the photo series publications.

In the mid 1990s, a natural fuels program began on the Burns Ranger District. The 854-acre Joaquin Timber Sale Prescribed Burning Project was the first prescribed burning project initiated in and around the Silvies Canyon project area that prescribed burned areas (210 acres) outside of timber sale units. Silvies River Prescribed Burning Project followed by prescribed burning approximately 2,000 acres on a landscape scale. Silvies South Prescribed Burning Project proposed prescribed burning on approximately 4,355 acres. This project was completed in 2002.

Low Intensity, Prescribed Fire
Silvies South Prescribed Burning Project
Spring 1998

Summary

Regardless of the forest type, most stands are generally overstocked. Most of the area has been partially harvested at some time in the last 50 years. Much of this harvesting was in the form of salvaging, sanitation, and regeneration cutting or large tree removal. There is still an old growth component in some of these stands, but it is generally declining due to age and competition. Many of these stands are susceptible to disease and insects due to overstocking. Typical insect and disease problems in ponderosa pine stands are mountain pine beetle, western pine beetle, Annosus root disease, black stain root disease, and western dwarf mistletoe. Typical insect and disease problems in the mixed conifer stands are fir engraver, western spruce budworm, Douglas-fir tussock moth, Douglas-fir beetle, Douglas-fir dwarf mistletoe, Indian paint fungus, and Annosus root rot.

The Silvies Canyon project area was historically maintained by fire, either caused by lightning or set by American Indians. Due to past fire suppression policies and inadequate fuel treatments, large amounts of fuels have built up in some areas. Fire cannot now be easily restored to the ecosystem during the historical burning period without the high risk of a large wildfire occurring unless vegetation is pretreated to reduce fuel levels.

Stand Structural Stages – Historical Range Of Variability

The Historical Range of Variability (HRV) can serve to compare historical and current conditions. HRV is an indicator of ecological health, integrity, and sustainability. A key concept is that native species are adapted to and have evolved with the disturbance regime of an area. Ecosystem elements occurring within their historical range are believed to represent sustainable, resilient, productive, and healthy situations. After identifying historical ranges for a particular variable, the important ecological processes may be inferred for creating and sustaining those conditions. As such, HRV is particularly useful as a reference point or benchmark.

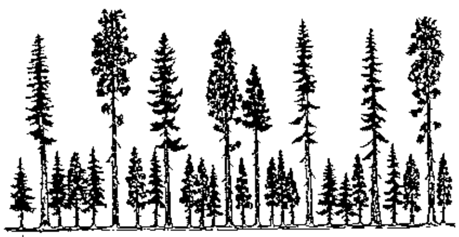
HRV can be used with a wide variety of ecosystem elements, although to date, the Forest Service has focused primarily on forest structural states. A stand can be assigned a point on a development pathway. Based upon this point, pathways of future development can be predicted. Every forest stand eventually passes through a series of structural stages, although not every stand passes through all of the stages or spends an equal amount of time in any particular stage. The route a stand takes and the time it takes in passing through a stage often is dictated by the disturbances it is or isn't subjected to; these include both natural and human caused disturbances.

Stand structure was evaluated at the project area scale. The stands within the project area were visited and classified on the ground. Structural stage classifications are consistent with the Regional Forester's Amendment #2. Structural stages used for the HRV analysis include the following (see Figure 3-2):

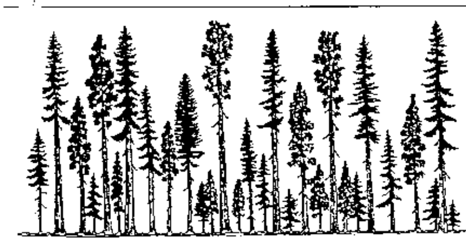
1. **Stand Initiation (SI):** Growing space is in the process of being reoccupied following a stand-replacing disturbance, typically by seral species.
2. **Stem Exclusion Open Canopy (SEO):** Occurrence of new tree stems is excluded (moisture limited). Crowns are open grown. Canopy is discontinuous. This structure can be maintained by frequent under burning or thinning.
3. **Stem Exclusion Closed Canopy (SEC):** Occurrence of new tree stems is excluded (light or moisture limited). Crowns are closed and abrading.
4. **Understory Reinitiation (UR):** A second cohort of trees is established under an older, typically seral, overstory. Mortality in the overstory creates growing space for new trees in the understory. Large trees are uncommon.
5. **Young Forest Multi-Stratum (YFMS):** Several cohorts of trees are established. Large overstory trees are uncommon. Pole, small, and medium sized trees dominate.
6. **Old Forest Multi-Stratum (OFMS):** Several to many cohorts and strata of trees are present. Large trees are common.
7. **Old Forest Single-Stratum (OFSS):** A single stratum of large trees is present. Large trees are common. Young trees are absent or few in the understory. Park-like conditions may exist.

Stand Initiation (SI). Following a stand replacing disturbance such as wildfire or timber harvest, growing space is occupied rapidly by vegetation that either survives the disturbance or colonizes the area. Survivors literally survive the disturbance above ground, or initiate growth from their underground roots or from seeds stored on-site. Colonizers disperse seed into disturbed areas, the seed germinates, and then new seedlings establish and develop. A single canopy stratum of tree seedlings and saplings is present in this stage.

Stem Exclusion (SECC or SEOC). In this stage of development, growing space is occupied by vigorous, fast-growing trees that compete strongly for available light and moisture. Because trees are tall and reduce sunlight, understory plants (including smaller trees) are shaded and grow more slowly. Species that need sunlight usually die; shrubs and herbs may become dormant. In this stage, establishment of new trees is precluded by a lack of sunlight (**stem exclusion closed canopy**) or of moisture (**stem exclusion open canopy**).



Understory Reinitiation (UR). As a forest develops, new age classes of trees (cohorts) establish as the overstory trees die or are thinned and no longer fully occupy growing space. Regrowth of understory vegetation then occurs, and trees begin to develop in vertical layers (canopy stratification). This stage consists of a sparse to moderately dense overstory with small trees underneath.



Young Forest Multi Strata (YFMS). In this stage of forest development, three or more tree layers are present as a result of canopy differentiation or because new cohorts of trees got established. This stage consists of a broken or discontinuous overstory layer with a mix of tree sizes present (large trees are absent or scarce); it provides high vertical and horizontal diversity. This stage is also referred to as "multi-stratum, without large trees" (USDA Forest Service 1995).

Old Forest (OFSS or OFMS). This structural stage is marked by many age classes and vegetation layers and usually contains large-diameter trees. Standing and fallen dead trees may have resulted in a discontinuous overstory canopy. The illustration shows a single-layer, old-forest stand of ponderosa pine that evolved from low-intensity underburning (**old forest single stratum**). On cool moist sites without recurring underburns, multi-layer stands with large trees in the uppermost stratum may be present (**old forest multi strata**). These stages have also been referred to as "single stratum, with large trees" and "multi-stratum, with large trees" (USDA Forest Service 1995).

Sources/Notes: Based on Oliver and Larson (1996) and O'Hara and others (1996).

Figure 3-2. Descriptions of stand structural stages.

3 AFFECTED ENVIRONMENT

Historical range of variability was developed for large landscapes. The project area was characterized by patterns of live tree stand structure by PVG/PAG and compared to HRV. This HRV is shown both by percentages and acres. Although non-forested PVG areas are usually not included in an HRV analysis, for this analysis they have been included to show changes due to encroachment and conversion of non-forested areas to forested areas.

For comparison the Historic period is approximately 1860 to 1900. This period was selected because it corresponds with the approximate beginning of impacts of settlement by European settlers or their descendents and we have some knowledge of what the area was like based upon their recordings in the early part of the century.

Watershed HRV

Figures 3-3 and 3-4 display the differences between historic and current vegetation conditions at the watershed scale. Current conditions show a decrease in non-forested acres and a subsequent increase in the Dry Forest, Hot Dry plant association group that is found primarily in the southern 1/3 of the watershed. This data corresponds with recent observations of conifer encroachment and conversion of non-forested land into forested land.

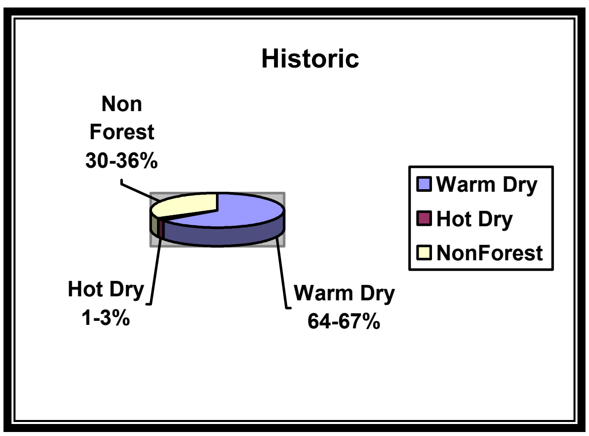


Figure 3-3. Silvies Canyon Watershed Historic Conditions.

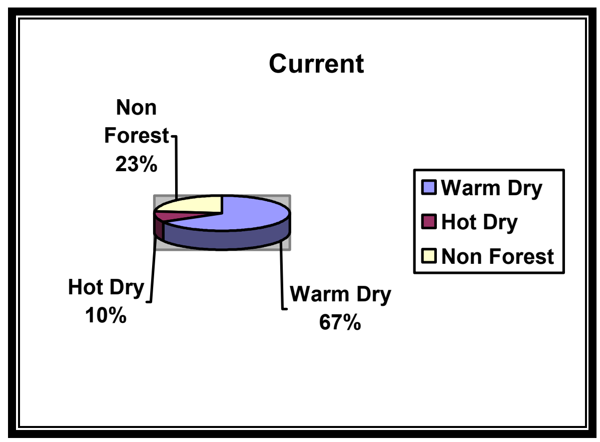


Figure 3-4. Silvies Canyon Watershed Current Conditions.

Figures 3-5 and 3-6 display the differences between historic and current Dry Forest, Hot Dry plant association group. Note the large decrease in stands where large trees are common (OFMS) and the increases in stands where large trees are uncommon (SEO, SEC and YFMS).

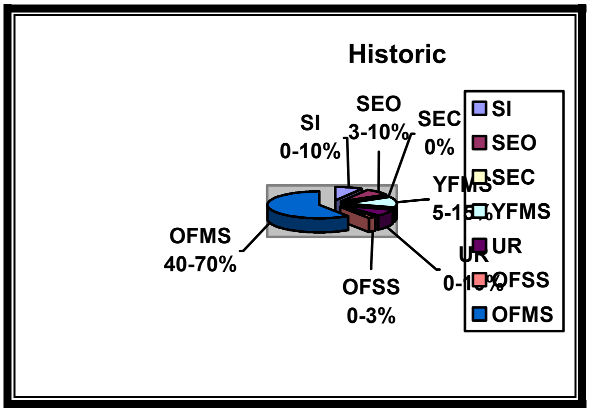


Figure 3-5. Historic Dry Forest - Hot Dry PAG.

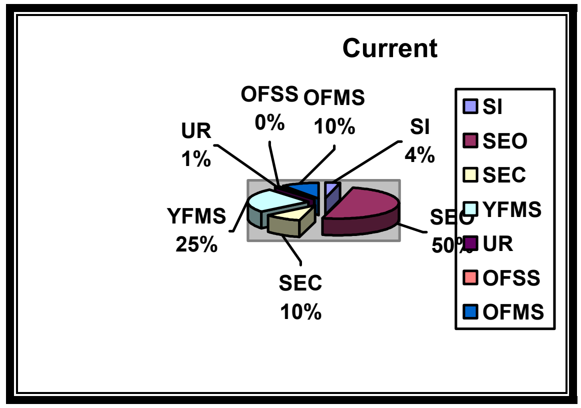


Figure 3-6. Current Dry Forest – Hot Dry PAG.

Figures 3-7 and 3-8 display the differences between historic and current Dry Forest, Warm Dry plant association group. Again note the large decrease in old growth (OFMS) stands and the increases in younger stands (YFMS and UR), where large trees are uncommon.

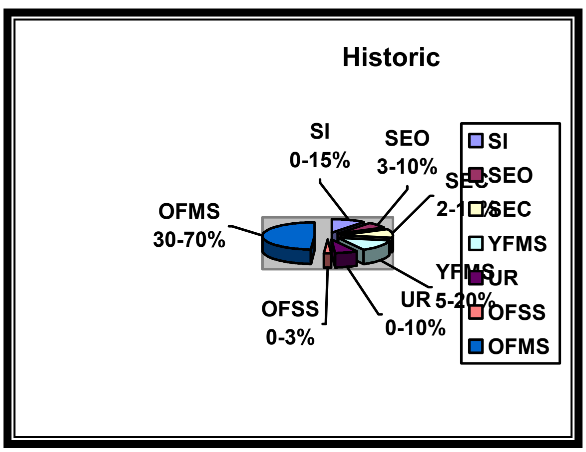


Figure 3-7. Historic Dry Forest – Warm Dry PAG.

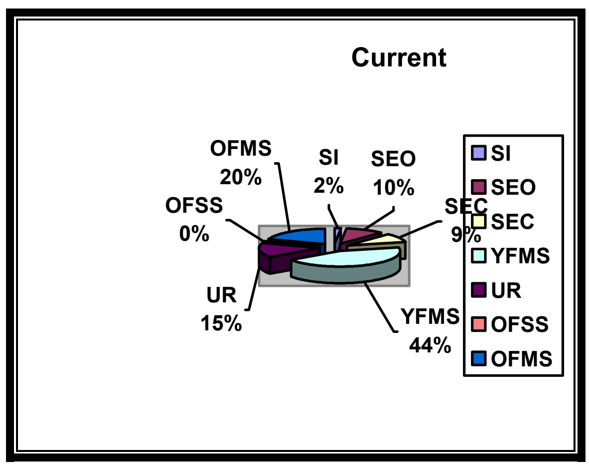


Figure 3-8. Current Dry Forest – Warm Dry PAG

Forest types, environmental settings, and disturbance regimes are generally relatively uniform across landscapes. However, analyzing HRV over such a large watershed may tend to mask significant changes that occur in localized areas. Within the Silvies Canyon watershed one significant change that is masked with a watershed HRV is the encroachment and conversion of non-forested land into forested land. Most of this encroachment has occurred in the southern subwatersheds. To display this significant change an HRV analysis was completed on a subwatershed basis.

Subwatershed HRV

HRV analysis was completed on a subwatershed basis to better display the significant change of encroachment and conversion of non-forested land into forested land. Most of this encroachment occurred in the southern subwatersheds. Stancliffe Creek subwatershed is shown below to display the magnitude of encroachment and conversion of non-forested land into forested land. Data for each subwatershed are located within the analysis file.

Figures 3-9 and 3-10 show the differences between historic and current conditions within the Stancliffe subwatershed. Current conditions display a significant decrease in non-forested acres (27-50%) and resulting increase in the Dry Forest, Hot Dry plant association group (33-35%). These data display the magnitude of conifer encroachment and conversion of non-forested land into forested land within the Stancliffe subwatershed.

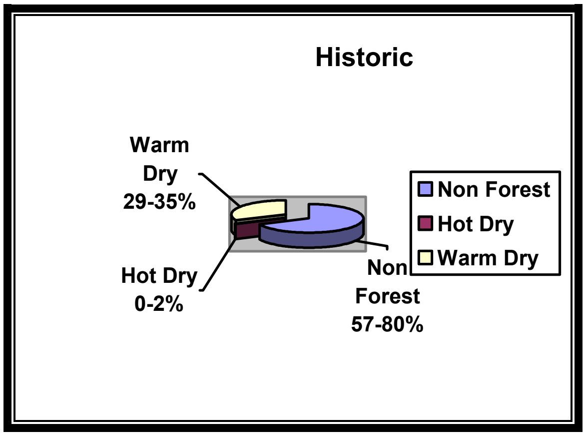


Figure 3-9. **Stancliffe Subwatershed Historic Conditions.**

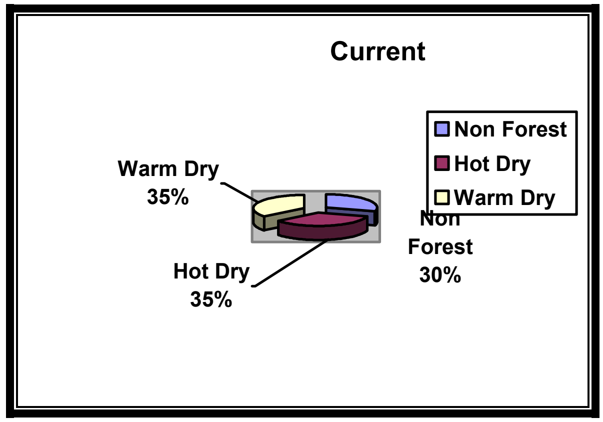


Figure 3-10. Stancliffe Subwatershed Current Conditions

Figures 3-11 and 3-12 show the differences between historic and current Dry Forest, Hot Dry plant association group within the Stancliffe subwatershed. Again, note the large decrease in old forest (OFMS) stands and the substantial increases in younger stands (SEO and SEC), where large trees are uncommon. This change is also magnified due to the large number of acres that have converted from nonforest to Hot Dry forest. Non-forested areas that have converted to Hot Dry forest have not had the time to develop into old forest structure.

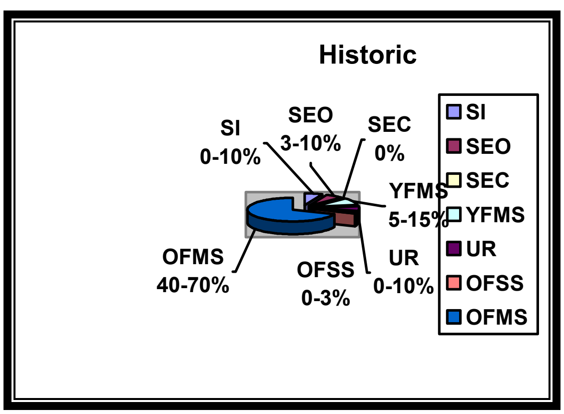


Figure 3-11. **Stancliffe Subwatershed Historic Hot Dry PAG.**

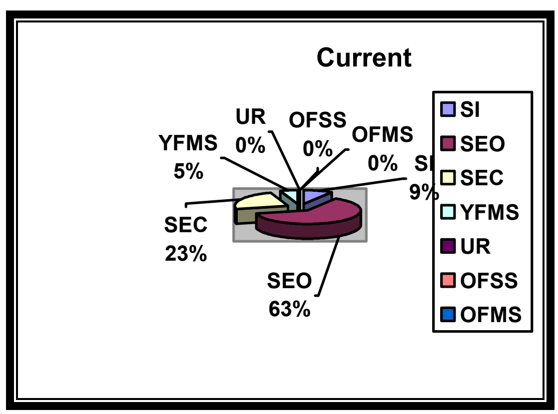


Figure 3-12. Stancliffe Subwatershed Current Hot Dry PAG.

HRV Conclusion

HRV was utilized to compare historical and current conditions. The objectives are to move towards historical conditions, not to historical conditions. The HRV analysis for the Silvies Canyon Watershed Restoration project area has determined the following conditions exist:

- The project area is lacking large trees (OFMS and OFSS) compared to historic numbers.
- The project area has an excess number of small tree stands (YFMS, SEO, SEC and UR) compared to historic numbers. This is primarily due to past management objectives of removing larger trees to release understory trees and effective fire suppression activities, which have facilitated the encroachment of pine and juniper onto historically non-forested lands.
- The project area, particularly the southern subwatersheds, has had a significant increase in forested lands and a subsequent decrease in non-forested lands. This is primarily due to effective fire suppression activities, which have facilitated the encroachment of pine and juniper onto historically non-forested lands.

Forest Pests

A variety of forest insects and diseases exist within the project area. Historically, the majority of these were present in low population levels due to lack of habitat because of the more pronounced role of fire. Due to gradual changes in densities of trees and composition of stands, current conditions are outside the normal range of variability. The high susceptibility of many stands to some of these pests is contributing to widespread mortality or constitutes a continuing threat of widespread mortality. This mortality and low vigor also increase the vulnerability of the area to stand-replacing wildfires.

Defoliators

Due to the harvesting of large trees coupled with fire suppression, conditions have become ripe for widespread defoliator outbreaks in the mixed conifer stands that have shifted from ponderosa pine dominated stands to Douglas-fir and white fir-dominated stands. Past management has contributed to stands with many different sizes of trees, and higher numbers of trees compared to historical conditions for the northern half of the project area. Although outbreaks of defoliators have occurred on a cyclic basis in the past (Swetnam et.al. 1995), the amount of area that supports vegetation that these defoliators attack is much greater than in the past and is more continuous over the landscape. As a result of these changes, stands have developed into favored habitat for such defoliators as Douglas-fir tussock moth (*Orgyia pseudotsugata*) and western spruce budworm (*Choristoneura occidentalis*), and for various bark beetles that often follow defoliator outbreaks (Buckhorn 1948, Wickman et al. 1973, Gast et.al. 1991, and Mason et al. 1998). Continuous-canopy, all-aged mixed conifer stands provide highly favorable habitat for defoliators. Larval stages of budworm and tussock moth feed primarily on true firs and Douglas-firs throughout their ranges. Past mortality and top kill can be seen throughout the area primarily in the mid to lower tree classes. Trees that have had top kill in the past have often formed multiple tops. Many of these stands have a stressed ponderosa pine over-story with a few or scattered pine under-story. Bark beetles (Douglas-fir bark beetles (*Dendroctonus pseudotsugae)*), fir engraver (*Scolytus ventralis*)) and woodborers often act as secondary disturbers, attacking and killing trees weakened by defoliators. Much of the past mortality is now contributing to the high fuel loads in this area.

Dwarf Mistletoe

There are a number of types of mistletoe; generally each mistletoe species is specific to a tree species. For example, dwarf mistletoe, which attacks Douglas-fir, does not attack white fir or ponderosa pine. In this project area the two mistletoes of most concern are Douglas-fir dwarf mistletoe and western dwarf mistletoe, which is specific to ponderosa pine.

Mistletoe often forms large brooms in host tree branches that reduce growth and eventually weaken and kill the tree. These large brooms increase the flammability and mortality of infected trees.

High levels of Douglas-fir dwarf mistletoe are causing tree and stand damage throughout the northern half of the project area. Western dwarf mistletoe is severe in some areas of Myrtle Canyon and scattered stands throughout the project area.

Bark Beetles

Western pine beetles (*Dendroctonus brevicomis)* historically were known for attacking and killing old, slow-growing ponderosa pine that were overstocked and susceptible to beetles due to drought and damage by fire (Munger, 1917). Once beetle populations increased in weakened host trees, they began switching to healthier green trees. In recent years with overstocking and drought causing low vigor in small diameter, even aged stands, western pine beetle has been known to cause extensive damage to all sizes of trees.

Mountain pine beetles (*Dendroctonous ponderosae*) are known for attacking and killing overstocked, low vigor pines (ponderosa, lodgepole, sugar, and white) throughout their range. Mountain pine beetles are endemic (Erickson 1906, Foster 1908) throughout their range but are noted for causing major damage in overstocked stands of 6-8" dbh trees, a size class that the beetles prefer (Sartwell 1971). They are thought to have been a regulator of stand density in the absence of other disturbances.

Douglas-fir beetles (*Dendroctonus pseudotsugae*) are common in most mixed conifer stands that have a Douglas-fir component. They usually breed in dead, diseased, or down material and cause little damage. Occasionally, Douglas-fir beetles may become a problem following large fires or other major disturbances such as outbreaks of spruce budworm or Douglas-fir tussock moth (Gast et al. 1991), at which point they act as a secondary disturber, attacking and killing trees weakened by other disturbances. In these situations, populations can build up to outbreak conditions.

Fir Engravers (*Scolytus ventralis*) attack true firs that have been stressed from other disturbances such as root rot, drought, or attacks from defoliators (Gast et al. 1991). Fir engravers often can cause major mortality in white fir trees.

Stem Decay

Indian paint fungus (*Echinodontium tinctorium*) attacks true firs with spores through tiny dead branch stubs (Foster 1908). The majority of the white fir in the project area has been inoculated with Indian paint fungus. The fungus remains dormant until the tree is stressed, usually by wounding. Once activated, it rapidly decays the wood.

Root Diseases

Annosus (*Fomes annosus*) **root disease** moderately damages lodgepole pine, ponderosa pine and true firs. Although it can damage Douglas-fir and larch, it seldom does. Annosus root disease can kill pines and fir, but mortality often is induced by secondary attacks from bark beetles. Infected trees usually die in clumps with mortality occurring over a number of years radiating out from the center of an infection site. The disease centers are usually focused around old infected stumps or large dead trees. To reduce the spread of this disease, fresh stumps 12" in diameter or larger can be treated with borax to inhibit the colonization of Annosus spores.

Black stain (*Ophiostoma wageneri*) **root disease** in this area affects ponderosa pine (Schmitt, 1993). The primary impact is tree mortality and is most often associated with second growth ponderosa pine.

Air Quality

Forest Service policy is to integrate air resource objectives into all Forest Service planning and management activities. A strategy for long-term air quality improvement was developed and signed by the Oregon Department of Environmental Quality (DEQ) *(Memorandum of Understanding (MOU) Between Oregon Department of Environmental Quality, Oregon Department of Forestry, USDI Bureau of Land Management, and USDA Forest Service in 1994).* This strategy is based on the assumption that light intensity prescribed burning in the spring and late fall create lower total smoke emissions than high intensity stand-replacement wildfires in summer and early fall. That agreement assumes prescribed burning could violate the Clean Air Act by going above the emission limits and target levels.

Oregon's greatest concern regarding air pollutants is the fine levels of particulate matter (PM) from wood smoke. Smoke emissions are monitored throughout the State of Oregon. When smoke emissions are determined to be too high, the agencies stated in the Memorandum of Understanding (MOU) will adjust, reduce or eliminate prescribed burning operations to comply with air quality objectives.

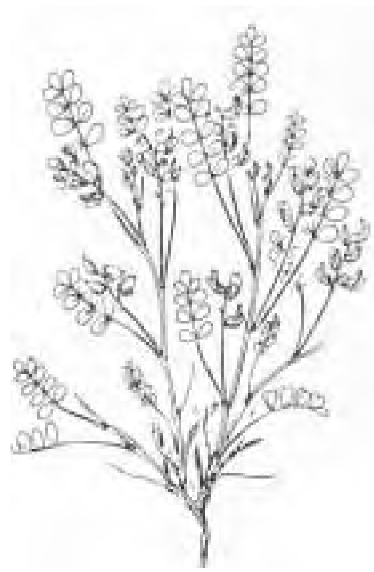
The Forest Service also maintains and protects air quality related values on class 1 areas as established under the 1977 Clean Air Act, which includes national wilderness areas larger than 5,000 acres that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional air pollution that can be added to these areas. The Strawberry Wilderness Area is the closest class 1 area to the Silvies Canyon project area.

The annual PM10 standards (Oregon and Federal) are met when the annual mean concentration is less than or equal to 50 micrograms of pollutant per cubic meter of air. The 24-hour standard is met when the number of days per calendar year with a 24-hour average concentration above 150 micrograms of pollutant per cubic meter of air is equal to or less than 1 over a 3-year period. The annual PM2.5 standard (Federal, no Oregon standard) is met when the 3-year average of the annual arithmetic mean is less than or equal to 15.0 micrograms of pollutant per cubic meter of air and the 24-hour standard is met when the 3-year average of the 98^{th} percentile values at each monitoring site is less than or equal to 65 micrograms of pollutant per cubic meter of air (DEQ Data Summaries, 2001).

DEQ data summaries for 2001 show that the Burns/Hines area has stayed below the state and federal standards for PM10 and PM2.5. According to DEQ report, the Burns/Hines area has not exceeded the limits of PM emissions in the last 7 years (1996 to 1991). There is no information for the year 2002. Burns now has surveillance equipment measuring PM10 and PM 2.5.

Sensitive Plants

Sensitive plants suspected to occur on the district are derived from the 1999 Region 6 Sensitive Plant List. The affected environment is identified by reviewing historical records of Region 6 sensitive plant occurrences in the project area, and by surveying areas of potential habitat for new populations of sensitive plants. Habitats suspected of harboring new populations are identified based on aspect, elevation, and plant association. Brooks et al. (1991) describes specific habitat features for Malheur National Forest sensitive species.



Deschutes milkvetch

Sensitive plant surveys were conducted in the Project area in 1994, 1996, 1999, 2000 and 2002. Potential sensitive plant habitats were reviewed by floristic walk-through survey during specific times of the year for peak plant identification periods (Nelson 1985). One new population of *Botrychium crenulatum* (crenulate moonwort) was found in August 2000. The documented sensitive plants from previous surveys include one population of *Lomatium ravenii* (Raven's lomatium) and fifteen populations of *Astragalus tegeterioides* (Deschutes milkvetch).

For additional information about the documented sensitive species in the project area, refer to the Biological Evaluation for Silvies Canyon (Appendix C).

Range Resources

The Malheur National Forest Land and Resource Management Plan (1990) allows for livestock grazing with the following stated goals (Forest Plan IV-2):

- Provide a sustained production of palatable forage for grazing by domestic livestock and dependent wildlife species.
- Manage rangelands to meet the needs of other resources and uses at a level that is responsive to site-specific objectives.
- Permit livestock use on suitable range when the permittee manages livestock using prescribed practices.

Primary and secondary ranges in the project area are in fair to good condition. Most of the forested areas are not providing forage at site potential. However, total forage production is not a limiting factor on the allotments at this time.

Monitoring of timber sales, precommercial thinning, and a variety of fuel treatments over the past decade indicate that seldom are tree canopies opened enough to provide lasting forage benefits. Fuels are rarely reduced to levels sufficient to provide good access and good herbaceous growing sites. Infrequent seeding following ground-disturbing activities, results in poor to no establishment of desirable forage species.

Range Improvements

Range improvements in the project area include allotment boundary fences, interior division (pasture) fences, livestock handling facilities at Rimrock Corral, developed and undeveloped springs, and reservoirs (ponds). There are approximately 108 miles of fence and 96 water developments within the project area. Many of the allotment fences were constructed in the 1950s when the Burns allotment was subdivided into several allotments. In the 1930s, the South Silvies fence on the Myrtle allotment was constructed by the Civilian Conservation Corp. Little Sagehen Flat fence was constructed in 1991 to protect the restoration project in the flat. The recreating public sometimes use spring enclosures and vegetation protection fences as horse confinement areas. Many improvements need to be reconstructed or partially reconstructed to maintain their function.

Pole Corral at Rimrock Springs, Summer 1999

Allotments

There are portions of eight grazing allotments within the Silvies Canyon project area. Nine permittees utilize these allotments, grazing an average of 10,532 animal months (AMs - amount of forage eaten per cow/one month). An estimated 8,092 AMs are permitted in the pastures the project area influences. Allotments involved are:

- **Silvies** - About 19% of this allotment is in the project area.
- **Big Sagehen** – About 80% of this allotment is in the project area.
- **Myrtle** - About 88% of this allotment is in the project area.
- **Crooked Creek** - About 21 % of this allotment is in the project area.
- **Rainbow** - About 19% of this allotment is in the project area.
- **West Myrtle** - About 82 % of this allotment is in the project area.

- **Scatfield** (administered by BLM) – 100% of National Forest land of this allotment is in the project area.
- **Scotty** (Blue Mountain RD) - About 9% of this allotment is in the project area.

Vegetation within these allotments is mixed. Timber types cover most allotments with ponderosa pine, Douglas-Fir and white fir being the dominant tree species. There are sagebrush/grass sites, meadow/stream riparian areas, and aspen stands. Non-forest vegetation includes juniper, grass, aspen, meadow vegetation, sagebrush, mountain mahogany and riparian shrubs (*Vegetation mapping* - 1979 - Burns Ranger District, *GIS* mapping).

Noxious Weeds

Oregon State Department of Agriculture (ODA) or Local Weed Districts designate species of plants as "noxious weeds." This designation refers to any species of plant that is, or is liable to be, detrimental or destructive to agricultural production and is difficult to control or eradicate. Weeds may be categorized as noxious because of the potential economic consequences of a weed invasion, or because of the threat to native vegetation communities and wildlife.

Characteristics of noxious weeds include a wide range of adaptability, rapid growth rates, abundant seed production, ability to re-sprout, ability to spread from vegetative or root fragments, and long seed viability in the soil. These attributes give noxious weeds a competitive edge over other plants and make them difficult to eradicate once established.

The current strategy emphasizes preventing the establishment of new weeds and slowing the spread of existing infestations. Decreasing the amount of ground disturbance, promoting establishment and proliferation of more desirable vegetation, and reducing the production and spread of reproductive plant parts are some of the means to implement the current strategy. The elimination and prevention of noxious weeds from the Emigrant Creek Ranger District is the long-term goal.

Mechanisms of Spread

The primary mechanisms for spread and establishment of noxious weeds are equipment, vehicles, people, animals, and roadwork moving reproductive plant parts from infested areas (on or off National Forest land) and depositing them in non-infested areas. Most of this activity occurs during the period mid June through October.

Existing Sites

At of the end of the 2002 field season, there were 77 inventoried noxious weed sites located in the Silvies Canyon Watershed project area, excluding the Blue Mountain Ranger District area (see Table 3-9). Of these, 65 were covered in the Malheur National Forest Noxious Weed EA, and will be treated manually. The remaining 12 sites will be analyzed for manual treatment under this EIS.

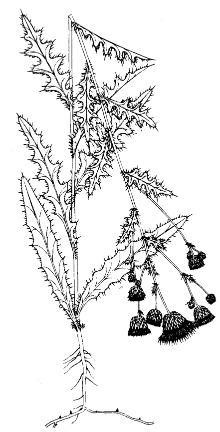
Inventoried sites may not represent the entire noxious weed population in the project area because every year there are new noxious weed sites found on the district.

Table 3-11. **Noxious weed sites in the Silvies Canyon Watershed Project Area.**

Weed Species	Number of Sites	Acres
Canada Thistle	40	5.45
Dalmatian Toadflax	5	0.5
Russian Knapweed	8	0.8
Spotted Knapweed	3	0.3
St. Johnswort	1	0.1
White Top	20	2.0
Total	77	9.15

Noxious Weed Species

Canada thistle is a relatively long-lived creeping perennial. Reproduction occurs from seed and buds on the roots, which sprout to form new plants if the weed is disturbed. Canada thistle seed is transported readily on vehicles.



Canada Thistle

Presently, Canada thistle is the most prevalent noxious weed inventoried within the project area. It has become very common across the forest. Most sites are along roads, but are increasing in riparian areas.

Knapweed Species readily establish themselves on any disturbed soil, and their early spring growth makes them excellent competitors for available soil moisture and nutrients. There is some evidence that knapweeds release chemical substances that inhibit the growth of surrounding vegetation. Knapweeds will reduce desirable plant communities if allowed to spread.

- ***Russian knapweed*** is the most prevalent knapweed species on the Emigrant Creek Ranger District. It is a perennial that can form dense colonies by adventitious shoots from widely spreading black roots; these roots can grow to eight feet deep. Reproduction occurs from seed and new plants will grow from roots left in the ground. Russian knapweed is found along Forest Roads 3100 and 3765.

- ***Spotted Knapweed*** is a biennial or short lived perennial with a stout taproot. Spotted knapweed is found on Forest Road 3145 and Highway 395, which provide access to the project area.

- ***Diffuse Knapweed*** is an annual or short-lived perennial 1 to 2 feet tall. It is located outside the project area on a main access road.

Dalmatian Toadflax is a perennial. Reproduction occurs from seed and root rhizomes. New plants will grow from roots left in the ground. It is often found in rock pits, but mainly along roads.

Dalmatian Toadflax

Common St. Johnswort is a perennial reproducing by seeds or rhizomes. It contains a toxic substance that affects white-haired animals. There is one known site along Forest Road 3100.

White Top is a perennial. Reproduction occurs from seed and root rhizomes. New plants will grow from roots left in the ground. White top is found along Forest Road 3100 and other disturbed areas along roads.

Houndstongue is a biennial growing 1 to 4 feet tall and reproducing by seed. It forms a rosette the first year and sends up a flowering stalk the second year. The nutlets (group of seeds) break apart at maturity and cling to clothing or animals. Houndstongue is toxic, containing pyrrolizidine alkaloids, causing liver cells to stop reproducing. Animals can live up to six months after ingesting a lethal amount of plant material (*Weeds of the West*, 1991). Currently there are no known existing sites within the Silvies Canyon project area; however, houndstongue is found along Highway 395 and Forest Road 3765, which provide access to the project area.

Risk Factors

- The project area has been altered, providing enhanced conditions for establishment of noxious weeds. These conditions include more sunlight to the soil surface, less organic material covering the soil surface, more exposed mineral soil, and increased soil disturbance.
- There are known noxious weed populations in Silvies Canyon Project area; additional populations nearby on the Forest constitute a source of reproductive material for establishment into the Project area.
- Vehicle traffic on Forest road 3100 acts as a dispersal mechanism for seed, both from within and outside the project area.
- Activities increase soil disturbance, vehicle traffic, and bring in specialized project machinery from possibly infested areas.

Socio-Economics

A social and economic analysis entitled *Silvies Canyon Watershed Restoration Project Final Environmental Impact Statement –Social and Economic Conditions and Effects* has been completed for this project (Kohrman 2003). This document is incorporated by reference under 40 CFR § 1502.21. The document presents social and economic affected environment information for this analysis. It provides information on human uses, social and economic characteristics, and conflicts among various users and uses of the ecosystem. It also discloses the health of the relationships among the people (community), the forest, and the larger ecosystem; perceptions and values related to ecosystem management; and recent social and economic trends in the economic region. The focus is primarily on but not limited to Grant and Harney Counties.

The local communities within an hour or two drive that are anticipated to be directly or indirectly affected by the proposed action, alternatives, and their associated economics include Burns/Hines (pop. 4,740), Dayville (140), John Day/Canyon City (2,500), Long Creek (230), Mount Vernon (600), Monument (150), Seneca (220), Sumpter (170), and Unity (130). Drewsey, Juntura, Prairie City and Riley are examples of other smaller communities also located in the vicinity. Larger cities two or more hours away from Burns-Hines area include Bend-Redmond (70,040), Ontario (11,140) and Prineville (7,750) (ODOT 2001). The nearest metropolitan area is Boise, Idaho, 3 hours away.

Primary Human Uses and Primary Users in the Silvies Canyon Watershed

The Silvies Canyon Watershed, a high use area in the southern end of the Malheur National Forest, is a destination area for numerous recreation and resource extraction activities. The following uses and users are known to occur in the project area.

Tribal Use

Northern Paiutes have inhabited and used the surrounding central southeastern region of Oregon, and Harney Basin, in which the watershed is located, for over 10,000 years. Silvies Canyon Watershed was part of the original proposed Malheur Reservation established by an 1872 treaty between the U.S. Government and the Paiute Tribe. Although Congress never ratified the treaty, and the Tribe was reimbursed for the original reservation in 1959 (at 1880 prices), the area remains extremely important to the Burns Paiute Tribe. The Burns Paiute Tribe has informed the Forest Service that the project area is used for "hunting, fishing, gathering, and religious purposes," and "every tribal family uses this region for cultural purposes" (Burns Paiute Tribe 2001). It is important for their culture for these practices to continue.

Other American Indian tribes may also have participated in hunting and gathering within the basin.

Recreation Use

In addition to traditional uses by the Burns Paiute Tribe, recreational use consists primarily of viewing scenery or wildlife, camping, hiking, hunting, snowmobiling, cross-country skiing, OHV use, horseback riding, firewood gathering and Christmas tree cutting. Regardless of the type of recreational use, access is key to how outdoor recreation resources are used. Recreation places easily accessed by vehicle have higher visitation rates than those located in remote, roadless areas.

About 53,000 acres of the project area supply roaded recreation, which is about 4.4% of the 1,197,300 acres available on the Malheur National Forest, including areas elsewhere on the Emigrant Creek Ranger district. Additional roaded recreation opportunities of several million acres exist on other public lands in the area. Most of the semi-primitive recreation opportunities with the project area are found within the Myrtle-Silvies Roadless area, comprising 11,700 acres. For more information on recreational use refer to the section titled "Recreation" on page 3-67.

Small Ranchers

Small ranches in the area are primarily family owned and managed businesses; many have been in the same family for generations. Despite the fact that many ranch families depend on a combination of farm and non-farm employment to remain economically viable, preserving the ranching lifestyle and culture is important. Most small ranchers do not have a high profit margin and increased operation costs may mean the difference between earning a living and survival of their business and lifestyle. Much of the local ranching is accomplished using traditional means, and distinctive gear and attire.

Forest Products and Subsistence Use

The project area has historically been a source for cultural, lifestyle, and economic uses that are vital to local residents, as well as out of area visitors. The economies of the counties surrounding the project area are dependent upon resource extraction and export. Most of the wood products from the watershed are processed in John Day or Prairie City, with a much smaller portion (less than 10%) processed elsewhere.

A number of nontimber forest products and subsistence resources including Christmas trees, post and poles, firewood, mushrooms, livestock forage, fish, and an abundance of big and small game are available in the project area. This availability of resources, combined with its close proximity to the Burns/Hines communities, makes the area very popular with local residents, as well as out of area visitors.

The local communities generally have a low per capita income and a high percentage of elderly people on fixed income. A significant percentage of the population also receives some form of public assistance. Because of this, firewood is a primary heating source for residents due to its availability and lower energy cost. Firewood gathering for home use is limited in the Myrtle-Silvies Roadless Area because of the distance to roads. The rest of the project area has been used heavily used for firewood gathering because of its close proximity to Burns-Hines. Many families use big game and fish to supplement their food supply. Posts and poles are important for smaller ranching operations to reduce their operating costs and maintain their ranching facilities. Forage in the project area is important to local ranch operations.

Residential and Water Use

There is one irrigation diversion on Myrtle Creek within the project area. There are numerous irrigation diversions on the Silvies River both upstream and downstream of the Silvies Watershed. The Silvies River is also one of the major water sources for Malheur Lake and the Malheur National Wildlife Refuge located in the Harney Basin, which is a closed desert watershed.

Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Minorities comprise 5.5% of Grant County, 9.9% of Harney County, and 31.2% of Malheur County, of which 25.6% is of Hispanic origin with the majority living east of Vale (Kohrman 2003 & U.S. Census Bureau 2003). The primary American Indian tribe involved is the Burns Paiute. With the exceptions of the Burns Paiute and Hispanics east of Vale, minorities are scattered throughout the counties.

Elderly people, especially those on fixed, low-incomes, and disabled people were also identified with potential to be impacted by various alternatives. A concern raised during public scoping referred to maintaining motorized access for scenic driving, wildlife viewing, or big-game hunting for elderly or disabled people.

There is no quantifiable information on how much use the area receives from minority and low-income populations other than the information shared by the Burns Paiute Tribe.

Economic Base

The economic base of this region is dominated by the agriculture and forest products industries, with opportunities for tourism development. Wood products manufacturing, government (including local, state, and federal), farming, and agricultural services provide the basic sectors of Grant County's economy. Government, farming, and agricultural services are the primary economic sectors for Harney County (Crone et al 1999).

Four communities in Grant and Harney counties (John Day, Prairie City, Burns and Hines) have been identified as isolated timber dependent communities with high reliance in their economy on timber products and livestock forage (USDA 1996). These communities have been making extensive attempts to diversify their economies, with only limited results. High transportation costs, limited infrastructure, and lack of skilled labor severely affect the ability to attract new industries. Recent data shows that economies of rural communities in the inland northwest having a business infrastructure including wood products and forestry are more resilient than those economies based largely on agriculture (Harris et al 2000).

Employment and Income

The communities surrounding the Silvies Canyon area are considered rural in character and have a disproportionately high unemployment rate compared with National and State figures, as well as a disproportionately low average income. See Table 3-12 for a comparison (OED 2003a).

Table 3-12. Comparison of National, State and Local Unemployment and Income Averages.

		Averages	
Locations		Unemployment Rate (%)	Income ($)
	United States	5.8	36,214
	Oregon	7.3	33,202
	Grant County	14.6	24,492
	Harney County	13.1	23,308
	Baker County	12.6	24,190
	Malheur County	11.4	23,163

Forest management and cattle production are the main industries supporting Grant and Harney Counties. Grant County is experiencing its sixth consecutive year of declining non-farm employment, and this is quite possibly the longest ongoing downturn any local Oregon labor market has ever experienced (OED 2003).

Recreation-based industries, while prevalent elsewhere in the region, have not been a major contributor to the local economies. Recent efforts indicate that the volume of business is only enough to supplement income rather than provide a primary source of income (Harney County Chamber of Commerce 1998-2000). The exception is hunting season, which typically draws larger numbers of people into the area. Stores that sell sporting goods benefit during this period.

Seasonal limitations, the dispersed nature of recreation within the counties, along with a general lack of large, water-based recreational opportunities does not create the concentrated numbers of recreationists and readily identifiable recreation destinations necessary to support many recreation industries (Oregon Department of Tourism 2001).

Unemployment

Grant County's annual average unemployment rate declined in each of the past two years. The 2001 annual average jobless rate of 10.3 percent was Grant County's lowest since 1995. Harney County's unemployment rate in 1998 was the lowest it has been in close to 20 years. It has risen recently to the highest rate (14.1%) in five years (USDA 2003). These higher rates are primarily due to the seasonal nature of jobs, less diversified job market for local job seekers, and higher reliance on industries that are either declining or, at least, are not growing to the same extent as other industries more prevalent in Oregon's metropolitan areas. Figure 3-13 illustrates average annual unemployment rates for the past five years in Grant and Harney counties.

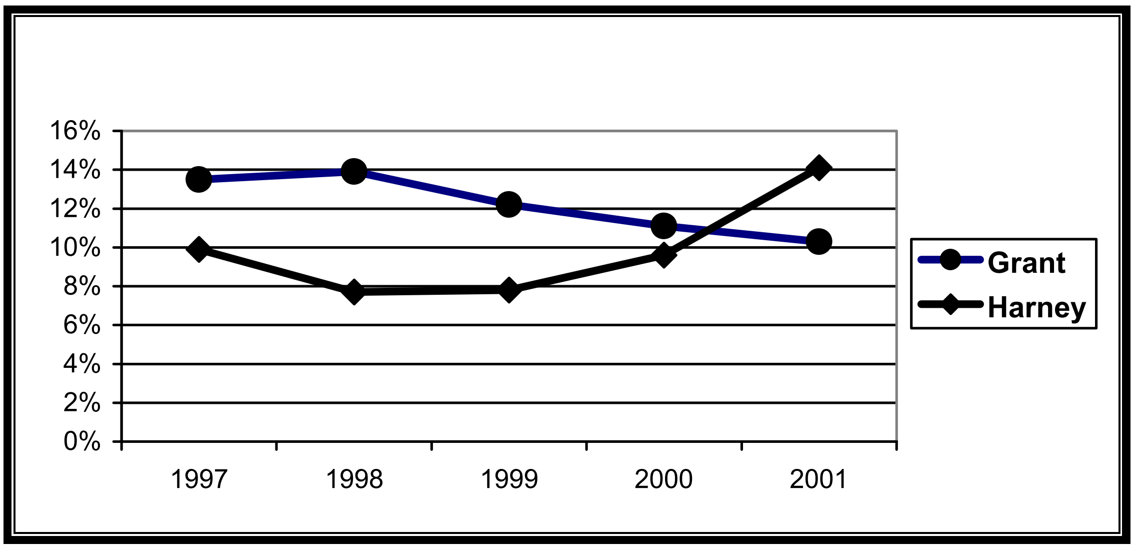


Figure 3-13. Average Annual Unemployment.

While unemployment figures reflect the project area situation as a whole, members of the Burns Paiute Tribe often experience much higher unemployment rates, sometimes reaching as high as 50 percent (OED 1997). The Tribe has made a number of attempts to improve employment for members with varying success. Currently, a small gambling casino at the edge of Burns and a farm enterprise on the reservation provide some employment. The Tribe has recently obtained a ranch in Logan Valley, located near Prairie City; and another near Juntura, Oregon, adding significantly to their land base.

Commonly, following a long period of high unemployment in rural areas, the work force shrinks for two reasons: (1) people leave to seek work elsewhere, or (2) people become discouraged and stop seeking work (OED 2001). The relatively low proportion of population in the 18-64 year range suggests that as people become more experienced or gain work skills, they seek work outside the area either for better pay or for better work stability. Young workers, those with small children, or those just starting their work careers; may remain until they can gain work experience, at which point they leave to seek higher paying jobs elsewhere. This would account for the higher number of residents under the age of 18, compared to 18-64 year old residents.

Economic Diversity

The Grant and Harney economies are not very diverse, relying primarily on raw material export, mostly in the form of wood products, livestock, or agricultural products. Nearly one-third of the livestock producers in the Grant County and half in Harney County depend on forage on federal lands (McGinnis et al. 1996). Tourism is a small, but growing portion of the economy. Any negative influences affecting these basic industries are quickly reflected in the Counties' economy. The results of increased market competition and less available wood fiber due to environmental restrictions in the recent years have been deeply felt within Grant and Harney Counties. This situation is not expected to improve in the near future. Harney County has been trying since the early 1990s to diversify its economy with limited success. Transportation cost and limited industrial infrastructure are major drawbacks to these efforts. Another factor affecting the economic situation of both counties is that local workers are highly skilled in resource-related work, but tend to have limited knowledge and skills for computer-oriented job limiting opportunities for this type of work. A number of residents also have multi-generational ties to the lifestyle and area and may be reluctant to seek work elsewhere.

Recent Timber Trends

The 1990 Malheur National Forest Land and Resource Management Plan (LRMP) established an allowable sale quantity (ASQ) for the forest of 38.4 million cubic feet or 211 MMBF average per year. An ASQ is an upper limit for the plan period, not a proposal for sale offerings or assigned targets. Actual sale levels depend on factors like: limitations of modeling, changes in law and regulations, changes in social-economic values, listing of threatened and endangered species, changes in budgets, and site-specific conditions. The Regional Forester amended this plan in 1994 through Amendment No. 2 (Eastside Screens), and by PACFISH and INFISH in 1995 in response to some of these changing factors. Table 3-13 compares the Malheur National Forest's annual offered timber volume with its assigned target timber volume for the fiscal year since the 1990 LRMP went into effect. Accomplishment of timber targets is based on volume offered.

Table 3-13. Malheur National Forest Timber Offer by Fiscal Year 1991 to 2002.

Fiscal Year	Target Volume MMBF	Offered Volume MMBF
1991	229.0	201.6
1992	220.0	100.8
1993	197.0	71.7
1994	101.0	33.1
1995	85.0	66.9
1996	100.0	80.9
1997	110.0	38.9
1998	95.0	77.1
1999	63.5	34.1
2000	45.0	17.5
2001	36.7	15.4
2002	24.2	2.7

In response to a request by then Oregon Governor Kitzhaber, the Blue Mountains Demonstration Area published in 2002 an assessment entitled *Assessment of Timber Availability from Forest Restoration with the Blue Mountains of Oregon* (USDA 2002). The assessment described management actions over the past decade, current vegetation conditions where a reliable supply of wood could be available, estimates the quantity and type of forest timber products that may result from forest restoration actions, and a market analysis for potential timber products and the associated economic impacts on individual communities.

This assessment concluded that 71% of the national forest lands in the Blue Mountains of Oregon were not available for substantial and sustainable harvesting of timber. It further concluded that the remaining 29% of the national forest lands that are available for substantial and sustainable timber harvest (Active Forestry lands) was actively managed over the last three decades. Up to a third of these lands have experienced timber harvest or non-commercial thinning since 1988. Approximately 58% of these Active Forestry lands are currently overstocked. However, nearly half of these overstocked lands are suitable only for non-commercial thinning treatments, yielding only incidental amounts of merchantable timber.

Wildlife

Big Game Habitat

Rocky Mountain elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus*) use many plant communities and successional stages; they need a mixture of hiding and thermal cover, forage areas, calving/fawning, and rearing areas.

Human-related factors combined with ongoing successional processes have greatly altered the habitats of elk and mule deer. How elk and mule deer populations have responded to these changes has varied. In the project area, elk and deer have apparently benefited from past events that have shaped and manipulated current vegetation across much of the project area and adjoining landscape (see Big Game Population Management Objectives, below).

Cover

Four conditions/actions have determined the extent of existing canopy cover in the Silvies Canyon project area: natural conditions (low site potential and past fire history), past harvest, recent growth of trees in formerly non-forested areas, and increased stocking and changes in tree species composition due to past treatment or lack of treatment. Natural conditions related to the amount of non-forested land (23% of the project area) and to hot dry and warm dry forest limit both the growth and sustainability of trees and canopy cover in the project area (see LOS discussion below). Past harvest (between 1982 to present) has removed timber on about 15,000 acres in the Silvies Canyon project area. It's estimated that 6,000 to 10,000 of these acres may have provided marginal or better cover prior to harvest. Up to 6,000 acres of these past harvested areas have regrown or are close to regrowing into marginal cover. In addition, 13% of historically non-forested areas (4,000-8,000 acres) have grown into forest (Fire Specialist Report). Much of the area that has gone from non-forest to forest is presently marginal cover, though this level of canopy cover is not expected to be sustainable. Current tree stocking is uncharacteristically high throughout the area. Tree stocking has increased both in basal area (2-4 fold increase) and in stocking levels (10 fold increase) (Vegetation Specialist Report). Many areas that are near or are currently meeting standards for cover reflect this increased stocking rate. Many of these stands would not have met satisfactory cover standards historically (see section on LOS).

There are approximately 53,000 acres (65.1% of project area) of summer range in the project area and approximately 28,500 acres (34.9% of project area) of winter range. Forest Plan standards were used to calculate the amount of satisfactory [thermal] cover (stands with a canopy closure of at least 60%) and marginal [thermal] cover (trees greater than or equal to 10 feet tall with a canopy closure of at least 40%) on summer and winter range. Sage Hen Creek is the only subwatershed that meets Forest Plan standards for satisfactory, marginal, and total cover in summer range (see Table 3-14). Six of the seven subwatersheds are currently below Forest Plan standards for satisfactory cover (with four of those subwatersheds not meeting total cover) due to past harvest, natural conditions and low site potential on summer range.

The USDA Forest Service manages 4% (714 ac.) of the summer range in the Red Hill subwatershed; the remaining 96% (17,258 ac.) of Red Hill is under other management. The non-Forest Service lands in Red Hill subwatershed are mostly open sagebrush, which provides forage but would never be forest and therefore would never provide cover or good cover distribution. Cover and HEI were initially calculated using all summer range in the entire Red Hill subwatershed. Analysis of effects at the subwatershed scale in Red Hill showed virtually no change in cover and HEI between existing conditions and alternatives with the maximum amount of harvest or road closure. At this scale, Forest Service actions would have appeared to have no effect. To be able to display and measure the change between alternatives in this FEIS, cover and HEIs have been calculated for the portion of summer range managed by the Forest Service. Since the Malheur National Forest can only influence the Forest-managed portion, the cover and HEI tables only display data on the Forest Service portion of the Red Hill subwatershed.

Four subwatersheds do not meet Forest Plan standards in winter range (Table 3-16) due in part to past harvest, low site potential in many areas, and large areas of non-forest habitat that occur within winter range.

Table 3-14. Cover in Summer and Winter Range by Subwatershed.

	Summer Range			Winter Range		
Subwatershed	**Marginal Cover**	**Satisfactory Cover**	**TOTAL Cover**	**Marginal Cover**	**Satisfactory Cover**	**TOTAL Cover**
Boulder/Fawn	14%	3%	17%	22%	6%	**28%**
Burnt Mtn.	15%	1%	16%	19%	16%	35%
Myrtle Creek	4.0%	5%	9%	40%	19%	59%
Myrtle Park	25%	5%	**31%**	51%	21%	72%
Red Hill (Forest-managed part)**	27%	0%	**27%**	13%	0%	13%
Sage Hen Cr.	47%	12%	59%	31%	5%	**36%**
Stancliffe Cr.	9%	0%	9%	12%	0%	12%
FP Standards	***5% min.**	**8% min.**	**20% min.**	**10% min.**	**8% min.**	**25% min.**

Does not meet Forest Plan standards

*Satisfactory cover can be substituted for marginal cover when standard is exceeded.

Road Density

The Forest Plan establishes road density standards at the watershed level, excluding private land and wilderness in the calculation. Approximately 16,300 acres of Red Hill, Burnt Mountain, and Myrtle Cr. subwatersheds were excluded from the analysis because the Malheur National Forest does not manage this area.

The modified project area used to analyze road density and HEI included 1,962 acres of private and 63,174 acres of land managed by the Malheur National Forest. There are approximately 375 miles of open roads (including four miles of private roads) in this modified Project Area, including about 63 miles of roads that were designated for closure under past decisions. Closure of these roads is occurring or is planned to occur regardless of this project's outcome. Because the 63 miles of open road designated for closure under past decisions are or will be closed, open road densities were calculated as if those 63 miles of road have been closed.

To conduct a meaningful analysis of road density on a site-specific level, road density was calculated at the subwatershed level, and further divided into winter and summer range. Based on calculated winter and summer range acreage and GIS database road length analysis, open road densities range from about 5.2 to <0.1 mi/mi^2 (see Table 3-1 in the Access and Travel Management Section).

Use of roads by off-road vehicles (e.g. OHV or snowmobile), where allowed, is included here as road use in road density and habitat effectiveness calculations. Off-road use by recreational vehicles is currently allowed throughout the area, except in the Myrtle-Silvies Roadless Area. The exact amount of this use and its effects to existing condition of elk and other wildlife are likely additive, but unknown. No data is currently available on actual OHV use in the Silvies area. Estimates by a recreation technician suggest moderate off-road use in summer and heavy use during hunting season (15-20 vehicles/day in summer, twice that in hunting season; Pat Ruvio, Pers. Observ.).

Habitat-Effectiveness Index

To comply with the Forest Plan standard #28 (FP IV-27) an elk habitat effectiveness analysis has been completed for the Silvies Canyon watershed (see Table 3-15).

Currently, high road densities limit summer and winter range HEI values. Low cover values somewhat limit HEI.

Table 3-15. Summer and Winter Range HEI Values.

	Summer Range				Winter Range				
Subwatershed	**HEc**	**HEs**	**HEr**	**HEI**	**HEc**	**HEs**	**HEr**	**HEf**	**HEI**
Boulder/Fawn	0.58	0.34	0.41	0.43	0.61	0.45	**0.48**	0.40	**0.48**
Burnt Mtn.	0.52	0.50	**0.30**	0.43	0.73	0.51	**0.47**	0.40	0.51
Myrtle Cr.	0.78	0.24	**0.18**	**0.32**	0.66	0.42	0.50	0.40	**0.48**
Myrtle Park	0.58	**0.43**	**0.29**	0.42	0.65	0.63	0.97	0.40	0.63
Red Hill *	0.50	0.49	**0.32**	0.42	0.50	0.33	**0.41**	0.40	0.41
Sage Hen Cr.	0.60	0.69	**0.38**	0.54	0.57	0.61	**0.40**	0.40	**0.49**
Stancliffe Cr.	0.50	0.32	**0.39**	0.40	0.50	0.45	**0.32**	0.40	**0.41**
FP standard	**0.30**	**0.30**	**0.40**	**0.40**	**0.40**	**0.30**	**0.50**	**0.40**	**0.50**

Does not meet Forest Plan standards

c=cover **s-spacing** **r-roads** **f-forage quality & quantity**

***Values displayed above are for the portion of the subwatershed that is managed by the Forest Service and is within the Forest boundary only.**

Calving and Fawning Habitat

Over 30,000 acres of the riparian habitat and gentle (1-15%) slopes found throughout the planning area meet the basic criteria for calving and fawning habitat. There is likely use of these areas, but information of where this habitat is located is not available. Little information is available on the condition of these areas. Livestock grazing may have reduced shrub cover, particularly in riparian areas (see Fisheries Specialist report).

Big Game Population Management Objectives (MOs)

The Silvies Wildlife Management Unit is about 1,821 mi^2, of which about 68% is public land. It covers the area between State Highway 20 and 395, and between Izee, Suplee, and near Hampton, Oregon.

In a 1919 Forest Service report, total forest dwelling big game populations were estimated to be 20 elk and 1,150 deer (Mosgrove 1980). Annual legal harvest was five elk and 195 deer. Poaching also occurred. By 1942, big game populations were estimated to be at 1,900 elk and 55,000 deer. In the intervening years, better game law enforcement, large-scale predator extermination programs, and increases in browse species (early intensive livestock grazing reduced competition by perennial grasses and declines in grazing level allowed shrubs to rebound) contributed to the dramatic increase in population densities on the forest.

Recent population estimates in the Silvies Wildlife Management Unit are at ODFW's management objective of 2,200 overwintering adults. Elk numbers were above objectives in 2001 and 2000 at 2,500 and 2,600. Through hunter harvest management, those numbers have been reduced to objectives. This indicates that the population is healthy and viable. ODFW estimates that about 250 summer adult elk inhabit the Silvies Canyon project area (ODFW, R. Garner, pers. com.). Elk appear to be doing well in this unit because the area provides "plenty of habitat" (in the form of space, hiding cover, and forage – ODFW, R. Garner, pers. com.). Components that could be limiting elk use on Forest Service System lands include high quality forage and human disturbance due to high density of roads (R. Garner, pers. com.).

The 2000-2002 Silvies Wildlife Management Unit mule deer population was estimated to be about 9,500-10,000 over wintering adults. ODFW population estimates indicate deer numbers have averaged 80% of management objectives over the past several years (objective - 12,000 deer, ODFW will be reviewing these objectives over the next few years). This indicates that the population has not reached its potential but appears to be stable. The reduced amount and palatability of shrubs (due partially to forest succession and fire suppression) as well as increased predation may be the cause for low mule deer populations (Unknown 1990-Mule Deer Plan for the State of Oregon and R. Garner, pers. com.).

Proposed, Endangered, Threatened and Sensitive Species

For Proposed, Endangered, Threatened and Sensitive (PETS) animal and plant species, surveys and analysis were conducted from 1992-2002. A prefield database review was also conducted.

Field reconnaissance was conducted to:

- Assess the project area to identify potential PETS habitat;
- Search suitable habitat for PETS species occurrence (if present);

- Confirm that known habitat is suitable (if present); and
- Refine knowledge of habitats that exist on the landscape and how species use their habitat.

The prefield data base review and field reconnaissance identified occurrence, suspected occurrence, or potential habitat for the following PETS:

- Gray wolf
- Bald eagle
- Canada lynx
- Wolverine
- Pygmy rabbit
- Peregrine falcon
- Western sage grouse
- Gray flycatcher
- Bufflehead
- Columbia spotted frog

The Silvies Canyon Watershed Restoration Project Biological Evaluation/Assessment (see Appendix C) discusses existing condition of these species and their habitat and the effects that the proposed action and alternatives have on these species. The following is summarized from those documents. Existing condition for these species is as follows:

Gray Wolf

Historically, wolves occupied all habitats on this Forest (Wisdom et al. 2000), but are currently considered extirpated. The three Blue Mountain Forests are probably suitable habitat for wolves. Over time, wolves dispersing from the growing experimental, non-essential central Idaho wolf population could return to the Blue Mountains and establish packs.

Bald Eagle

Occupied bald eagle nesting habitat (the Silvies River nesting territory) and two potential winter communal roosting sites are located in the project area. Due to overstocked understories and heavy accumulations of fuels, nest and roost stands are at risk from stand-replacing fires and epidemic insect attack.

Canada Lynx

Based on records and available collections, Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations of lynx in Oregon and USDI (1997) considered the species extirpated from Oregon. There are small, scattered primary vegetation blocks (lodgepole pine) present on the project area; these total about 294 acres, and mostly are located in the northern portion. There are also about 1,000 acres of small, non-continuous secondary vegetation blocks in portions of the project area that include grand fir, aspen and alder plant associations. Most grand fir plant associations are dry sites that do not qualify as secondary lynx habitat.

Wolverine

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. The most recent unconfirmed sighting of a wolverine on the Malheur NF was reported in 1994, in the Silvies Canyon Watershed.

Source habitat is very limited in this project area. There are no subalpine forest types with or without talus surrounded by trees in or adjacent to this area. Montane forest types within the northern portion of the project area may provide marginal or poor winter foraging habitat for wolverines. Because wolverines are sensitive to disturbance, the high levels of human disturbance (recreational use, firewood cutting, and management activities) reduce the suitability of the area for wolverine. The likelihood of wolverine using or frequenting the area is low.

Pygmy Rabbit

Pygmy rabbits are closely tied to habitats dominated by big sagebrush (*Artemisia tridentata*) growing on deep, loose, friable soil types (Verts and Carraway 1998, WDFW 1995). GIS analysis indicates four small shrubland stands of mountain big sagebrush plant association habitat, totaling 120 acres, widely scattered across the southern end of the watershed. This plant association is described as rough to rolling, or undulating terrain with mountain big sagebrush and bunchgrasses growing in deep, stony soils (Johnson and Clausnitzer 1992). Because of limited quantity and quality of habitat, the likelihood of pygmy rabbits occurring in these areas is low.

Peregrine Falcon

In 1992, surveys to identify probable nest sites were conducted on the Malheur National Forest (Pagel 1992). The potential for nests at various locations were identified and rated from no to high potential of use according to specific habitat criteria. The closest potential nest site is located within Silvies Canyon. Pagel (1992) classified this site as having a “medium” potential. No observations have been recorded of peregrine falcon use in this area. In July 2000 a pair of peregrine falcons with an immature were sighted near Yellowjacket Lake. In response to the observation of peregrine falcons in the adjacent watershed, potential nesting habitat within the Silvies Canyon Watershed was monitored twice in 2003 (once during the courtship/egg laying period and once during the hatching period). Peregrine falcons were not observed in the watershed and were not found nesting. The presence of an apparently successful breeding pair near Yellowjacket Lake suggest that peregrine falcons are breeding somewhere on or near the Malheur National Forest. As well as being a sensitive species, peregrine falcons are also listed as “Birds of Conservation Concern” in the Great Basin by the US Fish and Wildlife Service (2002).

Western Sage Grouse

Individual sage grouse have been noted within the project area. A lek site was recently reported just south of the southern border of the project area. Population information and other lek sites are unknown inside the project area. Historically there may have been substantial numbers and use in the area of Little Sage Hen Flat and along Sage Hen Creek. Sage grouse may nest inside the project area in patches of sagebrush within two miles of the reported lek (Call and Maser 1985). However, suitable nesting habitat is available in abundance outside the project area south of the reported lek. No information is currently available on use of the project area for nesting. Marginal quality potential late-season brood rearing habitat exists in sagebrush-steppe in the south end of the project area. There is no key late brood-rearing habitat identified in the project area. Use appears to be occasional and random within suitable habitat. As well as being a sensitive species, “Greater Sage Grouse” are also listed as “Birds of Conservation Concern” in the Great Basin by the US Fish and Wildlife Service (2002).

Gray Flycatcher

Abundance surveys confirmed the presence and general abundance of gray flycatchers near Silvies Canyon Watershed during roadside surveys on Breeding Bird Survey (BBS) route Ore-248: Silvies (0.01 birds/route-very low abundance) (USGS 2000). Presence and density information is not available for the Silvies Canyon Watershed.

The project area has about 10,691 acres of shrublands, most of which occurs in the south end of the watershed. While not all of the shrubland/nonforested areas found in the watershed provide habitat for this species, much of the shrubland habitat is potential habitat. Gray flycatchers are likely to inhabit the south end of the watershed.

Bufflehead

This species does not occur on the Malheur National Forest during the breeding season (USGS 2000, Csuti et al. 1997), but migrating/overwintering birds may be found on the Silvies River.

Columbia Spotted Frog

This frog is present in all subbasins on the Malheur National Forest. Confirmed sightings occur in Myrtle Creek and North Fork Myrtle Creek. It is thought to be widely distributed in the project area. Habitat has been reduced or degraded due to past management activities such as grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes.

Management Indicator Species (MIS)

To maintain viable populations of existing native and desired non-native vertebrate populations, the Malheur National Forest established a list of MIS that can be used to monitor the effects of planned management activities on wildlife.

Selected MIS may reflect a mix of threatened, endangered, or sensitive species; species commonly hunted, fished or trapped; non-game species of special interest; or species selected because their population changes are believed to indicate the effects of management activities on species of selected major biological communities or on water quality.

Rocky Mountain Elk

Rocky Mountain Elk was selected as a MIS due to its economic and social values, and its response to changes in forest cover, road densities, and forage quality.

Indicators of Old Growth and Late- and Old-Structure Habitat

Pileated, and three-toed woodpeckers and American marten are Management Indicator Species (MIS) for old growth and dead and defective tree habitat. White-headed woodpeckers are an MIS for dead and defective tree habitat, but are strongly associated with old growth habitat, so are considered here. Northern goshawk is not considered a MIS, but Amendment #2 of the Forest Plan identifies the goshawk as an important indicator for interior late and old structure habitat.

Pileated Woodpecker

Habitat requirements of the pileated woodpecker include stands of mature or old growth mixed conifer or ponderosa forests with two or more canopy layers or younger forests that contain large or old growth remnants. Thomas (1979) reports this species using mature (80-159 years) to old growth (160+ years) for reproduction and foraging.

Over the last nine years, there have been 18 documented sightings of pileated woodpeckers within the project area. These reports include individual and pair occurrences within DOGs, general forest and potential eagle roost stands. In 1992, formal breeding pair surveys were conducted to determine pileated presence in several DOGs in the project area (Becher 1992). DOG 011 and DOG 015 each had one pair of pileated woodpeckers present. Incidental observations of pileated pairs/singles were documented in DOG 012, DOG 016, Silvies River potential eagle roost, Myrtle Park area, and Stancliffe/Silvies area.

These sightings occurred during the breeding season, indicating that these areas may also have occupied nesting habitat. Additional observations of pileated woodpeckers within the project area are documented in the district wildlife database (Wildobs, wildlife project record).

Based on available data, there are at least seven probable pileated woodpecker territories in the project area; most center on MAs that limit or restrict timber harvest. Potential territories in Myrtle Park and Stancliffe/Silvies occur in general forest and big game winter range respectively.

Project area DOGS meet some of the pileated woodpecker management recommendations developed by Bull and Holthausen (1992) particularly in terms of vegetation types, size of core old growth, and canopy closures. However, these DOGS are not as large as pileated woodpecker home ranges in Bull and Holthausen (1992) and do not provide down wood, and in most cases snags, at their suggested levels. Current research (Bull and Holthausen 1992) indicates that at least 4 large snags/acre are needed to provide nesting and feeding habitat for pileated woodpeckers.

Although current literature suggests that larger home ranges might be needed, the Forest Plan assumed that a breeding pair needed 300 acres of quality nesting habitat plus an additional 300 acres of foraging habitat, and that 5 miles (or approximately one pair every 12,000 acres) was a suitable maximum dispersal distance to assure population viability (USDA Forest Service 1990, FEIS, Appendix G).

As discussed under snags and DecAID (Mellen et al. 2003), much of the project area may not provide a sufficient density of medium (10-inch dbh) and large (20-inch dbh) snags to provide optimal habitat for pileated woodpeckers.

White-headed Woodpecker

The white-headed woodpecker selects home ranges dominated by old-growth ponderosa pine. Dixon (1995) found the majority of nests and all roosts were in ponderosa pine forest types with <57% canopy closure. These birds nested mostly in ponderosa pine snags, but also used live and dead quaking aspen, white fir snags, and ponderosa pine stumps. White-headed woodpeckers use large diameter (>20" dbh) snags for nesting and for roosting in greater proportion than available. This relatively narrow habitat niche occupied by the white-headed woodpecker makes it strongly dependent upon open stands of large-diameter live ponderosa pine.

White-headed woodpeckers in Oregon and Washington are not found in all ponderosa pine forests having large trees. This is particularly true of those forest stands that have high canopy cover resulting from a dense understory of younger trees (Marshall 1997).

Due to the high commercial value of ponderosa pine, it has been intensively harvested in the past. Where ponderosa pine was not harvested, it was protected from natural and human-caused fires. Long-term suppression of natural fires, subsequent absence of natural fire regimes (frequent, cool ground fires), and past harvest strategies have, over time, allowed ground fuel accumulations and unnatural encroachment by Douglas-fir and white fir in the understory and midstory of productive white-headed woodpecker habitat (Fire and Vegetation Specialist Reports). Consequently, these habitats have become predisposed to increased risk of stand replacement wildfire and subsequent salvage, a cycle which prevents individual trees and many stands from reaching the large size and decayed conditions critical to this woodpecker.

There have been 10 incidental observations of white-headed woodpecker pairs/individuals in the watershed. This area currently provides poor to marginal habitat for white-headed woodpeckers. It has remnant old growth pine stands and mixed conifer stands with remnant pine LOS structure that are capable of supporting minimal numbers of this old growth associated species.

Three-toed Woodpecker

This species is usually found in mature or old growth lodgepole pine, and can also be found in fir forest types with a strong lodgepole pine component (Marshall 1992a). This species' typical habitat types are not abundant in the project area; however, lodgepole stands of varying age and condition exist in the very northern portion of the project area (Blue Mountain Ranger District). In this area, two old-growth lodgepole areas (two blocks, 79 and 80 acre, designated by Blue Mountain Ranger District) are available for this species. These dedicated blocks of nesting and foraging habitat provide core habitat for possibly two breeding pairs of three-toed woodpeckers. These areas are insufficient to support an entire home range but may be key habitat in the managed forest landscape.

There have been two incidental observations of individuals in the watershed near the Blue Mountain Ranger District's three-toed woodpecker management areas.

American Marten

The watershed is south of the current distribution range for marten and the DOGs are not considered optimal or suitable marten habitat. Hot dry and warm dry ponderosa pine forest, which makes up most of the project area, do not provide habitat for marten (Wisdom et al. 2003 [Vol. 3]). Less than 1% of the Silvies Canyon project area (294 acres) is classified as lodgepole pine, a habitat type that is used by marten. This habitat type is found in small, discontinuous pockets. No other habitat types typically used by marten are present in the project area.

Marten have not been observed in or near the Silvies Canyon project area, the project area is outside the known range of marten, and there is little potential habitat for marten in the project area. Therefore, marten are not likely to be present in the project area.

Northern Goshawk

Northern goshawks are known to use interior forests habitats of mature and old growth. These raptors prefer mature and over mature stands in mixed conifer with overstory ponderosa pine, but need a more open understory or openings for hunting compared to other interior forest raptors. Nests are often within ¼ mile of flowing water (De Stephano, 1992). Goshawk ranges have been reported as varying from about 520 acres to over 6,000 acres (Reynolds et al. 1992). Primary nesting habitat consists of OFMS cool moist and warm dry mixed conifer stands, often with a dominant presence of large ponderosa pine. These habitats also function as foraging areas. Secondary nesting habitats are generally young forest multi-stratum (YFMS), often lacking the large tree component.

Goshawk surveys were conducted in the project area from 1996 to 2002 (Wildlife Specialist Report, Project Record). There are over 63 documented sightings (incidental observations and formal surveys in and immediately adjacent to the Silvies Canyon watershed) and eight historic (documented use within the last five to six years) or active nest territories in the planning area. Thirty-acre nest core areas and 610-acre Post-fledging Areas (PFA) (larger than the required 400 acres except for the Myrtle Park PFA) have been established around active and historic nest trees. PFAs were not delineated based on the most suitable habitat, but were analyzed at a larger scale than those required in the Malheur Forest Plan to ensure that, where available, adequate amounts of old and young forest habitat were included.

There are at least two additional old territories identified in the area: South Fawn Creek found in 1980, adult near nest site in 1997 and last surveyed in 2000, and Ranger Spring, found in 1991, last active in 1991, last surveyed in 2000, and adult seen near the nest site in 2003. These older territories appear to be inactive based on periodic surveys; because surveys have not been done annually it is unknown whether these nests have remained inactive for the past five years. These old nest sites have had nest stands and 640-acre PFAs designated and have been included in the analysis below. The South Fawn nest stand may have been clearcut in the early 1980s, prior to Forest Plan standards that protected goshawk nest stands. For this analysis, the nest stand was considered to be the timbered stand adjacent to the reported nest location.

Forest structure in goshawk nest stands appears to be mature or old forest or younger forest generally with a closed canopy. The HJ Spring nest is associated with or in close proximity to an aspen stand that is in need of restoration treatment. PFAs below do not include their corresponding 30-acre nest stand.

Forest structure in established PFAs is as follows in Table 3-16, where percentages are based on the 610-acre PFAs. The Regional Forester's Forest Plan Amendment #2 recommends that up to 60% of PFAs be in late and old structure (OFMS/OFSS). None of the goshawk PFAs meets the Forest Plan standard for late and old structure. However, goshawk use of habitat does not meet the silvicultural definitions used in the Blue Mountains. Goshawk use mid-aged, mature, and old forest as described in the Southwest Management Recommendations (Reynolds et al. 1992). In the case of goshawk, YFMS has been included in the analysis of effects with OFMS and OFSS, because YFMS provides the most suitable habitat in the area with many of the structural characteristics needed and used by goshawk for nesting and fledging. It is expected that within many of the PFAs in Silvies Canyon, goshawk are using YFMS or portions of YFMS because OFMS or OFSS are unavailable.

There are five additional nest sites identified outside of but within one mile of the watershed boundary (Rainbow Spring, Five Hundred Flat, and Hall Creek, Lost Cabin, and Crooked Creek). Home range associated with these territories may overlap into the watershed.

Table 3-16. Acres and percentage of area by structural stage within nine[1] goshawk post-fledging areas.

PFA	Grass/forb/shrub and Seedling/ sapling (NF/SI)[2]	Young forest (SEC/SEO/UR) [2]	Mid-aged to mature forest (YFMS) [2]	Old forest (OFMS/OFSS) [2]
HJ Spring	142 ac (23%)	210 ac (35%)	218 ac. (36%)	39 ac (6%)
Van Zandt	108 ac (18%)	452 ac (74%)[3]	49 ac (8%)	0 ac (0%)
Bellows Spring	116 ac (19%)	220 ac (36%)	273 ac (45%)	0 ac (0%)
FL Spring	110 ac (18%)	47 ac (8%)	314 ac (51%)	139 ac (23%)
Myrtle Creek	344 ac (56%)	125 ac (21%)	140 ac (23%)	0 (0%)
Crane Creek	43 ac (7%)	133 ac (22%)	429 ac (70%)	4 ac (1%)
Bennett Spring	223 sc (36%)	61 ac (10%)	29 ac (5%)	297 ac (49%)
Ranger Spring	121 ac (20%)	121 ac (20%)	329 ac (54%)	38 ac (6%)
South Fawn	99 ac (16%)	407 ac (66%)[3]	61 ac (10%)[3]	0 ac (0%)
Reg. For. FPA #2	N/A	N/A	N/A	60%
SW Recommendations (Reynolds et al. 1992)	20%	20%	60%	

[1]Myrtle Park (Blue Mountain) PFA habitat was not included here. OFMS and YFMS represent over 75% of the 640 acres surrounding this nest. Existing condition and effects to the PFA designated by Blue Mountain RD will not be discussed further since no treatment will occur in the Myrtle Park PFA designated by Blue Mountain RD.
[2]Verbal description from Reynolds et al. (1992); structural stage codes from Blue Mountain Forests' structural stage definition.
[3]20% of the Van Zandt PFA is outside the project area and no structures were available in this GIS coverage and 18% of the South Fawn PFA has no structures assigned in GIS; from aerial photos of this 20% of Van Zandt PFA, it is estimated that this area is SEO or SEC. Some of the 18% of South Fawn appeared to be YFMS; the remainder was SEO or SEC.

Indicators of Dead and Defective Tree Habitat

Eleven species were selected as indicators of dead and defective tree habitat because they are Primary Cavity Excavators (PCE), species that create their own nesting cavities in dead or defective trees. By providing habitat for these woodpeckers, habitat is provided for many other cavity-dependant species. Three of these species, (white-headed woodpecker, Lewis' woodpecker, and Williamson's sapsucker) are also listed as "Birds of Conservation Concern" in the Great Basin by the US Fish and Wildlife Service (2002).

Snags may be a limiting factor to woodpecker populations in some areas (see discussion of Dead and Defective Tree Habitat). But while all woodpeckers use dead and defective trees, specific habitat needs vary between species. The Silvies Canyon project area is within the range of the selected woodpecker species (except for yellow-bellied/red-breasted sapsucker-see Table 3-14 under red-naped sapsucker). Pileated, three-toed, and white-headed woodpecker habitat and its availability are described under Indicators of Old Growth, above. The remaining species and their habitat requirements are summarized in Table 3-17.

Table 3-17. MIS for Dead and Defective Tree Habitat.

Bird Species	Habitat/s required	Habitat available?	Presence Confirmed**
Pileated woodpecker	Discussed under old growth-assoc. species	Yes	Yes
Three-toed woodpecker	Discussed under old growth-assoc. species	Yes	Yes
White-headed woodpecker	Discussed under old growth-assoc. species	Yes	Yes
Black-backed woodpecker	Young to old growth mainly lodgepole forest, prefers over-mature/ or disturbed forest for feeding	Yes, declining condition of forested stands helps create this species' habitat.	Yes
Hairy woodpecker	Young to old growth forest, prefers deciduous trees (including aspen and cottonwood) for nesting (Baicich and Harrison 1997, DeGraaf et al. 1991)	Yes, though habitat in decline	Yes
Downy woodpecker	Young to old growth forest, breeds in open woodlands, uses aspen and cottonwood for nesting	Yes, though habitat in decline	Yes
Lewis' woodpecker	Open, lower elevation forest with large snags, prefers ponderosa pine and cottonwood for nesting (DeGraaf et al. 1991)	No-habitat is marginal	No
Common flicker	Young to old growth forest, often near openings.	Yes, ample habitat	Yes
Red-naped sapsucker*	Young to mature forest, prefers mature aspen for nesting (Baicich and Harrison 1997)	Yes, though habitat in decline	Yes
Williamson's sapsucker	Breeds in pine and aspen in mature to old growth ponderosa pine/Douglas fir forest (Baicich and Harrison 1997)	Yes, though habitat in decline	Yes

* **yellow-bellied sapsucker** (*Sphyrapicus varius*) Found mainly east of the Rocky Mountains and in Canada. This species is not known to occur in Oregon. Formerly classified with **red-naped sapsucker** (*S. nuchalis*) and red-breasted sapsuckers as one species. The red-naped sapsucker occurs throughout much of eastern Oregon, including the Malheur National Forest. It will be substituted for the red-breasted and yellow-bellied sapsuckers as a Malheur National Forest MIS.
** Yes = Presence Confirmed, based on one or more sightings recorded in Wildobs database; No = Possible Limited Presence, based on limited habitat present and current range of species.

Featured Species

The Malheur National Forest Plan includes Standards for Featured Species, species of high public interest and demand. Featured species that occur within the project are blue grouse, pronghorn antelope, osprey, and sage grouse. Featured species are briefly discussed here. More information on these species is in the Wildlife Specialist's Report (Project Record).

- Winter roost habitat for blue grouse is present within the project area. District silviculturists state that there is abundant habitat within the Silvies Watershed.

- Habitat for pronghorn is located within sparsely timbered, or non-forest (shrublands, juniper woodlands, and meadows) lands on about 14,445 acres in the project area. Optimum habitat for this species in Oregon is found in open areas. Juniper encroachment is occurring within sagebrush-steppe habitats in the project area.

- Three osprey nest sites exist in the Silvies Canyon project area.

- Sage grouse are discussed above under PETS and in the Silvies Canyon Watershed Biological Evaluation/Assessment.

Raptor Nests

Active raptor nests are protected with period of use restrictions and harvest deferment. Over the last 10 years, 12 raptor nests have been found in the Silvies Watershed (Wildlife Specialist's Report, Project Record). Species known to nest in the project area are Cooper's hawk, red-tailed hawk, osprey, and prairie falcon. There are likely additional raptor nests located within the watershed. New nests may be identified during management activities and would be protected through development of site-specific mitigation measures as needed and appropriate.

Local Land Birds Including Neotropical Migratory Birds

Of the 225 migratory birds that are known to occur in the western hemisphere, about 82 are known to breed on the Malheur National Forest. Nesting generally begins in June in the Silvies Project Area for most migratory songbirds (R. Sutcliffe, Pers. Comm., 2003).

Informal surveys conducted for the Oregon Breeding Bird Atlas (Adamus et al. 2001) and informal walk-through surveys in the project area detected most common neotropical migratory bird species expected to occur on the Emigrant Creek Ranger District.

Trend information displayed in the Wildlife Specialist's Report (Project Record) is based on Breeding Bird Survey data for birds that occur in Oregon as interpreted by Mac et al. (1998) and Sharp (1996). Their data show that many forest-dwelling migratory bird species are in decline. From the Andelman and Stock (1993) research, research conducted by Sharp (1996), trend analysis by Mac et al. (1998), Partners in Flight (PIF) focal species recommendations (Altman 2000), the "Birds of Conservation Concern" in the Great Basin list (US Fish and Wildlife Service 2002), and internal Forest Service reviews, several local NTMBs that are expected to be present in the project area appear to show significant population declines and stand out as warranting attention during this project analysis. Table 3-18 lists these Neotropical Migrants of Concern present in the Silvies Canyon project area and the PIF habitat it represents or habitat elements the species requires. More information on these bird species can be found in the Wildlife Specialist's Report (Project Record).

Table 3-18. Neotropical migrants of concern considered in the Silvies Canyon Watershed Restoration Project analysis.

Bird Species	Habitat(s) required	Habitat available?
Swainson's thrush	Aspen/riparian	Yes, though aspen habitat is in decline.
Olive-sided flycatcher	Mesic (moist) mixed conifer, open forest, uneven-aged with snags	No, though this species may use habitat in the project area opportunistically.
Vaux's swift	Mesic mixed conifer, old growth forest, snags	No, though this species may use habitat in the project area opportunistically.
Chipping sparrow	Open understory ponderosa pine/Douglas fir with regenerating pine	Yes, though the high density of understory trees may be limiting the quality of habitat.
Williamson's sapsucker	Breeds in pine and aspen in mature to old growth ponderosa pine/Douglas fir forest (Baicich and Harrison 1997)	Yes, though aspen habitat is in decline.
Flammulated owl	Mature dry (ponderosa pine) forest	Yes, though quality and quantity of habitat is very limited.
Veery	Riparian woodlands (aspen/cottonwood), understory shrub layer	Yes, though aspen and cottonwood habitat is in decline.
Red-eyed vireo	Riparian woodlands (aspen/cottonwood), canopy foliage	Yes, though aspen and cottonwood habitat is in decline.
Loggerhead shrike	Nests in tall shrubs usually in very open stands/savannah	Yes, though nesting habitat would likely be limited to productive riparian sites and possibly to mountain mahogany stands
Brewer's sparrow	Open, shrub dominated habitats including sagebrush and pinyon-juniper	Yes, though juniper and other trees are encroaching on shrubs in many locations
Sage sparrow	Open sagebrush with scattered bushes	Yes, though juniper and other trees are encroaching on shrubs in many locations
Long-billed curlew	Dry prairie, grassy meadows	Yes though quantity of habitat is very limited

Dedicated and Replacement Old Growth

There are six Dedicated Old Growth areas (managed by Emigrant Creek Ranger District) and a portion of a 7th DOG (managed by Blue Mountain Ranger District) in the Silvies Canyon Watershed. Under the Forest Plan, DOGs 02011-012, 015-017 and 2039 were set aside primarily for the management of pileated woodpeckers. The project area is south of the southern boundary of the current distribution range for marten and the DOGs are not considered optimal or suitable marten habitat.

For this analysis, existing condition of the dedicated old growth areas will be discussed under habitat requirements for pileated woodpecker and marten and in the context of the Forest Plan and the 1992 interim old growth definition (USDA Forest Service 1993).

Data in DOGs were collected during an old growth validation inventory done in 1992 (USDA Forest Service, Malheur N.F. 1993; data on file under "Old Growth" at the Emigrant Creek RD). These data are determined to still be valid. Biologists reviewed the Forest's newest aerial photos (from 2001); no major occurrences, such as blow-down, bug-kill, or fires, have taken place, so habitat changes are expected to have been minimal between 1992 and 2001. Six attributes are used to define old growth using the 1992 (USDA Forest Service 1993) interim definitions:

- The minimally acceptable number of large trees/acre is being met for all DOGs except 02012.
- The minimally acceptable number of large snags/acre is being met for all DOGs.
- The minimally acceptable number of down log pieces/acre is being met for all DOGs.
- The typical range of percent canopy cover for shrub and herbaceous components is being exceeded in all DOGs.
- The typical range number of lower tree layers is being met in DOGs 02011, 02012, 02015, and 02016. Other DOGs have poorly developed second and/or third lower canopy layers.
- All DOGs exceed the highest number of contiguous acres needed to maintain ecological integrity of an old growth stand.

Table 3-19 displays information on DOGs managed by the Emigrant Creek R.D. within the project area. At this time, Forest Plan standards are being met in all but DOG 02012, 02015, and 02039. These DOGs do not have 2.39 snags over 21" dbh, but they do have enough snags to meet the 1992 interim old growth definition. DOG 02039 is slightly smaller than the Forest Plan standard of 300 acres.

Table 3-19. Description of DOGs.

DOG #	Total Acres	Habitat type	% OFMS*	Meets all Forest Plan Standards
02011	344	Warm dry mixed conifer	95%	Yes
02012	482	Warm dry mixed conifer	75%	No, lacks snags
02015	684	Warm dry mixed conifer	84%	No, lacks snags
02016	515	Warm dry mixed conifer	89%	Yes
02017	475	Warm dry mixed conifer	73%	Yes
02039	286	Warm dry mixed conifer	100%	No, DOG is 14 acres smaller than standard, and possibly lacks snags**

*old forest, multi-stratum (OFMS-see Vegetation Specialist's Report for descriptions of forest structures and plant association groups).
** High tree mortality in a 30-acre patch has likely provided more snags.

Replacement old growth and pileated woodpecker feeding areas have not been identified for these DOGs. Habitat adjacent to DOGs is available that may function as feeding habitat and replacement old growth.

DOG 01101 is located on the Blue Mountain Ranger District. A corresponding ROG area was designated in a previous Environmental Assessment. Much of this DOG lies outside the Silvies Canyon Watershed. There are no activities planned in or near this DOG, therefore, it will not be included in this analysis.

Two DOGs have been treated with prescribed fire. DOG 02016 was treated with a very low intensity prescribed burn in 2002. DOG 02017 was treated with a low intensity prescribed burn in 2000. These burns appear to have left components of old growth in conditions similar to 1992. Full descriptions of the DOGs can be found in the Wildlife Specialist's Report, Project Record.

Most of the project area, including old growth, is experiencing reduced stand vigor and increased tree mortality. This is primarily due to stand overstocking, a result of long-term fire exclusion and other management practices (Vegetation Specialist's Report). Old growth and other areas have high fuel loads and above-historic levels of ladder fuels (Fire Specialist Report).

These DOGS meet some of the pileated woodpecker management recommendations developed by Bull and Holthausen (1992), particularly in terms of vegetation types, size of core old growth, and canopy closures. However, these DOGS are not as large as pileated woodpecker home ranges described in Bull and Holthausen (1992) and do not provide down wood, and in most cases snags, at the suggested levels. Current research (Bull and Holthausen 1992) indicates that at least four large snags/acre are needed to provide nesting and feeding habitat for pileated woodpeckers.

Late and Old Structure (LOS), Connectivity, and Fragmentation

Late and Old Forest Structure (LOS) habitat is classified as Old Forest Multi-Stratum (OFMS) and Old Forest Single-Stratum (OFSS).

Under natural conditions, slope aspect, soil productivity, moisture, and fire create a mosaic of vegetation. Historically, the Silvies Canyon area was dominated (40-73% of area) by large blocks of mature pine and pine/Douglas-fir mixed with other seral stands and non-forest types in a broad mosaic pattern (see Vegetation, Chapter 3). High frequency, low-severity fires historically occurred in these dry Douglas-fir and ponderosa pine sites (Tiedermann et al. 2000).

Currently, about 14% of the project area is made up of stands classified as LOS. Almost all LOS (99.7%) is classified as OFMS and almost all (92.6%) is Warm Dry ponderosa pine (PIPO) or Mixed Conifer. The remaining LOS is classified as Hot Dry PIPO. The project area is not currently consistent with HRV (see "Stand Structural Stages – Historical Range Of Variability" on page 3-29).

The productivity of vegetation in the Silvies Project Area environment is limited by low moisture and a short growing season. Warm Dry LOS is capable of sustaining low to moderate canopy closure and can carry 9-17 large (20" dbh or larger) trees per acre depending on aspect. Hot Dry LOS generally has low site potential. It likely can sustain minimal canopy closure (≤29% canopy closure), and can support about 0-9 large trees per acre; slope aspect is typically southern (Vegetation Specialist Report).

Other structures that often provide some quality habitat for pileated woodpeckers, other old growth obligate species, and many canopy dependent species are currently available across portions of the project area. This is mainly made up of mid-aged strata stands (stem exclusion and young forest) with remnant old growth structures (few to several large remnant trees and snags).

Recent timber management and fire suppression have created a more monotypic condition, reduced structure and composition (Vegetation Specialist Report), and somewhat limited the distribution and amount of connective habitat between blocks of LOS found in Silvies Canyon Watershed (Wildlife Specialist Report, Project Record). Most of the LOS that occurs in the analysis area occurs in the Silvies-Myrtle Semi-Primitive Area and in DOGs; these areas are well connected to each other by similar stands forming large blocks of LOS (see Map #28 - Note that this map does not show the blocks of LOS which are connected to and provide connections among the corridors). This area is connected to adjoining subwatersheds with mid-seral aged stands that may provide wildlife movement corridors (Wildlife Specialist Report, Project Record).

Unique and Special Habitats

"Unique habitats" include features such as meadows, cliffs, animal dens, wallows, seeps and springs and are often created by geomorphic features. The project area contains minor areas of talus, rock cliffs and outcrops, and a shallow ice cave.

Special habitats such as riparian (bogs, seeps, and springs), dead and defective tree habitat (snags), dead and down woody material (logs), edge areas, aspen stands, meadows, animal dens, and wallows provide habitat diversity, contribute to the quality and quantity of habitat, and may be an integral part of a plant or animal's life cycle.

Riparian Habitat

There are numerous small seeps, springs, and various classes of streams in the project area. These special habitats are covered in more detail in the Fisheries and Hydrology section of this chapter. Riparian areas provide habitat for numerous wildlife species including spotted frogs, several woodpeckers, and a variety of migratory birds. The condition of this habitat as it relates to wildlife species is discussed in each species' subsection.

Aspen

Quaking aspen habitat supports one of the most diverse wildlife communities in the western United States, yet covers less than 1% of the landmass in the Blue Mountain and Great Basin physiographic provinces. It is one of the most important deciduous tree communities on the Malheur National Forest and is second only to riparian habitat in importance to wildlife. Aspen provides high quality forage, cover, resting, and breeding habitat or is a habitat element for over 50 species of mammals, 150 species of birds, and many amphibians, reptiles, insects and other invertebrates. Due to past management practices and the lack of natural disturbance most of the aspen in the Silvies Canyon Watershed has lost proper functioning condition and is at risk of disappearing from the landscape. The existing condition of aspen habitat is described in detail in the Vegetation Specialist's Report.

Dead and Defective Tree Habitat (Snags)

Snags are defined as completely or partially dead trees still standing and at least 20 feet tall (Thomas 1979). During the decay process of the tree, from recent dead and standing, to dead and lying rotten on the ground or in a stream, snags provide habitat for a wide variety of insects, reptiles, birds, mammals, fish, and plants.

The Regional Forester's Forest Plan Amendment #2 (May 1994) directed that all sale activities would maintain snags >21 inches dbh at 100% Potential Population Level (PPL) or 2.39 snags per acre. Subsequent to Amendment #2 direction, Johnson and O'Neil (2001) invalidated the biological potential models that had been used to determine consistency with Forest Plan standards; they provided no replacement methodology but mentioned a Forest Service tool (DecAID) that was being developed. Very recently DecAID (Mellen et al. 2003) was completed. DecAID is an internet-based computer program developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats. The tool synthesizes published literature, research data, wildlife databases, and expert judgment and experience.

DecAID presents information on wildlife use based on snag density and snag diameter. This information is presented at three statistical levels: low (30% tolerance level), moderate (50% tolerance level), and high (80% tolerance level). A tolerance level can also be defined as an "assurance of use" or the likelihood that individuals in a population of a selected species will use an area given a specified snag size and density. Snag density, size and distribution influence use levels and vary by individual species.

Data in DecAID suggest that snag and down log levels for some primary cavity excavators may need to be higher than the levels based on 100% PPL models. It should be noted that DecAID does not model biological potential or population viability. There is no direct relationship between tolerances, snag densities and sizes used in DecAID and snag densities and sizes that measure potential population levels (LRMP 2002, Thomas 1979).

Snag densities and sizes in the Silvies Canyon were compared against synthesized data in DecAID; data in the large ponderosa pine/Douglas-fir wildlife habitat type were used for comparison (Mellen et al. 2003).

Snag data have been collected in portions of the Silvies Canyon project area (Wildlife Specialist's Report, Project Record). Through a combination of walk-through evaluations, snag transects, and IDT knowledge of stand conditions, it is estimated that current snag densities are about one 15" dbh or larger hard snag per acre in forested stands throughout Silvies Canyon Watershed. This estimated level reflects an overall landscape level estimation; it is not intended to imply that every forested stand or every acre has this level of snags present. Soft snags are also present in most forest stands but were not quantified.

This level of snags does not meet the Forest Plan standard of 2.39 snags per acre over 21" dbh (100% PPL). According to DecAID (Mellen et al. 2003), the project area may be providing habitat at the 30-50% tolerance level for white-headed woodpecker. For white-headed woodpecker, 30% tolerance level equates to 1.1 snags/acre greater than 10" dbh (of which 0.5 snags/acre should be over 20" dbh), and 50% equals 4.0 snags/acre greater than 10" dbh (with 1.8 snags/acre over 20" dbh). The project area is well below the 50% tolerance level for snag density for pileated woodpecker; thus overall, the area may provide only degraded foraging habitat for pileated woodpeckers. DecAID suggests that existing snag sizes could be limiting use by bats and somewhat limiting use by flammulated owl, northern flicker, pileated woodpecker, white-headed woodpecker, and Williamson's sapsucker (Mellen et al. 2003).

While DecAID suggests higher snag densities are needed, data from 1918 compiled by Roy Schwenke (2003) suggest levels of 12" or larger dbh snags may have been closer to 1 to 1.8 per acre on Blue Mountain forests.

The "low" number and size of snags is due in part to low site-potential as well as past forestry practices such as:

- Past harvest practices, which left small diameter live trees (so no large trees were available to become snags),
- Pre-amendment projects which removed snags to the minimum forest standards (40 PPL), and
- Past and ongoing commercial and personal use fuelwood cutting.

Based on slow growth rates and historically low stocking of stands (both from natural conditions and past treatment), the Forest Plan standard for snags may not be attainable at the present time in the project area. In areas with smaller diameter (15" dbh) trees, it may take 30 to 80 or more years for trees to reach the 21" dbh size class. Until that time no 21" snags would be available.

Current patterns of snags and logs are highly variable across the watershed. This pattern is typically associated with environmental gradients, forest composition, successional stage and past forest management.

In 1992, DOG 016 and 017 were evaluated to determine existing dead and defective tree habitat availability. Stand exam data indicated that, prior to prescribed burning, snag densities were capable of supporting about 80-100 percent PPL.

Informal post-prescribed burn monitoring was done in DOG 017. Burning removed a number of snags from the stand but provided replacements at a rate equal to observed losses. While the type of snags removed may be different than the replacements (i.e. level of wood decay, presence of insects and fungus, and structural soundness) the overall snag density was maintained.

Dead and Down Woody Material

Dead and down wood of various stages of decay serves many important functions, one of which is habitat for wildlife. In the Blue Mountains, 179 species of vertebrates (five amphibians, nine reptiles, 116 birds and 49 mammals) make some use of logs (Thomas 1979). The number of invertebrates that use this habitat is not fully documented, but is considered significant. Logs are considered more important element to wildlife than other forms of woody debris. They are more stable and persist longer in the environment than other forms of dead and down woody material (Brown 1970, Wagener and Offord 1972).

Down wood data have been collected in portions of the Silvies Canyon project area (Wildlife Specialist's Report, Project record). Qualitative observations of down wood present in the project area indicate that fair to good numbers of logs are present in forested stands within the watershed. Through a combination of walk-through evaluations, down wood transects, and general knowledge of stand conditions, it is estimated that current down wood levels meet Forest Plan standards for most ponderosa pine sites (3-6 pieces per acre) but may be deficient in mixed conifer stands (15-20 pieces per acre) in Silvies Canyon Watershed. Estimated levels reflect the overall landscape and are not intended to imply that every forested stand or every acre has this level of down wood present.

DecAID (Mellen et al. 2003) provides some information for down logs. The Forest Plan standard (10" diameter at the small end, and at least 12' in length) lies between the 50% and 80% tolerance level for ants and woodpeckers. DecAID does not provide wildlife tolerances for down log densities. It does summarize inventory information across eastern Oregon and Washington; information is presented as percent cover of down logs rather than log length. As with snag densities, DecAID suggests that the Forest Plan standard for down logs is low.

Ongoing tree mortality should increase dead and down woody material densities in many stands. Small diameter woody debris is abundant in most stands, as both old activity slash and from natural accumulations.

Current patterns of down wood are highly variable across the watershed. This pattern is typically associated with environmental gradients, forest composition, successional stage and past forest management.

Other Habitats
Elk wallows, animal dens, and other unique or special habitats are present in the project area and when identified during management activities, will be protected through the development of site-specific mitigation measures as needed.

Recreation

The Silvies Canyon watershed, a high use area in the southern end of the Malheur National Forest, is a destination area for numerous recreation activities. This is due to:

- Its close proximity to Burns, Oregon;
- An extensive and relatively accessible transportation system,
- Presence of rivers, streams, canyons, and other diverse scenery,
- The size of the watershed, which accommodates those seeking a recreation experience with solitude,
- Presence of the Myrtle-Silvies Roadless area.

Roadless Areas
The Myrtle-Silvies Roadless Area offers a setting for individuals seeking a recreation experience with solitude. Big-game hunting, fishing and hiking are currently the primary recreational uses of the area. Other minor uses include Silvies river rafting or canoeing during the spring high water periods, picnicking, camping, horseback riding, recreational gold panning, photography, and nature study. All recreational use within the Myrtle-Silvies Roadless Area is believed to be light. The Myrtle-Silvies Roadless Area is currently being managed with no scheduled timber harvest and no additional roads and has a manageable boundary of 11,776 acres. For more information about this area refer to the section titled "Myrtle-Silvies Roadless Area."

The Myrtle-Silvies Roadless Area represents approximately 4.3% of the 270,200 acres of roadless, semi-primitive and primitive recreation opportunities existing on the Malheur National Forest, including other areas on the Emigrant Creek Ranger District. Additionally, nearly one million acres of roadless primitive and semi-primitive recreation opportunities exist on the Burns BLM District located south of the analysis area. Additional roadless recreation opportunities exist on other public lands within Grant County. These lands include designated Wilderness Areas, Wilderness Study Area, Wild and Scenic Rivers, or other designated areas.

Recreational Uses
Information of regional trends in the Columbia River Basin indicates that hunting, day use, motor viewing and fishing are primary uses of the area (Haynes and Horne, 1997). Residents of Oregon, Idaho, and Washington primarily seek these recreational opportunities. Because there are few developed recreation facilities within the watershed, recreational use consists primarily of dispersed activities of viewing scenery or wildlife, camping, hiking, fishing and hunting. Other activities such as snowmobiling, cross-country skiing, OHV use, horseback riding, and horn hunting are also popular pursuits. Although not commonly considered recreation activities elsewhere, many local people use firewood gathering and Christmas tree cutting as a low cost family outing. Driving for pleasure to look at scenery and wildlife, and picnicking are also popular low-cost activities practiced in the watershed. The area is currently, as well as historically, an

important source for the Burns Paiute tribe to gather native plant materials for medicine, food, traditional crafts, and art, and for ceremonial purposes. Culturally important plant materials gathered include grasses, bitterroot, wild onion, biscuit root, sagebrush, rabbit brush, chokecherry, willow, dogwood, dogbane, juniper, and camas. Regardless of the type of recreational use, access is key to how outdoor recreation resources are used. Recreation places easily accessed by vehicle have higher visitation rates than those located in remote, roadless areas.

Recreation Opportunity Spectrum (ROS)

The Forest Service developed the Recreation Opportunity Spectrum (ROS) system to help identify, quantify, and describe the variety of recreational settings available in National Forests. The ROS system provides a framework for planning and managing recreation resources. The ROS settings are classified on a scale ranging from primitive to urban. Seven elements are used to determine where the setting belongs on the scale:

1. **Visual Quality -** the degree of apparent modification of the natural landscape.
2. **Access -** the mode by which activities are pursued and how well users can travel to or within the setting.
3. **Remoteness -** the extent to which individuals perceive themselves removed from the sight and sounds of human activity.
4. **Visitor Management -** the degree and appropriateness of how visitor actions are managed and serviced.
5. **On-Site Recreation Development -** the degree and appropriateness of recreation facilities provided within the setting.
6. **Social Encounters -** the degree of solitude or social opportunities provided.
7. **Visitor Impacts -** the degree of impact on both the attributes of the setting and other visitors within the setting.

Based on these seven elements the Forest Service assigns one of six ROS settings to National Forest lands. The project area is managed as semi-primitive non-motorized, roaded natural, roaded modified and semi-primitive motorized as stated in the Forest Plan. Recreation opportunities are divided between the motorized (53,676 acres) and non-motorized (9,882 acres) categories. The 53,676 acres of motorized recreation within the analysis area is approximately 4.4% of the 1,197,300 acres available on the Malheur National Forest, including areas elsewhere on the Emigrant Creek Ranger district. Additional roaded recreation opportunities of several million acres exist on other public lands in the area.

- **Roaded Modified –** a natural environment that has been substantially modified by development of structures and vegetative manipulation characterizes. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. There are 27,065 acres of roaded modified within the project area.
- **Roaded Natural –** A predominantly natural-appearing environment with moderate evidence of the sights and sounds of humans. 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. There are 26,575 acres of roaded natural within the project area.

- **Semi-primitive Motorized –** A predominately 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 onsite 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 motorbikes are permitted. There are 36 acres of semi-primitive motorized within the project area.
- **Semi-primitive Non-Motorized -** A predominately natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite 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. There are 9,882 acres of semi-primitive non-motorized within the project area.

The 1990 Forest Plan sets specific recreation standards for Management Areas. They are as follows:

- **MA 1** - Manage dispersed recreation for roaded modified conditions
- **MA 2** - Manage for dispersed recreation ranging from semi-primitive to roaded modified
- **MA 3A** – Manage for recreation ranging from semi-primitive to roaded modified, depending on the ROS objectives of the adjacent lands
- **MA 4A** – Same as MA 3A
- **MA 5** – Manage for roaded natural
- **MA 10** – Manage dispersed recreation for goals of semi-primitive non-motorized recreation.
- **MA 13** – Provide dispersed recreation setting consistent with adjacent lands
- **MA 14** – Manage for roaded natural recreation.

The ROS setting of a Recreation place largely determines its attractiveness and utility. Many recreation opportunities, such as viewing scenery, require a natural ROS setting; other activities, such as hunting, may not directly depend on the setting. The type of activities that occur in recreation places within the project area can be grouped into two general categories based on the physical setting required for the activity.

- **Land-based Recreation -** Land-based recreation activities occur widely, but are more prevalent in easily accessed areas. The most popular activities are hunting, dispersed camping, viewing scenery, hiking, driving for pleasure, and winter activities. The principle attributes of these places are good access, remoteness from communities and developed sites, parking availability for recreational vehicles, scenery for viewing, seldom used roads to explore, and freedom to choose activities. The vastness of the undeveloped area creates the perception of a natural and remote area.

- **Freshwater-based Recreation -** The Silvies River and its tributaries provide numerous recreational opportunities, including fishing, hunting and camping. The most popular freshwater related recreation places are those that provide opportunities for getting away (solitude), enjoying natural and scenic settings, hunting, and fishing. Other minor uses include Silvies River rafting or canoeing during the spring high water periods.

Dispersed Campsites

Dispersed campsite located within an RHCA

There are 37 known dispersed campsites identified and mapped within the watershed. Other dispersed campsites probably exist within the watershed, but are currently unmapped. Dispersed campsites are easily accessed by roads and can be identified by the presence of rock campfire rings, and/or poles for hanging harvested big game. While many dispersed campsites are associated with hunting camps, about six are also associated with the Silvies River and recreational use in the Myrtle-Silvies Roadless Area. Of the 37 mapped recreation places, eight are located within Riparian Habitat Conservation Areas (RHCAs).

Table 3-20. Dispersed Campsites by Subwatershed and RHCAs.

Subwatershed	Dispersed Campsites	Dispersed Campsites within RHCA
Boulder Creek/Fawn Creek	4	2
Sage Hen creek	7	3
Burnt Mountain	9	2
Stancliffe	1	0
Red Hill	0	0
Myrtle Creek	4	0
Myrtle Park	12	1
Total	**37**	**8**

Trails

Ten and one-half miles of developed trail exist within the analysis area, which is 4.2% of the 258 miles of designated trails on the Malheur National Forest; additional trails exist on other public lands in the area. Trails are the only developed recreation facilities within the analysis area. These trails are within the Myrtle-Silvies Roadless Area and are designed for horse, mountain bike, and hiking use.

This trail system receives moderate use, especially on weekends and during mild weather. In recent years, increasing ORV use on some of these trails (not designated or designed for motorized travel) has resulted in user conflicts and resource damage within the roadless area. Roads closed to motorized vehicles also provide trail opportunities for hiking, horse use, mountain biking, cross country skiing, snowmobiles, and other similar uses.

Myrtle Creek Trail #308

The trailhead is located at the end of Forest Road 3100226 and the ends at the Forest Service Boundary. This trail travels along Myrtle Creek for 8.6 miles. Myrtle Creek provides good small stream fishing and wildlife viewing.

West Myrtle Creek Trail #314

The trail begins at the end of Forest Road 3100440 and ends at Myrtle Creek Trail # 308. This trail descends into Myrtle Creek drainage and dissects Myrtle Creek Trail. This trail provides good scenic viewing as the trail descends into the canyon.

Hunting and Fishing

Hunting season typically draws large numbers of people into the area. Both resident and non-resident hunters use the project area extensively from September to late November during big game hunting seasons. The area is well known as a place to find large mule deer and elk.

The Silvies River and its tributaries are recreationally fished for both warm and cool water fish species. The Silvies River is a natural cool water fishery; warm water fish species have been introduced.

Cultural Resources

The Emigrant Creek Ranger District lies at the northwestern edge of the Great Basin. The majority of its streams drain to the south into Malheur and Harney Lakes, an example of the internal drainage that gives the Great Basin its name. Culturally, the district is also tied mainly to the Great Basin, since most of the indigenous people who utilized these forested uplands and scabflats as a hunting and gathering area centered in the Harney Basin, wintering around Malheur Lake.

Current Condition

Archaeological surveys have been conducted in the Silvies Canyon area since 1978, including surveys completed in 1993, 1998, 1999, and 2003, that were specific to this project. These efforts have resulted in the intensive survey of over 50,000 acres, and the discovery and recording of 255 heritage sites, of which 190 are prehistoric, 39 are historic, and 26 contain both prehistoric and historic components. Many of these sites are considered eligible for inclusion on the National Register of Historic Places, some are considered ineligible, while the eligibility of still others remains undetermined, awaiting further investigation. Table 3-21 lists the eligibility status by site type.

Table 3-21. Eligibility Determination by Site Type.

Site Type	Eligible	Non-Eligible	Undetermined
Prehistoric	172	1	17
Historic	0	13	26
Prehistoric/Historic	4	0	22

Silvies Canyon Project Area as a Part of the Malheur Reservation

Archaeological evidence, earlier ethnographic work, and historic accounts support the information passed on by elders regarding the traditional and continuing importance of this area to the Burns Paiute Tribe. Approximately 20% of the Silvies Canyon Project area lies within the boundaries of the original Malheur

Reservation, which continued north to the summit of the Strawberry Mountain, and east to Monument Rock. The lands included within the Silvies Canyon Project area, the health of the vegetation, wildlife, water, geology, and soils, are integral to the lifeways of members of the Burns Paiute Tribe. Tribal members use these lands for traditional religious ceremonies, hunting, fishing, and the gathering of plants for subsistence, medicinal, utility crafting, artistic, and ceremonial purposes. Today, with the general public taking considerable interest in traditional indigenous lifeways, craftwork can offer commercial opportunities as well. Though members of the Burns Paiute Tribe have become members of the greater Burns and Harney County communities, they have also kept alive traditional lifeways, and continue to pass on knowledge, beliefs and practices to younger generations. Traditional Northern Paiute territory, including the Silvies Canyon Project area, hosted Paiute people long before the coming of Europeans to the region. Many generations were born, lived, and died here, and the importance of this land has to the Paiute people living today cannot be overly stressed.

Burns Paiute tribal members have a vested interest in resources such as dogbane, sagebrush, rabbit brush, dogwood, juniper, bitterroot, biscuit root, chokecherry, willow, quaking aspen, camas, mountain mahogany, cattail, and bitter brush. Other issues considered important to the Burns Paiute Tribe are the potential denial of motorized access to important plant species through road closures, since many elders are not capable of long walks to procure needed plants, and the application of chemicals to noxious weeds in areas that might also contain plants used by tribal members (Jerofke, 2001).

Scenery Management

Introduction

The Scenery Management System (SMS) has replaced the Visual Management System (VMS). Terminology has changed regarding Visual Quality Objectives (VQOs); they are now considered Scenic Integrity Objectives (SIOs). The Scenic Integrity Objectives reflect the goal for the area, while a Scenic Integrity Level indicates the integrity level being met at any one point in time. Table 3-22 shows the transition from the old to the new terms.

Table 3-22. Old and New Scenery Management Terms.

VMS (VQOs)	SMS (SIOs)
Preservation	Very High
Retention	High
Partial Retention	Moderate
Modification	Low
Maximum Modification	Very Low

Viewshed Corridors

Portions of the watershed within Management Area 14 (Viewshed Corridors) encompass those middleground areas that are seen, or potentially seen, from Highway 395, a Sensitivity Level 1 corridor. The management goal for Management Area 14 is to manage corridor viewsheds with primary consideration given to their scenic quality and the growth of large diameter trees. Current Forest Plan direction for the portions of the watershed within MA 14 is to manage middlegrounds as slightly altered (partial retention visual quality objective) in Sensitivity Level 1 corridors. Under the new Scenery Management System, manage to a moderate scenic integrity objective in the middleground.

Distant views of the Silvies Canyon watershed from Highway 395 provide a slightly altered visual condition. Management activities may be evident, but subordinate to the characteristic landscape (FSM 2382.21(3)).

Existing Conditions

Distant views of the Silvies Canyon watershed from Highway 395 provide a slightly altered visual condition. The visual objective of managing to a moderate scenic integrity objective in the middleground has been met. Therefore, existing conditions within Management Area 14 meet 1990 Forest Plan standards.

Chapter 4 Environmental Consequences

Introduction

Chapter 4 provides the scientific and analytic basis for the comparison of alternatives presented in Chapter 2. It describes the probable consequences (impacts, effects) of each alternative on the physical, biological, social, and economic environments. Significant or potentially significant environmental consequences to each resource are disclosed, including the direct, indirect, and cumulative effects, both beneficial and detrimental. Combinations of effects occurring over time can produce cumulative effects. Effects are quantified where possible, although qualitative discussions are often necessary.

Environmental consequences are the effects of implementing an alternative on the physical, biological, social, and economic environment. ***Direct effects*** are defined as those occurring at the same time and place as the initial cause or action. ***Indirect effects*** are those that occur later in time or are spatially removed from activity but would be significant in the foreseeable future. ***Cumulative effects*** result from the incremental effects of actions when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertaking such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Unavoidable adverse effects are potential adverse environmental effects that cannot be avoided. They may result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced or mitigated by limiting the extent or duration of effects. Mitigation measures within standards and guidelines are specified for project activities to be implemented under the alternatives. These are discussed in detail in Chapter 2.

Short-term effects are those that occur annually or within 5 years. Long-term productivity refers to the capability of the land and resources to continue producing goods and services for 5 years and beyond.

Irreversible commitments are decisions affecting non-renewable resource such as soils, minerals, plant and animal species, and cultural resources. Such commitments of resources are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or the resource has been destroyed or removed. The gradual decline in old growth habitat or significant loss of soil productivity would be considered irreversible commitments.

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. These decisions are reversible, but the production opportunities foregone are irretrievable. For example, the use of land for a roadbed precludes its use for growing trees, at least for the time the land is used as a road.

Irreversible and irretrievable commitments resulting from this project are discussed in more detail in the Other Environmental Considerations section at the end of this chapter.

Benchmark Dates and Implementation Schedule

Benchmark dates of Years One (initiation of project implementation), Five, Ten, Fifteen (all project activities would be completed), and Thirty (when it is estimated that maintenance treatments would need to be initiated) are presented to display the implementation schedule. Implementation schedules are needed to sufficiently display the effects of proposed activities. The following discussions on environmental consequences focus on the direct, indirect and cumulative effects of the proposed activities in conjunction with ongoing and recently finalized projects, programs and uses in the Silvies Canyon Watershed.

Year One

During the first year of implementation, commercial harvesting would begin in Burnt (960 acres), Curry 1 (920 acres) and Curry 2 (2,500 acres) areas in all action alternatives except Alternatives Three and Six.

Year Five

For all action alternatives except Alternatives Three and Six, by year five, Burnt, Curry 1 and Curry 2 timber sales would be completed. Commercial harvesting would also be completed on Curry 3 (1,135 acres), which would have been offered in year two. Commercial harvesting would also be completed or near completion on Curry 4 (1,600 acres), Dry (2,300 acres) and Mud (2,800 acres) timber sales, which would have been offered in year four. Commercial harvesting would be beginning on some miscellaneous small sales (about 2000 acres) scattered throughout the project area. Post and pole sales would be ongoing depending on demand for these products.

Aspen restoration would have begun in aspen stands that are in or near areas harvested in Burnt, Curry 1, Curry 2 and Curry 3 timber sales. Precommercial thinning and fencing of aspen stands would occur the same year stands are harvested. Aspen stands that have no commercial harvest would have precommercial thinning and fencing completed by fuel block. The order of priority would be Fuel Block 7, then 9, 5, 6, 3, 8, 11 and 12.

By year five, precommercial thinning and fencing of the cottonwood stand on Sage Hen Creek would be completed in conjunction with the adjacent aspen stand.

In stands where precommercial thinning is the primary treatment, implementation of precommercial thinning and burning of piles would be ongoing in Fuel Blocks 7, 9, 5, 6, 3, 8, 11 and 12.

Implementation of precommercial thinning and pile burning would have also begun in Burnt, Curry 1, Curry 2 and Curry 3 areas.

For all action alternatives except Alternative Seven-A, by year five, precommercial thinning and burning of hand piles would be implemented in the potential eagle roost stands in Myrtle Creek.

Precommercial thinning of springs would be implemented in Fuel Blocks 7, 9, 5, 6, 3, 8, 11 and 12 and in conjunction with precommercial thinning stands whenever practical. Fencing and developing springs would occur after precommercial thinning.

Juniper reduction would be implemented in Fuel Blocks 7, 9, 5, 6, 3, 8, 11 and 12 and in conjunction with precommercial thinning stands whenever practical.

Roads would be decommissioned, closed, maintained or reconstructed at various times during the implementation phase of the project, depending on the alternative selected and the timing of the timber harvest, prescribed burning and post and pole activities in those areas. Roads used for harvest activities and identified for reconstruction or maintenance in Burnt, Curry 1, Curry 2, Curry 3, Curry 4, Dry and Mud timber sales units would be treated. Roads identified for decommissioning and used for timber harvest or prescribed fire activities would not be completed. Roads identified for treatment that are not associated with project activities would be treated. Of the twelve roads identified as contributing sediment to streams, three of them (Forest roads 3100035, 3130129 and 3700379) would be treated.

When all vegetation activities are completed, prescribed burning would have begun in fuel blocks seven, nine and eleven.

Year Ten

By year ten, all commercial harvesting would be completed. All precommercial thinning in harvest areas would also be completed. Precommercial thinning, aspen and spring restoration and juniper reduction in non harvest areas would all be completed except in fuel blocks two and three where those activities would still be ongoing.

Prescribed burning would be completed in all Fuel Blocks except 4. Fuel Blocks 4 and 1 would still have implementation activities occurring. Fuel Blocks 2 and 3 would be scheduled for implementation in years 11 and 12, respectively.

Road closures and decommissioning associated with timber harvest units would be implemented on all sale areas. Roads identified for decommissioning and used for prescribed fire activities would not be completed in Fuel Blocks 4, 1, 2 and 3. Of the twelve roads identified as contributing sediment to streams, the remaining nine (Forest roads 3100286, 3100860, 3100864, 3125244, 3125912, 3700117, 3700167, 3700275, 3700294) would be treated.

Year Fifteen

By year fifteen all activities proposed in this EIS would have been implemented.

Year Thirty

By year thirty, maintenance treatments would begin.

Environmental Consequences by Resource (Issue)

The Environmental Consequences are described by resource (issue). All affected resources are analyzed; however, the analysis focuses more detailed discussions on resources linked to the significant issues identified in Chapter 1. Complete details of environmental effects can be found in specialists' reports, located in the Silvies Canyon Watershed Restoration Project Planning Record, Burns Ranger District, Malheur National Forest. Environmental consequences will be discussed in the following sequence:

The environmental consequences of each alternative are described by resource (effects of Alternative X on resource Y). For brevity, alternatives are grouped by similar activities whenever possible. Alternative One, the No Action alternative, provides a baseline against which effects of the action alternatives could be measured and compared. Alternatives Two, Four, and Five, Seven and Seven-A, the restoration with commercial harvest alternatives, are similar in terms of proposed activities but differ in their magnitude. Correspondingly, Alternatives Three and Six, the restoration without commercial harvest alternatives, are similar in terms of proposed activities but differ in their magnitude. The effects discussion focuses on two parts, the effects of proposed activities and their magnitude.

Effects on Access and Travel Management (Issue 1)

This section describes the effects on access and travel management from activities proposed in each alternative. Road closure, decommissioning, maintenance, reconstruction, and temporary construction are the proposed activities that would potentially affect access and travel management. These activities can affect wildlife habitat, water quality and fish habitat. For more information on effects to wildlife habitat, water quality and fish habitat, see the sections titled Effects on Watershed/Fish Habitat (Issue 3), Effects on Big Game and Big Game Habitat (Issue 5), Effects on Management Indicator Species and Effects on Proposed, Endangered, Threatened and Sensitive species. Each alternative proposes varying amounts of road closure, decommissioning, maintenance, reconstruction, and temporary construction activities. The effects of each alternative are similar in terms of proposed activities but vary in the magnitude of disturbance.

Direct and Indirect Effects Common To All Action Alternatives

All action alternatives include varying amounts of planned road closures, which were designed to maintain an adequate transportation system for forest management, including wildfire suppression. Access to identified dispersed camping sites was generally not closed off unless there were identified problems with the road such as sedimentation. The distance between open roads is generally not more than one mile.

The majority of roads proposed for closure, seasonal closure, or decommissioning are currently classified at Maintenance Level (ML) 2, which provides access for high clearance vehicles. Passenger car traffic is not encouraged. Traffic on ML 2 roads is normally minimal, usually consisting of one or a combination of administrative, dispersed recreation, or other specialized uses, including commercial activities.

With increasing budget constraints, the agency cannot adequately maintain the majority of road miles at their designed maintenance level. Failure to maintain these roads may impair water quality by eroding and/or contributing sedimentation to streams. Closure of these roads would reduce animal disturbance, improve water quality, and reduce maintenance costs.

When roads are closed, they are assigned a ML 1 status. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to minimally perpetuate the road to facilitate future management activities. Emphasis is given to assuring drainage structures suitable for the runoff pattern are in place and functional prior to closure. These closed roads are inspected annually for two or three years to assure the drainage facilities are adequate and self-maintaining. Planned road deterioration, such as increased vegetation growth and bank slough to natural slope repose may occur at this level. While these roads are closed to motorized vehicles, they remain open and suitable for non-motorized travel.

Decommissioned roads are permanently closed and no longer maintained. Soil compaction may be reduced where feasible, and cut or fill slopes may be returned to natural contours.

Manufactured drainage structures (culverts) and cattle guards are removed. Where appropriate, bank cuts or ditches created by the removal of these structures may be contoured to provide a natural drainage and prevent erosion.

Permanent road closures and decommissioning could hamper initial attack of fires by increasing the response time, which can increase size of fires, cost of suppression, and the risk of having a large stand replacement fire. Seasonal closures would also affect fire suppression efficiency, but not to the same extent; severe fires typically occur during months (July – September) when these roads would be open. There is a helitack crew based in Burns, Oregon; this proximity allows for a quick response time for initial attack of fires and is not affected by road closures.

Roads that are seasonally closed are still classified as ML 2. Seasonal road closures exclude access usually during the wet season to protect the road and adjacent resources. During seasonal closures many roads could become blocked by deadfall

Road maintenance activities are proposed to correct erosion problems associated with roads used for commercial harvesting. Direct beneficial effects from this proposed activity would be improved road conditions. Removing and replacing culverts would have a negative impact on access for less than ½ day per installation. Blading road surfaces and cleaning ditches would have no negative impact on access, as roads remain open during these activities.

Figure 4-1 shows the road treatment comparisons between alternatives.

Cumulative Effects Common to All Alternatives

There are 63 miles of roads identified for closure under prior environmental documents. The decision to close these roads has been made. One hundred seventy-four roads were 1) previously identified as closed; 2) identified for closure under past environmental documents; 3) historic closures; or 4) breached closures. These roads would be treated according to the descriptions in the preceding paragraphs and closed, which would reduce the miles of open roads in the watershed to 83% of current levels.

Direct, Indirect and Cumulative Effects from Alternative One – No Action

Under the No Action Alternative, all existing roads would remain open, except for the 63 miles of roads identified and analyzed in prior environmental documents. This alternative does not allow opportunity to close or decommission any additional roads within the project area. The 33 miles of roads with riparian habitat conservation areas would continue to be chronic sediment sources and degrade water quality and fish habitat within the watershed. The agency would continue to expend limited funds for maintenance of unneeded roads.

This alternative would have the least impact on access. The road density within the watershed would remain above Forest Plan standards. Administrative use, access for fire suppression and public access would not change, and hiding cover for big game, water quality, and sedimentation would not improve over the slight changes and improvements due to road closures under previous decisions.

Direct and Indirect Effects from Alternative Two

Two hundred and sixteen roads, totaling 78 miles would be permanently closed with an earthen berm, sign, or gate; 85 roads totaling 62 miles would be seasonally closed with signs; five roads totaling three miles would be decommissioned; for a total of 306 roads and 143 miles. Road closures would reduce the miles of open roads in the watershed to 45% of current levels. This alternative also proposes 164 miles of maintenance and 3.5 miles of temporary road construction.

Road closures would reduce motorized vehicle access for gathering forest products such as edible plants, posts, poles, and firewood. In addition, seasonally closed roads that are not available for motorized vehicle travel during the hunting season would require use of non-motorized forms of travel. For some hunters, this provides solitude and a more enjoyable hunting experience. For others, it means they would not be able to access certain areas.

Seasonal closures (November 15 – May 31, annually) would eliminate motorized vehicle use from the late elk hunting seasons through the spring period when the ground is wet and road surfaces are more highly saturated. This would also reduce spring access for horn hunters, mushroom pickers, recreationists, and others.

Thirty-nine miles of seasonal and permanent closures proposed for the Forest Road 3125 system would affect access into the Burnt Mountain area. Closure of four spur roads would permanently close four miles to motorized vehicle traffic and eliminate access into a large area. Twenty-four miles of seasonal and permanent closures proposed for the Forest Road 3746 system would affect access into the Squaw Flat area.

One hundred sixty-four miles of road maintenance activities are proposed for this alternative. The 3.5 miles of temporary road construction would be utilized during harvest operations and scarified, seeded (if needed), and permanently closed at the conclusion of harvest operations.

Direct and Indirect Effect from Alternatives Three and Four

Two hundred eighty-three roads totaling 110 miles would be permanently closed with an earth berm, sign, or gate; 27 roads totaling 25 miles would be seasonally closed with signs; and 35 roads totaling 25 miles would be decommissioned; for a total of 345 roads totaling 160 miles. Road closures would reduce the miles of open roads in the watershed to 41% of current levels.

All or portions of Forest Roads 3100195, 3100860, and 3700861 are proposed for either permanent closure or decommissioning under these alternatives. Approximately six miles of road access would be eliminated by these closures.

Alternative Three has no proposed miles for maintenance or temporary construction.

Under Alternative Four, one hundred ninety-two miles of road maintenance activities are proposed. The 3.5 miles of proposed temporary road construction would be utilized during harvest operations and scarified and seeded (if needed), and permanently closed at the conclusion of harvest operations.

Direct and Indirect Effects from Alternative Five

One hundred five roads totaling 23 miles would be permanently closed with an earth berm, sign or gate; 4 roads totaling 4 miles would be seasonally closed with signs; and 16 roads totaling 9 miles would be decommissioned; for a total of 125 roads and 37 miles. Road closures would reduce the miles of open roads in the watershed to 74% of current levels.

This alternative proposes 163 miles of road maintenance and 2.8 miles of temporary road construction. The temporary road construction would be utilized during harvest operations and scarified and seeded (if needed), and permanently closed at the conclusion of harvest operations.

Direct and Indirect Effects from Alternatives Six, Seven (the Preferred Alternative), and Seven-A

Two hundred twenty-four roads totaling 70 miles would be permanently closed with an earth berm, sign, or gate; 7 roads totaling 10 miles would be seasonally closed with signs; and 16 roads totaling 7 miles would be decommissioned; for a total of 247 roads totaling 87 miles. Road closures would reduce the miles of open roads in the watershed to 61% of current levels. Ten miles of road maintenance are proposed on five of the twelve roads identified as "problem roads" contributing sediment directly to streams and to the degradation of stream habitat conditions.

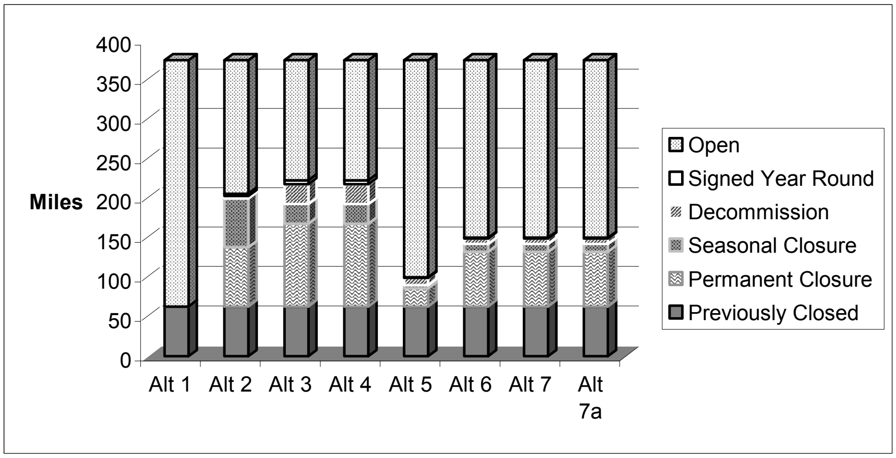
One hundred ninety-two miles of road maintenance activities and 3.5 miles of temporary road construction are proposed for Alternative Seven and Seven-A. Temporary road construction would be utilized during harvest operations and scarified and seeded (if needed), and permanently closed at the conclusion of harvest operations.

The Preferred Alternative also proposes to decommission about 4 miles of Forest Road 3100035. This is the portion of the 3100035 road that was closed under the Forest Plan, breached, and closed again in 2001. Currently this road is closed to motorized access. However the mere presence of the road encourages motorized vehicles to ford the Silvies River and travel into the Myrtle-Silvies Roadless Area. Additionally, the southwest portion of the road accesses the Myrtle-Silvies Roadless Area from private property. This alternative would decommission about 2 miles on both ends of the 3100035 road to discourage motorized vehicles from entering the Myrtle-Silvies Roadless Area.

Cumulative Effects from All Action Alternatives

The cumulative effects of these alternatives combined with the road closures approved in previous decisions and road closures that are likely in the future would be a reduction in sedimentation, fewer roads to maintain, less money spent on maintenance, reduced access for all motorized users, increased response time for fire crews, and less disturbance to wildlife.

Figure 4-1. Road Treatment Comparison.



(Also see Chapter 2, Table 2-20 for Issue Comparison)

Consistency with Direction and Regulations

Forest Plan

All action alternatives would be consistent with applicable Forest Plan road standards (standards 156-164, FP IV-42), including Forest Plan road densities standards. All action alternatives meet the 1999 Forest road density standards (as monitored on a watershed basis); Alternatives Three and Four are best at moving the watershed towards the desired future condition road densities as described in the Record of Decision for the Forest Plan (page 23). The No Action alternative does not meet Forest Plan road densities standards (as monitored on a watershed basis).

Roads Analysis

A Roads Analysis for this project was prepared in accordance to policy published in the Federal Register on March 3, 2000 (65 FR 43) and Forest Service Manual (FSM) 7700, specifically section 7712; as well as recommendations published in Miscellaneous Report FS-643, *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System* (August 1999).

Effects on Roadless Areas (Issue 2)

This section discloses the effects on the Myrtle-Silvies Roadless Area from activities proposed by each alternative. Road closures and decommissions, landscape scale prescribed burning, precommercial thinning and associated fuels treatments, and riparian (spring) habitat restoration are the proposed activities within the roadless area that would potentially affect it; similar activities as well as other vegetation management have been proposed outside the roadless area but close enough to affect it. Affects to recreational aspects of the roadless area are disclosed in the section titled "Effects on Recreation."

Proposed activities under all alternatives within the Myrtle-Silvies Roadless Area are consistent with the National Roadless Area Conservation Policy. No new road construction or reconstruction is proposed within the existing Myrtle-Silvies Roadless Area. No commercial harvest treatments are proposed within the existing Myrtle-Silvies Roadless Area. Besides the

Roadless Area, there are no contiguous 1000-acre or greater blocks of unroaded area within the Project Area.

Direct, Indirect and Cumulative Effects From All Alternatives

A proposal by the Oregon Natural Resources Council (ONRC) and a coalition of 130 environmental groups would designate as wilderness the Myrtle-Silvies Roadless Area as well as adjacent areas the coalition refers to as "uninventoried roadless" which total about 15,097 acres. See their website at http://www.oregonwild.org.

Recommendations for wilderness designation by the agency are done as part of the forest plan revision process (see 36 CFR 219.17). The Malheur National Forest will start the revision process in fiscal year 2004. In the interim, activities proposed within the Silvies Canyon Watershed Restoration Project are consistent with the direction for Roadless Area Protection published in the *Federal Register* on January 12, 2001 (66 FR 3244). Specifically, this project does not propose road construction or reconstruction in unroaded portions of roadless areas. Additionally, this project does not propose commercial cutting, sale or removal of timber in roadless areas.

Implementation of activities proposed in the FEIS within the Myrtle-Silvies Roadless Area would not preclude the area's future ability to be designated wilderness. Specifically, proposed road closures (seasonal and year-long closures) and road decommissions meet and enhance roadless characteristics by closing or decommissioning unneeded roads within roadless areas.

Proposed landscape scale prescribed burning on 5,526 acres within roadless areas would enhance roadless characteristics by reducing the risk of uncharacteristic wildfire effects through restoration of ecosystem composition and structure.

Proposed precommercial thinning and associated fuels treatment (hand piling and burning) within roadless areas meets the exceptions for cutting of generally small diameter trees which maintains or improves roadless characteristics. Proposed precommercial thinning of small diameter trees, (less than 9" dbh) and hand piling and burning slash on 729 acres of potential bald eagle winter roost areas would improve habitat for the bald eagle, a threatened species, and move towards restoring ecosystem composition and structure, thus reducing the risk of uncharacteristic wildfire effects.

Proposed riparian habitat (spring) restoration on two springs (less than 5 acres) within roadless areas would enhance roadless characteristics by improving habitat for riparian associated species (see Chapter 2 for a description of spring restoration activities).

Direct, Indirect and Cumulative Effects From Alternative One - No Action and Alternative Seven-A

Under these Alternatives, no additional activities would occur in the Myrtle-Silvies Roadless Area except for road closures and decommissions under Alternative Seven-A. These activities are the same as described for the Preferred Alternative.

About 6,000 acres of prescribed burning in the Silvies River portion of the roadless area authorized under the Silvies South and Silvies River Prescribed Burning Project was accomplished between 1995 and 2002. Evidence of this past burn is still visible on the landscape. For about two years following prescribed burning brown needles in the lower tree canopies were evident. Many trees less than 5" dbh were killed. Clumps of trees (less than a quarter acre in size) 5-20" dbh occasionally were killed and occasional large dead trees are still evident. These past prescribed burns have not changed the natural integrity or the naturalness of the area since they appear natural to the average user.

Currently the Myrtle Canyon portion of the roadless area is at very high risk of a high intensity wildfire and protecting it from such a fire would be almost impossible within the steep canyon. Overstocking, shifts in species composition away from fire resistant ponderosa pine, fuels build up and the development of ladder fuels have created an area at high risk to a stand replacement fire. The No Action Alternative and Alternative Seven-A would not change these conditions, and would perpetuate the potential for a stand replacement fire to eventually occur. A stand replacement wildfire could drastically affect the natural integrity of the roadless area, and wildlife and fish habitat.

Precommercial thinning and related fuels treatment activities would not occur within the two potential bald eagle winter roost stands. A decline in suitability is underway and would continue in the Silvies River potential bald eagle winter roost stands, as reflected by shifts in tree species composition, loss of large ponderosa pine, and increased fire risk.

The closure of Forest Road 3100035, proposed and implemented previously, has been breached. This closure would be re-implemented and monitored for effectiveness. Motorized use on this portion of the road has been reduced but not eliminated. In the long term, this would reduce impacts and improve the overall naturalness and natural integrity of the area.

Direct and Indirect Effects Common to Alternatives Two, Three, Four, Five, Six and Seven

Prescribed burning and spring restoration activities would increase the disturbance level within the Myrtle-Silvies Roadless Area under these alternatives. The goals of managing for tranquility and isolation in the roadless area would be interrupted by prescribed burning activities during implementation. Public access to the Silvies River portion of the Myrtle-Silvies roadless area would be excluded during the ignition period. Fire crews would be working within the area during ignition, holding, patrol, and mop-up periods. The ignition and holding periods would last a few days and would be the most disruptive to individuals using the roadless area. The patrol and mop-up periods may last up to approximately a month but are less disruptive. The sights and sounds of the helicopter used in prescribed burning could be very disruptive to individuals seeking solitude. Smoke would be evident for many miles.

For about two years following prescribed burning brown needles in the lower tree canopies would be very evident. About 80% of the trees less than 5" dbh would be killed. Clumps of trees (less than a quarter acre in size) 5-20" dbh occasionally would be killed and occasional large dead trees would be evident. The prescribed burning should appear natural to the average user and therefore should not change the natural integrity or naturalness of the area.

Riparian habitat (spring) restoration on two springs by removal of encroaching conifers and junipers and fencing on one spring for protection is proposed under these alternatives. The goals of managing for tranquility and isolation in the roadless area would be interrupted by spring restoration activities during implementation, which would last a few days. The sights and sounds of chainsaw use could be very disruptive to individuals seeking solitude. Removal of encroaching conifers and junipers may result in some benefits to aquatic species and their habitats but the stumps may appear unnatural to some users. Fencing of one spring would improve and protect habitat for aquatic species that utilize springs such as amphibians and aquatic macroinvertebrates, but could also have a negative affect on the naturalness of the roadless area to some users.

Direct and Indirect Effects from Alternative Seven – The Preferred Alternative

This alternative would decommission the portion of Forest Road 3100035 that was previously closed and breached. Decommissioning this portion of the road would better camouflage the road, thus dramatically reducing vehicles fording the Silvies River and excluding several miles of roaded access into the Myrtle-Silvies Roadless Area. The sights and sounds of machinery used in this activity could be very disruptive to individuals seeking solitude during implementation (it is anticipated that implementation would be completed in no more than one month). In the long term, however, this activity would reduce conflicts of OHV use in a non-motorized area and improve the overall naturalness and natural integrity of the area.

Direct and Indirect Effects from the Proposed Action and Alternatives Three, Four, Five, Six, Seven and Seven-A

Under these Alternatives there would be indirect burning in the Myrtle Creek and West Myrtle Creek portion of the Myrtle-Silvies Roadless Area. The effects are similar to those described above.

Direct and Indirect Effects from Alternatives Three, Four, Five, Six and Seven

Additionally, in Alternatives Three, Four, Five, Six and Seven there would be precommercial thinning and associated fuels treatment on 471 acres in the Silvies Canyon portion and 258 acres in the Myrtle Creek portion of the Myrtle-Silvies Roadless Area to enhance and protect the potential bald eagle winter roost stands. Precommercial thinning would reduce stand densities and move stand composition towards predominately ponderosa pine. Thinning slash would be hand piled and burned. Crews working in the area on precommercial thinning would affect individuals using the roadless area for several weeks. The sights and sounds of chainsaw use could be very disruptive to individuals seeking solitude and the stumps may appear unnatural to some. However, precommercial thinning and associated fuels treatment activities are proposed on less than 10% of the roadless area and the affects would be of short duration. Precommercial thinning in these areas would significantly reduce the risk of a stand replacement fire in the potential bald eagle winter roost stands in the long term.

Cumulative Effects from All Action Alternatives

The Myrtle Creek portion of the roadless area has an extremely high risk of stand replacement wildfire. The high-risk conditions are due to heavy fuel loading, overstocked stands, steep terrain and limited access. Once fuels are treated along the perimeter of the Myrtle Creek portion of the roadless area, prescribed burning could be introduced to Myrtle Creek canyon in the future.

The Silvies River portion of the roadless area is within fuel block 6. Under all action alternatives except for Alternative Seven-A it would be proposed for prescribed burning aimed at reducing overstocked stands with high fuel loads to historical conditions. One or two additional prescribed burns would be needed in the future before the area would be ready for maintenance burning.

These proposed activities, along with probable future activities aimed at reducing fuels, would help ensure the long-term capability of sustaining the desirable attributes within the Myrtle-Silvies Roadless Area. The natural integrity and naturalness of the area as well as the opportunity for solitude would be enhanced in the long term.

If the Myrtle-Silvies Roadless Area is designated Wilderness during the Forest Plan revision process, none of the current uses are expected to noticeably change.

Consistency with Direction and Regulations

All alternatives are consistent with the National Roadless Area EIS (November 2000), and final rule at 36 CFR 294 published in the *Federal Register* (66 FR 3244); other roadless area direction published as part of the final planning regulations 36 CFR 219 (65 FR 67514) on November 9, 2000, as well as interim direction for Roadless Area Protection published in the *Federal Register* on August 22, 2001 (66 FR 44111) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). Specifically, this project does not propose road construction or reconstruction in unroaded portions of roadless areas. Additionally, this project does not propose commercial cutting, sale or removal of timber in roadless areas. Because of these reasons, implementation of activities proposed in this FEIS within the Myrtle-Silvies Roadless Area would not preclude the area's potential to be designated as wilderness.

Effects on Watershed/Fish Habitat (Issue 3)

This section describes the effects on uplands, riparian and fisheries habitat, and water quality from activities proposed by each alternative. Proposed activities differ between alternatives and would have varying direct, indirect and cumulative effects on watershed and aquatic resources. The magnitude and timing of these combined activities, or lack of, determine the cumulative effects.

Direct and Indirect Effects From Alternative One - No Action

Under this alternative no management activities are planned; however, there would be direct and indirect effects to water quality, riparian habitat and fisheries habitat. This alternative would maintain current conditions within the watershed, including high road densities, high fuel levels, degraded riparian areas and overstocked forest stands that have resulted from past management activities.

Transportation System

No roads would be constructed, reconstructed, decommissioned or closed. However, 63 miles of road that have been identified for closure under previous Environmental Assessments would be closed and placed into a self maintaining condition to improve drainage features and reduce sedimentation. The road system would continue to contribute fine sediment directly into stream channels and would continue to have negative direct and indirect effects on water quality and fisheries habitat. Increases in fine sediment can result in decreased reproductive success of redband trout, reductions in pool and interstitial habitat, and reductions in bank stability. Due to numerous variables affecting stream temperatures and current habitat conditions, it is difficult to predict future temperature patterns; however, they are not expected to improve under this alternative.

Upland and Riparian Vegetation

As no vegetation or fuels treatments would be done, there is a high probability that this alternative would allow additional understory fuel build-up in both uplands and RHCAs and would leave stands susceptible to mortality and insect/disease occurrences. This would augment amounts of dead ladder fuels, increasing the risk of stand-replacement wildfires. A stand-replacement wildfire could have effects on soils and hydrology of the watershed, dependent upon the intensity and severity of the fire.

Wildfires can have short-term (1-5 years) adverse affects on fish and aquatic macroinvertebrates by heating streams to lethal temperatures, changing water chemistry, removing riparian cover, increasing fine and coarse sediment, and changing LWD (Brown 1990). High intensity wildfires can cause extirpation of fish at the reach scale (Rieman et al. 1997) and may result in the complete extirpation of fish in a stream (Rinne 1996). However, fire is a natural process in the Pacific Northwest and post-wildfire studies have shown that salmonids often survive high intensity wildfires and rapidly repopulate stream reaches where they were eliminated during fires (Novak and White 1990, Rieman et al. 1997). Unaffected fish populations in areas adjacent to fires, relatively unaffected areas within the fire and multiple age classes of fish are important mechanisms for recovery of salmonid populations following high intensity wildfires (Novak and White 1990, Rieman et al. 1997). A high intensity wildfire in the Silvies Canyon watershed would probably not result in total extirpation of aquatic species due to the widespread distribution and multiple age classes of redband trout, diversity of aquatic habitat and the lack of permanent impassable fish barriers in the watershed. An irrigation diversion is present on Myrtle Creek and may be a passage barrier during the irrigation season, which would slow the recovery time associated with a high intensity fire.

Noxious Weeds

Treatments on the 12 noxious weed sites would not occur under the No Action alternative. Noxious weeds can adversely affect aquatic habitat by altering erosion processes, increasing delivery of fine sediment to streams. Increases in fine sediment can have adverse effects on reproductive success of redband trout, pool and interstitial habitat, and bank stability. Noxious weeds can also replace desirable riparian species, decreasing stream shade. Untreated noxious weed sites would allow further spread of noxious weeds in the watershed and adjoining areas.

Cumulative Effects From Alternative One - No Action

During the past 100 years timber harvesting, livestock grazing, noxious weeds, stream dewatering, fire suppression, road construction on erosive soils, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes in overland and stream flows affecting riparian and aquatic habitat. These changes are having negative affects on water quality and aquatic species. Fire exclusion in the 20th century resulted in dense understories that may be detrimentally affecting late season flow in streams. Extensive road construction and timber harvest activities often occurred adjacent to stream channels resulting in unstable streambanks and high amounts of sediment. The cumulative effects of riparian grazing and timber harvest contributed to a reduction of LWD, wider stream channels, and loss of stream shade, resulting in higher stream temperatures and a reduction of high quality pools due to increased sediment. Map 30 (Stream Reach), Map 31 (Road Segments Contributing to Fine Sedimentation to Stream Channels and Degrading Aquatic Habitat), Map 32 (Past Harvest Activities with Stream Category), Map 33 (Stream Segments with Large Wood Deficit and Surveyed Segments) and Map 34 (Stream Segments with Deficit Pools and Surveyed Segments) in Chapter 2 display site specific areas within the project area where these activities and subsequent habitat alteration occur. As streams became channelized, riparian floodplains lost their ability to retain ground water and floodplain vegetation changed from grasses, sedges and forbs to sagebrush and rabbitbrush. During the past 10 years successful efforts have been made to limit resource degradation in the RHCAs and conduct small-scale restoration projects. INFISH guidelines established riparian stream buffers and now exclude activities from these areas that may have negative affects on aquatic ecosystem. However, this process will require decades to restore natural drainage systems and meet INFISH/Forest RMOs, including pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width depth ratios.

Stand densities within the watershed would continue to increase influencing water yield and timing of stream flows. Low water flows would likely continue as juniper and other conifer species increase across the landscape. This is a result of increased transpiration and decreased water available for soil storage, spring recharge, and downstream water yield. As fuel levels and stand densities increase, so do the chance for stand replacement fires. An intense wildfire can adversely modify soil conditions, water quality, water quantity and fish populations in the watershed and downstream areas, leading to increased cumulative watershed effects and diminishing watershed health.

Potential large-scale wildfires, which are likely to occur in the future due to worsening watershed conditions, would temporarily increase adverse effects to water quality (sediment and temperature), aquatic species, and aquatic habitat both in the watershed and downstream areas. Considering the number of streams and distribution, diversity, abundance and age classes of fish within the Silvies Watershed, similar positive effects would be expected if riparian areas are rested from livestock grazing, following wildfire. Since there are no plans to rest riparian pastures if a large fire did occur, the riparian and streambank vegetation would require a longer time period (5-9 years) to recover. Potential effects from the No Action alternative would be cumulative with effects from non-federal activities within the project area and all activities outside the project area on federal, state and private lands but within the Silvies River drainage. Aside from this project, other activities that may contribute to cumulative effects include; timber harvest activities, wildfires, livestock grazing, road use, flood irrigation, and vegetation alteration. These activities occur on an annual basis with the exception of timber harvest and wildfire and are known contributors of stream dewatering and sediment affecting water quality and aquatic species to an unknown degree.

Other large-scale timber harvest activities and wildfires within the sub-basin (35 river miles upstream of the Silvies project area) include the 8,000-acre Flagtail wildfire, which burned in 2002. Between 3,800 and 5,000 acres would be harvested on National Forest System Lands in 2004, with no harvesting activities in RHCAs. Associated restoration projects occurring in 2003 include adding LWD to 27 miles of streams, riparian planting of hardwoods on 200 acres, coarse wood placement on 3-5 acres of sensitive soils, and decommissioning/closure of 24 miles of road.

Additionally there are state permits for timber harvesting on 8,540 acres of private land occurring within the entire upper Silvies watershed, upstream of the project area.

Both positive and negative effects from these activities are likely to be immeasurable at the Silvies Canyon project area due to distance between project areas, numerous beaver dams, and diversions for flood irrigation that filter out sediment over 35 miles of stream channel. Restoration activities associated with these projects would be designed to improve the resiliency of the watershed by reducing sedimentation, restoring base flows, improving road drainage, enhancing in-channel habitat conditions and shade, and increasing the health and vigor of stream-side vegetation. Improvements in watershed and stream channel conditions will likely improve habitat conditions for redband trout within the watershed. Improvements in water quality (water temperature and fine sediment) will also benefit downstream habitat conditions for redband trout.

Livestock grazing and its effects on water quality (temperature and sediment) and aquatic species would continue into the foreseeable future until addressed in allotment management plans. Allotment management plans for Silvies, Big Sagehen, Crooked Creek, and Scotty allotments are scheduled for completion in 2005. The West Myrtle and Scatfield allotment management plans were completed in 1996. The Myrtle allotment management plan completed in 1996 addressed negative effects of livestock grazing on several reaches of the Silvies River and Myrtle Creek systems that are in a current downward trend due to excessive riparian forage utilization and associated bank failures. Currently more than half of the reaches within the Silvies Canyon watershed are classified as functioning-at-risk (see Silvies Canyon WA 2000) and contribute to higher stream temperatures and sediment, due to lack of shade and bank failure, respectively. Shading of streams has been documented as a key component in maintaining proper stream temperatures (Beschta et al., 2003).

Direct and Indirect Effects Common to All Action Alternatives

Alternatives Two, Four, Five, Seven, and Seven-A would treat vegetation in the watershed through thinning and commercial harvest, involving ground disturbing activities. Alternatives Three and Six would treat vegetation through precommercial thinning, without the ground disturbing activities associated with commercial harvest. Commercial harvest activities, related permanent and temporary road construction, and commercial hauling are the primary activities influencing the delivery of sediment to stream channels with the potential to adversely affect aquatic habitat. The use of BMPs, design features and RHCA buffers would lessen the potential effects but may not totally eliminate them. Effects to water quality, riparian vegetation and fish habitat can generally be summarized as follows:

- Sediment levels are directly affected by erosion from harvest units, roads, skid trails, and unstable stream banks, and are indirectly affected by increased peak flows that erode stream banks. INFISH stream buffers would keep harvest units and related skid trails far enough away from streams so potential sediment from these sources would not negatively impact streams. Decommissioning roads within RHCAs would have the long-term effect of reducing sediment input into streams, and improving fish habitat and conditions for aquatic species. Reconstruction and maintenance of sections of road that are causing sedimentation would also improve water quality and fish habitat.

- Stream temperatures are not expected to increase under the action alternatives because riparian buffers following INFISH standards and guidelines would be applied. No commercial timber harvest or associated activities, including landings, stream crossings, road construction or skidding, would occur within the RHCAs. Aspen, cottonwood, and spring restoration are the only activities occurring in RHCAs. About 147 acres of conifer thinning in aspen and cottonwood stands would occur within RHCAs representing less than one percent of the linear stream distance in the project area.

- Due to seasonal browsing and the lack of fire the typical aspen or cottonwood stand within the project area now consists of a few decadent trees and recovery of these stands depends on immediate action. Most of this activity is on intermittent streams and would result in a small, short-term (one to five years) increase in solar radiation. However, effects are expected to be minor and not affect downstream temperatures (including 303(d) listed streams) since very little shade would be removed, the aspen sites are dispersed and small, and the intermittent streams have ceased flow during the warmest months (July and August). As aspen and other hardwoods grow and re-establish, stream shade should improve over current shade conditions. Caging and fencing of these aspen sites is a critical part of aspen restoration and would deter both livestock and wildlife browsing, while increasing vigor and reducing recovery time of aspen.

- Runoff from forested lands is affected by vegetation manipulation (thinning, removal, fire), soil compaction and road systems. Road systems can reroute surface runoff, intercept subsurface flows, and shorten time of concentration of flows. Generally this has resulted in higher peak flows and lower summer flows of longer duration. Reduction of juniper through prescribed fire and thinning of forest stands would decrease evapotranspiration and increase subsurface water, which could increase stream flows longer into summer months.

Transportation System

Sediment from roads is one of the main contributing factors degrading aquatic habitat and water quality. Road closures, reconstruction or decommissioning activities are the most effective means of reducing sediment input from these roads into streams. Direct beneficial effects from road closures and decommissioning would be a decrease in chronic sediment input to streams and improved spawning and rearing habitat for redband trout and other aquatic species. Indirect beneficial effects would be increases in large woody material recruitment and canopy closure (shade) along streams as closed and decommissioned road segments re-vegetate with native conifers and hardwoods. Table 2-20 describes the differences in road treatments between alternatives.

Decommissioning would remove the road from the Forest Road Transportation System and close the road at the entrances with earthen berms and/or boulders. Road surfaces would be sub-soiled to a depth of about 18" and scattered with slash to restore natural infiltration processes, allowing the reestablishment of vegetation and reducing sediment runoff. All culverts would be removed and the natural drainage channel restored. Removing culverts may result in short-term (< 1 year) sediment increases to stream channels; however, design features and BMPs would minimize these impacts. Long-term effects would include improvements to water quality, reestablishment of drainage-ways and natural vegetation, and improvements to fisheries habitat and populations of aquatic species.

Permanently and seasonally closed roads would be closed to motorized traffic, but would remain on the Forest Road Transportation System. Surface erosion from these roads can be a major source of sediment to streams (Furniss et al. 1991). Sediment from unpaved roads is correlated to traffic volume; higher traffic levels result in higher amounts of sediment reaching streams (Reid and Dunne 1984). Road closures would decrease the amount of road-related sediment into streams and improve water quality and aquatic habitat. Under these alternatives, all permanently closed roads would be treated to correct drainage problems and may require periodic maintenance to ensure they remain hydrologically stable.

Road reconstruction (Alternatives Six, Seven, and Seven-A) would improve roads through blading, realignment, new surfacing, cleaning ditches and culvert replacement to restore drainage and reduce sediment input into streams. Depending on the alternative selected, maintenance activities using BMPs would occur on approximately 8-200 miles of road, which would further reduce sediment input into streams throughout the project area. Alternatives Four, Seven, and Seven-A would have the greatest benefit to water quality and aquatic species, treating over 192 miles of road.

Alternatives Two and Five would treat about 163 miles, whereas Alternative Six would treat the least amount, only 8 miles. About fourteen temporary roads, totaling between 2.8 and 3.5 miles, would be constructed outside of RHCAs following BMPs in Alternatives Two, Four, Five, Seven, and Seven-A. No long-term negative effects (including effects to 303(d) listed streams) are expected from these roads due to the small number and short lengths. They would also be constructed and decommissioned (at the completion of harvesting activities) following BMPs, which would minimize the ground disturbing activities and potential water runoff.

Twelve roads were identified in the project area as contributing sediment directly into streams and contributing to the degraded stream habitat conditions in the Silvies Canyon watershed (Table 3-5 in Chapter 3).

Varying combinations of these twelve roads would be decommissioned, closed, maintained or reconstructed at various times during the implementation phase of the project, depending on the alternative selected and the timing of the timber harvest, prescribed burning and post and pole activities in those areas (see section titled "Benchmark Dates and Implementation Schedule" in this chapter, Table 2-21 in Chapter 2 and Table 4-1). The location of the road and possible connected use for other project activities will determine the timing for treatment. Treating roads early as possible in the project timeframe would allow for maximum benefits to water quality and fisheries habitat. Roads used for harvest activities and identified for reconstruction or maintenance would be treated just before the start of harvest activities. Roads identified for decommissioning and used for timber harvest or prescribed fire activities would be treated at the completion of those activities. Roads identified for treatment that are not associated with project activities would be treated within the first three years of implementation. Roads identified for closure would be closed at each end (following BMPs) with drainage structures along the length of the road to reduce water movement and sediment input to streams.

Table 4-1. Specific Road Treatments by Alternative.

Road Number	Timber Sale/Year of Road Treatment	Harvest Activities?	Alt. One	Alt. Two	Alt. Three and Four	Alt. Five	Alt. Six and Seven-A	Alt. Seven
3100035	2004-2006	No	Portion Closed Previously	Portion Closed Previously	Close Entire Road/ Maintenance	Portion Closed Previously	Portion Closed Previously	Decommission Roadless Portion
3100286	Dry/2004-2007	Yes	Open	Open	Decommission	Open	Maintenance	Maintenance
3100860	Curry4/2004-2007	Yes	Open	Open	Decommission	Decommission	Maintenance	Maintenance
3100864	2004-2007	No	Open	Open	Decommission	Decommission	Decommission	Decommission
3125244	2007/2009	No	Open	Seasonal Closure	Permanent Closure	Decommission	Decommission	Decommission
3125912	Mud/2004-2007	No	Open	Seasonal Closure	Decommission	Decommission/ Seasonal Closure	Reconstruct	Reconstruct
3130129	Curry3/2006	Yes	Open	Open	Signed Year Round Closure	Open	Maintenance	Maintenance
3700117	2007	No	Open	Open	Open	Open	Permanent Closure/ Maintenance	Permanent Closure/ Maintenance
3700167	2007	No	Open	Permanent Closure/ Maintenance	Permanent Closure/ Maintenance	Decommission	Decommission	Decommission
3700275	2007	No	Open	Open	Decommission	Decommission	Decommission	Decommission
3700294	Dry/2007	Yes	Open	Open	Decommission	Seasonal Closure	Seasonal Closure	Seasonal Closure
3700379	Dry/2005	Yes	Open	Permanent Closure/ Maintenance	Decommission	Open	Permanent Closure/ Decommission	Permanent Closure/ Decommission

Within the Myrtle Park sub-watershed, S.F. Myrtle Creek and Heifer Creek are two specific streams identified as receiving excessive amounts of sediment from roads. South Fork Myrtle Creek has fine sediment being contributed from roads in the vicinity of West Myrtle Spring, Brad Spring, Soup Spring, and Gribble Spring. Figure 4-2 compares the amount of road treatments to existing road densities in S.F. Myrtle Creek drainage. Heifer Creek also has high amounts of fine sediment identified from several roads. Figure 4-3 compares the amount of road treatments to existing road densities in Heifer Creek drainage.

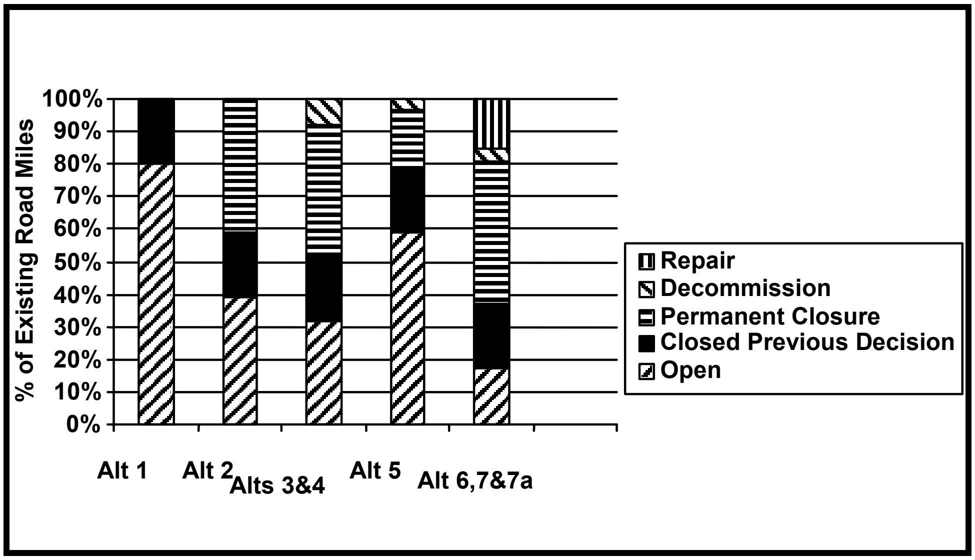


Figure 4-2. Comparison of road treatments in South Fork Myrtle Creek Drainage.

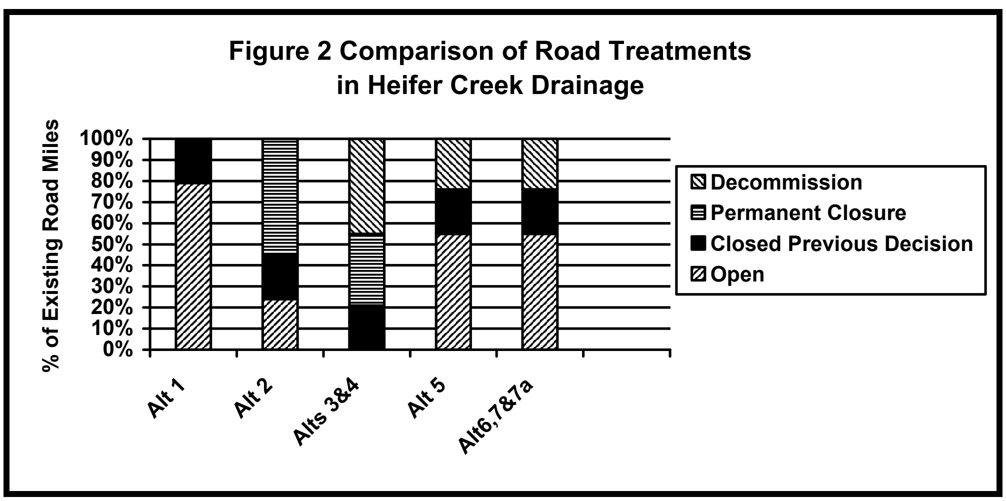


Figure 4-3. Comparison of road treatments in Heifer Creek Drainage.

The following discussion describes varying effects, by alternative, of road treatments on water quality and aquatic species and includes a discussion on the twelve specific roads identified as sediment sources as well as the reduction of roads within the S.F. Myrtle Creek and Heifer Creek drainages.

Alternative Two would correct five of the twelve specific roads identified as sediment sources, and would have less beneficial effect than the other action alternatives. This alternative would reduce the miles of open roads in the vicinity of S.F. Myrtle Creek to 39% of current conditions and Heifer Creek to 24% of current conditions. Additionally, this alternative treats the fewest miles of roads in the Silvies Canyon Watershed.

Although Alternatives Three and Four would have the second greatest benefit by correcting eleven of the twelve specific roads identified as sediment sources, they would have the greatest reduction of open roads in the S.F. Myrtle Creek and Heifer Creek drainages by reducing the miles of open road to 32% and 0%, respectively. Additionally, these alternatives treat the most miles of roads in the Silvies Canyon Watershed.

Alternative Five would be the second least effective of the action alternatives by correcting eight of the twelve specific roads identified as sediment sources. This alternative would also reduce the miles of open roads in the S.F. Myrtle Creek and Heifer Creek drainages to 59% and 55% of current conditions, respectively.

Alternatives Six, Seven, and Seven-A would have the greatest benefit by correcting all twelve of the specific roads identified as sediment sources. However, these Alternatives would be less effective than Alternatives Three and Four because they reduce the miles of open roads in the S.F. Myrtle Creek and Heifer Creek drainages to 17% and 55% of current conditions, respectively. Alternative Seven would decommission an additional 4 miles of FS road 3100035 in the Silvies-Myrtle Roadless Area.

Upland and Riparian Vegetation

Several types of riparian habitat restoration are proposed at 46 springs under all action alternatives. Removal of encroaching conifers and junipers would have a beneficial impact by increasing the abundance and diversity of understory riparian species (grasses, forbs and shrubs) and possibly increasing water flows at springs. Anecdotal reports have suggested that removal of conifers and junipers (Eddleman and Miller 1992) adjacent to springs can increase spring flows; however, little quantifiable scientific information exists to substantiate these claims (Belsky 1996). Five of these springs would be fenced to restrict livestock and protect riparian habitat for Columbia spotted frogs and other aquatic species. Four of the fenced springs would be developed and would transfer water to livestock troughs. These developments would include float valves or return lines to prevent dewatering of the riparian habitat and potential altering of the riparian vegetation. Fencing spring sites would reduce compaction, improve water quality, and limit sediment transport into the stream network. To reduce fuel loading, fire intensity and fence damage, springs located in burn blocks would be treated (conifer thinning and fencing) after prescribed burning is completed.

Aspen restoration within RHCAs would include converting encroaching conifers and junipers to standing snags or LWD, with hand tools. This would occur on 147 acres within RHCAs associated with category 1, 2, and 4 streams, in all action alternatives. Most of this activity is proposed on category 4 streams which are intermittent and do not affect downstream summer water temperatures. Ground disturbance would be limited to the felling of conifer trees, which would add to the LWD component, benefiting soil stabilization and reducing sediment input into streams. Releasing these aspens from conifer competition and protecting them from ungulate browsing by fencing or felling trees would allow the reestablishment of stream shade within 7-10 years. Due to the small size of aspen stands, the potential loss of stream shade from felled conifer trees would be minimal with no negative effects.

Aspen stands associated with harvest units would be restored the same year that commercial harvest treatments are scheduled (2004-2008). Aspen stands with no commercial treatment would be treated with precommercial thinning, prescribed burning and then fencing, in order of the burn block schedule (2006-2014). Aspen stands not associated with harvest or precommercial harvest activities would be treated in years 2003-2005.

Cottonwood restoration is proposed under all action alternatives and would reduce conifer encroachment at the remnant cottonwood stand on upper Sagehen Creek. Due to the few remaining cottonwood trees and their poor condition, immediate action is necessary to maintain and restore these unique ecosystems and would take place within the first three years of the project. Conifers would be converted to standing snags or downed LWD. Effects from these activities would benefit the stream channel by adding. Cottonwood plantings with protective cages or fencing on Sagehen Creek, Stancliffe Creek and reaches on the Silvies River below the FS Road 31 would restore a unique riparian species and benefit aquatic species and their habitat. Benefits include reduced stream temperatures, improved fisheries habitat, increased deposition of organic material (leaves), and increased bank stability.

Twelve of the identified noxious weed sites in the project area are proposed for manual treatment (hand pulling) under all action alternatives. Fewer than five sites are located near streams. Due to the control method, distance from streams, and relatively small size (each site < 25 sq. ft.), there would be no negative effects to water quality and aquatic species during the control effort. Noxious weed treatments would result in increases in native vegetation species, control of the spread of noxious weeds, stabilization of stream banks and improved stream shade, which would benefit aquatic habitat, water quality and aquatic species.

Precommercial thinning and slash treatment, post and pole removal, juniper removal, and conifer thinning in aspen stands would reduce dense stands of timber and ladder fuels, reducing the likelihood of stand replacement fires within the project area and potential negative effects on soils and water quality (McNabb and Swanson 1990). This would also increase the amount of water available for stream flows and for remaining plants. Between 10,920 and 17,577 acres would be treated depending on the alternative selected. There would be no effects on stream shade, LWD, water quality or aquatic species. All of these activities would be conducted by hand except slash treatment of thinning material, which would be accomplished by grapple piling. These activities would be limited to areas outside INFISH RHCA buffers and result in minimal impacts to soils, surface water flows, water quality and aquatic species.

Grapple piling using machinery that has a ground pressure of less than 7 psi typically makes only one pass, and operates over slash where possible. It is considered to have less impact than a feller-buncher operation. However, recent monitoring and data from areas of similar soils and conditions are only available for feller-buncher operations and so this data will have to serve as a basis for discussing impacts of grapple piling. The effects of a feller-buncher logging operation have recently been monitored on both the Fremont and Malheur National Forests. On the Fremont, six units were monitored at two different locations, both within and one meter outside of feller-buncher tracks. Monitoring results indicate that the change in soil bulk density within the feller-buncher tracks, as compared to outside the tracks, ranged from zero to an increase of 8 percent (based on an average of five measurements at each monitoring site), with the average increase in soil bulk density for all 12 locations being 4%. The overall result was no net increase in detrimental soil compaction (change in soil bulk density must be more than 15%, 20% or more for volcanic soils) due to the feller buncher operation. Similar results were found on the Emigrant Creek District of the Malheur National Forest in 1996 (McNeil 1996, unpublished). A summary of the results of this study revealed that 11% of the logging unit monitored was tracked by a feller-buncher, of which 15% showed an increase in soil bulk density (some level of compaction) – for a total of less than 2% of the unit showing an increase in compaction. The increase in soil bulk density averaged 5% with a standard deviation of 7%. The overall result was only a negligible increase in detrimental soil compaction due to the feller buncher operation.

Based on this recent monitoring information from the Malheur and Fremont National Forests, grapple piling of slash within specified units would create only a small amount of soil displacement from turning machinery and negligible detrimental compaction. Design features would limit the overall detrimental soil impacts from grapple piling machinery within the proposed units to less than 1%. It is unlikely that these limited impacts would lead to soil erosion and a reduction in water quality or aquatic habitat (sedimentation).

Effects from Burning

Alternatives Two, Three, Four and Seven would prescribe burn 12 fuel blocks for a total of 39,277 acres in each alternative. These alternatives propose the highest amount of burning and have the greatest potential for effects from prescribed burning. Alternative Seven-A would prescribed burn 11 fuel blocks for 33,751 acres, Alternative Six, 10 burn blocks for 33,374 acres, and Alternative Five, 7 burn blocks for 25,311 acres, with corresponding levels of potential effects in each alternative. Prescribed burning activities (by aerial and ground ignition) are planned over a 10-year period to allow different combinations of spring and fall burning and allow for varying stages of vegetation growth across the landscape. There would be no aerial ignition within 300 feet of category 1 riparian areas except for incidental ignitions due to steep slopes or wind gusts. All ignitions would be allowed to back burn into the RHCAs. Table 4-2 displays the relationship of burn blocks to stream categories.

Table 4-2. Stream Categories by Burn Block.

Burn Block	Category 1 Streams	Category 2 Streams	Category 4
1	None	Heifer Creek	Category 4 streams present
2	None	None	Category 4 streams present
3	Sagehen Creek	None	Category 4 streams present
4	None	None	Category 4 streams present
5	L. Sagehen Creek	None	Category 4 streams present
6	Silvies River	None	Category 4 streams present
7	Stancliffe Creek	None	Category 4 streams present
8	Stancliffe Creek	None	Category 4 streams present
9	Stancliffe Creek	None	Category 4 streams present
10	Crane Creek	Cooley Creek	Category 4 streams present
11	None	None	Category 4 streams present
12	None	None	Category 4 streams present

Landscape level prescribed burning is designed to improve watershed functions within the project area. Prescribed fire associated with the action alternatives would aid in decreasing areas of bare soil (removal of competing juniper and sagebrush) while promoting the establishment of grasses and forbs, resulting in reduced surface erosion and downstream sedimentation. This would have positive effects on site productivity, soil resources, water quality, aquatic species, and downstream beneficial uses.

Few adverse direct and indirect effects from prescribed burning are expected from these alternatives due to the gently sloping terrain of the project area, which reduces the potential for soil erosion and sedimentation. Sediment transport to stream channels may occur during the first year. There is little risk of mortality to fish and other aquatic species since these burns would be initiated outside RHCAs and would only be allowed to passively back into riparian areas as low intensity burns. Within the first 3 years, aspen stands within RHCAs would be thinned, to remove competing conifers and start the restoration process. Prescribed fire would then be used under appropriate fuel levels in order promote aspen suckering and restore the stand. The use of prescribed of fire in aspen stands is recommended to maintain the stand (Debyle et al.) Effects on water quality and fish habitat would be minimal due to the small (two acres) size of treated stands and controlled fuel levels. In the short-term (one to three years), the prescribed fires may produce small amounts of sediment into the project area tributaries. Groundcover may be consumed in small areas of moderate to high intensity burns on upslope and riparian areas during the prescribed burn. If this occurs, groundcover usually returns to or exceeds pre-burn levels three to five years in the Blue Mountains (Johnson 1998). Sediment yields, however, are expected to be insignificant for the following reasons:

(1) Low intensity burns. DeBano et al. (1998) states that low to moderate intensity fires have minimal effects on soil infiltration, citing sources that documented infiltration rates as nearly normal in areas affected by low intensity fires. Prescribed burns would be low to moderate intensity, resulting in little change to soil structure or infiltration capacity and minimal amounts of surface runoff. These types of fires only burn portions of the surface litter component resulting in minimal surface erosion.

(2) Timing. Spring burns would occur after snowmelt and before plant growth begins. As a result, burn sites would have a complete growing season to produce grasses and forbs before the next year's snowmelt and period of predictable erosion. This regrowth would be effective in preventing soil erosion and minimizing downstream sedimentation. Fall burns would permit little or no regrowth prior to snowmelt, but observations of other fall burns within the general area in the same vegetation types indicate that surface erosion is minimal when fires are of low to moderate intensity.

Fall burning conducted by ground ignition would be outside category 1, 2, and 3 RHCAs. Based on previous prescribed burns there would be a 20-50% reduction of large woody material during fall burning and 10-30% increase in new large woody material in the RHCAs. Prescribed burning of decadent riparian vegetation would be beneficial to riparian plants, fish and wildlife. Riparian vegetation would be stimulated and would regenerate following the burning.

(3) Mosaic burn patterns. Due to varying wind conditions and fuel densities, the burns are expected to spread in a mosaic pattern, burning some areas and passing others. As a result, patches of unburned ground distributed across the landscape would act as sediment capture sites until the burned patches revegetate.

(4) Moist, wet riparian conditions. Riparian zones, characterized by wet fuels, should inhibit combustion and maintain a buffer that reduces sedimentation into an associated stream channel. Fire may creep into riparian areas and be allowed to burn in order to reduce conifer densities and stimulate riparian species such as aspen and willow.

A remnant stand of cottonwood on upper Sagehen Creek in burn block 3 is the only stand of cottonwood present in the Silvies watershed adjacent to a stream, and represents a unique riparian component. This area would be protected from burning. Cottonwood can sprout from roots but are susceptible to fire due to their shallow root systems (FEIS 2000). While spring burning generally results in low intensity burns compared to fall burning, spring burning can result in high soil temperatures (Agee 1993), which may kill roots of the cottonwoods.

With the implementation of mitigation and resource protection measures, prescribed burning should not cause adverse impacts to riparian ecosystem functions, channel conditions, soil resources, water quality and aquatic species. Mitigation and Resource Protection Measures are included to minimize potential impacts from prescribed burning and protect the functioning of riparian ecosystems, without totally excluding these areas from low intensity burning. Additionally, the action alternatives are intended to enhance watershed/riparian health and aquatic habitat, moving conditions toward the Riparian Management Objectives recommended in INFISH. The enhancement of any deciduous tree and shrub species as a result of the burning will increase the preferred forage of macroinvertebrates, a major food source for redband trout.

Effects from Commercial Harvest

Alternatives Two, Four, Five, Seven, and Seven-A propose varying levels of commercial harvest activities. Alternatives Four, Seven, and Seven-A propose the most timber harvesting activities (15,701 acres) and therefore would have the highest potential for impact. Alternative Two (13,222 acres) would have a slightly lower potential for causing adverse effects than Alternatives Four, Seven, or Seven-A. Alternative Five (9,920 acres) proposes the least amount of timber harvesting activities and therefore would have the least impact of the five harvest alternatives. No harvest or harvest related activities are proposed in the RHCAs.

Timber harvesting and associated activities can increase peak and channel modifying flows, and can increase sediment supply from erosion and bank destabilization resulting in channel degradation (Chamberlin et al., 1991). Tree felling by itself is not usually a significant cause of increased sediment production. Timber yarding, on the other hand, can cause measurable increases in erosion through alteration of soil structure, gouging of slopes, disturbance to stream channels and modification of soil infiltration capacities. Road systems, skid trails, and landings can accelerate hill slope runoff by concentrating flow and altering the natural drainage system.

Significant increases in sediment yields to stream channels may exceed the stream's natural ability to carry the sediment load. This would result in sediment deposition as point and mid-channel bars, especially in lower gradient reaches of a stream, which would lead to wider, shallower, and less stable channels. This can result in bank erosion and bed-scour, which further increase the sediment load in the stream. These effects can be activated by initial direct introduction of sediment from outside the channel and/or increases in water yields that result in channel erosion. Increases in fine sediment can result in decreased reproductive success of fish. However, significant increases in sediment yields are not expected with any of the action alternatives due to the gentle terrain, design features, mitigation, and riparian protection measures (INFISH buffers).

Burning of approximately 700 large heavy slash piles outside the RHCAs can result in burned soils and create sediment sources; however, most slash pile burning would occur at sites that have been previously compromised due to compaction and slash pile burning from previous logging activities. Due to the gentle topography and distance from streams only minor impacts to site productivity are anticipated.

Aquatic habitat would be buffered from effects related to commercial harvest activities by using INFISH RHCA buffers, R6 BMPs, Malheur N.F. Forest Plan standards, and INFISH standards and guides. RHCAs help maintain the integrity of aquatic habitats by buffering stream channels from non-channelized sediment delivery, and providing for other riparian functions such as LWD inputs, shading, and bank stability (USDA Forest Service, USDI Fish and Wildlife Service, INFISH, 1995). INFISH RHCA buffers are: 300 ft each side of fish-bearing streams, 150 ft each side of non fish-bearing perennial streams, and 50 feet each side of non fish-bearing intermittent streams. Springs would be protected with 100-foot buffers as required by the Forest Plan.

R6 BMPs, Forest Plan standards, and INFISH standards and guides would reduce effects from timber harvest and associated road reconstruction and use. These measures are designed to protect stream channels and banks, reduce soil disturbance and compaction, and reduce channelized sediment delivery to streams, which would result in minimal impacts to water quality and aquatic species.

No significant impacts are expected from the five commercial harvest alternatives due to the implementation of design features, BMPs, INFISH RHCA buffers and monitoring. However, alternatives Four, Seven, and Seven-A have the highest amount of ground disturbing activities that create the potential for causing negative effects to water quality and aquatic species. These alternatives propose the highest combination of acres of commercial harvest, miles of temporary road construction, and miles of road activities related to timber harvest (i.e. truck traffic, road reconstruction, and road maintenance). Alternative Two would have a slightly lower potential for causing adverse effects based on fewer acres of timber harvest related activities. Alternative Five has the least potential for negative effects to water quality and aquatic habitat based on the fact that this alternative has the least amount of acres with timber harvest related activities.

Table 4-3. Magnitude of Commercial Harvest and Related Activities.

Alternative	Acres of Commercial Harvest	Miles of Temp Roads	Miles of Haul Route	Miles of Road Reconstruction
Two	13,222	3.5	221	164
Four, Seven and Seven-A	15,701	3.5	228	192 - 201.8
Five	9,920	2.8	200	163

Cumulative Effects Common to All Action Alternatives

Management activities and natural processes over space and time create cumulative watershed effects. These include but are not limited to: changes in timing and magnitude of flows, sediment supply to channels, sediment storage, structure in channels, and water temperature, snowmelt and freezing. Cumulative watershed effects can affect fish directly by increasing sedimentation of spawning/rearing habitat, or indirectly by changes in habitat, water quality, or impacts to macroinvertebrates/aquatic organisms.

Prescribed burning combined with juniper treatments, precommercial and commercial thinning, aspen restoration, road closures and decommissioning, spring restoration and noxious weed control would improve watershed conditions and aquatic habitat. The result would be improved channel stability with the addition of LWD from aspen restoration sites, enhanced riparian areas and riparian vegetation through thinning of conifers in aspen stands and reduction in sediment erosion-prone roads. As individual roads are closed and decommissioned, sediment input would be reduced and eventually the entire watershed and downstream area would receive less sediment, resulting in long-term positive effects for water quality and aquatic species.

The cumulative effects of precommercial thinning, commercial thinning and prescribed burning would reduce the chance of stand replacement fires and the potential negative effects to soils and water quality (McNabb and Swanson 1990, Effects of Fire on Soil 1979). The higher the number of acres thinned and prescribed burned, the greater the reduction in fuel levels across the landscape. This reduces fire danger and decreases the intensity of wildfires. Alternatives Four and Seven would reduce fuel levels on the most acres, followed by alternatives Seven-A, Two, Five, Three, and Six.

Based on the analysis of proposed activities, the action alternatives are not likely to exacerbate cumulative watershed effects; few adverse impacts from harvesting activities are expected due to design features, mitigation, and monitoring. Insignificant sediment increases are expected from soil disturbances, as RHCA buffers would filter any sediment from upslope activities.

Standard Cumulative Watershed Effects

An explanation of Cumulative Watershed Effects and how they are calculated is located in Chapter 3 in the "Watershed/Fish Habitat" section.

Table 4-4 summarizes by subwatershed existing Equivalent Roaded Areas (ERAs), Thresholds of Concern (TOCs; see Chapter 3 for definition), and changes in ERAs from implementing Alternatives Two, Four, Five, Seven, and Seven-A. Commercial harvest is a common activity among these alternatives.

Table 4-4. ERAs for Alternatives Two, Four, Five, Seven, and Seven-A.

Subwatershed	Existing ERA	Alternative Two		Alternatives Four, Seven, and Seven-A		Alternative Five		TOC
		ERA	% Change	ERA	% Change	ERA	% Change	
Myrtle Park	5.7%	9.3%	+3.6	9.3%	+3.6	8.7%	+3.0	16%
Red Hill	4.1%	6.7%	+2.6	6.8%	+2.7	6.0%	+1.9	12%
Sage Hen Creek	3.9%	9.6%	+5.7	10.0%	+6.1	8.7%	+4.8	12%
Stancliffe Creek	3.5%	10.4%	+6.9	10.9%	+7.4	9.1%	+5.6	14%
Boulder/Fawn Creeks	1.9%	4.6%	+2.7	4.7%	+2.8	4.3%	+2.4	12%
Burnt Mountain	1.4%	4.6%	+3.2	5.5%	+4.1	4.6%	+3.2	12%
Myrtle Creek	3.5%	6.3%	+2.8	6.7%	+3.2	6.4%	+2.9	14%

ERA numbers for Alternatives Two, Four, Five, Seven, and Seven-A are below the TOC for all subwatersheds. Alternatives Four, Seven, and Seven-A essentially double the ERA values for Red Hill, Sage Hen, Stancliffe, Boulder, and Burnt Mountain subwatersheds. However, all subwatersheds would still remain below the TOC. The ERA was calculated with the assumption that all timber harvest activities would occur in one year, although it is anticipated that these activities would take place over a ten-year period. Thus, ERA numbers are higher than what would actually occur. ERAs for Alternatives Seven and Seven-A would be similar to the ERA calculated for Alternative Four since decommissioning of roads was not modeled and ERA numbers do not approach TOC. The TOC would not be exceeded in any subwatershed.

Table 4-5 summarizes by subwatershed existing ERAs, Threshold of Concerns, and changes in ERAs from implementing Alternatives Three and Six.

Table 4-5. ERAs for Alternatives Three and Six.

Subwatershed	Existing ERA	Alternative Three		Alternative Six		TOC
		ERA	% Change	ERA	% Change	
Myrtle Park	5.7%	5.8%	+0.1	5.9%	+0.2	16%
Red Hill	4.1%	4.1%	+0.0	4.1%	+0.0	12%
Sage Hen Creek	3.9%	4.4%	+0.5	4.0%	+0.1	12%
Stancliffe Creek	3.5%	3.6%	+0.1	3.5%	+0.0	14%
Boulder/Fawn Creeks	1.9%	2.0%	+0.1	2.0%	+0.1	12%
Burnt Mountain	1.4%	1.6%	+0.2	1.5%	+0.1	12%
Myrtle Creek	3.5%	3.7%	+0.2	3.7%	+0.2	14%

ERA numbers for Alternatives Three and Six are below the TOC for all subwatersheds. Since ERAs are below the TOC for each subwatershed the cumulative effects of the proposed actions are not anticipated to be a concern.

Alternatives Three and Six would cause the least amount of ground disturbance in the watershed and still allow varying degrees of other restoration activities to occur, including road decommissioning, precommercial thinning, juniper reduction, and aspen, cottonwood and spring restoration. However, without commercial thinning of forest stands across the watershed, dense stand conditions and high fuel levels will remain an issue, increasing the risk of stand replacement fires.

Cumulative Effects from Reasonably Foreseeable Future Actions

Potential effects from the action alternatives would be cumulative with effects from non-federal activities within the project area and all activities outside the project area on federal, state and private lands but within the Silvies River drainage. Aside from this project, other activities that may contribute to cumulative effects include timber harvest activities, wildfires, livestock grazing, road use, flood irrigation, and vegetation alteration. These activities occur on an annual basis with the exception of timber harvest and wildfire and are known contributors of stream dewatering and sediment affecting water quality and aquatic species to an unknown degree.

Water diversions for flood irrigation occur in Myrtle Creek just above the 31 Road on USFS/private lands, and in the Silvies River in Silvies and Bear Valleys, on private lands. In both cases, small weir dams block the stream flow and divert it into the floodplain for livestock grazing or hay production. These diversions may restrict seasonal fish movement during the spring and summer and temporarily trap fish. Sediment is released downstream when the structures are opened at the end of the irrigation season, affecting fish habitat and reproductive success. These diversions also affect natural seasonal water flows.

Other large-scale timber harvest activities and wildfires within the sub-basin (35 river miles upstream of the Silvies project area) include the 8,000-acre Flagtail wildfire in 2002. Between 3,800 and 5,000 acres would be harvested on National Forest System Lands in 2004, with no harvesting activities in RHCAs. Associated restoration projects occurring in 2003 include adding LWD to 27 miles of streams, riparian planting of hardwoods on 200 acres, coarse wood placement on 3-5 acres of sensitive soils, and decommissioning/closure of 24 miles of road. Additionally there are state permits for timber harvesting on 8540 acres of private land occurring 35 miles upstream of the Silvies Canyon watershed.

Both positive and negative effects from these activities are likely to be immeasurable at the Silvies Canyon project area due to distance between project areas, numerous beaver dams, and diversions for flood irrigation that filter out sediment over 35 miles of stream channel.

Livestock grazing and its effects on water quality (temperature and sediment) and aquatic species would continue into the foreseeable future until addressed in allotment management plans. Allotment management plans for Silvies, Big Sagehen, Crooked Creek, and Scotty allotments are scheduled for completion in 2005. The West Myrtle and Scatfield allotment management plans were completed in 1996. The Myrtle allotment management plan completed in 1996 addressed negative effects of livestock grazing on several reaches of the Silvies River and Myrtle Creek systems that are in a current downward trend due to excessive riparian forage utilization and associated bank failures. Currently more than half of the reaches within the Silvies Canyon watershed are classified as functioning-at-risk (see Silvies Canyon WA 2000) and contribute to higher stream temperatures and sediment, due to lack of shade and bank failure, respectively. Shading of streams has been documented as a key component in maintaining proper stream temperatures (Beschta et al., 2003).

This cumulative component and future recovery of riparian areas depends on the level of livestock use and achievement of grazing standards within the RHCAs. The outcome would influence and may offset some of the positive benefits gained from this project. This analysis assumes that Forest Service grazing standards would be achieved in the future. Under these conditions riparian vegetation would stabilize stream banks in about 3-5 years, and produce stream shade in 5-10 years. Narrowing of stream channels requires the longest recovery period, between 10 to 50 years, but due to the high number of stream reaches currently functioning at risk, the stream channel recovery period could be longer.

Summary of Effects

Of the alternatives, Alternatives Four and then Seven allow for the most improvement within the project area with the least potential for negative impacts to soils and water quality. Alternative Four treats (closures, decommissions and reconstruction) about 345 roads and 164 miles while Alternative Seven treats about 248 roads and 93 miles. These alternatives would prevent further decline in watershed health, reduce risks affecting ecosystem sustainability, begin vegetation and watershed restoration activities, lower the risk of stand-replacement fires, protect and improve riparian, aquatic and terrestrial habitat, and address road management concerns. Environmental changes resulting from these actions include the enhancement of riparian areas and improved watershed health and ecosystem sustainability that would be consistent with the Clean Water Act, INFISH and Forest standards. Minimal watershed and aquatic impacts from harvesting activities are likely to occur due to the implementation of design features, BMPs, INFISH RHCA buffers and monitoring strategies associated with these action alternatives. Negligible direct, indirect, and cumulative effects on water quality (sediment and temperature) and quantity (magnitude, timing, and duration) are anticipated if these alternatives are implemented. Erosion control structures and stream buffers would limit sediment input into streams. Canopy reductions would allow more snow accumulation and reduce evapotranspiration, which would make more water available for stream flows. A reduction in stream sediment would improve aquatic habitat, especially pool quality, and allow redband trout and other aquatic species to increase in size. Activities associated with the action alternatives would maintain or improve water quality (temperature and sediment) in the long term on Myrtle Creek, a 303D listed stream for temperature and on other streams with documented high water temperatures.

Consistency with Direction and Regulations

Forest Plan

All action alternatives are consistent with Forest Plan direction. None of the potential combined effects are expected to adversely affect INFISH RMOs, redband trout, and Malheur mottled sculpin populations. Application of INFISH direction is expected to maintain or improve fish habitat conditions in the project area. Stream channel conditions are expected to improve with road management treatments.

Recreational fishing opportunities are limited in the project area by water quality and habitat degradation resulting from past activities. The action alternatives include closing and decommissioning roads within RHCAs, aspen and cotton restoration, and riparian (spring) habitat restoration. These aquatic conservation and restoration actions would improve the quantity, function, sustainable productivity, and distribution of recreational fisheries as directed under Executive Order 12962, Recreational Fisheries.

Clean Water Act Section 303 (d)

There is one stream within the project area, Myrtle Creek, which is currently on the 303 (d) list for temperature. Two other streams within the project area have been monitored for water temperature and have exceeded the maximum water temperature standards established by ODEQ at least once during the period of 1995-1999. Stream temperatures are not expected to increase under the action alternatives because riparian buffers following INFISH standards and guidelines will be applied. Increases in sediment yields are not expected with any of the action alternatives due to the gentle terrain, design features, mitigation, and riparian protection measures (INFISH buffers). No changes in the Section 303(d) List of Water Quality Impaired waterbodies would be made as a result of the action alternatives. Therefore, the action alternatives would not increase water temperature and would be consistent with the Clean Water Act and the Forest Plan as amended.

Effects on Soil Productivity

This section describes the effects on soil quality from activities proposed by each alternative. Soil Productivity was discussed as "Other Issues" in Chapter 1. The issue was described as "soils and soil productivity are a concern, particularly nutrient cycling, microorganisms, mycorrhizae, soil compaction, soil displacement, erosion and soil integrity." Each of these concerns is a subset of a broader and more inclusive concept called "soil quality." Maintenance or enhancement of soil quality is essential for performing vital ecosystem functions such as biological productivity and diversity, storing and cycling of nutrients and partitioning of water and energy. The evaluation of effects emphasizes overall soil quality. But specific effects to several components of soil quality are named and described. Effects to soil quality are coupled with sedimentation and effects on riparian and fish habitat and water quality. For more information about these effects see the section titled "Effects on Watershed/Fish Habitat (Issue 3)." See Table 4-6 for a sample of soil data; the complete table of data for this project is located in Appendix E.

Table 4-6. A sample of soil data from the Silvies Watershed Restoration Project Area.

Stand#	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit (Land Type)	Subsoiling Potential	Existing Detrimental Conditions %	Detrimental Conditions % Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
1.01	123	CT*	Curry I #1	71/85	Low	0	5-7	Yes
1.02	74	CT*	Curry I #1	71/74	Low	0	5-7	Yes
1.03	14	PCT		71/85	Low	0	5-7	Yes
1.04	4	JR		71	Low	0	5-7	Yes

Effects on soil quality are described in terms of physical impacts, biochemical and biological impacts, and erosion. Effects to soil productivity can generally be categorized as follows:

Soils Impacts – Compaction, Displacement, and Puddling

Soil compaction is defined as an increase in soil bulk density of 20% or more from the undisturbed level for volcanic ash soils. For all other soils, it is an increase in soil bulk density of 15% or more. Soil displacement is defined as the removal of more than 50% of the A horizon from an area greater than 100 square feet and at least five feet in width. Soil puddling is defined as ruts or imprints that are six inches deep or more. Soil deformation and loss of structure are observable and usually bulk density is increased. Each of these conditions is considered detrimental (FSM 2520, R-6 Supp. No. 2500.98-1, Forest Plan, Standards and Guides). An aerial extent of more than 20% of an activity area in these conditions and erosion, including the permanent transportation system, is detrimental (FSM 2520, R-6 Supp. No. 2500, 98-1).

Soil Biochemical and Biological Impacts-Nutrient Cycling, Soil Organisms, Soil Organic Matter

Nutrient cycling is an important ecosystem process that contributes to the maintenance of forest soil fertility, soil development, and availability of nutrients for sustaining forest productivity. Excessive removal of fine organic material (litter, duff and woody material less than 3" in diameter), coarse woody material (greater than 3" in diameter) and soil organic matter by mechanical means, or fire, (prescribed or wildfire) can alter nutrient cycling and soil organisms. Mechanical removals reduce the amount of material available for decomposition and release of nutrients. Fire reduces organic materials by combustion. Nutrients can be removed by volatilization, erosion of ash and leaching. Soil organisms can increase or decrease, depending on the species and the amount and type of organic material. Soil structure changes, such as compaction and puddling, results in death of some organisms and changes the population distribution. Excessive accumulation of organic material also can alter nutrient cycling by immobilization of nutrients. The population distribution of various soil organisms can change depending on the type and amount and location of organic material.

Soils Impacts - Erosion

Soil erosion is the wearing away of the land surface by water, wind, gravity, ice or other natural or anthropogenic agents that remove soil or geologic parent material from one point on the surface to another. Common forms of erosion are sheet and rill, gully, dry ravel and mass wasting (landslides). Accelerated soil erosion can decrease soil productivity and, when material is deposited as sediment, decrease water quality and fish habitat.

Direct, and Indirect Effects from Alternative One - No Action

There would be no new direct physical impacts, such as compaction, displacement or puddling.

Where soil compaction or puddling exists, there would be no opportunity to implement subsoiling for restoring physical conditions. After several decades, natural processes, such as freeze-thaw, wetting and drying, root growth and burrowing animals, may restore soil physical conditions to near pre-managed conditions.

Continued increases in vegetation densities outside HRV, and increases in late successional species, such as Douglas-fir and white fir, on soils that historically did not support these species, would tend to increase fine roots near the soil surface in duff layers. (See the vegetation specialist report). Also, continued increases in tree densities with accompanying increased fuel accumulations in resource-limited ecosystems would likely result in significantly altered nutrient storage and recycling processes (Harvey, et. al. 1999). Thus, vegetation would become increasingly stressed because of the inability of the soils to supply adequate moisture and nutrients. If stand replacement fires occur, substantial effects to soil nutrients, mycorrhizae, organic matter, soil organisms, and erosion would be likely because of combustion of organic matter, volatilization of nutrients, and soil erosion. A study in lodgepole pine and jack pine forests in Canada, found that wildfire destabilizes the ectomychorrizal and decomposer fungi community to a greater extent than clearcutting (Visser and Parkinson 1999). Visser and Parkinson also found that recovery to pre-disturbance conditions is more rapid following clearcutting than with wildfire. Similar results would be expected in the Silvies Watershed soil-vegetation systems.

Stand replacement fires also generate enough heat to cause hydrophobicity, or water repellency, in some soils (DeBano 1991). Because of reduced infiltration, soil erosion occurs. There is a high probability that hydrophobicity would occur with stand replacement fires, especially on the soils forming in volcanic ash. The soils where hydrophobicity is most likely to occur with stand replacement fires are in Landtypes 48, 58, 65, 75, 82 and 83.

Juniper would continue to increase on soils that historically have not supported them or supported juniper in low frequencies. Those soils are mostly shallow or moderately deep and have low moisture holding capacity and low nutrient supply. Plant-available moisture would be increasingly limited so that species, other than juniper, would become excluded. The indirect effect would be reduced plant diversity. The soils where this is highly probable are in Landtypes 7, 44, 46, 47, 73, 74 and 85.

On those areas where deep ruts exist from past practices, mainly poorly maintained roads and skid trails, soil erosion is expected to continue. These conditions will continue to be sources of sediment that impair water quality and fish habitat. Since no roads would be decommissioned, some localized significant and critical sources of erosion and sediment would continue. This would be most likely to occur on the most highly erosive soils occupied by native surfaced roads. Map 35, Chapter 2, documents the existence of native surfaced roads on erosive soils. Where existing stream crossings are within areas adjacent to highly erosive soils, such as ash and loamy over clayey soils on slopes greater than 30%, there is likely to be continuing sedimentation. Map 36, Chapter 2, illustrates the relationship between stream crossings and general soil groups. No new road closures would occur so chronic road generated erosion and sediment would continue. Once a road has been built, traffic has been attributed as the major cause of sediment from a road. Traffic-induced sediment can be quite high (Elliot, and others 1996).

Cumulative Effects from Alternative One - No Action

Past management activities have changed soil physical, chemical and biological conditions in the project area. Where ground equipment has operated, soil compaction, puddling and displacement have occurred to varying degrees. About 90% of the project area remains well below detrimental soil physical conditions. About 1% of the project area exceeds soil quality standards and an additional 9% is approaching those limits (See Soils-Affected Environment). Because no new ground equipment is planned in this alternative, or is likely in the foreseeable future, some gradual improvements are probable through natural processes including freeze-thaw cycles, wet-dry cycles, root penetration and growth, and burrowing animals. Measurable changes probably would take several decades to be observable in most of the soils in this watershed because the soils don't often freeze to depths of more than a few inches, root growth is relatively slow in these droughty soils, and the soils are of relatively low productivity.

Because stand densities would remain high, the cumulative effects within the watershed would accrue to water yield and timing of flows. Seasonal low flows are likely to be low and continue to decline in the foreseeable future because of high transpiration losses and depletion of soil moisture. High levels of transpiration would leave little excess water for soil storage and runoff. Thus, recharge of springs and downstream yields would be potentially lower over the long-term than for any of the action alternatives.

Direct and Indirect Effects from Alternative Two - the Proposed Action, and Alternatives Four, Five, Seven, and Seven-A

Forest Plan soil quality standards would be met in each of these alternatives as described in the alternatives. In order to meet the soil quality standards, existing skid trails would be used, equipment would be operated over packed snow or frozen ground, operated when soils are dry, or operated over a bed of forest residues. So, there would be minimal detrimental impacts to soil physical properties and to soil erosion. Where soil compaction and puddling exist from past practices in excess of soil quality standards, and where soil compaction and puddling occur during commercial activities, subsoiling to meet standards would lead toward restoration of soil physical properties and improved habitat for soil organisms. However, all of the units that currently exceed the standards have low suitability for subsoiling and only three units that exceed 15% in detrimental conditions have moderate suitability for subsoiling. Those three units are Burnt 3, Mud 33.02 and Dry 27.15.

There would be some localized impacts to soil fauna, mycorrhizae, and nutrient cycles for up to three to five years, until needles and other small diameter organic materials fall to the forest floor, following harvest and slash removal or prescribed burning.

"Mitigation Measures, Design Features and Management Practices," described in Chapter 2, should be adequate to protect soils from measurable amounts of new detrimental compaction, displacement, puddling, and soil erosion. Also, leaving about five to 20% of the harvest-generated slash and existing fuels, according to the fire and fuels specialist report, together with the remaining standing trees, would be adequate to protect soil organisms, soil organic matter and nutrient cycling.

Grapple piling using machinery that has a ground pressure of less than 7 psi typically makes only one pass, and operates over slash where possible, is considered to have less impact than a feller-buncher operation. However, recent monitoring and data from areas of similar soils and conditions are only available for feller-buncher operations and so this data will have to serve as a basis for discussing impacts of grapple piling. The effects of a feller-buncher logging operation have recently been monitored on both the Fremont and Malheur National Forests. On the Fremont, six units were monitored at two different locations, both within and one meter outside of feller-buncher tracks. Monitoring results indicate that the change in soil bulk density within the feller-buncher tracks, as compared to outside the tracks, ranged from zero to an increase of 8 percent (based on an average of five measurements at each monitoring site), with the average increase in soil bulk density for all 12 locations being 4%. The overall result was no net increase in detrimental soil compaction (change in soil bulk density must be more than 15%, 20% or more for volcanic soils) due to the feller buncher operation. Similar results were found on the Emigrant Creek District of the Malheur National Forest in 1996 (McNeil 1996, unpublished). A summary of the results of this study revealed that 11% of the logging unit monitored was tracked by a feller-buncher, of which 15% showed an increase in soil bulk density (some level of compaction) – for a total of less than 2% of the unit showing an increase in compaction. The increase in soil bulk density averaged 5% with a standard deviation of 7%. The overall result was only a negligible increase in detrimental soil compaction (1% or less) due to the feller buncher operation.

Based on this recent monitoring information from the Malheur and Fremont National Forests, grapple piling of slash within specified units would create only a small amount of soil displacement from turning machinery and negligible detrimental compaction. Design features would limit the overall detrimental soil impacts from grapple piling machinery within the proposed units to less than 1%. It is unlikely that these limited impacts would lead to soil erosion and a reduction in water quality or aquatic habitat (sedimentation).

Skid trails for this operation would occupy less than 9% of each unit since skid trails would be spaced about 120 feet apart. It is estimated that skidtrails are usually about 50% to 80% compacted, and because existing skidtrails would be reused where they are appropriately located, skidding would increase detrimental impacts by about 4-5%. The amount of compaction that may occur depends much more on soil moisture than on soil type. If the unit happens to be harvested over deep snow or on deeply frozen soil, compaction would typically be less than 0.5%. Use of feller-bunchers on dry soil would increase detrimental impacts by about 1% (see discussion below), and detrimental soil impacts expected from grapple piling machinery would be limited to 1% or less (see discussion below), for an expected overall total increase of 5-7%. Design features requiring equipment use under dry soil or winter conditions and mitigation requiring tillage/remedial action of landings and skid trails in units expected to exceed 20% detrimental soil impacts, meets Regional direction and Forest Plan standards.

Commercial harvesting activities have the highest potential for negatively impacting soil physical properties. The proposed action (Alternative Two) and Alternatives Four, Seven, and Seven-A would have ground impacting mechanical equipment activities on the largest number of acres. The greatest potential for detrimental soil compaction and puddling would occur in these alternatives. Alternative Two would have somewhat less potential for compaction and puddling than Alternatives Four, Seven, and Seven-A because fewer acres would be mechanically treated. Alternative Five would have the least potential for compaction and puddling, of these commercial harvest alternatives, because this alternative has the least number of acres treated mechanically. Even though soil quality standards would be met by the mitigation measures in each of the alternatives, the fact that there are differences in acres treated means that the possibility exists for some differences in the amount of land that might be in detrimental soil physical conditions. The standards permit up to 20% of an activity area to be in detrimental conditions, including the permanent transportation system. Measurable soil displacement is unlikely in any of these alternatives because there would not be tractor piling of slash by blading. There are no harvest activities planned for RHCAs, so soils in RHCAs would not be impacted from harvest activities in any alternative.

Many of the soils within the project area are not suited to subsoiling because of their high stone content, shallow depths, or steep slopes. So, if soil compaction and puddling do occur in excess of standards during equipment operations, subsoiling to restore soil physical processes and conditions isn't often possible in these soils. The soils with the most suitable properties for subsoiling are in Landtypes 58, 81 and 82.

Removal of harvest generated slash, existing fuel accumulations, and prescribed burning to reduce vegetation densities would have a slight probability for negatively impacting soil fauna, micorrhizae, and nutrient cycles in localized areas. Areas such as landings and jackpot burn piles would probably be negatively impacted for about five to ten years, if slash is burned very hot (Harvey et al. 1994, Fire and Fuels Specialist Report). However, after about five to ten years, nutrient cycles, soil fauna, and mycorrhizae would probably be improved and moving toward HRV. Natural variability in soil organic matter, nutrient levels, soil organism populations, and physical properties are highly variable in these soils. Therefore, there is a very low probability of detection of measurable positive or negative effects to these soil properties from planned fuel treatments or removal of harvest generated slash among these alternatives (Meurisse et al. 1991). Underburning will release nitrogen, sulfur, phosphorus and cations, such as potassium and calcium, which can be immediately available for improving plant growth.

Low to moderate intensity underburns together with reduction of stand densities during thinning would probably stimulate growth of shrubs, grasses, and lichens, which provide protective ground cover and are hosts for bacterial symbionts that fix nitrogen from the atmosphere and make nitrogen available to higher plants. These understory plants also are important sources of organic matter that can be decomposed and incorporated into the soil by soil organisms. This organic matter is an important nutrient reservoir. These nutrient cycling processes are important for maintaining nutrient availability and for tree nutrition in forest ecosystems (Cromack 1998). Alternatives Four, Seven, and Seven-A would have the most acres of stand density reduction and would have high amounts of underburning so that there would be a high probability of stimulating growth of desirable plants that create conditions for improving and sustaining nutrient cycling for tree nutrition and tree vigor. Alternative Five would have the least amount of stand density reduction and Alternative Two would have the second lowest stand density reduction of the action alternatives.

Alternatives Two, Four, Seven, and Seven-A would have the most fuel treatment acres by prescribed burning and the most acres moved toward historic conditions. So, in the long-term, they would have the lowest probability for stand replacement wildfires that could potentially have adverse effects on soil organisms, soil organic matter, nutrient cycles and erosion. Alternative Five would have the least amount of fuels treated, so would have the highest probability for stand replacement wildfires that could adversely affect soil organisms, soil organic matter, nutrient cycles and erosion for several years (Visser and Parkinson 1999, DeBano 1991).

Road closures, maintenance and decommissioning activities are designed to correct erosion and sediment problems associated with roads. Road decommissioning probably would have some temporary, localized increases in erosion and fine sedimentation for one to three years. The magnitude of any increases would be highly variable and dependent on storm timing, intensity, and duration prior to vegetation establishment and any ground cover accumulation through needle and litter fall. After about three years, decommissioned roads would be stabilized and erosion would be minimized. Alternative Four has the highest number of miles of permanent road closures so would have the highest probability for reducing chronic road-related erosion and sediment after about three years. Alternative Two has the next highest number of miles closed followed by Alternatives Seven and Seven-A. Once a road has been built, traffic has been attributed as the major cause of sediment from a road. Traffic-induced sediment can be quite high (Elliot et al. 1996).

Alternative Four has the highest number and miles of decommissioned roads, so would have the highest probability for reducing erosion and sediment from critical areas such as stream crossings, steep gradients into drainage-ways, and roads on highly erosive soils. Alternative Seven would have the second most miles decommissioned. Decommissioned roads will have a greater effect than road closures on reducing erosion and sediment in critical areas such as existing stream crossings or steep gradients into drainage-ways and roads on highly erosive soils. Alternative Five has the least amount of permanent road closures, and an intermediate number of miles decommissioned, so would have the highest probability for road erosion and sedimentation in the long-term.

Alternatives Two, Four, Seven, and Seven-A have the highest probability for increasing road-related erosion and sediment during commercial activities, and for about three years after completion, because of the temporary road construction and re-construction. After about three years following the temporary road construction, there would be no measurable difference in road erosion and sedimentation among these alternatives. The maximum amount of temporary road construction is 3.5 miles. The probability that measurable amounts of erosion and sedimentation would occur in localized segments of the temporary roads is high. The estimated volume of soil that would be eroded would probably be less than 60 to 75 yds^3 the first year after construction. The amounts would decline slightly during the life of the project. After completion of the project, the roads would be decommissioned. Probably less than 50 to 75% of the eroded soil would reach streams. Alternative Five would have about 25% lower volumes of erosion and sedimentation.

Cumulative Effects from Alternative Two - the Proposed Action, and Alternatives Four, Five, Seven, and Seven-A

Past management activities have changed soil physical, chemical and biological conditions in the project area. Where ground equipment has operated, soil compaction, puddling and displacement have occurred to varying degrees. Among the activity areas, about 90% remains well below detrimental soil physical conditions, while about 1% does not meet soil quality standards over 20% or more of the area with an additional 9% approaching this condition (see Soils-Affected Environment in Chapter 3). Each of these action alternatives would have ground impacting equipment operations to remove trees and harvest-generated slash. Mitigation measures are prescribed to minimize additional impacts to soil physical conditions. With these measures, there is a low probability that new areas of soil compaction and puddling would develop. Because natural processes require several decades to recover soil conditions to natural functions, future entries within several decades would probably add a small amount of soil compaction and puddling. Some gradual improvements are probable through natural processes, including freeze-thaw cycles, wet-dry cycles, root penetration and growth, and burrowing animals. Cumulatively, past, present and foreseeable future activities are not likely to result in measurable changes to soil physical, chemical or biological properties. Use of existing skid trails would produce no measurable new effects to soil physical properties, erosion and sedimentation, or soil biological and chemical properties in foreseeable future entries. If new skid trails were used in future entries, there potentially would be some new and cumulative effects of soil compaction and puddling. Because most of the units that have detrimental soil conditions on 15% or more of prior activity areas have low suitability for subsoiling, there is little opportunity to improve soil physical and biochemical properties, soil organism populations and functions, and soil erosion and sedimentation by subsoiling. Natural processes will be required to restore vital functions to the soil, which will take several decades.

Past management, such as exclusion of fire and thinning, has created stands that are denser than most of the soils in the project area can sustain without undue plant stress. Severe stress can lead to insect and disease conditions that are outside HRV. Proposed actions to reduce stand densities would result in a reduction of transpiration losses and leave more water for recharge to springs and seasonal low flows. Alternatives Four, Seven and Seven-A would have the highest probability for reducing transpiration losses. However, as tree growth increases and as roots increasingly occupy the soils, there will be a gradual reduction in excess water for release to streams and springs. Alternative Five would retain and regain the highest stand densities and therefore have the lowest probable increase in water yields over the long-term. The net effect to overall soil quality for the long term should be somewhat positive. Most of the soils would be able to perform their vital functions of productivity and diversity, nutrient storage and cycling, and partitioning of water and energy. Soil and ecosystem health likely would be enhanced in each of the alternatives. Vital soil functions would be enhanced the most with Alternatives Four, Seven and Seven-A through the combined actions of reduced stand densities compatible with the soil properties, stimulation of understory plants that probably would enhance nitrogen fixation, and organic matter decomposition and incorporation into the soil.

Direct and Indirect Effects Specific to Alternatives Three and Six

Forest Plan soil quality standards are expected to be met in each of these alternatives. No new commercial harvest activities would be implemented, so no new soil compaction, displacement, or puddling would occur. Where compacted soils already exist from past practices, they would likely remain compacted for several decades until natural processes could ameliorate these conditions.

Prescribed burning and precommercial thinning would be the primary methods of treatment to reduce stand densities of small diameter trees. Some areas may be treated mechanically. If thinning slash is treated mechanically, there would be a low probability for soil compaction and puddling because of a limited amount of equipment travel, and design features that would minimize soil impacts. Alternative Three would have a higher potential for soil physical impacts than Alternative Six, if slash were treated mechanically, because more acres would be treated. Reductions in surface duff and litter by fire would help to reduce the amount of fine roots near the surface and stimulate nutrient cycling so that remaining larger trees would respond with increased vigor for about ten years after treatment. The forest floor would then become thicker with litter and duff, and fine roots would tend to re-occupy the near surface. As stand densities increase, tree vigor would again be reduced because of limited moisture and nutrients. Tree mortality, from insects and diseases, probably would increase and the risk of stand replacement fires would increase. Alternative Six would show the reduced plant vigor before Alternative Three.

The risk of stand replacement fires would be reduced for about five to ten years. After about ten years, the risk of stand replacement fires would increase because stand densities would have increased to levels at which soil moisture and nutrients would become limited. This would result in stressed sites and lead to a higher risk of insect and disease conditions that increase tree mortality. Continued increases in tree densities with accompanying increased fuel accumulations in resource-limited ecosystems, would likely result in significantly altered nutrient storage and recycling processes (Harvey et. al. 1999). If stand replacement fires occur, substantial effects to soil nutrients, mycorrhizae, organic matter, soil organisms, and erosion would be likely because of combustion of organic matter, volatilization of nutrients, and soil erosion. A study in lodgepole pine and jack pine forests in Canada found that wildfire destabilizes the ectomychorrizal and decomposer fungi community to a greater extent than clearcutting (Visser and Parkinson 1999). Visser and Parkinson also found that recovery to pre-disturbance conditions is more rapid following clearcutting than with wildfire.

Stand replacement fires also generate enough heat to cause hydrophobicity, or water repellency, in some soils (DeBano 1991). Because of reduced infiltration, soil erosion occurs. There is a high probability that hydrophobicity would occur with stand replacement fires, especially on the soils forming in volcanic ash. Alternative Six would have the highest probability of stand replacement fires because fewer acres would be treated and fuel loads would remain relatively high.

Only small diameter juniper would be reduced by prescribed fire. Large diameter juniper will continue to increase on soils that historically have not supported them in both Alternatives Three and Six. Those soils are mostly shallow or moderately deep and have low moisture holding capacity and low nutrient supply. Plant available moisture would be increasingly limited so that species other than juniper would continue to be excluded. The indirect effect would be reduced plant diversity. Soils that may have previously supported microbiotic crusts may again support them on some small, localized areas that would be exposed by burning. The probability of contiguous crusts forming is very low, however.

Road closures and decommissioning activities are designed to correct erosion and sediment problems associated with roads. Once a road has been built, traffic is thought to be the major cause of sediment from a road. Traffic-induced sediment can be quite high (Elliot et al. 1996). Road decommissioning could have some slight increases in erosion and fine sedimentation for one to three years. After three years, decommissioned roads would be stabilized and erosion would be minimized. Alternative Three would have the highest probability for reducing chronic erosion and sediment from roads because of the miles of roads closed and decommissioned. It would be similar to Alternative Four. Alternative Six would have fewer miles of road closed and decommissioned than Alternative Three, but more miles would have maintenance. Alternative Six would have a lower probability for reducing chronic erosion and sediment than Alternative Three and it would be similar to Alternatives Seven and Seven-A.

Cumulative Effects from Alternatives Three and Six

Past management activities have changed soil physical, chemical and biological conditions in the Silvies Watershed. Where ground equipment has operated, soil compaction, puddling and displacement have occurred to varying degrees. About 90% of the project area remains well below detrimental soil physical conditions. About 1% of the project area does not meet soil quality standards and an additional 9% is approaching those limits. (See section titled "Soils" in Chapter 3). Because the only new ground equipment planned in these alternatives is for removing thinning slash, the probability of adding to existing compacted, displaced, or puddled soils is very low, but is higher in Alternative Three than Alternative Six, because more acres are planned for treatment. Also, no additional physical impacts are likely in the foreseeable future. Some gradual improvements are probable through natural processes including freeze-thaw cycles, wet-dry cycles, root penetration and growth, and burrowing animals. Measurable changes probably will take several decades to be observed in most of the soils in this watershed because the soils don't often freeze to depths of more than a few inches, root growth is relatively slow in these droughty soils and the soils are of relatively low productivity.

Stand densities would be reduced from the current levels by thinning and prescribed fire. The reduction would be mostly in the small diameter classes (see the vegetation specialist report). The cumulative effects to soil nutrient cycles, soil organisms, and organic matter would result from the combined effects of thinning and prescribed fire. The net effect from past practices, present actions and foreseeable future activities would probably be only a short interval of about ten years of improved nutrient cycling. Soil organism populations would probably be minimally affected over the long term.

The combined effects of past practices with the present and foreseeable activities would result in the soils being fully occupied by roots to exploit moisture and nutrient supplies. There would be a temporary and insignificant reduction in transpiration losses from the current conditions. Because stand densities would return to relatively high levels (outside HRV) in about ten years, there probably would be no measurable increases in seasonal low flows or recharges to springs. High levels of transpiration would leave little excess water for soil storage and runoff; there would be no measurable difference between Alternative Three and Alternative Six. The cumulative effects of road closures, decommissioning, and no foreseeable temporary road construction would result in reduced erosion and sedimentation within the watershed and downstream for the foreseeable future.

Consistency with Direction and Regulations

All action alternatives would be consistent with applicable Forest Plan soil protection standards (standards 125-129, FP IV-40). Stands that currently exceed 20% detrimental conditions or stands that would exceed 20% detrimental conditions after implementation would be monitored and mitigated as described in Chapter 2.

Effects on Vegetation Condition (Issue 4)

This section evaluates the effects of the alternatives on existing and future characteristics and patterns of vegetation, including stand structure and composition, and natural processes such as wildfire, insects, and disease.

Vegetation Response to Fire

The following is a general discussion of how different vegetation types respond to fire. The vegetation in the project area is highly adapted to periodic fire in forest, shrubland, and grassland ecosystems. The adaptations that enable the vegetation to survive, increase site occupancy, and attain renewed vitality following fire include thick bark (in ponderosa pine and western larch), ability to sprout from root crowns and rhizomes (in shrubs and graminoids like willow, alder, sedges, and rushes), and protection of buds in crown foliage (in grasses like bluebunch wheatgrass and Sandberg's bluegrass).

Forested Stands

Tree species occurring in the Blues, Wallowas, and Seven Devils have been rated into categories of fire resistance (Johnson 1998). Tree species that occur within the project area and their fire resistance include:

- Very high resistance - western larch
- High resistance – ponderosa pine and Douglas-fir
- Moderate resistance – grand fir (white fir)
- Low resistance – lodgepole pine.

Thick bark enables western larch, ponderosa pine and Douglas-fir to sustain moderate and light intensity underburns (Johnson 1998). Within the high resistance category, ponderosa pine is more resistant than Douglas-fir. Resistance also varies with size of the tree; the larger the tree the better resistance to fire.

Non-Forest Vegetation

Rangeland communities where woodlands, savannas, shrublands and grasslands regularly occur are composed of species with varying responses to fire. Historically, fires have visited rangelands on frequent return intervals. The natural fire regime of these areas in the project area is one of frequent (5-23 years) low-intensity fires (Schwenke 2003). As with forest stands, there has been a decreased frequency of fires over the last century resulting primarily from effective fire suppression. As a result there has been an increase in fire-susceptible plant species in rangelands; juniper and sagebrush have increased in densities and extent in sites where high-frequency fires once kept them subordinate to fire-adapted vegetation.

MOIST AND DRY UPLAND SHRUBLANDS AND DRY UPLAND HERBLANDS

Numerous studies have shown that sagebrush (Blaisdell 1953, Blaisdell et al. 1982, Neuenschwander 1980, Young 1983), bitterbrush (Blaisdell 1950), mountain mahogany and currant species (Bradley et al. 1992, Bradley et al. 1991, Crane and Fischer 1986) are all highly susceptible to fire and would be expected to be killed by prescribed fire; however, sagebrush and bitterbrush will resprout on moist ground (Johnson 1998). Rubber rabbitbrush is often top-killed by fire (Martin and Dell 1978, Mitchell 1984); mortality after fire is variable, but is generally very low (Neuenschwander [n.d.], Plummer et al. 1955).

In general, bunchgrasses with large accumulations of dead material can generate high temperatures for long periods after fire has passed, which can reduce fire survival for older plants (Wright and Bailey 1982).

Idaho fescue is susceptible to severe damage by fire owing to perennating buds located in the dense basal tufts where fire can burn hot and linger (Johnson 1998). Sandberg's bluegrass, prairie junegrass and bluebunch wheatgrass are all tolerant and resistant to fire damage (Johnson 1998). Although bottlebrush squirreltail is generally top-killed by fire, its small size and low density of coarse fuel per unit basal area make it relatively fire tolerant (Britton et al. 1990, Volland and Dell 1981, Wright 1971). Orchardgrass is reported to increase or remain stable after burning (Cocking et al. 1978, Pase et al. 1977). Kentucky bluegrass and common timothy are moderately resistant to fire. Fires may stimulate seed production and rhizome growth. When plants are dormant, cool fires have little effect on them (Crowe and Clausnitzer 1997).

RIPARIAN HERBLANDS

Willows, alder, red-osier dogwood and common snowberry are all well-adapted to fire and have the ability to sprout from roots, root crowns, basal stems and stolons, even when fire kills the aboveground plant parts (Lyon and Stickney 1976, Crowe and Clausnitzer 1997). Sedges and rushes are primarily located in wet associations and probably do not burn frequently. Those with deep-seated rhizomes are well-suited to survive low to moderate intensity fires. They can also colonize burned areas by seeds and with the spread of rhizomes.

Direct and Indirect Effects of Alternative One – No Action

Under the No Action alternative, there would be no commercial or precommercial thinning, no fuels treatments, and no restoration activities conducted. Because there are no treatments proposed under this alternative, there would be no direct effects to vegetation resulting from implementation.

Effects to Stand Structure and Forest Health

In general, the indirect effects of this alternative in all forested areas would be that overstocked conditions would continue to exist. Stands would continue to increase in density as growth and regeneration continue. Competition for available resources, such as moisture and nutrients, would continue to increase, and vigor of the trees would continue to decrease. Scattered individual trees in the highest density areas would continue to die periodically. Number and diversity of shrubs, forbs, and grasses would decrease as stand density increases (Oliver and Larson, 1990).

Large overstory ponderosa pine would continue to decline and mortality rates would continue to increase. Naturally endemic levels of western and mountain pine beetles would likely increase, and may become epidemic due to heavy stocking and low vigor of the trees. Mortality due to these insects would probably increase, especially if a drought occurred. When bark beetle outbreaks occur on low productivity sites, higher mortality rates from beetles tend to occur in the largest trees first (Lynch 1958, Keen 1950, Eckberg et al. 1994), resulting in a natural thin from above, and may approach a clear cutting (Keen 1936). Ponderosa pine stands begin to be at risk when they become 8” dbh and are 50 to 100 years old (Gast et al. 1991), which is the approximate age of about 5,000 acres in the Hot Dry PAG. Blackstain root disease would continue to spread in small disease centers and kill pine. Stumps infected with Annosus root disease would not be treated to prevent spread, so this disease would likely continue to increase.

White fir and Douglas-fir would continue to increase in density in mixed conifer stands, while the ponderosa pine component would continue to decrease. Ground vegetation would continue to decrease in quantity and diversity. Populations of naturally occurring defoliators such as Douglas-fir tussock moth and western spruce budworm would likely reach outbreak levels. Douglas-fir mistletoe would likely increase, as the opportunity to spread throughout stands would increase with increased tree density. If trees are weakened by these factors, secondary disturbers such as fir engraver in white fir and Douglas-fir bark beetle in Douglas-fir may kill trees. Indian paint fungus may become activated in white fir if these trees are stressed by other factors.

When stand-replacing events occur, the ability of forested stands within the project area to naturally regenerate would be compromised as early seral species give way to climax species. Natural regeneration may not occur, and historically forested areas may become non-forested. The seed source for early seral species would be deficient, and if natural regeneration should occur, it would be to later seral species. If a stand-replacing event occurs, regeneration of that area would largely be dependent upon artificial reforestation.

There would be no treatment of western larch to improve the regeneration and increase the percent composition of this species.

In the absence of restoration treatments, most aspen stands would continue to decline, and small stands would continue to be lost. It is estimated that up to 20-50% of existing aspen stands may be lost within the next 20 years (Vegetation Specialist Report).

No effort would be made to protect or restore the two existing cottonwood stands. One stand may be able to regenerate naturally, but has not been able to do so effectively in the past. The other stand is made up of only one tree; regeneration is very unlikely, since this species requires pollination and seed production to propagate. The cottonwood stands would likely continue to decline and may die out. Because this species is so limited in the project area, a stand replacing wildfire could eliminate it.

Effects to Non-Forest Vegetation

Without vegetation treatments, natural processes would continue in forested stands that were previously non-forest. Tree canopies would continue to reduce the amount of sunlight and precipitation that would reach the ground. Duff layers would increase and trees would use up most of the available soil water and nutrients. The grasses, forbs and shrubs would continue to decline in abundance, vigor and density.

Without the introduction of prescribed fire to Woodlands and Non-Forested PVGs, juniper would continue to encroach into non-woodland areas causing a decrease in available moisture to other plants (grasses, forbs, and shrubs) and a corresponding decrease in the number and density of these species. As desirable plant species die out, the areas they occupied would become fire resistant due to a lack of continuous fuels. In shrub-dominated areas, shrubs would increase and forbs and grasses would decrease.

Historically, fires have visited rangelands on frequent return intervals. The natural fire regime of these areas in the Silvies Canyon Watershed Restoration Project Area is one of frequent (5-23 years) low intensity fires (Schwenke 2003). Past management actions, primarily effective fire suppression, have decreased the frequency of fires over the last century. Today the unprecedented combination of decreased low-intensity surface fires, increased stand-replacing fires, and fire-exclusion management practices has resulted in a high percentage of plant communities vulnerable to crowning fires. No Action would result in the persistence of these conditions until a large stand-replacing fire occurs.

Effects to Natural Fuels

Natural fuels would not be reduced in the project area. In all timber types, increased mortality due to a variety of factors would contribute to the risk of stand replacing wildfire. As individual trees die and eventually fall, the ground and ladder fuels components would increase. Mistletoe brooms, where they occur, would contribute to ladder fuels. Should a fire occur, it would likely be larger, of higher intensity and more difficult to contain than historically.

The northern half of the project area has higher stocking, more natural fuels and ladder fuels, and greater forest continuity than the southern half; more extreme fire behavior and conditions would be expected in the northern half of the project area. Wildfires would be more likely to spread from the project area to adjacent Federal and non-Federal lands under this alternative.

It is expected that the mortality rate associated with wildfire would be higher than found historically, due to increases in natural fuels, overstocking, and higher percentages of late-successional species. A stand replacing fire would move the structure toward stand-initiation phase, and would set back structural development approximately 100 years; diversity of ground vegetation would increase, while tree species diversity would decrease (Oliver and Larson, 1990). Fire would tend to select against white fir and Douglas-fir, and for ponderosa pine and for lodgepole pine and western larch, where they occur.

If a fire occurred in a forested stand adjacent to a non-forested site, it would likely burn into the non-forested area in a mosaic fashion, wherever ground vegetation was continuous, at a hotter intensity than would be found historically. This would probably cause more severe environmental damage than a natural, low-intensity fire. Some of the invading juniper would be killed, as would shrubs; grasses and forbs would increase in the short-term.

Cumulative Effects of Alternative One – No Action

Past disturbances and activities that have affected the vegetation condition in the project area include timber harvest, precommercial thinning, road construction, livestock grazing, fire, and fuels treatments. Reasonably foreseeable future disturbances and activities under the No Action alternative include continuation of present levels of livestock grazing and open roads. Since current levels of natural fuels and tree stocking would not be reduced, and stand conditions are such that fuels levels and stocking would continue to increase, it is reasonable to predict that stand replacing event(s) such as wildfire or insect/disease outbreak would occur in the foreseeable future. Forest structure would be moved toward stand initiation phase, and structure development would be set back 100-250 years. Following a stand-replacing event, intense salvage harvest and reforestation would likely occur.

Direct and Indirect Effects Common to All Action Alternatives

All action alternatives propose treatments that would reduce stocking from below, treat natural fuels, and move species composition toward early seral species; the level of effects to vegetation would vary between alternative depending on how many acres were treated and the intensity of treatment. In general, resulting and future stand structure and composition would be closer to what existed before the beginning of the 20th century. The action alternatives vary in the number of acres treated and the intensity of the different types of treatment. Table 2-20 summarizes the proposed commercial harvest, precommercial thin, and juniper removal in each alternative. Table 4-7 summarizes the acres of commercial harvest and PCT in fuel blocks.

Table 4-7. Acres of Commercial Harvest and PCT in Fuel Blocks.

Alternative	Acres of Commercial Harvest in fuel blocks	Acres of PCT in fuel blocks
Two	10,094	11,874
Three	0	12,116
Four	12,208	12,570
Five	4,645	6,977
Six	0	5,819
Seven	12,207	12,569
Seven-A	11,737	11,864

Effects to Stand Structure and Forest Health

Table 4-8 shows the acres of each structure being treated by alternative.

Table 4-8. Acres of Stand Structure Manually Treated by Alternative.

Alternatives	Structure*							
	Non-Forest	SI	SEO	SEC	YFMS	UR	OFSS	OFMS
Existing Condition	15,201	942	7,765	4,734	20,772	6,567	31	9,225
Two	583	127	3,612	2,473	8,925	1,046	29	2,857
Three	593	127	2,311	1,247	7,909	1,007	29	3,391
Four and Seven	664	231	3,802	2,554	9,228	1,058	29	3,624
Five	579	127	2,913	2,043	7,762	1,012	29	2,669
Six	71	12	759	894	5,807	714	29	2,512
Seven-A	664	231	3,802	2,554	9,105	1,058	29	3,021

*SI= stand initiation; SEO=stem exclusion open canopy; SEC=stem exclusion closed canopy; YFMS=young forest multi-story; UR=understory reinitiation; OFSS=old forest single story; OFMS=old forest multi-story.

All action alternatives propose precommercial thinning. This activity would move the stand density and the forest composition for trees 7" dbh and under towards historical stand conditions in this size class. Generally speaking, trees in treated stands would grow faster than trees in untreated stands. Stands classified as YFMS, SEO, SEC, and UR that are treated would move towards OFMS and OFSS at a faster rate than stands not treated. All action alternatives would treat 27-39% of OFMS stands to maintain their old forest characteristics.

All action alternatives propose treatments in pure ponderosa pine stands to improve forest health and reduce the risk of insect and disease outbreaks and stand replacing fire. Mistletoe would be reduced in ponderosa pine stands by reducing stocking, especially of trees under 21" dbh that are affected by mistletoe; after reduction in stocking, the released trees have the ability to outgrow the mistletoe infection. Risk of bark beetle outbreak and incidence of blackstain root disease would be reduced in treated stands.

All action alternatives propose treatments in mixed conifer stands for forest composition and density. Treatments would reduce white fir and Douglas-fir with the intent to move the forest towards historic forest composition. With the reduction of white fir and Douglas-fir in the mixed conifer stands, the risk of an outbreak of defoliators, mistletoe, and stand replacement fire would be lowered on the acres treated. The spread of mistletoe would be reduced in mixed conifer by removing Douglas-fir. Prescribed burning would further reduce mistletoe because mistletoe brooms are highly susceptible to fire, and trees that are highly infected with many brooms are apt to torch out and become snags.

Ponderosa pine and western larch are more fire resistant than either white fir or Douglas-fir, so it is expected that prescribed burning would increase the composition of these species. No western larch would be cut with any alternative. Following treatments, especially prescribed burning, western larch should increase in species composition.

No regeneration harvesting is proposed in any of the alternatives. Following harvesting, areas would be fully stocked. It is expected that following treatment of units some limited natural regeneration would occur in openings through time.

All action alternatives propose aspen restoration. Removing competition for a space of 60 to 70 feet around the existing aspen stems (including suckers), would allow the aspen stands to expand in acreage. With reduction of competition, suckering would be initiated resulting in a two-storied stand of aspen. These treatments would enhance and maintain aspen areas. With all of these alternatives some site disturbances would occur. This site disturbance would further stimulate the aspen to sucker, but may impact other associated vegetation; impacts would be limited due to mitigation measures. In the RHCAs snags and large woody debris would be created under all action alternatives to enhance fisheries and watershed conditions.

Cottonwood restoration is proposed in all action alternatives. The existing stands of cottonwood would be protected and precommercially thinned. To increase the opportunity for future natural propagation of this species, planting of cottonwood would be done as cuttings become available; cuttings would be protected from herbivores. Measures would be taken to restore cottonwood by reducing competing vegetation.

The Forest Plan standards amended by Regional Forester Amendment #2 set the management level for snags at 100% potential population level (PPL), or 2.39 snags per acre 21" dbh or larger. The project area does not currently meet this standard. However, this does not mean that the project area doesn't comply with the Forest Plan. While the standard is the desired level, the current condition could be called the natural level. The project area is unable to support the desired level of snags due to past management practices, past disturbances, and the fact that approximately 6,000 acres were historically non-forested and have not been forested long enough for trees to grow to 21" dbh. All alternatives propose snag creation in replacement old growth areas. Following the guidelines described in Mitigation Measures in Chapter 2 for creating snags out of codominants and intermediates with an occasional dominant tree, would be feasible and sustainable in the long term.

Effects to Non-Forest Vegetation

In forested areas that were historically non-forest, when the canopy is opened up by vegetation activities (harvest, thinning, and burning) and duff levels are reduced, the amount of sunlight and precipitation (snow and rain) reaching the forest floor increases. Because whole tree yarding is proposed and 80% of created slash would be removed to landings, there should be little increase in slash in commercial harvest units. Precommercial thinning units would have an increase of slash for about two years until the slash is fully treated. Once the slash is treated, more sunlight and moisture would reach the forest floor and more water and nutrients would be available to the grasses, forbs and shrubs. These species would therefore increase in composition and density.

All action alternatives propose landscape scale prescribed burning (25,311-39,277 acres) that would affect shrublands and herblands. Table 4-9 lists fuel blocks and the amount of shrublands and herblands in each. Amounts of shrublands and herblands are listed by percentage and acres to show the magnitude of effects.

Direct lighting from prescribed burning would not occur in non-forest PVGs; however, there would be some indirect burning by allowing fire to back into or creep into these PVGs. Spring burning generally would be of low intensity due to the wet conditions. Fall burning would have more potential for higher intensity fire due to dryer conditions. Because of this, fall burning would be accomplished by ground ignition to maintain better control of fire intensity (Mackey 2003).

Because moist upland and dry upland shrublands and dry upland herblands PVGs within the project area have less vegetation than forested areas, these areas are expected to burn in a mosaic pattern at low intensities (Mackey 2003). The sparse herbaceous condition of these areas makes them practically immune to fire. Riparian herbland PVGs within the project area can be densely vegetated but because of the high moisture content and often cool temperatures of these sites they too are expected to burn in a mosaic pattern at low intensities (Mackey 2003). In non-forested areas similar to scab flats, less than 5% of the area would burn and this would mainly be along the timberline. Non-forested areas that contain meadows, grasses, or shrubs would be 10-40% burned depending on the density and continuity fuels. Prescribed fire would therefore create small openings in shrublands and herblands in which fire tolerant species would begin to become re-established. This would enhance biological diversity by providing for varied structure and species composition.

Table 4-9. Acres and Percent of Herblands and Shrublands by Fuel Block.

Fuel Block		Dry Upland and Riparian Herblands		Moist Upland and Dry Upland Shrublands	
#	**Acres**	**%**	**Acres**	**%**	**Acres**
1	2,484	1%	25	0%	0
2	5,298	< 1%	3	3%	173
3	5,023	4%	163	10%	525
4	2,100	< 1%	4	<1%	15
5	7,798	1%	89	12%	936
6	5,526	1%	39	35%	1913
7	3,988	< 1%	35	20%	798
8	940	3%	25	45%	422
9	895	< 1%	8	27%	242
10	3,419	2%	58	2%	68
11	696	3%	21	1%	8
12	1,110	0%	0	22%	243
Total	**39,277**	**1%**	**470**	**14%**	**5343**

Because prescribed fire intensities are expected to be low, areas of total vegetation consumption by fire are expected to be low. In the moist and dry upland shrublands and dry upland herblands PVGs, prescribed fire is expected to creep into these areas and occasionally kill or top kill the vegetation that occupies the burned areas. Sagebrush and bitterbrush would resprout after burning if the ground is moist (Johnson, 1998). Rubber rabbitbrush, Sandberg's bluegrass, prairie junegrass, bluebunch wheatgrass, bottlebrush squirrel tail, orchardgrass, Kentucky bluegrass and common timothy are all relatively fire resistant and would be expected to be reduced slightly, remain stable, or increase after burning. Idaho fescue would be reduced after burning.

In the riparian herbland PVGs, prescribed fire is expected to creep in and occasionally kill or top kill the vegetation that occupies the burned areas. Willows, alder, red-osier dogwood and common snowberry would be expected to sprout from roots, root crowns, basal stems and stolons. Sedges and rushes would most likely not burn or burn at very low intensities. Species with deep-seated rhizomes are expected to survive low to moderate intensity fires. They would also colonize burned areas by seeds and with the spread of rhizomes.

Burning forested areas surrounding shrubland habitat would result in decreased use of shrubland habitat by big game for about 3 to 5 years. With the removal of overstory cover, woody vegetation previously suppressed would prosper under conditions that are more open.

Effects to Natural Fuels

The planned treatments that would affect fuels are timber harvesting, precommercial thinning, and prescribed burning. The timber harvesting would have little effect, as the trees would be whole tree yarded to the landings. Some minor breakage of limbs would take place but should not change the overall fuel loading on the landscape scale.

Precommercial thinning to at least 15 x 15' spacing at 8" dbh would normally eliminate the first stage of reintroducing fire as long as the created slash is piled and burned. Pruning of the lower limbs on the remaining trees would still need to be done. This pruning can be accomplished with a higher intensity fire than of the normal first stage prescribed burn. This higher intensity fire would also reduce more of the duff layer.

In precommercially thinned stands, controlling fire with a wider window of opportunity is more feasible than in unthinned stands. The possibility of manipulating fire height and rate of spread increases as tree spacing increases. A thinned stand would start losing this burning opportunity within five to seven years following treatment, as new shrubs and trees grow.

Precommercial thinning would have a short-term effect of two to five years. An estimated 30 to 50 tons per acre of slash would be created from a thinning treatment. This slash would either be hand piled or grapple piled during the same field season or the following field season. Burning of the piles would take place no later than the second field season after thinning. Piling of the slash would also remove some of the natural fuels that are currently there.

Prescribed burning on the landscape scale would be mosaic. In non-forested areas similar to scab flats, less than 5% of the area would burn and this would be along the timberline. Non-forested areas that contain meadows, grasses, or shrubs would be 10 to 40% burned depending on the density and continuity fuels. Forested areas would be 40 to 70% burned.

Prescribed fire would have the largest effect on reducing the current fuel loading. With moderate burning it is estimated that 40% to 70% of the fuel loading would be reduced after the first stage burn. This would include the litter and duff layers. Within five to seven years following the prescribed fire, approximately 75% of the fuels would return. These new fuels would be in the form of needles and limbs created both naturally and caused from the effects of the prescribed burn.

As fire burns through the timbered stands, it would consume mostly grass, shrubs, and litter. Most of the litter consumption would be near the base of the trees. Shrubs would return in a few years (one to five years) as new growth. Grass would start returning after sufficient rains and would come back vigorously the following spring.

The forest floor and mineral soil contain most of a forest's nutrient reserves (Downer and Harter 1979). With high intensity prescribed fire and wildfires, many nutrients in the forest floor are vulcanized. However, low intensity fire does not have this effect and generally has a positive reaction on nutrient cycling.

Treated slash would be a combination of activity-created slash and natural fuels. The activity-created slash would either be from logging or precommercial thinning. Underburning, jackpot burning, hand piling or grapple piling, and pile burning are the proposed fuels treatments.

Of the different fuels treatments, underburning has the least impact on the soils resource. Burn severities are minimized through prescriptions that are designed to burn at low intensities and the potential for impacts is generally dispersed across a larger area. These types of burns most closely emulate natural process as to nutrient volatilization and nutrient dispersal and are not expected to have an adverse effect on soil productivity. Revegetation would begin immediately after burning.

Jackpot burning can produce high severity effects on a small area (burn pile size), depending on fuel concentrations. This type of fire may be similar to stand-replacement type fire intensities leading to hydrophobic soils conditions. Normally jackpot burning is conducted under wetter condition with low intensity fire effects. Less area is affected than with underburning, since only concentrations of fuels are burned; the area isn't a continuous fuel treatment.

Grapple piling from existing trails and landings allows the net ground disturbance to be kept to a minimum. Hand piles are placed away from boles of trees and are at least one forth the size of a grapple pile. Horizontal fuel continuity would be interrupted so that potential rate of wildfire spread and overall severity is reduced. Burning usually takes place with snow pack conditions. Fire intensities would be higher under piles; however, grapple piles would be concentrated near or on already disturbed areas and hand piles would be smaller, resulting in fewer fire effects. After burning, piled areas would take the longest to revegetate. Table 4-10 compares the acres of hand and grapple piling following precommercial thin for each alternative.

Table 4-10. Comparison of hand and grapple piling following precommercial thin for each alternative.

Alternative	Total PCT Acres	Hand Pile	Grapple Pile
Two	15,109	661	14,835
Three	16,060	1,129	14,890
Four	16,186	1,135	15,590
Five	13,733	1,086	13,015
Six	10,799	992	9,746
Seven	16,186	1,135	15,588
Seven-A	16,186	4,86	15,561

The general effect of fuels treatments would be that fuel loading and risk of stand replacement wildfire would be reduced from current levels. Fuel concentrations would be broken up so that when unplanned ignition occurs, the fires would be smaller and suppression efforts more effective. Crown fires would be less likely, and fires would burn with less intensity. Likelihood of wildfires spreading from the project area to adjacent Federal or non-Federal lands, or vice-versa, would be reduced.

Fuels treatments are expected to have the following effects in treated areas:

- Reduction of surface fuel loading to 2 to 10 tons/acre with light to moderate intensity prescribed burning;
- Reduction of seedling and sapling size trees by 60 to 80%;
- Reduction of western juniper < 18" in diameter by 70 to 90%;
- Entrance of low intensity fire (< 2' flame length) into RHCAs;
- Increase in the amount of surface area covered by grass and forbs by 10 to 50%;
- Creation of a mosaic of burned (60 to 80% of any one block) and unburned areas;
- Retention of stocking on a variable spacing, depending upon the size of the residual trees, to produce an average of 50 basal area (range 30 to 70) for hot-dry and 60 basal area (range 40 to 80) for warm-dry sites;

- Limiting stand-replacement fire to < 1% of the size of any block, and to pockets <1 acre in size;
- Maintenance or creation of snag habitat at 100% of potential population levels of primary excavator species (2.39 snags per acres, 15" diameter small end);
- Maintenance or creation of large down woody material to meet appropriate standards (in ponderosa pine, 3-6 logs per ac greater than 12" diameter small end and 6' in length, in mixed conifer, 15-30 logs per ac greater than 12" diameter small end and 6' in length).

Cumulative Effects Common to All Action Alternatives

Effects to Non-Forest Vegetation

In forested areas, due to the implementation of vegetation treatments that would open up tree canopies and reduce duff layers, grasses, forbs and shrubs would be expected to increase. Prescribed burning proposed under this EIS would re-incorporate fire into the ecosystem. In non-forested areas such as shrublands and herblands the re-incorporating of fire would be minimal and in a mosaic pattern. In the future, additional prescribed burning is likely and would aid in re-establishing more fire tolerant species. This would enhance biological diversity by providing for varied structure and species composition.

Effects to Natural Fuels

Foreseeable future actions related to management of natural fuels are mechanical stocking reductions, periodic prescribed burning, continued unplanned ignitions, and the instigation of fuels treatments within Myrtle Canyon.

The effects of these futures actions would be to continue to move stocking and species composition towards historic levels. This would result in historical fuel loading and fuel distribution. When unplanned ignitions occur, the fire(s) would burn in a low intensity mosaic manner. The risk of crown fires and/or large stand replacement fires would be reduced.

With treatment of fuels within Myrtle Canyon, the risk to firefighter safety would be reduced. Following treatment of fuels, if fire(s) should occur, the effects to vegetation would be similar to those of a low-intensity, low-severity historic fire.

Direct and Indirect Effects Common to Alternatives Two, Four, Five, Seven and Seven-A

The effects of these five alternatives vary only in the acres that are being treated (see Chapter 2, Table 2-20).

Effects to Stand Structure and Forest Health

With commercial treatment, most stands currently classified as stem exclusion closed canopy (SEC) would move to the stem exclusion open canopy (SEO) category. Table 4-11 lists the number of acres by alternative that would change from SEC to SEO. The rest of the acreage would remain in the same structure as currently classified.

Table 4-11. Acres changed from SEC to SEO by Alternative.

Structural Stage (PAG)	Alternative Two	Alternatives Four, Seven, and Seven-A	Alternative Five
Hot Dry	541	546	318
Warm Dry	1,629	1,797	1,323

These alternatives reduce the risk of a major disturbance (stand replacement fire, and/or disease and insect outbreaks) considerably more than the No Action alternative or Alternative Six. Alternatives Four and Seven, closely followed by Seven-A and then Two, would reduce the risk of a major disturbance the most.

With these alternatives, large trees in treated stands would be released from competition with smaller surrounding trees, which would improve their overall health and vigor. This would preserve the seed source, and these stands would be more sustainable than at present. However, corridors between late structure stands (OFMS and OFSS) would be left at a higher density, and thus would be under higher stress than the trees in the surrounding stands. Due to this stress, the trees in the corridors would actively attract bark beetles from the surrounding lower density stands and provide an opportunity for bark beetles to use in moving between old structure stands. The mortality in these corridors would be higher than in the adjoining stands. These corridors would increase the mortality of the large trees in the old forest structure that they connect in the next 5 to 20 years.

As pine stands are treated to reduce stand density, more moisture would be available for the residual trees. With this increased moisture, the residual trees would increase in growth rates and vigor. As the growth rates and vigor of the trees increase, their susceptibility to western and mountain pine beetles decreases. Risk of an outbreak of bark beetles would be reduced on 13,249 acres in Alternatives Four, Seven and Seven-A, 11,328 acres in Alternative Two, and 8,614 acres in Alternative Five.

These alternatives would harvest trees that have characteristics of small disease centers of blackstain root disease. Once the trees are harvested and the roots die, the disease dies and does not persist in the dead roots. These alternatives would result in a reduction of blackstain root disease in treated stands.

With these alternatives, stumps would be created that could potentially be infected by spores of Annosus root disease. Due to the slow spread of this disease, the stumps of small trees (under 12” diameter) decompose too quickly to become disease centers. The stumps of trees over 12” diameter would be treated with borax, which inhibits the colonization of the Annosus spores. There would be no spread of Annosus root disease as a result of these alternatives.

Treatments in mixed conifer sites would reduce the density of trees under 21” dbh, reduce the composition of late seral species (white fir and Douglas-fir) and move the forest towards historical stand stocking and composition, which would increase the vigor and the growth rates of the residual trees. With a reduction in white fir and Douglas-fir, the risk of large wide-spread mortality due to either Douglas-fir tussock moth or western spruce budworm would be reduced. This would also reduce the incidence of Douglas-fir dwarf mistletoe, and decrease mortality due to secondary disturbers such as Douglas-fir bark beetles and fir engraver. Risk of Douglas-fir tussock moth and western spruce budworm would be reduced on 6,869 acres in Alternatives Four, Seven and Seven-A, 5,961 acres in Alternative Two, and 4,342 acres in Alternative Five. Risk of insect-related mortality would be reduced for 20 to 50 years and possibly up to 100 years. While reducing the white fir component would reduce the incidence of Indian paint fungus, this fungus could be activated in residual white fir that are damaged during treatment of the units, and many of the remaining trees may become hollow. This would decrease their chances of growing into large trees and predispose them to early mortality.

Western larch, which is found in the northern 1/3 of the project area, would be stimulated by activities proposed in these alternatives to reproduce and increase in frequency. Reintroduction of fire would favor western larch by killing advance regeneration and larger trees of Douglas-fir and white fir and exposing mineral soil. Given an equal start, western larch can usually outgrow competing conifers, since western larch was historically regenerated by fire.

Aspen should respond to all five of these alternatives and increase in area coverage and regeneration of a young stand component. In aspen outside the RHCAs, coniferous trees in excess of historic levels and those not needed for snags and large woody material would be commercially harvested. Harvest would be limited to trees under 21" dbh, except under Alternative Four. There would be no harvesting within RHCAs, so there would be little site disturbance.

Juniper would be reduced throughout the areas by mechanical treatments and with the use of prescribed fire. This should increase the moisture available to other plants such as riparian vegetation, grasses, forbs, and shrubs. As these other species respond to the decrease in juniper, ground cover should increase, reducing erosion and the space that is available to invasion of non-native plant species.

Effects to Natural Fuels

With reduction in stocking and the subsequent treatment of the existing fuels, the risk of a stand replacement fire would be reduced in treated stands due to breakup of continuity of the fuels and the reduction in ladder fuels.

The increase in ground cover resulting from juniper removal could cause an increase in light fuels and the spread of range fires. These conditions would more closely resemble historic conditions where the rangeland burned at low intensities but at frequent fire intervals.

Cumulative Effects Common to Alternatives Two, Four, Five, Seven and Seven-A

It is reasonable to predict that if Alternative Two, Four, Five, Seven or Seven-A is implemented, future actions would follow the same guidelines; that is, commercial harvest and precommercial thinning as well as prescribed burning would be used to treat stand density, stand composition and natural fuels and maintain desired conditions. Within 20-30 years, stands treated under these alternatives would need to be treated again. Stands that would not be treated under these alternatives would likely need treatment within 10-15 years. Fuel blocks treated under these alternatives would be revisited on a rotation of 5-15 years. It is assumed that livestock grazing would continue at current levels.

Effects to Stand Structure and Forest Health

Future treatments would reduce competition in the vicinity of the large old tree structure. Mortality rates would be reduced and growth would be encouraged in smaller size structure so that it develops into large old structure. In the long term, OFMS and OFSS would be maintained.

Future actions in ponderosa pine and mixed conifer stands would maintain the densities and stand structures resulting from implementation of this project and treat density and structure in stands not treated in this project. These actions would reduce stocking toward historical stocking levels; vigor of individual trees and overall resistance of stands to insect and disease outbreaks would be improved.

Future treatments of the area, including additional commercial thinning, other intermediate thinning, pre-commercial thinning, and prescribed burning, would move species composition toward historical early seral species, decrease stocking, and treat fuels, ultimately increasing fire resistance and reducing fuel continuity across the landscape.

Percent composition of western larch and aspen should increase over time as proposed and future treatments reduce competition and encourage the regeneration of these species.

Effects to Non-Forest Vegetation

Future management would continue to reduce the amount of juniper that is competing with other vegetation, which would increase the amount of ground vegetation.

Effects to Natural Fuels

Due to the lower density of residual trees, the fuels that are treated would be replaced with fine flashy fuels that have a low intensity burning. With periodic prescribed burning these fuels would be reduced.

The fuel blocks proposed for treatment in these alternatives completely surround Myrtle Canyon. In the future, if fire should occur in Myrtle Canyon, due to planned or unplanned ignition, the ability to contain it would be greater than with the other alternatives.

Direct and Indirect Effects Common to Alternatives Three and Six

These two alternatives propose no commercial harvest and no post and pole sales.

Effects to Stand Structure and Forest Health

The large old growth component in stands throughout this watershed would continue to decline and mortality levels would be higher than the other action alternatives, but lower than the No Action Alternative. Although precommercial thinning and prescribed fire would reduce some of the stress on the old growth ponderosa pine, the resultant stocking would be higher, and the percent stand composition made up of ponderosa pine would be lower, than the other action alternatives. The "pure" ponderosa pine stands would still be at a higher risk to either mountain pine beetle or western pine beetle attack than the other action alternatives, but would be lower risk than the No Action alternative.

Treatment of the species composition and stand density for trees over 9" dbh would totally be accomplished by prescribed fire. Stand densities would remain at higher level than the other action alternatives, but at lower levels than the No Action alternative. This first introduction of prescribed fire would be at low intensities. Some mortality is expected in the diameter classes over 9" dbh. In the hot dry PAG and ponderosa pine-dominated warm dry PAG, this mortality would probably be low. Mortality would be higher in the late seral species in the mixed conifer-dominated warm dry PAG sites, but would still not be sufficient to lower competition and reduce the stress of the residual trees for any significant time (longer than 5 years). In most of these stands, the trees over 9" dbh are causing the greatest competition and stress to the remaining large trees.

Since these alternatives would treat few trees over 9" dbh, the bark beetle risk would be only slightly reduced from the current condition and would remain high. These alternatives would precommercially thin small trees that may have blackstain root disease, but would do nothing to reduce larger trees that are infected with it. These alternatives would do little to control or reduce the incidence of blackstain root disease in the project area. Some stumps may be created that could become disease centers for Annosus root disease and could cause mortality of surrounding trees in the future.

Since this alternative treats few trees over 9" dbh in the mixed conifer sites, the risk of an outbreak of Douglas-fir tussock moth and/or western spruce budworm also remains higher than the other action alternatives, but would be lower risk than the No Action alternative.

Cutting trees less than 9" dbh and prescribed burning could directly affect residual trees by causing damage to their boles. The indirect effect is that this damage could activate Indian paint fungus, and many of the remaining white fir would become hollow. This would decrease their chances of growing until they are large, and predispose them to early mortality, creating snags and down woody material, and adding to fuel loads.

Although the fuels treatment would favor western larch regeneration over the regeneration of Douglas-fir and white fir, regeneration of western larch would still remain substantially lower than the other action alternatives due to the competition from trees over 9" dbh. Western larch would not substantially increase in area or percent composition.

Aspen should respond to these alternatives and increase in area coverage and regeneration of a young stand component although not as well as the other action alternatives. Due to the higher levels of snags and large woody debris, the risk of a large fire(s) burning through these aspen stands is much higher than with the other action alternatives or the No Action alternative.

Effects to Natural Fuels

The risk of a prescribed burn getting out of control and killing the larger trees would be much higher with these two alternatives than with the other action alternatives, because there would be no manual treatment of trees larger than 9" dbh.

Treated stands would remain at a higher risk of a stand replacement fire due to higher fuel loads and more ladder fuels than Alternatives Two, Four, Seven and Seven-A but at a lower risk than the no action alternative.

Cumulative Effects Common to Alternatives Three and Six

It is reasonable to predict that if Alternative Three or Six is implemented, future actions would follow the same guidelines; that is, only precommercial thinning and prescribed burning would be used to treat stand density, stand composition and natural fuels and maintain desired conditions. Within 10-15 years, stands treated under these alternatives would be treated again with prescribed fire. Stands that would not be treated under these alternatives would likely need treatment within 10-15 years. It is assumed that livestock grazing would continue at current levels.

Effects to Stand Structure and Forest Health

Units being treated with this project would continue to be treated with prescribed burning in the future. Due to greater competition from other trees, mortality of large old component in the stands would continue at a higher level than the other action alternatives.

Within 15 years densities in treated stands are expected be equal to or greater than present densities. Growth and vigor would again be reduced and these stands would be susceptible to insect and disease outbreak. Future treatments of prescribed burning would eventually move the stands toward historical stocking and composition, but this would happen more slowly than in alternatives with combinations of harvest, thinning, and burning treatments. Future treatments in stands not being treated with this project would improve health and vigor of those stands, but effects would likely last 5-10 years. The risk of losing stands to high intensity burns would be higher than with the other action alternatives due to higher levels of fuel and fuel ladders.

After 5 years stocking in treated stands would be at or above present levels and risk of pine beetle outbreaks would return to present levels. Future treatments of the area being treated now would do little to reduce these risks since only periodic prescribed burning would be done. Treatment of areas not being treated at the present may reduce the risk for a limited time (5 to 10 years).

Current and future treatments would be unlikely to benefit western larch, and this species would likely continue to decline.

Current and future treatments would increase the percent composition and vigor of aspen. However, risk of stand replacing fire and the associated risk of losing entire stands of aspen to fire would remain higher than with the other alternatives.

Annosus root disease may be perpetuated or increased over the long term, as infected stumps would not be treated in this or future projects.

Effects to Natural Fuels

Due to the densities of residual trees, the fuels that are treated would be replaced at the present levels within 5 years following currently proposed treatments. Periodic future burning would maintain these fuels at lower levels that currently, but the risk of a large stand replacement fire would remain higher than the other action alternatives because of more ladder fuels and greater fuel continuity (tree density) in the 9” dbh class.

Direct and Indirect Effects of Alternative Two, Proposed Action

Approximately 43,880 acres (67% of the project area) would be treated. Some acres would have two or more treatments. For example, a stand may first be treated with a commercial thin, followed by a precommercial thin, followed by prescribed burning. Twelve fuels blocks totaling 39,277 acres (60% of the project area) would be treated, primarily by prescribed burning. Within these acres, 15,070 acres (38%) would be pretreated to reduce stand density and to treat forest composition. Pretreatment would include commercial harvesting, precommercial thinning, juniper reduction, or post and pole removal. Another 4,584 acres (7% of the project area) outside of fuel blocks would also be pretreated for a total of 19,654 acres (30% of the project area) of pretreatment.

Effects to Stand Structure and Forest Health

Of the action alternatives, Alternative Two is the medium alternative in treating forest stocking and species composition; it would take a more aggressive approach than Alternatives Three, Five, and Six but would be less aggressive than Alternatives Four, Seven, and Seven-A. With this alternative, the risk of a bark beetle outbreak in the stands composed primarily of ponderosa pine would be substantially reduced. In the mixed conifer stands the risk of an outbreak of spruce budworm or Douglas-fir tussock moth would also substantially be reduced.

Effects to Non-Forest Vegetation

About 15% (5,813 acres) of the 12 fuel blocks proposed for prescribed burning are composed of moist upland and dry upland shrublands, dry upland herblands and riparian herblands. Effects on these acres would be as described in the section "Direct and Indirect Effects Common to All Alternatives."

Effects to Natural Fuels

Fuels treatments proposed under this alternative would result in the control of prescribed burning being greatly enhanced and the risk of a prescribed burn getting out of control greatly reduced.

Prescribed burning would create fuel breaks to reduce the risk of stand-replacement fires. Old growth conditions would be improved in a designated old growth stand; habitat would be improved in a bald eagle nest area.

Along with the treatments, approximately four miles of hand line or plow line would be constructed. There would be 34 miles of blackline, primarily along the Myrtle-Silvies Roadless Area border.

Direct and Indirect Effects of Alternative Three

Approximately 43,212 acres (66% of the project area) would be treated. Some acres would have two or more treatments. Twelve fuels blocks, totaling approximately 39,277 acres (60% of the project area) would be treated, primarily with prescribed burning. Within these acres, approximately 12,683 acres (32%) would be pretreated to reduce stand density and to treat forest composition. This pretreatment would consist of thinning trees under 9" dbh and juniper reduction. Approximately 3,934 acres (6% of the project area) outside of fuel blocks would also be pretreated for a total of approximately 16,617 acres (25% of the project area) of pretreatment.

Effects to Stand Structure and Forest Health

Of the action alternatives, this alternative would take the second least aggressive approach to treating forest stocking and species composition, since only precommercial thinning of trees under 9" dbh and prescribed fire would be used. Of the action alternatives, only Alternative Six would take a less aggressive approach. Although the total number of acres treated would be greater than with Alternatives Five or Seven-A, reduction in stocking and increase in vigor would be lower. In the stands composed primarily of ponderosa pine, the risk of a bark beetle outbreak would be much higher than with the other action alternatives, except for Alternative Six. This alternative would result in the risk or probability of an outbreak of spruce budworm or Douglas-fir tussock moth in mixed conifer stands being much higher than the other action alternatives, except for Alternative Six. Although prescribed burning would reduce late seral species more than early seral species, the control of this reduction would be less and the risk of unacceptable results would be greater than with the other action alternatives. With the limited types of treatment, the risk of prescribed fire getting out of control would be much higher than for the other action alternatives, except for Alternative Six.

Juniper would be reduced throughout the area in units designated as juniper reduction units and in units that would precommercially thinned and prescribed burned. Reduction of juniper should result in increased groundwater becoming available to other plants such as grasses, forbs and shrubs. As these other species respond to the decrease in juniper, ground cover should increase, reducing erosion and the space that is available to invasion of non-native plant species. This increase in ground cover could also cause an increase in light fuels and the spread of range fires. These conditions would be more similar to historic conditions in which the rangeland burned at low intensities but with frequent fire intervals.

Effects to Non-Forest Vegetation

Effects would be the same as under Alternatives Two, Four, and Seven.

Effects to Natural Fuels

Effects would be the same as under Alternatives Two, Four, and Seven.

Direct and Indirect Effects of Alternatives Four & Seven

These two alternatives propose the same vegetation treatment; the difference between them is in the proposed treatment of roads. Approximately 44,450 acres (68% of the project area) would be treated. Some acres would have two or more treatments. Twelve fuels blocks, totaling approximately 39,277 acres (60% of the project area) would be treated to reduce fuels, primarily by prescribed burning. Within these acres, approximately 16,008 acres (40% of the project area) would be pretreated to reduce stand density and to treat forest composition. This pretreatment would include commercial harvesting, precommercial thinning, juniper reduction, post and pole removal, and aspen treatment. Approximately 5,166 acres (7% of the project area) outside of fuel blocks would also be pretreated for a total of approximately 21,174 acres of pretreatment.

Effects to Stand Structure and Forest Health

Alternatives Four and Seven take the most aggressive approach of the action alternatives to treating forest stocking and species composition. These alternatives would result in the greatest reduction of the risk of a bark beetle outbreak in the stands composed primarily of ponderosa pine and an outbreak of spruce budworm or Douglas-fir tussock moth in mixed conifer.

Proposed reductions in stocking and late seral species would result in the control of prescribed burning being enhanced and the risk of a prescribed burn getting out of control being reduced more than any other alternative.

Effects to Non-Forest Vegetation
Effects would be the same as under Alternatives Two and Three.

Effects to Natural Fuels
Fuel loading would be reduced in treated stands by approximately 50% to 75%. Reducing the fuel load would reduce flashy fuels and disrupt fuel continuity, thus reducing the spread rate, size, and intensity of wildfires, as well as reduce the risk of a large stand-replacement fire. If wildfires occur after treatment, they would be expected to burn in a low-intensity, mosaic fashion. Units that are not mechanically treated with this project may require additional entries with prescribed burning to prepare for maintenance burning.

These two alternatives proposed more treatments than the other action alternatives. By treating more stands with harvest or PCT, they would result in a greater reduction of risk of stand replacing wildfire and greater manageability of prescribed fire operations.

Direct and Indirect Effects of Alternative Five
Approximately 35,248 acres (54% of the project area) would be treated. Some acres would have two or more treatments. Fuel Blocks 2, 5-7, 9, 11, and 12, totaling approximately 25,311 acres (38% of the project area) would be treated to reduce fuels, primarily with prescribed burning. Within these acres, approximately 9,444 acres would be pretreated to reduce stand density and to treat forest composition. This pretreatment would include commercial harvesting, precommercial thinning, juniper reduction, or post and pole removal. Approximately 7,690 acres outside of fuel blocks would also be pretreated for a total of approximately 17,134 acres of pretreatment.

Effects to Stand Structure and Forest Health
This alternative takes an approach between Alternative Three and Alternative Two in aggressiveness to treating forest stocking and species composition. Although the total number of acres being treated is lower than Alternative Three, Six, and Seven-A, it would more greatly reduce the risk and probability of insect outbreaks in treated stands than would alternatives Three or Six. Although Alternative Seven-A would treat fewer acres than this alternative, the acres that would be treated would be treated more intensely. This alternative would not reduce the risk and probability of insect outbreak as much as Alternative Two. The risks associated with prescribed burning would be greatly reduced with this alternative, much more so than with Alternative Three because fewer acres would be prescribed burned, and the acres that would be prescribed burned would have lower stocking due to the treatments involved in this alternative.

Effects to Non-Forest Vegetation
About 18% (4,508 acres) of the fuel blocks proposed for burning are composed of moist upland and dry upland shrublands, dry upland herblands and riparian herblands. Effects to these acres would be as described on page 47 of the section "Direct and Indirect Effects Common to All Action Alternatives."

Effects to Natural Fuels

In this alternative, less acreage would be prescribed burned, which could keep the risk of stand-replacement fire high in some areas. In the fuel blocks treated under this alternative, prescribed fire would be used as one of the tools to return overstocked stands to historically healthy conditions. About three miles of hand line or plow line would need to be constructed. There would be 31 miles of blackline, mostly where the fuel blocks border the Myrtle-Silvies roadless area. There would be about two miles of blackline in the southern portion of block 7.

Prescribed fire would be introduced in three major areas:

1. Squaw Flat from West Myrtle Creek south and between the western side of the project boundary and Myrtle Creek;
2. East of Myrtle Creek, along the southern boundary of the project area, north along the western boundary to Silvies River, south to the 31 road, and then north to northern boundary of the project area;
3. The designated old growth unit along Gold Creek on the northern boundary of the project area.

Fuel loading would be reduced in treated stands by approximately 50% to 75%. Reducing the fuel load would reduce flashy fuels and disrupt fuel continuity, thus reducing the spread rate, size, and intensity of wildfires, as well as reduce the risk of a large stand-replacement fire. If wildfires occur after treatment, they would be expected to burn in a low-intensity, mosaic fashion. Units that are not mechanically treated with this project may require additional entries with prescribed burning to prepare for maintenance burning.

Because fewer acres would be commercially or precommercially treated with this alternative, the reduction in fuels would be less, and the risk of a stand replacement fire remains higher than under other action alternatives.

Cumulative Effects of Alternative Five

Effects to Natural Fuels

This alternative does not treat fuel blocks on the North and Northeast portions of Myrtle Canyon. If fire(s) should occur, under peak fire conditions, the likelihood of containing a fire to Myrtle Canyon is the lowest of the action alternatives.

Direct and Indirect Effects of Alternative Six

Approximately 38,300 acres (58% of the project area) would be treated. Some acres may have two or more treatments. Fuel Blocks 2-9, 11 and 12, totaling approximately 33,374 acres (51% of the project area) would be treated to reduce fuels, primarily with prescribed burning. Within these acres, approximately 5,876 acres (17% of the project area) would be pretreated to reduce stand density and to treat forest composition. Pretreatment would be by precommercial thinning. Approximately 4,920 acres (7% of the project area) outside of fuel blocks would also be pretreated for a total of approximately 10,796 acres of pretreatment.

Effects to Stand Structure and Forest HEalth

Alternative Six would take the least aggressive approach of the action alternatives to treating forest stocking and species composition. Although this alternative treats more acres than Alternative

Five, the acres treated would not be treated as intensively. Risk of a bark beetle outbreak in the stands composed primarily of ponderosa pine and risk of an outbreak of Spruce budworm or Douglas-fir tussock moth in mixed conniver would be reduced the least. With the limited reduction in stocking and the limited reduction in late seral species with this alternative, the control of prescribed burning would be the least of the action alternatives and the risk of a prescribed burn getting out of control would be the greatest.

Effects to Non-Forest Vegetation

About 17% (5,662 acres) of the fuel blocks proposed for burning are composed of moist upland and dry upland shrublands, dry upland herblands and riparian herblands. Effects to these acres would be as described in the section "Direct and Indirect Effects Common to All Action Alternatives" under "Effects on Vegetation Condition."

Effects to Natural Fuels

This alternative is similar to Alternative Three but without fuel blocks 1 and 10. It proposes to use prescribed fire as one of the tools to return overstocked stands to historically healthy conditions. To conduct these burns, approximately four miles of hand line or plow line would need to be constructed. There would be 31 miles of blackline, mostly where the fuel blocks border the Myrtle-Silvies roadless area. There would be approximately two miles of blackline in the southern portion of block 7.

Prescribed fire would be introduced in two major areas:

1. Squaw Flat from West Myrtle Creek south and between the western side of the project boundary and Myrtle Creek.
2. East of Myrtle Creek, along the southern boundary of the project area, north along the western boundary to Silvies River, south to the 31 road, and then north to northern boundary of the project area.

Fuel loading would be reduced by 50% to 75% in pine stands, and by 10% to 30% in stands dominated by juniper. Reducing the fuel load would reduce flashy fuels and disrupt fuel continuity, thus reducing the spread rate, size, and intensity of wildfires, as well as reduce the risk of a large stand-replacement fire. If wildfires occur after treatment, they would be expected to burn in a low-intensity, mosaic fashion.

Similar to Alternative 3, this alternative proposes no harvest activities. This alternative would treat the fuels created by precommercial thinning on fewer acres. Of the action alternatives, this alternative would do the least fuels treatment. This would leave more area susceptible to risk of stand replacing fire and manageability of prescribed burning operations would be reduced.

Cumulative Effects of Alternative Six

Effects to Natural Fuels

This alternative does not treat the fuel block on the North side of Myrtle Canyon. If fire(s) should occur, under peak fire conditions, the likelihood of containing a fire to Myrtle Canyon is slightly greater than Alternative 5 but less than the other action alternatives.

Direct and Indirect Effects of Alternative Seven-A

Approximately 39,144 acres (60% of the project area) would be treated. Some acres would have two or more treatments. All fuel blocks except 6, totaling approximately 33,751 acres (51% of the project area) would be treated to reduce fuels, primarily with prescribed burning. Within these acres, approximately 15,282 acres (45% of the project area) would be pretreated to reduce stand density and to treat forest composition. Pretreatment would include commercial harvesting, precommercial thinning, juniper reduction, post and pole removal, and aspen treatment. Approximately 5,166 acres (7% of the project area) outside of fuel blocks would also be pretreated for a total of approximately 20,448 acres of pretreatment.

The effects of this alternative would be almost identical to Alternatives Four and Seven except there would be no treatment of vegetation in the Silvies-Myrtle roadless area. In other words, there would be approximately 730 acres in the Warm Dry PAG that would not be treated with a precommercial thin, and there would not be approximately 5,526 acres of prescribed burning of fuels.

Effects to Stand Structure and Forest Health

The greatest difference from Alternatives Four and Seven-A would be in the effects on the area that is not being precommercially thinned. The intent of this proposed activity was to create better roosting habitat for bald eagles, which would not happen under Alternative Seven-A. The direct effects of not prescribed burning the area would be minimal in the short term (next five years), since the area has been prescribed burned within the last five years. The indirect effects would be that the benefits from reintroducing fire into this habitat might be less effective than intended, since we would not be doing the follow up treatment that was described in the original NEPA document.

Effects to Non-Forest Vegetation

About 11% (3,861 acres) of the fuel blocks proposed for burning are composed of moist upland and dry upland shrublands, dry upland herblands and riparian herblands. Effects to these acres would be as described in "Direct and Indirect Effects Common to All Action Alternatives" under "Effects on Vegetation Condition."

Effects to Natural Fuels

This alternative is similar to Alternative Four but without fuel block 6. It proposes to use prescribed fire as one of the tools to return overstocked stands to historically healthy conditions. To conduct these burns, approximately 29 miles of hand line or plow line would need to be constructed. There would be approximately two miles of blackline in the southern portion of block 7.

Fuel loading would be reduced in treated stands by approximately 50% to 75%. Reducing the fuel load would reduce flashy fuels and disrupt fuel continuity, thus reducing the spread rate, size, and intensity of wildfires, as well as reduce the risk of a large stand-replacement fire. If wildfires occur after treatment, they would be expected to burn in a low-intensity, mosaic fashion. Units that are not mechanically treated with this project may require additional entries with prescribed burning to prepare for maintenance burning.

Although the total acres being treated would be much lower than under Alternatives Four and Seven, the effects would be similar because approximately 4,000 acres in the roadless area were treated recently (1998 – 2002). Commercial harvest would be the same, but there would be 1% less precommercial thinning that in Alternatives Four and Seven; Alternative Seven-A would be slightly less effective in fuels reduction than Four and Seven.

Cumulative Effects of Alternative Seven-A

Effects to Natural Fuels

An additional cumulative effect, particular to this alternative, is that these fuel blocks completely surround Myrtle Canyon. If large fire(s) should occur within Myrtle Canyon, the ability to contain it would approximately be equal to Alternatives Two, Three, Four and Seven. Risk would be slightly higher because the eagle roost stand would not be precommercially thinned, which would allow fire to gain higher intensity as it moves through the canyon.

Effects on HRV

The following summarizes the effects of the alternatives on the development of old forest structure 25 and 50 years in the future.

Direct and Indirect Effects in 25 and 50 years

Table 4-11 summarizes the predicted effects of the alternatives on the development of old forest structure. The following assumptions were used in the development of these effects.

- In acres not being treated there will be no stand replacement disturbance(s) in the next 50 years. This may be a valid assumption for the action alternatives, but would be highly unlikely for the No Action alternative.
- Present old forest structure (OF) will remain in an old forest structure. This assumes that no snags would be created in existing OF stands that would move this structure to an earlier structure.
- Prescribed burning would occur on some acres on a regular basis throughout the next 50 years.
- Stand acres that are in the medium age structure stages (SEO, SEC, YFMS, and UR) have the ability to move into old forest structure (OFMS, OFSS).
- In approximately 25 years, stocking will have increased to the point that growth and vigor will begin to slow down. Without treatment between 25 and 50 years the rate that stands will move into old forest structure will be half the rate of the first 25 years.
- Stand acres that are not being treated in the medium age structure stages will move into old forest structure at the rate of approximately 5% in 25 years and 7.5% in 50 years.
- Stands in the medium age structure that are being treated with a fuels treatment only will move into old forest structure at the rate of approximately 10% in 25 years and 15% in 50 years.
- Stands in the medium age structure that are being treated with a pre-commercial thin followed by a fuels treatment will move into old forest structure at the rate of approximately 15% in 25 years and 22.5% in 50 years.
- Stands acres in the medium age structure that are being treated with a commercial harvest followed by a fuels treatment or a pre-commercial thin and fuels treatment will move into old forest structure at the rate of approximately 30% in 25 years and 45% in 50 years.

Cumulative Effects

It is reasonable to predict, based upon average growth rates, that a second treatment would be done 20-30 years following the treatments proposed in this project. If this should occur the rate at which stands would move into old growth structure should remain the same as during the first 25 years. Table 4-12 summarizes the predicted levels of OF following anticipated second treatments.

Table 4-12. Projected Acres of Late/Old Structure (OF) in 25 and 50 yrs Following Proposed Treatments.

Treatments	Alternatives						
	One-No Action	Two	Three	Four and Seven	Five	Six	Seven-A
Present Acres of OF	8,607	8,607	8,607	8,607	8,607	8,607	8,607
Acres of OF in 25 years Resulting from No Treatment	2,502	1,184	1,363	1,154	1,300	1,578	1,161
Acres of OF in 25 years Resulting from Fuels Treatment Only	0	1,747	1,984	1,659	1,156	2,039	1,390
Acres of OF in 25 years Resulting from Fuels Treatment with PCT	0	816	2,403	663	945	1,611	554
Acres of OF in 25 years Resulting from Commercial Harvest with Fuels Treatment and PCT	0	3,947	0	4,681	2,921	0	4681
Total OF in 25 Years[1]	11,109	16,301	14,357	16,764	14,929	13,835	16,393
Total OF in 50 Years (if no additional treatments)[2]	12,360	20,148	17,232	20,839	18,090	16,449	20,286
Total OF in 50 Years (with additional treatments)[3]	13,611	23,996	20,106	24,923	21,250	19,062	24,177

[1]Total acres of OF resulting from treatments, added to 8,607 acres of existing OF.
[2]This assumes that no additional treatments would be done in 25 years following completion of the treatments proposed by this project.
[3]Total acres of OF resulting from a second treatment that would be done 20-30 years following treatments proposed in this project.

Consistency with Direction and Regulations

NFMA

All alternatives are consistent with NFMA in terms of vegetation.

Forest Plan

All action alternatives would be consistent with applicable Forest Plan timber standards (standards 89-129, FP IV-40) and Forest Plan fire management and residue management standards (standards 178-184, FP IV-44).

Regional Forester's Forest PLan Amendment #2 (Eastside Screens)
All alternatives meet the direction to not decrease old forest structural stages. Treatments are planned in old forest structural stages; however, they are designed to enhance large tree health and percent composition. The action alternatives meet the objective to shorten the time to grow additional old forest structure stages; of the action alternatives, Alternatives Four and Seven best meet this objective.

All action alternatives meet the objective to manage vegetation on a sustainable basis (HRV); of the action alternatives, Alternatives Four and Seven best meet this objective.

National Fire Plan
All action alternatives are consistent with the National Fire Plan.

Effects on Air Quality

A strategy for long-term air quality improvement has been approved by the Oregon Department of Environmental Quality (Memorandum of Understanding [MOU] Between Oregon Department of Environmental Quality, Oregon Department of Forestry, USDI Bureau of Land Management, and USDA Forest Service, 1994). This strategy is based on the assumption that light intensity prescribed burning in the spring and late fall create lower total smoke emissions than high intensity stand-replacement wildfires of summer and early fall. The purpose of this long-term strategy is to reintroduce fire into the ecosystem on a landscape scale during spring and late fall. As more large areas are treated, air quality would increase during the summer months because fewer wildfires would occur. Maintaining these areas with maintenance burning would create lower smoke levels because the fuel loading would be reduced and burning would be less intense.

Along with implementing the MOU, there are seven items the Forest Service addresses in an environmental document when proposing alternatives that may affect air quality. These seven items are:

1: Describe alternative fuel treatments considered and reasons why they were not selected over prescribed fire.

No Treatment:

Not selected because it would not move the area to the desired future condition.

Mechanical Treatment:

Throughout most of the planning area, the fuel loading is high. To lower this fuel loading, there were several different fuel treatments proposed. One fuel treatment would not be enough to prepare the area to meet the desired future risk and protection. Most fuel treatments would connect to the final treatment, which is prescribed burning.

The fuel treatment proposed for timber sale units is to yard whole trees, with tops attached, to landing sites. This treatment would gather most of the newly created slash to the landing areas where it would be piled and later burned, or sold as a commercial product such as firewood. This treatment would dispose of 80% of the newly created logging slash.

Much of the planning area is overstocked. PCT would need to be completed prior to prescribed burning those areas. Created slash and litter would be piled and burned.

Hand piling would be done on slopes of 35% and higher, rocky areas where equipment cannot operate, sensitive areas, and within the roadless area. Grapple piling would be used on the rest of the areas. Lop and scatter and mastication were not considered because of the present high fuel loading.

Pile burning is done during late fall or early winter. When piles are ignited, heavy smoke begins to displace PMs into the atmosphere. After the pile is fully involved (six to ten hours for landing piles, one to two hours for grapple piles and ½ to one hour for hand piles) the smoke decreases because the pile is burning intensely and the PMs are being consumed. After the pile is consumed, the pile area will continue to smolder for two to three days.

Prescribed burning the fuel blocks would be less intense following the previous fuel treatments. The main effects would be putting high levels of PMs into the air during the ignition stages. After ignition, smoke will be heavy for one to two days then decrease while the fire smolders for one to two weeks.

Treating the fuels with these different fuel treatments would displace the PMs from smoke over several years instead of treating with prescribed fire in a one-entry treatment.

2. Quantity of fuels to be burned (acres, tons, type):

Alternative One proposes no prescribed fire use.

All action alternatives would be completed over an approximately 10-year period.

Alternative Two would burn approximately: 39,277 acres of natural fuels (consume twelve tons per acre) represented by fuel model 9; 409 acres of hand piles (consume three tons per acre) and 12,151 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Three would burn approximately: 39,277 acres of natural fuels (consume 12 tons per acre) represented by fuel model 9; 834 acres of hand piles (consume three tons per acre) and 12,109 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Four would burn approximately: 39,277 acres of natural fuels (consume 12 tons per acre) represented by fuel models 9; 840 acres of hand piles (consume three tons per acre) and 12,524 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Five would burn approximately: 25,311 acres of natural fuels (consume 12 tons per acre) represented by fuel models 9; 794 acres of hand piles (consume three tons per acre) and

10,701 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Six would burn approximately: 33,374 acres of natural fuels (consume 12 tons per acre) represented by fuel model 9; 697 acres of hand piles (consume three tons per acre) and 7,179 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Seven would burn approximately: 39,277 acres of natural fuels (consume 12 tons per acre) represented by fuel model 9; 840 acres of hand piles (consume three tons per acre) and 12,524 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

Alternative Seven-A would burn approximately: 33,751 acres of natural fuels (consume 12 tons per acre) represented by fuel model 9; 658 acres of hand piles (consume three tons per acre) and 11,977 acres of grapple piles (consume 14 tons per acre) represented by fuel models 11 and 12 (activity generated slash).

3. Describe the type of burns (broadcast, pile understory etc.)

Done in Step 2 above.

4. Describe measures taken to reduce emissions (fuel moisture content, site preparation, removal of debris-YUM/PUM whole tree yarding etc).

- Whole tree yarding to landings on all commercial units.
- Skidding of slash created by post harvest activities where ground skidding equipment is allowed.
- Underburning to be done with 10-hour fuels at a moisture content of 12% or less.
- Spring burning with high moisture content in large woody material to prevent it from burning.

5. Quantify the amount of emissions to be released.

Alternative One: Emissions would come from wildland fire. Estimates from CONSUME model show higher emission release of both PM 10 and PM 2.5 than in spring or fall prescribed fire due to lower fuel moisture content.

Action Alternatives: See Table 4-13 for amount of emissions released by treatments in each Alteranitve. All action alternatives would be completed over an approximately ten-year period.

Table 4-13. Amount of emissions to be released by burning slash and natural fuels in each Action Alternative.

Alternative	PM 10 Emissions (tons)	PM 2.5 Emissions (tons)
Two	3,471	3,224
Three	3,484	3,241
Four	3,540	3,279
Five	1,974	850
Six	2,591	2,438
Seven	3,540	3,279
Seven-A	3,238	2,992

6. Describe the regulatory/permits requirements for burning; i.e., the applicable parts of the smoke management plan.

Alternative One: None

Alternatives Two through Seven-A: Action alternatives need to meet the Oregon State Smoke Management Plan as amended by the Operational Guidance for the Oregon Smoke Management Program, criteria for the National Forest and Bureau of Land Management in the Blue Mountains of Northeast Oregon (directive 1-4-1-601).

Prescribed fire emissions limits have been established for forested lands administered by USDA-FS and the BLM in NE Oregon. When the emissions limit is reached (15,000 tons of PM 10/year), no more burning is allowed for the year. In years with severe summer fire events fall burning may be curtailed because of this factor. The Malheur, Umatilla, and Wallowa-Whittman National Forests along with Burns and Vale BLM will have daily conference calls during prescribed fire season to discuss smoke impacts and ways to reduce those impacts.

FASTRACKS is a fuels analysis, smoke tracking, and report access computer system used by the Forest Service and BLM to predict and calculate emissions from prescribed fires and report to the Oregon Department of Forestry.

The Oregon Smoke Management Program requires a smoke management forecast be used to:

- Assess smoke impacts
- Determine if the unit is in prescription to burn or not
- Effects of the transport winds and mixing height
- Potential for inversions

7. Provide a quantitative description of air quality impacts of burning activities, focusing on new or increased impacts on down wind communities, visibility in Class I Wildernesses, etc.

Alternative One: No impact would occur from management-ignited fire. However, wildfires, as seen in recent years, have significant impacts on local communities. Studies have indicated that smoke (quantity of PM-10 emissions) from wildfires is greater than from prescribed fires.

Alternatives Two through Seven-A: There are three areas of concern for health standards. The Harney Basin, containing the towns of Riley, Hines, Burns, Buchanan, and Crane, is the area that is least likely to be affected due to normal prevailing wind patterns from the southwest. If wind patterns were from the northwest, which is uncommon, the duration of smoke would be limited to a day or two. Night inversion may also reach some of these areas in the early morning hours. The normal pattern of the inversion lifting is at the latest from 8 A.M. to 10 A.M.

The Drewsey area is likely to experience the same effects as the Harney Basin area.

Due to the proximity to the communities of Silvies and Seneca area, adequate smoke dispersal conditions would need to be in place prior to ignition. These conditions include adequate air mixing at the lower levels of the atmosphere and adequate transport winds. Normally, the duration of smoke would be limited to a few days up to a week at the most. Even with good daytime air mixing, inversions at night are common in the watershed. Prescribed burns are to be timed to minimize smoke production during periods of night inversions. Highway 395 is most likely to be affected by smoke and pilot cars may be needed when burning.

The nearest Class I Area for air quality that can be affected by burning in the watershed is the Strawberry Mountain Wilderness area. Air quality standards are to be met from July 1 through September 15 in Class I Areas. Predominately southwest winds tend to carry Forest smoke towards the Strawberry Mountain Wilderness Area. Heavily populated areas, including Boise, Idaho (200 miles to the east), are far enough away that dispersal occurs before smoke can arrive to those locations. Air quality effects are also generally dispersed by the time they reach other Class I areas including the Eagle Cap Wilderness in Oregon or the Selway-Bitteroot Wilderness in Idaho.

Burning seasons are spring and fall. There are usually more days meeting prescription for burning during the spring. Prescribed burning and associated smoke production would need to be coordinated with adjacent Ranger Districts along with adjacent national forests (Wallow-Whitman and Umatilla NF) in order to minimize smoke impacts to local communities. There may be a need to post signs along the highway to inform the public of the burning activity.

Consistency with Direction and Regulations

All action alternatives would be consistent with applicable Forest Plan air quality standards (standards 130-135, FP IV-40).

Effects on Sensitive Plants

This section summarizes the effects of the alternatives on existing and future characteristics of sensitive plants, as well as the effects of the different types of vegetation treatments proposed in each alternative. Refer to the project Biological Evaluation (Appendix C) for a detailed analysis of effects to sensitive plants

The three possible types of effects to TEPS (Threatened, Endangered, Proposed, or Sensitive) species that a Biological Evaluation or Biological Assessment can identify, and the corresponding "determinations of effect" to use, are given for TEP species in the 1986 Endangered Species Act regulations (50 CFR Part 402) and the March 1998 FWS/NMFS Endangered Species

Consultation Handbook; and for sensitive species in FSM 2670 and in the May 15 and June 11, 1992 Associate Chief/RF 2670 letters on this topic.

Crenulate Moonwort (*Botrychium crenulatum*) Wagner

Under the No Action Alternative and the action alternatives, there would be **NO IMPACT (NI)** to the *Botrychium crenulatum* (BOCR) population.

Deschutes Milkvetch (*Astragalus tegetarioides*) Jones

Under the No Action Alternative, there would be **NO IMPACT (NI)** to the *Astragalus tegetarioides* populations.

Under the action alternatives, activities **may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH)**. Potential impacts to *Astragalus tegetarioides* would be essentially avoided with implementation of recommended project design criteria.

Raven's Lomatium (*Lomatium ravenii*) Mathias and Constance

Under the No Action Alternative and the action alternatives, there would be **NO IMPACT (NI)** to the *Lomatium ravenii* population.

Consistency with Direction and Regulations

All action alternatives would be consistent with applicable Forest Plan Threatened, Endangered and Sensitive species standards (standards 62-68, FP IV-32).

Effects on Range Resources

Cumulative Effects Common to All Alternatives

Allotment management plan revision and associated NEPA analysis are tentatively scheduled for Silvies, Big Sagehen, Crooked Creek and Scotty allotments in 2005. Environmental Analyses were completed on Myrtle, West Myrtle and Scatfield allotments in 1996 and on Rainbow allotment in 1991.

Direct, Indirect and Cumulative Effects From Alternative One - No Action

Natural processes would continue to occur as well as activities from other decisions. In the long term, tree canopy cover and duff levels would increase causing a reduction in the vigor, extent, and density of understory vegetation. The forage base for grazing animals would be reduced. With less available upland forage vegetation, ungulate use in riparian zones would increase.

In the long term, conditions for a stand replacing fire would increase. A large stand replacement fire would severely disrupt grazing systems and indirectly cause economic impacts to permittees by reducing or eliminating feed, destroying or damaging range improvements and causing direct mortality of livestock. New recommendations for burned areas suggest that there be no livestock grazing on a burned area for at least two years following wildfire. A disruption in the availability of grazing resources could be devastating to the affected permittee as well as to the grazing program.

Cumulative effects of the No Action alternative would include continued reduction of the forage base due to tree and nonnative plant encroachment, competition between grazing species, and overuse of forage as the decline in forage availability focuses livestock use into smaller areas. Risk of wildfire would increase until stand-replacing fire(s) occurred. These factors could combine to reduce the grazing program in the Project Area to the point where it is no longer economically feasible for local family ranches to utilize this resource.

Direct and Indirect Effects Common to All Action Alternatives

The following is a general discussion of the effects of proposed activities. Alternative-specific effects are summarized in Table 4-14.

There would be no change to existing permitted livestock use from any Action alternative.

The prescriptions for the vegetation activities including prescribed burning would keep ground disturbance to a minimum, produce no more than 12 tons/ac of activity slash and reduce the duff layer, which would increase forage production.

Harvest, thinning and fuels treatment activities would open the canopy, encouraging the increase of ground vegetation for up to 25 years. Juniper removal would slow the encroachment of this species onto rangeland, which would also improve the availability of forage species. Manual treatment of noxious weeds would reduce their rate of spread. Increases in availability and palatability of forage species would improve the range's ability to support current levels of livestock and big game use. Road closures would reduce sedimentation and directed runoff into creeks and improve riparian condition. This would have a positive affect on range forage resources.

Prescribed burn blocks and timing of burns were designed with pasture and allotment boundaries in mind to prevent non-use of an entire allotment and the subsequent effects to the permittees.

In the short term (one to five years), vegetation treatment activities could disrupt livestock grazing, reduce ground vegetation and create slash, which may prevent livestock's access to areas of forage. These affects may cause grazing animals to focus in undisturbed areas, leading to localized overuse of resources. There is the potential for harvest and fuels treatment activities to damage range improvements. Road closures could reduce access to rangelands, making maintenance/reconstruction of range improvements and administration of permits more time consuming and costly. Activity-related soil disturbance increases the risk of introduction/establishment of noxious weeds and annual grasses.

Aspen restoration activities include fencing to protect regeneration from browsing. Fencing aspen stands removes forage from the forage base. Fences can also change/disrupt livestock and other ungulate movement, depending on where the fences are in relation to other features on the landscape. Fenced aspen stands can potentially remove livestock watering areas causing distribution problems. Identifying available alternate watering sources would mitigate this impact. Caging aspen sprouts would have less impact on range resources than fencing aspen stands, but would not be as effective for long-term protection of aspen.

Table 4-14. Summary of Affected Range Resources.

	Alt. Two	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven	Alt. Seven-A
Fence Affected by Veg. Treatment	31 miles	29 miles	36 miles	36 miles	19 miles	36 miles	36 miles
Fence Affected by Fuels Treatment	46 miles	46 miles	46 miles	30 miles	35 miles	46 miles	38 miles
Range Improvement Access Affected by Road Closures	17 sites	8 sites	8 sites	0 sites	7 sites	7 sites	7 sites
Spring Improvement Access Affected by Road Closures	0 sites	0 sites	7 sites	0 sites	4 sites	4 sites	4 sites
Riparian Monitoring Site Access Affected by Road Closures	3 sites	4 sites	4 sites	2 sites	4 sites	4 sites	4 sites
Juniper Reduction	537 ac	515 ac	715 ac	535 ac	Incidental by fire	715 ac	715 ac

Cumulative Effects from All Action Alternatives

Foreseeable future actions include more decreases in open roads, which could reduce access to rangelands. Maintenance/reconstruction of range improvements and administration of permits would be more difficult and costly. Road closures would reduce sedimentation and directed runoff into creeks and improve riparian condition. This would have a positive affect on range forage resources.

Potential effects from the proposed alternatives would be cumulative with effects from treating noxious weeds and expected future maintenance treatments such as prescribed burns. Beneficial effects on forage production would be expected. There would be beneficial indirect effects as well, since noxious weed spread would be prevented or minimized. In the long term, vegetation treatment activities could increase forage production and improve availability.

Consistency with Direction and Regulations

All action alternatives would be consistent with applicable Forest Plan range standards (standards 78-88, FP IV-34).

Effects on Noxious Weeds

Noxious weeds may alter ecosystems by negatively affecting native plants and animals and the communities they compose. They invade ecosystems, causing changes in structure and function. Noxious weeds can spread quickly, modifying the resident community and often usurping many of the resources. Changes in the native plant community can result in the loss of recreational opportunities, forage production for livestock and wildlife, and soil stability on slopes, roadsides, springs, and streams. Weeds often do not stabilize soils as well as native grasses, which can lead to erosion in riparian areas and loss of stream channels (USDA Malheur NF, Summit fire Recovery

Project FEIS). Public use restrictions on activities such as hunting, fishing, camping, firewood gathering, horseback riding, hiking, and off road vehicle travel could become necessary if weeds become more prevalent in the area.

State law requires landowners to keep weeds from infesting other lands from their land. More weed sites would increase the cost of following state law.

Noxious Weed Response to Ground Disturbance

Weed seeds carried on equipment to a landing site where the ground is churned up during skidding activities will grow and expand. Experience on the Emigrant Creek Ranger District shows that bull thistle and Canada thistle can be the major vegetation component on landings after use. In eastern Washington, it has been found that bull thistle invaded post-harvest, spring and fall burn treatments and cover was twice that of native species (Invasive Species Workshop Proceedings 2001). In some areas, houndstongue will also take over these areas. Noxious weeds will infiltrate areas along roads. Gelbard and Belnap (2003) found that the more improved a road was the more apt it was to have invasive plants alongside.

Noxious Weed Response to Fire

The effects of fire differ by weed species and fire intensity and may include the following:

- Burning may not increase the rate of spread, but makes the seedbed more habitable.
- Burning may increase competitiveness of the weeds by improving rhizomatous growth and seed germination.
- Seed banks in soil may survive fire and re-establish populations following a fire.
- Aboveground vegetation may burn. Extensive underground root structures are likely to survive and retain a large reservoir of carbohydrates to quickly fuel new plant growth.
- Removal of top growth may stimulate vegetative shoot production.
- Removal of overstory vegetation by fire may increase success of some existing weed populations.
- Removal of vegetation competing for water and nutrients will have a similar effect.
- Plants lacking a deep root system will generally be killed by high intensity fire.
- Several species can often re-sprout, flower and set seed six weeks after a fire, while most other vegetation is waiting for another season to produce seed (Invasive Species Workshop Proceedings 2001).

Direct and Indirect Effects of Alternative One – No Action

Under the No Action alternative, there would be no treatment to the 12 noxious weed sites identified in this EIS. New weed sites would continue to occur. Weeds would continue to spread. Spread of weed seed from the existing sites would be by wind, water, and normal activities of people in the forest. There may be some transport of the known types of weeds by wildlife and livestock (Galley and Wilson 2001). Current noxious weed treatment activities would continue, including inventory, monitoring, and manual control by pulling/digging and cutting down noxious weed plants. Closure of roads from other environmental documents would limit spread of weeds from vehicles, but could make access to existing sites difficult for treatment. The treatment of five known Canada thistle sites would be affected by road closures from previous decisions. Non-activity can also allow the spread of weeds; no treatment of existing sites would lead to expansion of the sites and occurrence of new sites.

Cumulative Effects of Alternative One

Past treatments of noxious weeds in the project area have included chemical and manual methods, and have reduced the number and size of weed sites. Sites that were chemically treated for two consecutive years have been eradicated.

The 65 noxious weed sites in the project area that were identified in the Forest Noxious Weed EA will be manually treated as planned. Because manual treatments are not completely effective in eradicating weeds, it is likely that the sites would persist and spread. Satellite sites (new weed sites that are close but not attached to existing sites) would likely develop around many treated sites as well as around the 12 untreated sites.

Region Six of the Forest Service is working on a Region-wide Noxious Weed Environmental Document. After the Regional document is completed, there will be forest-specific documents completed with options for using and Integrated Weed Management strategy to treat noxious weeds. This includes mechanical, biological and chemical treatments. Using integrated weed management, whereby the most effective eradication methods can be applied as appropriate to each situation, would result in more efficient and effective noxious weed management in the foreseeable future.

Direct and Indirect Effects of the Action Alternatives

The same treatment is proposed in all action alternatives. Noxious weeds would be manually treated (hand-pulled) on twelve sites within the project area.

Direct and Indirect Effects Common to All Action Alternatives

Manual treatment of weed sites would be moderately effective in removing weeds, but would not be completely effective. Treatments would control the size of existing weed sites, but the sites would persist.

Vehicles associated with proposed activities in the project area could transport weed seeds from other locations. Activities could create seedbeds for weed seeds and propagules. Any increase in the number of noxious weed sites, density of existing sites or introduction of new noxious weed species to the project area would have a negative effect upon rangeland vegetation, soil stability, biological diversity, and watershed condition. If additional noxious weeds sites were created, weeds could spread across acres of pastureland as they have in other parts of the country. Most weeds are not highly palatable to wild or domestic animals and can reduce the carrying capacity of the range.

With project design criteria/prevention measures in place (see Mitigation Measures, Chapter 2), the spread of weeds from the action alternatives would be kept to a minimum.

Alternative Two – Proposed Action

Fourteen known weed sites are within proposed activity units, and more sites are on roads adjacent to units. This alternative would create disturbed ground from harvest and fuels reduction activities, which could create a seedbed and possibly spread roots. Closing and ripping of roads would add acres of potential seedbed. Access for treatment of four existing Canada thistle weed sites would be limited by road closures. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Alternative Three
Eight known weeds sites are in proposed activity units. Thinning and burning activities would create disturbed ground, which could create a seedbed and possibly spread roots. Access for treatment of four existing Canada thistle weed sites would be limited by road closures. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Alternative Four
Twenty-four known weeds sites are in proposed activity units. Restoration, harvest and burning activities would create disturbed ground, which could create a seedbed and possibly spread roots. Access for treatment of four existing Canada thistle weed sites would be limited by road closures. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Alternative Five
Seventeen known weeds sites are in proposed activity units. Activities associated with fuels reduction, tree harvest, and roadwork would create disturbed ground, which could create a seedbed and possibly spread roots. No road closures would affect treatment of existing weed sites under this alternative. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Alternative Six
Fuels reduction activities and roadwork would create disturbed ground, which could create a seedbed and possibly spread roots. Access for treatment of three existing Canada thistle weed sites would be limited by road closures. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Alternatives Seven (Preferred Alternative) and Seven-A
Twenty-three known weeds sites are in proposed activity units. Fuels reduction and harvest activities and roadwork would create disturbed ground, which could create a seedbed and possibly spread roots. Access for treatment of four existing Canada thistle weed sites would be limited by road closures. Increased vehicle activity on haul routes could increase the opportunity for weed seeds to spread along the roads.

Cumulative Effects of the Action Alternatives
Cumulative effects of the action alternatives would be identical to those of the No Action Alternative, except that the 12 weed sites identified in this EIS would have been treated. Continued monitoring and treatment of noxious weed sites would limit the size and number of sites in the project area.

Consistency with Direction and Regulations
All action alternatives would be consistent with applicable Forest Plan noxious weed standard 188, FP IV-45.

Effects on Socio-Economics

Introduction

A social and economic analysis entitled *Silvies Canyon Watershed Restoration Project Final Environmental Impact Statement –Social and Economic Conditions and Effects* has been completed for this project (Kohrman 2003). This document is incorporated by reference under 40 CFR § 1502.21. The following is a brief discussion of the effects of the proposed alternatives on social and economic concerns. Tables 4-15, 4-16 and 4-17, at the end of this section, summarize effects.

Effects on Tribal Use

None of the alternatives would prevent continuation of traditional tribal practices. The anticipated direct and indirect social effects to the Burns Paiute Tribe are primarily due to change of motorized access from road closures and decommissioning proposed in the action alternatives. This change from road to non-road access would have its greatest effect on the young, elderly, and disabled tribal members. Those with other forms of non-motorized transportation, such as horses or mountain bicycles, would be less affected than those without these opportunities. The action alternatives change access on approximately 37 miles of road (Alternative Five), 87 miles of road (Alternatives Six, Seven and Seven-A), 143 miles of road (Alternative Two), and 160 miles of road (Alternatives Three and Four). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

Effects on Recreation Use

Effects on recreation access and use are described in the section titled “Effects on Recreation” on page 174 of this FEIS.

No social effects to roadless and wilderness values are anticipated (USDA 2000)[1]. The proposed fuels treatment activities in the Myrtle-Silvies Roadless Area are within the permitted activities of the January 12, 2001 Roadless Area Conservation Final Rule. There effects over time are anticipated to improve the vegetation and thus maintain these social values. None of these activities will prevent the area from being considered for wilderness nomination during the upcoming Malheur National Forest Plan revision.

Effects on Small Ranchers

There would be little impact from prescribed fire due to ability to coordinate grazing systems and burning. The biggest potential impact would occur from a short-term loss of forest forage and infrastructure through wildfire and threat to adjacent or intermingled private property.

Since the Myrtle-Silvies Roadless Area directly abuts private lands, alternatives having hazardous fuels reductions within the roadless area would have fewer potential negative impacts than those that do not. The No Action alternative and Alternative Seven-A would have the greatest potential

[1] Detailed information on social values and effects of roadless areas can be found in the USDA Forest Service, Roadless Area Conservation Final Environmental Impact Statement, November 2000.

to adversely impact the wildfire risk to those lands because they propose no activities in the Myrtle-Silvies Roadless Area. The Proposed Action would be next because it does not propose precommercial thinning in the potential bald eagle roost areas. The other alternatives would be equal in providing reduced risk (roughly 47% reduction) to those private lands abutting the roadless area.

Availability of post and poles for corrals and fencing is important to small ranchers due to the high purchase cost and continual need for a source of posts and poles. The ability to obtain post and poles from NFS lands reduces operating costs. Since the most posts and poles (452 acres) would be available in Alternatives Two (Proposed Action), Four, Five, Seven-A and the Preferred Alternative, these alternatives would be best at satisfying this need. The No Action Alternative, Alternatives Three and Six would not provide additional post and pole opportunities.

Alternative Four and the Preferred would be most effective to meet the needs of small ranchers and the No Action would be the least. Alternative Two would be next, followed by Alternatives Five, Seven-A, Three, and Six. Alternatives Seven-A and the No Action would not treat hazardous fuels within the roadless area that is adjacent to private ranches.

Effects on Forest Products and Subsistence Use

Economic effects on wood products are discussed later in this section, in subsection "Effects on the Viability of Timber Harvest" on page 79.

Effects on nontimber forest product uses from changes in roaded access would be as discussed in the subsection "Effects on Tribal Use" on page 76. Users of forest products can request a permit to use a closed road if necessary.

Effects on the availability of posts and poles would be as discussed in the subsection "Effects on Small Ranchers" on page 76.

Alternatives Four, Seven, and Seven-A would provide the most acres of available firewood (5,389 acres); the No Action alternative and Alternatives Three and Six would provide no additional firewood.

Effects on Residential and Water Use

Effects to water quality are discussed in detail the section "Effects on Watershed/Fish Habitat (Issue 3)"on page 4-13 of this FEIS.

The No Action alternative would result in no improvements to the health of the watershed. All action alternatives could potentially improve watershed conditions; The Preferred Alternative would restore the most acres in the watershed, followed by Alternatives Four, Seven-A, Two, Three, Six and Five.

Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income populations. In this assessment, elderly people, especially those on low-incomes that are fixed, were also identified with potential to be impacted by various alternatives. There is no quantifiable information on how much use the area receives from these populations other than the information shared by the Burns Paiute Tribe. None of the alternatives would prevent continuation of these traditional practices. The anticipated direct and indirect social effects to these populations are primarily due to change of motorized access from road closures and decommissionings proposed in the action alternatives. This change from road to non-road access would have its greatest effect on the young, elderly, and disabled. Those with other forms of non-motorized transportation – horses, off-highway vehicles, mountain bicycles, et cetera – would be less affected than those without these opportunities. The action alternatives change access on approximately 37 miles of road (Alternative 5), 87 miles of road (Alternatives 6, 7 & 7a), 143 miles of road (Alternative 2), and 160 miles of road (Alternatives 3 & 4). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

Effects on Income and Employment for Local Economies

Based on the effects of the various alternatives, the No Action alternative would have the least positive impact on local economies. This alternative would not support federal contract work or timber harvesting-related employment. It would continue to support less than 1 federal work force job, 10 livestock grazing-related jobs, and fewer than 5 recreation-related jobs. Cumulatively, the No Action Alternative does little to maintain or improve the current economic conditions in Grant and Harney counties. Unemployment rates would remain high under the No Action alternative. Continued declines in Forest Service work force and budgets as well as lack of related employment would have significant effects on the economy.

All action alternatives would support ten livestock-grazing related jobs, and fewer than five recreation-related jobs.

The Preferred Alternative Seven and Alternative Four would contribute the most positive impact on local economies, supporting nearly 55 contract related jobs, 40 federal work force related-jobs, and 355 timber harvesting-related jobs.

Alternative Seven-A would support the next highest level with 55 contract-related jobs, 30 federal work force-related jobs, and 355 timber harvesting-related jobs.

Alternative Two would support around 45 contract related jobs, 35 federal work force-related jobs, and 300 timber harvesting-related jobs.

Alternative Five would support about 45 contract related jobs, 30 federal work force-related jobs, and 235 timber harvesting-related jobs.

Alternative Three would support 20 contract related jobs, 15 federal work force-related jobs, and no timber harvesting-related jobs.

Alternative Six would support 15 contract related jobs, 15 federal work force-related jobs, and no timber harvesting-related jobs.

The alternatives with the highest jobs would support the highest potential incomes. Overall, the alternatives supporting the most employment and income would occur under the Preferred Alternative (Seven), Four, Seven-A, Two, Five, Three, Six, and No Action (One), respectively.

Effects on the Viability of Timber Harvest

The area proposed for commercial thinning within the project area was analyzed to determine the economic viability of harvesting timber by determining the tentative advertised bid rates per hundred cubic feet ($/ccf). This estimate was based on estimates of volume, species, amount of sawtimber and non-saw material, logging systems costs, haul costs, road maintenance costs, contractual costs, erosion control and other developmental costs, temporary road costs, and specified road construction costs, and the value of timber proposed for removal. The preliminary value of the timber was based on the prices for the same species and material of all sales actually sold within Appraisal Zone 3 (primarily Blue Mountain forests) within the last 12 months.

The tentative advertised bid rates estimated for the project reflect the most current volume, price, and cost estimates for this analysis. An initial bid rate was determined by subtracting the costs associated with logging from the base period prices adjusted for the quality of the material and current market conditions. This rate was further reduced per current appraisal methods (Transaction Evidence Appraisal) to allow for competition between bidders to determine the tentative advertised bid rate. The computer software program TEA_ECON was used for this analysis.

Direct, Indirect and Cumulative Effects from the Action Alternatives

All alternatives that harvest timber were analyzed in four areas (Burnt, Curry, Dry, and Mud) that account for primary transportation routes to the areas. Burnt and Curry areas would produce positive tentative advertised bid rates and the Dry and Mud areas would produce negative tentative advertised bid rates. Positive bid rates indicate the costs associated with the harvest activities would be covered by the revenue produced while negative rates indicate the revenue would not be sufficient to cover the costs. At this time, negative tentative advertised bid rates occur on Dry and Mud because data on harvest levels by tree species mix and size of trees is not available. This information is determined during layout, marking and cruising of proposed timber sales.

Based on this analysis, Alternative Five produces the highest risk of receiving no bids on sales from the Dry and Mud portions of the project due to the greatest negative tentative advertised rates ($-18.84/ccf and $-12.47/ccf), followed by Alternatives Two ($-14.26/ccf and $-8.13/ccf), Four, Seven and Seven-A ($-12.08/ccf and $-6.07/ccf). These portions of the project would remove the least timber resulting in negative bid rates.

Alternatives Four, Seven and Seven-A have the highest likelihood of receiving the highest bids on sales from the Burnt and Curry portions of the project due to the highest positive tentative advertised rates ($21.04/ccf and $6.73/ccf). Alternatives Two and Five would produce the same tentative advertised bid rates as Alternatives Four, Seven and Seven-A for the Burnt area and would result in a slightly lower rate ($4.56/ccf and $1.87/ccf, respectively) for the Curry area. These portions of the project would remove the most timber resulting in positive bid rates.

All sale proposals would not be sold unless they received the minimum base rates. The base rates are the same for all alternatives ranging from a high of $17.43/ccf for the Burnt and Curry areas to $12.51/ccf for the Dry, and Mud areas. Tentative advertised bid rates exceed the minimum bid rates only in the Burnt area (Alternatives Two, Four, Five, Seven and Seven-A). The Curry, Dry, and Mud areas would not result in viable harvest proposals that would cover the minimum required costs in any of the alternatives. Alternatives One, Three and Six would not harvest any timber and therefore would not produce any revenue or benefits to wood products industries.

Estimates for tentative advertised bid rates are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last few years and have fluctuated reflecting the volatility of the market for timber. Changes to tentative advertised bid rates would likely occur in the future at the time of the appraisal depending on actual market conditions.

The viability of the timber harvesting portions of the project would influence the ability of any one county or community in the analysis area to experience the largest extent of the harvest-related employment and income effects. The financial viability of the timber sale proposals demonstrated by the tentative advertised bid rates would influence whether potential purchasers closest to the project area could be competitive with other purchasers to acquire the majority of the supply of wood. New road construction and reconstruction proposed under the alternatives would increase access and increase the quality of access to sale units and increase financial viability of harvesting units with ground-based logging systems. Employment projections would depend on other factors such as market conditions, quality and quantity of the volume offered for sale, timing of the offerings, and financial conditions of local firms.

Economic Efficiency

Forest Service Handbook 2409.18 provides direction to analyze financial efficiency and, if needed, economic efficiency to identify the alternative that most efficiently achieves the desired objectives of the project. Consideration of the proposal that maximizes net public benefits is important to the decision-making process.

An economic efficiency analysis was completed that focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value (benefits minus costs) to assess which alternative comes nearest to maximizing net public benefits (36 CFR 219.3).

Ecosystem functions provide a broad set of services such as clean water or native forest stands that are valuable to both human and non-human components of the ecosystem. Changes in ecosystem services must be measurable and quantifiable in like terms, preferably monetary measures, in order to assess a relevant change in economic value (Bergstrom and Loomis 1999).

This analysis is based on identifiable and quantifiable economic benefits and costs and is more typically a financial comparison between revenues and costs. The objective of the economic efficiency analysis is to show a relative measure of difference between alternatives based on direct costs and values used. All dollar values have been discounted in terms of the present net value (2003 dollars).

Present net value is defined as the present (discounted) net value of project benefits minus the present (discounted) net value of project costs. A benefit-cost ratio is the ratio of present net benefits to present net costs. Present net value is a more appropriate measure for comparison between alternatives when land and productive activities are limiting such as in an environmental analysis of alternatives. A benefit-cost ratio comparison is more appropriate when investment capital is limited, for example when considering budget allocation among a number of different activities.

Measurable and quantifiable economic market benefits identified for the project include discounted revenue from timber volume proposed for harvest. Revenue is derived from the tentative advertised bid rate for the timber multiplied by the total cubic-feet proposed for harvest and discounted to the present. Refer to the section above on Viability of Timber Harvest. Other non-market benefits that may occur as a result of the proposed activities include changes in recreational fishing through reductions in sediment and improvements to fisheries habitat, improvements in the quality of the recreation experience, and increases in forage to wildlife species.

In addition to use values, existence values otherwise referred to as passive, non-use or preservation values may capture important economic value to the public (Swanson and Loomis 1996). Although these benefits are important components of the ecosystem services provided to humans, the production relationship between ecosystem functions and ecosystem services (such as changes in recreation visitor days, fishing days, animal unit months, or fish population) is not well defined or measurable at the project level in terms that provide meaningful comparisons of commensurate dollar values.

Measurable and quantifiable costs at the project level include direct costs to the Forest Service for preparing and administering the commercial timber sale and implementing other restoration activities including fuels reduction treatments and precommercial thinning. Refer to Chapter 2 – Alternative Comparison, for a complete list of activities.

Direct, Indirect and Cumulative Effects from the Action Alternatives

All action alternatives illustrate a negative present net value based on discounted revenue received from the project compared to the discounted total dollar-quantified costs for the project. The No Action alternative and Alternatives Three and Six would not harvest timber and would not produce quantified benefits due to the data limitations described for quantifying economic benefits and costs beyond those identified at the project level. The No Action alternative would have no costs associated with harvesting although ongoing costs associated with management of the area would continue. Planning costs associated with the project are treated as "sunk costs" which have already been incurred regardless of the alternative and are not included in the present net value.

Because present net values are negative, the comparison of alternatives is an illustration of the figures considering that the lowest figure for present net value demonstrates the greatest contribution to present net value. Alternative Six would produce the greatest present net value ($-2.4 million), followed by Alternatives Three ($-2.9 million), Five ($-3.3 million), Two ($-4.1 million), Seven-A ($-4.4 million), Four and Seven ($-4.5 million). Figure 4-4 illustrates the present net value by alternative.

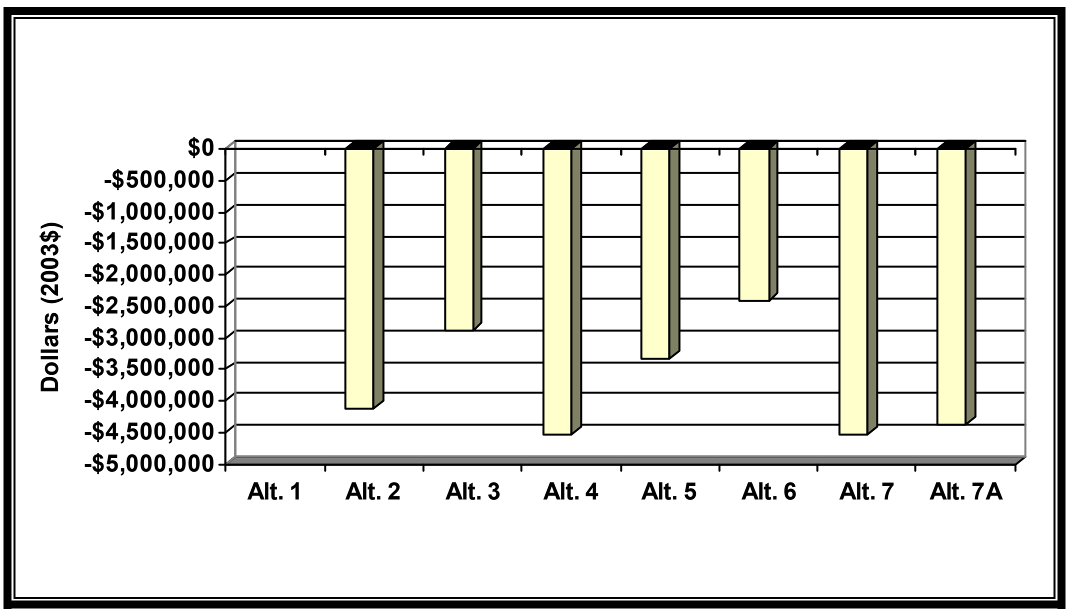


Figure 4-4. Present Net Value.

The costs associated with the fuels reduction and thinning projects account for all or the majority of the discounted costs in all alternatives. Alternatives Six and Three would have the greatest present net values of the action alternatives due primarily to the lowest costs associated with the fuels reduction and thinning activities and no costs associated with timber harvesting activities. Alternatives Two, Five and Seven-A would have slightly higher costs associated with fuel reduction, thinning and timber harvesting activities. Alternatives Four and Seven propose the most fuel reduction and thinning actions and the highest amount of timber harvest resulting in the highest costs and the least present net value of all alternatives.

Potential benefits that were not quantified in economic terms due to the limitations of measuring the production relationship between ecosystem functions and ecosystem services at the project level, including improvements to soil productivity, reduced erosion, water temperature improvements, terrestrial and aquatic habitat improvement. Potential improvements in fish habitat would subsequently increase smolt survival rates, overall fish population levels and increase commercial and recreational fishing opportunities. Two measures of potential economic effects would be changes in the value of commercial and sport fishing harvests.

Sport values quantified for fish range from an average net value per fish (the economic trade-offs an angler would make for access to a given fishing experience) of $58 for salmon and $164 (2003$) for steelhead in the Columbia River Basin depending on the location and size of the catch (Olsen et al 1991). Depending on the level of change from the restoration activities in the project area, the net economic value of fish, for example, would or would not be affected. Changes in sport fishing would also have an effect on recreation expenditures and potential economic impacts. Refer to the Effects on Watershed/Fish Habitat section of this EIS for further discussion of effects to fish habitat.

Other potential qualitative economic benefits or costs from the alternatives include changes to the diversity, quality, and quantity of wildlife habitat for both game and non-game terrestrial species. With respect to big-game populations, the economic value of hunting would depend on how changes in population levels and spatial distribution of game animals affect either the quality or intensity of the hunting experience. Consequently, the overall level of hunting would change with corresponding economic impacts from hunting-related expenditures. Changes in non-game population levels and diversity would affect wildlife viewing, photography, and other non-consumptive uses of the area. Refer to the Recreation and Wildlife sections of this EIS for further discussion of effects to these resources.

Other opportunities or externalized costs that would potentially occur include damage to soils from harvest operations resulting in long-term losses in soil productivity and potential timber harvest, losses in wildlife habitat as a result of reduced large snags or increases in wildfire risk, or increases in sedimentation to downstream fish habitat and public drinking water from erosion in the fire area. These costs are not well defined or measurable at the project level in terms that provide comparison of commensurate dollar values. Refer to the other environmental consequences sections in this EIS for a discussion of effects to ecological and human use for a relative comparison between alternatives. Refer to Tables 4-16, 4-17, and 4-18 for a summary of the effects to Grant, Harney, and other counties.

Table 4-15. Summary of the Effects to Grant County.

Affected Item	Alt. One – No Action	Alt. Two- The Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven – The Preferred Alternative	Alt. Seven-A
Estimated Total Potential Income[1]								
Federal Contracts	$0	$736,080	$483,250	$827,620	$692,410	$328,290	$822,610	$799,700
Federal Salary, Support	$1,440	$1,266,840	$1,051,430	$1,392,900	$1,010,370	$757,700	$1,420,100	$1,399,360
Forage	$102,940	$102,940	$102,940	$102,940	$102,940	$102,940	$102,940	$102,940
Wood Products - Sawtimber	$0	$4,753,330	$0	$5,517,493	$3,663,705	$0	$5,517,493	$5,517,493
Recreation	$11,500	$10,020	$6,280	$6,280	$11,500	$11,160	$11,160	$11,160
Estimated Total Potential Jobs[2]								
Federal contracts	0	5	<5	10	5	<5	10	10
Federal Salary, support	0	10	5	10	10	<5	10	10
Forage	5	5	5	5	5	5	5	5
Wood Products - Sawtimber	0	165	0	195	130	0	195	195
Recreation	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1

Table 4-16. Summary of the Effects to Harney County.

Affected Item	Alt. One – No Action	Alt. Two- The Proposed Action	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven – The Preferred Alternative	Alt. Seven-A
Estimated Total Potential Income[1]								
Federal Contracts	$0	$2,358,400	$1,548,325	$2,651,710	$2,218,470	$1,051,830	$2,635,640	$2,628,640
Federal Salary, Support	$3,925	$4,076,140	$3,606,390	$4,466,050	$3,168,970	$2,646,520	$4,647,780	$4,479,310
Forage	$119,640	$119,640	$119,640	$119,640	$119,640	$119,640	$119,640	$119,640
Wood Products - sawtimber	$0	$2,592,725	$0	$3,009,542	$1,998,385	$0	$3,009,542	$3,009,542
Recreation	$41,580	$36,210	$22,680	$22,680	$41,580	$40,320	$40,320	$40,320
Estimated Total Potential Jobs[2]								
Federal contracts	0	20	10	25	20	5	25	25
Federal Salary, support	0	25	10	30	20	10	30	20
Forage	5	5	5	*5*	5	5	5	5
Wood Products - sawtimber	0	90	0	105	70	0	105	105
Recreation	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Table 4-17. Summary of the Effects to Other Counties.

Affected Item	Alternative One – No Action	Alternative Two- The Proposed Action	Alternative Three	Alternative Four	Alternative Five	Alternative Six	Alternative Seven – The Preferred Alternative	Alternative Seven-A
Estimated Total Potential Income[1]								
Federal Contracts	$0	$2,395,200	$1,572,500	$2,693,090	$2,253,090	$1,068,250	$2,676,770	$2,634,370
Federal Salary, Support	$0	$0	$0	$0	$0	$0	$0	$0
Forage	$0	$0	$0	$0	$0	$0	$0	$0
Wood Products - sawtimber	$0	$1,296,363	$0	$1,504,771	$999,192	$0	$1,504,771	$1,504,771
Recreation	$0	$0	$0	$0	$0	$0	$0	$0
Estimated Total Potential Jobs[2]								
Federal contracts	0	20	5	20	20	5	20	20
Federal Salary, support	0	0	0	0	0	0	0	0
Forage	0	0	0	0	0	0	0	0
Wood Products - sawtimber	0	45	0	55	35	0	55	55
Recreation	0	0	0	0	0	0	0	0

[1]Potential income (rounded to the nearest 10) and employment (rounded to the nearest 5) is based on proposed management actions. Discounting at 4%/year has been applied to result in 2002 dollars. This analysis tracks base and secondary activity for a number of actions, as well as estimates of potential returns to various counties.

[2]Federal Contracts: The value of potential contracts was derived from proposed restoration work (acres and structures) and average costs per unit. The results were discounted at 4% to the present from the year the activity would occur and disaggregated by county based on past contracts from the Malheur National Forest. While there is no guarantee that these proportions would be the same in the future, the analysis provides a relative comparison of potential effects by county. Direct jobs were determined by dividing the value of contracts by average county income. Indirect and induced jobs were determined by multiplying the values by adjustment factors supplied by Oregon Department of Employment economists for each county.

Consistency with Direction and Regulations

This socio-economic analysis is consistent with NEPA and the Forest Plan. The Forest Plan contains direction under social-related headings such as recreation, visual quality, etc. The discussions of how the alternatives analyzed in this EIS meet that direction is included in those sections of this document. The Forest Plan also contains several goal statements under social-related headings such as timber and human and community resources. This socio-economic analysis is consistent with these goal statements.

Executive Order 12898 – The anticipated direct and indirect social effects to the Burns Paiute Tribe, minority, low-income populations, elderly people, or civil rights are primarily due to change of motorized access from road closures and decommissioning proposed in the action alternatives. This change from road to non-road access would have its greatest effect on the young, elderly, and disabled. The action alternatives change access on approximately 37 miles of road (Alternative Five), 87 miles of road (Alternatives Six, Seven and Seven-A), 143 miles of road (Alternative Two), and 160 miles of road (Alternatives Three and Four). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

Other Issues

Besides the significant issues, other concerns were identified as non-significant issues and were resolved without developing separate alternatives. The sources for each of these issues are located in the planning record.

Effects on Wildlife

Effects on Big Game and Big Game Habitat

This section discloses the effects on big game habitat from activities proposed by each alternative. All proposed activities could potentially affect big game habitat. Each alternative proposes varying amounts and types of proposed activities. The effects of each alternative are similar in terms of proposed activities but vary in the magnitude of disturbance. Disclosing the effects to cover, road densities, habitat effectiveness index (HEI), and migration and travel corridors arrives at the effects to big game habitat.

Effects on Cover

Satisfactory [thermal] cover (stands with a canopy closure of at least 60%) as prescribed in the Forest Plan, is likely not sustainable in the Silvies Canyon watershed. Marginal cover, defined as trees greater than or equal to 10' tall with a canopy closure of at least 40%, is likely closer to historical values in terms of percent canopy cover for this area (Historical Crown Closure data, Wildlife Project Record). The majority of the forested stands in the northern 2/3 of the watershed are Warm Dry stands capable of providing sustainable canopy closure at or above 30%. It is likely that at any given time, some stands can produce a canopy closure capable of providing satisfactory thermal cover but stress on these stands and low site potential would likely keep the majority of these stands at or near the lower limit of marginal [thermal] cover (Vegetation Specialist Report).

Most forest stands in the southern end are Hot Dry stands capable of providing sustainable canopy closures up to 30%. These stands generally are not capable of providing satisfactory or marginal thermal cover (Vegetation Specialist Report).

Direct, Indirect and Cumulative Effects of Alternative One – No Action

With ongoing fire suppression, only one outcome of the No Action alternative is expected within the foreseeable future: removal of some or all old-forest characteristics, such as canopy cover. Removal of canopy cover is expected to occur through a combination of stress, insects, and disease and through stand-replacing fires or other stand-replacing events. See the section titled "Effects on Vegetation Condition" for a discussion of the effects of the No Action alternative on forested stands.

Over the next 50 years, canopy cover is expected to oscillate from 40-60% in warm-dry forest and from 25-45% in hot-dry forest (percent canopy based on all tree layers, not just overstory and midstory layers). Cover values would change from those displayed in Table 3-14 and be dependent on insect outbreaks.

As mortality increases in cover areas, accumulating ground material would inhibit animal movement through cover stands. This buildup of residue would also reduce the production and availability of forage in these stands by covering the ground with coarse material that would interfere with understory growth. As this occurs, animals seeking forage and thermal cover would have to use adjacent areas, use available topographic features for thermal relief, adjust physical activities and metabolic rates to compensate for reduced thermal cover values of available cover, or a combination of all of the above to survive thermal stresses.

In the short-term, the availability of hiding cover would be limited to areas where the affects of insects and disease are light. Areas more heavily affected by insects and disease would experience a gradual loss in most of the remaining cover over the next three to five years. This condition would reduce big game security and possibly increase hunter success because of the loss of hiding cover along open roads or in areas easily accessible by foot.

If disease and insect populations return to endemic levels and overstocking is reduced by inter-tree competition and mortality, suppressed seedling and saplings may begin to develop into hiding cover over the next 15 to 40 years. Hardwood shrubs previously suppressed by overstory trees would grow up in areas not fully stocked with tree species and would continue to prosper until a closed canopy condition develops.

Direct, Indirect, and Cumulative Effects of Alternative Two – The Proposed Action

Timber management can enhance, maintain, or degrade elk habitat, and can be used to restore some sites to productive forage areas. Results depend on how treatments move habitat towards management objectives and how these objectives relate to the needs of elk herds in the project area.

1. Effects of Silvicultural Treatments

The primary purpose of proposed treatments is to retain continuous forest cover in harvest units while improving the quality of remaining trees and improving long-term wildlife habitat. Some general effects of proposed vegetation treatments are:

- CT (Commercial Thinning): Primarily reduces the amount of canopy cover, therefore reducing thermal protection values to big game.
- IT (Intermediate/Selection Harvest): Effects would vary depending on the type of cutting (single tree or group selection) done and resulting stand structure and density. Effects on big game would depend upon the amount of canopy closure that is maintained and the extent of the stands in this condition. This treatment offers an excellent opportunity for removal of trees that have encroached on and are competing with more desirable species in important habitats such as aspen, riparian areas, big game winter range, LOS stands, natural meadows and shrub steppe/grasslands.
- PCT (Precommercial Thinning): This affects big game cover values by reducing hiding cover characteristics. This treatment would not likely alter overall thermal values of the overstory.

To improve stand vigor, reduce overstocking-dependent mortality, manage stand structure, and improve or maintain sustainable stand cover, intermediate harvest and commercial thinning would focus mainly on the removal of excess trees from mid-story tree canopies. Removal of these trees would leave most of the overstory and would have little effect on overstory canopy conditions. However, since mid-story trees are contributing to canopy cover, their removal would reduce canopy closure (Vegetation Specialist's Report).

Most untreated satisfactory and marginal cover blocks are predicted to alternate between meeting and failing cover standards. Effects would be the same as described in Alternative One.

As suppressed understory trees are harvested and precommercial thinning takes place, small openings in the canopy would occur. These small openings in existing canopies should create optimal growing conditions for herbaceous vegetation, shrubs, and natural regeneration of seedlings and should promote the development of multistory hiding and thermal cover. This should promote the development of more sustainable cover over time. In units where existing canopy structure is retained, less natural regeneration would occur and development of understory hiding cover and understory canopies would be slowed or not occur at all.

During precommercial thinning, wildlife patch cuts and leave patches would be left to create a mosaic pattern of various ages of cover. Over time, these leave patches will deteriorate in cover value. Stand treatments and post-treatment fuels reduction (grapple or hand piling of generated slash and landscape level prescribed burning) should reduce the risk of large scale stand replacement wildfire and may prevent or reduce the scope of unexpected loss of large blocks of cover.

Effects on Thermal Cover

Several characteristics associated with the structure of forest canopy should be taken into account to understand the theoretical value of cover. During the day, the forest canopy creates an umbrella effect that prevents incoming radiation from adding heat energy to the airmass under the canopy. At night, it helps reduce the animal's radiational heat loss to the open sky. Tree trunks and low ground vegetation reduces air movement which protects the animal from the chill factor associated with low temperature and increased windspeed.

In the project area, there is relatively little low ground vegetation under thermal cover. At midday during hot summer months, air movement in such stands may be an important factor that helps keep animals cool (Thomas 1979).

Energetic contributions of thermal cover have been widely assumed to be valuable to big game during the winter. Cook et al. (1998) tested the hypothesis that the sheltering effect of thermal cover is important to elk. This study concluded that there was no positive effect of thermal cover on elk. Instead, they found that dense cover provides a "…costly energetic environment, resulting in significantly greater overwinter mass loss, fat catabolism and mortality…" These authors also reported that previous studies of winter thermal cover for white-tail deer (*Odocoileus virginianus*) and mule deer had reached similar conclusions.

Some researchers (Brown 1989, Thomas 1979) reported that elk appear to use summer thermal cover to escape from high ambient summer temperatures. Thinning of cover stands may cause an increase in daytime ambient air temperature and a decrease in nighttime ambient air temperature profiles. This may cause elk and deer to expend more energy in maintaining homeothermy (Thomas 1979). In some cases, similar relief may be found on north aspect slopes and through topographic relief.

Regarding summer thermal cover, recent studies in the shrub-steppe of south-central Washington and southeastern Idaho have demonstrated that Rocky Mountain elk can prosper with cover types not associated with coniferous forest structure (Toweill and Thomas 2002). Cook et al. (1998) found no indication that during summer, elk performance was influenced in any way by forest cover treatments, despite temperatures significantly above normal during the study. Other researchers have found elk to be surprisingly tolerant of high summer temperatures. "Because elk populations successfully establish in areas lacking classically defined thermal cover, cover requirements need further quantification (Toweill and Thomas 2002, pg. 540).

The assumed energetic benefits of thermal cover seem inconsequential, thus leaving forage effects as the primary mechanism through which habitat influences individual animal performance. Thermal cover may be important under certain conditions, but its value should be considered in relation to that of other habitat attributes. This consideration needs to be in the context of the ability of each attribute to contribute to the productivity of local elk herds. Cook et al. (1998) suggests that habitat managers should give more attention to forage relationships and vulnerability of ungulates to hunting and harassment when managing habitat for big game.

While thermal cover may have less importance to elk than previously thought, its value to other species that use the structure provided by closed canopies (canopy nesters and canopy gleaners) should not be ignored.

Summer Range: This alternative reduces cover values in all subwatersheds for about 20 years (see Table 4-18). Because of the reduction in cover, Sage Hen Creek would not meet Forest Plan standards for satisfactory cover.

In the short-term, total cover would be reduced by about half in Burnt Mountain, Myrtle Park, Red Hill, and Sage Hen Creek subwatersheds, though total cover remains above Forest Plan standards in Sage Hen Creek. In Stancliffe Creek, cover would be reduced by about 2/3. In two subwatersheds, Boulder/Fawn and Myrtle Creek, the reduction in cover is minor (see Table 4-18). Harvest generally occurs over a 2-year period, and will occur in about 1/3 of the project area at a time (see the project implementation schedule, Table 2-21, Chapter 2).

Although cover would be unavailable in most stands proposed for treatment for about 20 years, proposed vegetative treatments would create more sustainable cover in the long term. After about 20 years marginal cover is expected to develop in YFMS and SE stands while OFMS stands would mostly remain below 40% canopy cover. The canopy cover that does redevelop is expected to be more sustainable because it will be provided by fewer, but larger and healthier trees that are more adapted to site conditions than those there presently.

The response of elk to these changes in their habitat is not certain, though elk on the Malheur National Forest appear to select for habitat with [thermal] cover. Elk in some subwatersheds (such as Stancliffe Cr.) may be adapted to low levels of cover, and they may adjust to the changes in habitat. Other elk may be displaced and may move out of the immediate habitat, move to other subwatersheds, or move to private or BLM lands. The degree of displacement is expected to be minor. Little movement of big game onto private/BLM land is expected to occur due to the loss of [thermal] cover, because [thermal] cover is more available on the Malheur National Forest than on private and BLM land. In addition, well-distributed, untreated areas would be available to provide habitat for displaced elk between units, in the roadless area, and in large parts of the bald eagle management area during the entire project. Elk may also move into areas that are not being treated or are only partially treated (generally 2/3 of the area remains untreated or lightly treated at any time during the project; see implementation schedule, Table 2-21, Chapter 2). While elk are likely to move around within the Malheur National Forest, no net change in the number of elk using the project area is expected due to proposed activities. Proposed activities are not expected to permanently displace elk off the Forest. Mule deer are not expected to be displaced off-Forest by changes in habitat (R. Garner, ODFW, pers. com.)

Elk that may be displaced from their home ranges are prone to higher predation and increased interactions with hunters due to their lack of knowledge of the home range. However, elk populations have not declined in the area (Chapter 3-Big Game Population Management Objectives) because of past activities, and they are not expected to decline because of proposed activities. Mule deer forage would increase as the reduced cover and competition for water increases shrub production; this could benefit the deer population.

Although cover is being reduced, habitat effectiveness improves in this alternative on both summer and winter range due to road closures (see HEI discussion below). Big game animals might move from an area during treatments, but they are expected to return upon completion. Although cover is being reduced, the effect on big game populations is not expected to be measurable.

Winter Range: This alternative maintains thermal cover at Forest Plan standards for winter range in three subwatersheds (see Table 4-19). The most pronounced reductions in winter range thermal cover following treatment would occur in portions of Sage Hen Creek subwatershed. Proposed commercial thin and intermediate thin would likely reduce winter range cover from near standards to well below standards.

Similar to the discussion of effects under summer range thermal cover, the response of elk to these changes in their habitat is not certain. Although cover is being reduced, habitat effectiveness improves in these alternatives on both summer and winter range due to road closures (see HEI, below). Big game animals might move from an area during treatments, but they are expected to return upon completion. Although cover is being reduced, the effect on big game populations is not expected to be measurable.

Table 4-18. Percentages[1] of satisfactory and marginal[2] thermal cover remaining in summer range by Alternative.

Subwatershed	Alt One			Alt Two			Alts Three and Six			Alts Four, Seven and Seven-A			Alt Five		
	S	M	T	S	M	T	S	M	T	S	M	T	S	M	T
Boulder/fawn	3	14	17	3	13	15	3	14	17	3	13	16	3	14	17
Burnt Mtn.	1	15	16	1	8	9	1	15	16	1	8	9	1	11	12
Myrtle Creek	5	4	9	5	2	7	5	4	9	5	2	7	5	3	8
Myrtle Park	5	25	30	5	13	18	5	25	30	5	13	17	5	16	20
Red Hill	0	27	27	0	18	18	0	27	27	0	18	18	0	27	27
Sage Hen Cr.	12	47	59	3	26	29	12	47	59	1	19	20	8	27	35
Stancliffe Cr.	0	9	9	0	3	3	0	9	9	0	3	3	0	8	8

S = Satisfactory cover; M = Marginal cover; T = Total cover; Hatching indicates where the standard is not met.
Forest Plan Standards are S=8%, M=5% and T=20% per Subwatershed.
[1]Numbers in table are percentages of available cover relative to total area of subwatershed.
[2]Satisfactory cover can be substituted for marginal cover when standard is exceeded.

Table 4-19. Percentages[1] of satisfactory and marginal[2] thermal cover remaining in winter range by Alternative.

Subwatershed	Alt One			Alt Two			Alts Three and Six			Alts Four, Seven and Seven-A			Alt Five		
	S	M	T	S	M		S	M	T	S	M		S	M	T
Boulder/fawn	6	22	28	5	18	23	6	22	28	5	13	18	6	21	27
Burnt Mtn.	16	19	35	16	12	28	16	19	35	16	11	27	16	14	30
Myrtle Creek	19	40	59	15	37	52	19	40	59	15	37	52	16	38	53
Myrtle Park	21	51	72	21	50	71	21	51	72	21	50	71	21	50	71
Red Hill	0	13	13	0	13	13	0	13	13	0	13	13	0	13	13
Sage Hen Cr.	5	31	36	3	21	23	5	31	36	2	19	21	4	29	33
Stancliffe Cr.	0	12	12	0	12	12	0	12	12	0	12	12	0	12	12

S = Satisfactory cover; M = Marginal cover; T = Total cover; Hatching indicates where the standard is not met.
Forest Plan Standards are S=8%, M=5% and T=20% per Subwatershed.
[1]Numbers in table are percentages of available cover relative to total area of subwatershed.

[2]Satisfactory cover can be substituted for marginal cover when standard is exceeded.

Effects on Security (Hiding Cover)

This alternative would result in the loss of most hiding cover in units where understory trees are removed to reduce stress on retained overstory trees and where prescribed burning would occur.

To mitigate the short-term loss of hiding cover and resulting potential increases in vulnerability to hunting and harassment, road densities would be reduced across the project area. This should help negate the effects of hiding cover loss.

A slight increase in hunter success may occur because of reduced hiding cover, but the level of change is expected to be low because of reductions in road density. This is not expected to affect local bull/cow or buck/doe ratios, impact the quality of the local herd, or herd vigor across the wildlife management unit.

Wildlife patch cuts and leave patches in precommercial thinning units as well as a Design Criterion that leaves hiding cover in FPA #2 corridors and in stands adjacent to corridors (see Chapter 2) should help offset hiding cover losses.

Areas where vegetation management practices were deferred would experience the same effects as those described in Alternative One.

Effects on Forage

Most investigations of the effect of timber stand thinning have suggested favorable results for big game, usually in the form of improved forage production (Toweill and Thomas 2002). In addition to measurable increases in total forage production, higher protein content, greater palatability of forage plants, and greater species diversity in created openings usually occurs.

Increased forage production would be limited in stands where more than 50% canopy closure remains after treatment. In most cases, canopy closure would be opened (on patch scale or entire unit) enough to allow some increases in forage production.

Effects on Big Game (Disturbance from Logging)

Thomas and Toweill (1982) suggest that displacement of elk during logging operations is temporary, and animals usually return to the affected area within days. This is the expected response of elk and deer to logging activities in the Silvies Canyon Project Area.

As discussed under summer range thermal cover, the degree of displacement of big game is expected to be minor. Elk may move to the untreated areas that are well distributed across the project area, or into areas that are not being treated or are only partially treated. Mule deer are not expected to be displaced (R. Garner, ODFW, pers. com.). Disturbance from logging may cause some movement of elk but because of the amount of habitat that is untreated, elk movement would mostly occur within the Forest. Little to no movement of elk is expected off the forest because of disturbance. The effect of such a movement would not be measurable.

A certain amount of physiological stress is likely to result from the involuntary displacement of elk from portions of the project area during logging activities. To avoid compounding stress from displacement with stress caused by adverse weather conditions, limited food supply, and pregnancy, seasonal restrictions would be applied to limit the amount and duration of disturbance to elk while on winter range (see EIS, Chapter 2).

Other activities, such as sale prep, layout, marking, and post-harvest treatments would also disturb and potentially displace elk and deer from treatment units. This disturbance would be relatively short and animals should reoccupy the area quickly after the disturbance ceases.

2. Effects from Fuels Treatments

Prescribed burning can be used effectively to improve elk habitat in this watershed. Timing and intensity of burning affects the results of the burn. Prescribed burns can open up the vegetation, improve forage under the retained canopy, and set succession back to earlier stages that improve forage quality and quantity for big game. Underburning would reduce overstocking and help to promote the development and retention of more sustainable canopy cover. As some suppressed understory trees are consumed by fire, small openings in the canopy could develop, which should create optimal growing conditions for limited regeneration of tree seedlings and improve forage quantity and quality (Thomas et al. 1988).

Hobbs and Swift (1985) noted that burns contained more forage with high nutrient concentrations but less forage overall. They noted that forage quality is inversely related to its abundance in many ecosystems. Improvements in diet quality for ungulates after fires can be related to removal of standing herbage and litter on the ground, and removing coarse vegetation from old decadent plants (Thomas et al. 1988).

Prescribed burning also caused a short-term difference in initiation of plant growth between burned and unburned areas. This benefits ungulates by offering two temporally distinct flushes of nutritious plant tissue, early on the burned areas and later on the unburned areas. This prolongs the time when nutritious forage is available for utilization (Thomas et al. 1988).

Most untreated cover is predicted to degrade to lower quality cover over the next 10 to 40 years. Effects on these areas would be similar to discussion under Alternative One.

With maintenance burning, the development of hiding cover would be limited. Most stands would remain in an open, widely spaced condition. Big game security would be provided mainly from reduced access because of road closures.

Prescribed fires are expected to burn relatively cool, move slowly, and burn in a mosaic of burned and unburned patches. Large, highly mobile animals like deer and elk tend to move calmly in response to fire, tending towards the periphery of the fire (Smith 2000). Depending on burn size and complexity, crews of 20-50 people would manage the fire. Disturbance would be short-term, unlikely to last more than a week on the larger burning operations. Animals could return to burn areas as soon as the ground cools.

Direct fire-caused mortality would be unlikely; mortality typically occurs only in uncontrolled wildfire situations where fire fronts are wide and fast moving, fires are actively crowning, and thick smoke occurs (Smith 2000).

3. Effects of Other Proposed Activities

The effects of road activities are discussed below under "Open Road Densities and their Effects on Elk." Juniper reduction effects on big game are discussed under Mountain Shrubs. Weed treatments proposed in the action alternatives would all be done mechanically (no herbicides would be used). Big game may experience localized minor disturbance, but weed treatments should benefit all wildlife by creating space for native or desired plants. Spring and aspen restoration would return these small inclusions to healthier conditions that more closely resemble historical conditions. A small amount of forage in these areas would be unavailable or difficult to access for several years due to fencing/protection of these areas. However, as these habitats are restored, they may provide small pockets of foraging, hiding cover, and calving and fawning habitat to elk and deer.

Direct, Indirect, and Cumulative Effects from Alternatives Three and Six

Alternative Three proposes a substantial amount of precommercial thinning in stands to thin and space densely stocked understories. This treatment would essentially be a mechanical pretreatment for prescribed burning. Alternative Six would treat the same total amount of the landscape but would reduce the amount of precommercial thinning and substitute prescribed burning as the primary tool to thin stands. The outcome of treatments and resulting effects are similar; therefore, these two alternatives are combined.

1. Effects of Silvicultural Treatments

Understory thinning would remove a portion of the structure from the understory, resulting in a possible reduction in canopy layers. Overall, stand structure would remain intact.

The residual stand should become more vigorous as competition from the understory is reduced. This would make this stand more stable over time as the remaining trees become increasingly resilient to the effects of pathogens, drought and fire. Habitat loss due to these factors may be reduced.

Most of the overstory would remain intact; therefore, light penetration would be less than that seen in commercial treatments that open up both the understory and overstory structure. Slightly increased light penetration to the ground and a reduction in understory conifers may allow for increased growth of some understory grasses, forbs and shrubs that occur in the understory. This would result in a slight increase in forage availability for big game.

Effects on Thermal Cover

There would be a slight reduction in canopy closure following precommercial thinning due to the removal of suppressed understory trees. The canopy closure could be reduced by up to 5-10%. This treatment would not reduce thermal cover values because the remaining larger trees provide most of the canopy cover and the understory trees thinned through this type of treatment do not contribute to thermal cover. The availability of cover would similar to that seen in Alternative One (see Tables 4-18 and 4-19).

The slight change in canopy closure may result in a slight increase in ambient and ground temperature as more light is allowed through the canopy.

2. Effects on Security (Hiding) Cover

This alternative would result in the loss of most hiding cover in units where understory trees are removed to reduce stress on retained overstory trees and where prescribed fire would be introduced. Trees ≥9" dbh would be retained in the mid-story. These additional trees would increase the amount of stems per acre that could provide additional limited hiding cover for big game.

To mitigate the short-term loss of hiding cover and resulting potential increases in vulnerability to hunting and harassment, road densities would be reduced across the project area, more so with Alternative Three. This should help negate the expected effect of lost hiding cover.

Wildlife patch cuts and leave patches in precommercial thinning units as well as a Design Criteria that leaves hiding cover in FPA #2 corridors and in stands adjacent to corridors (see Chapter 2) should help offset hiding cover losses.

Areas where vegetation management practices were deferred would experience the same effects as those described in the Alternative One.

2. Effects of Fuels Treatments

Through the removal of smaller diameter dead and dying trees from the understory, ladder fuels that are capable of carrying a ground fire into the canopy would be removed. Follow-up slash treatments would treat hand piled activity generated slash. Some fire creep is expected between piles depending on concentration of natural fuels and burning conditions. This treatment would result in an overall reduction of fuel levels throughout the stand and would reduce the risk of a stand-replacing fire.

Effects to elk would be similar to the effects described in Alternative Two.

3. Effects of Other Proposed Activities

Effects to elk would be similar to the effects described under Alternative Two.

Direct, Indirect, and Cumulative Effects from Alternatives Four, Seven and Seven-A

The effects of these alternatives on cover and big game would be similar to those discussed under Alternative Two. The intensity of treatment would also be similar; however, additional acres would be treated. This would affect the availability of cover across the project area.

Summer Range: Pronounced reductions in summer range thermal cover would occur in all subwatersheds. Cover would fall below the Forest Plan standard for all subwatersheds except Sage Hen Creek following treatment (Table 4-18).

Winter Range: Cover values continue to meet Forest Plan standards or do not go further below standards on five subwatersheds, but fall further below cover standards in two subwatersheds (Table 4-19). The most pronounced reductions in winter range thermal cover would occur in Boulder/Fawn and Sage Hen Creek subwatersheds.

Direct, Indirect, and Cumulative Effects from Alternative Five

The effects of this alternative on cover and big game would be similar to those discussed under Alternative Two; however, the intensity of treatment would be reduced because fewer acres of cover would be treated.

Summer Range: Reductions in summer range thermal cover would occur in several subwatersheds; generally, however, marginal rather than satisfactory cover would be treated. Cover would remain below Forest standards (Table 4-18).

Winter Range: Cover values would continue to meet Forest Plan standards or do not go further below standards on five subwatersheds, but would fall further below cover standards in two subwatersheds (Table 4-19). The most pronounced reductions in winter range thermal cover would occur in Boulder/Fawn and Sage Hen Creek subwatersheds. Satisfactory cover would remain at or close to existing conditions.

Open Road Densities and their Effects on Elk

Road density was calculated using road prescriptions (Table 4-20). Only open roads were included.

For the purpose of this analysis, roads proposed for closure under previous decisions were included as closed in Alternative One road densities. They are or would be closed regardless of the outcome of this project.

Table 4-20. Road density comparison in summer and winter range.

Subwatershed	Alt. One		Alt. Two		Alt. Three and Four		Alt. Five		Alt. Six, Seven and Seven-A	
	Sum.	Winter	Sum.	Winter	Sum.	Winter	Sum.	Winter	Sum.	Winter
Boulder/fawn	2.8	2.1	2.1	1.5	2.1	1.3	2.5	1.9	2.3	1.7
Burnt Mtn.	3.9	2.2	2.1	0.5	1.7	0.4	3.9	2.0	2.6	1.5
Myrtle Creek	5.2	1.9	2.0	0.7	2.0	0.5	4.8	1.7	3.9	1.4
Myrtle Park	4.0	< 0.1	2.4	0.0	2.1	0.0	3.5	0.0	2.8	0.0
Red Hill	3.8	2.9	1.0	1.2	1.0	1.2	3.4	2.6	2.6	2.2
Sage Hen Cr.	3.1	2.9	1.5	1.5	1.8	1.3	2.8	2.3	2.2	1.9
Stancliffe Cr.	3.0	3.7	2.4	2.9	2.0	2.6	2.8	3.3	2.6	3.0
Project Area Total	3.7	2.4	2.2	1.1	2.0	0.9	3.2	2.1	2.7	2.1

Forest Plan Standards for road densities In Silvies Canyon Watershed are **3.2 mi/mi² in Summer Range** and **2.2 mi/mi² in Winter Range.**

Most discussions of roads and their effects on wildlife center on big game related effects. While there are strong correlations between road densities and suitability of habitat for many forest species, the Malheur Forest Plan specifically ties roads to big game habitat effectiveness. Roads may directly and indirectly affect big game species. Direct effects can include direct harassment, elimination of habitat, blockage of travel and migration routes to essential forage resources, and higher harvest rates due to improved access and reduced security (Joslin and Youmans 1999, Cole et al. 1997). Indirect effects are primarily in the area of reduced habitat effectiveness, displacement from quality habitat, overgrazing of marginal areas, and possibly reduced reproduction (Joslin and Youmans 1999, Thomas 1979). Table 4-23 summarizes the road-associated factors that can negatively affect habitat or wildlife, including big game.

Harassment: In general, greater traffic flow on higher quality unpaved roads produces a larger area of avoidance. Disturbance to elk can also occur on lower quality primitive roads especially if vehicle traffic is slow (Thomas 1979).

Elimination of Habitat: Construction and maintenance of roads permanently removes a portion of the land from forage or cover production. On average, most forest roads are at least 20 feet wide (road prism and drainage); therefore, every mile of road potentially removes 2.5 acres of habitat from production. Vehicular traffic on and off roads has also been linked with high rates of establishment and spread of noxious weeds in wildlife habitat. Resulting establishment of noxious weeds can reduce quality and quantity of summer forage for ungulates, resulting in poor reproductive performance during the lifetime of an animal (Joslin and Youmans 1999).

Reduced Security (Reduced Bull ratios): One of the surest methods of increasing elk security has been to close roads and/or areas to motorized vehicles (Joslin and Youmans 1999). High road densities make elk highly vulnerable to hunter harvest while closures generally increase the time hunters spend hunting. This tends to prolong the time required to achieve the desired harvest, reduces the rate of bull harvest, increases bull carryover, and improves the recreational quality of the hunt (Joslin and Youmans 1999). However, security is more complex than just low road densities and can be influenced by a multitude of factors that may vary from one population or habitat complex to the next. Road closures must encompass large areas to be effective (Hurley 1994).

Reduced habitat use and effectiveness: It is commonly accepted that during hunting season elk avoid areas occupied by humans. Most evidence supports the conclusion that free ranging elk prefer to be at least 0.5 miles from humans engaged in out-of-vehicle activities (Leege 1984). Avoidance of this nature results in less effective use of available habitat and can displace animals from high quality habitat into reduced quality areas. Lyon (1983) concluded that open road densities as low as 2 mi/mi^2 can easily affect half of the available elk habitat.

Displacement: Vehicle traffic on open roads can cause elk to develop spatial shifts and/or avoid habitat adjacent to the road. Vehicular use of open roads can spatially shift elk away from roadside habitat, which in turn displaces co-occupying mule deer toward less effective roadside habitat (Wisdom et al. 1999b, Rowland et al. 1999).

Limited-vehicle access ("Administrative Access" - fire suppression, emergency access, and access for forest management) can still reinforce avoidance behavior, influence core area size, home range size, and daily movements of elk (Joslin and Youmans 1999). Reductions in elk movement would likely occur with reduced vehicular access but would still occur on a limited basis when roads are used for administrative or emergency use.

The potential benefits of reduced elk movement would be reduced energy expenditure, increased fat reserves, increased overwintering survival rate, and increased productivity which would provide more recreational and economic opportunities (Cole et al. 1997).

Another possible indirect result of disturbance of wintering elk and deer can be movement from historical and accepted winter ranges to private land (Joslin and Youmans 1999).

Effects of Alternative One

Under this alternative no new road closures or decommissioning would occur. Road densities in most summer subwatersheds and about half of the winter subwatersheds, as well as the watershed as a whole, would continue to exceed Forest Plan standards (Table 4-20). Approximately 314 miles of roads would remain open in this watershed. This would maintain the existing conditions that contribute to less effective use of available habitat and probable displacement of animals from high quality habitat into reduced quality areas. Five percent (3,150 acres) of the project area is 0.5 mile or more from an open or seasonally closed road (Security Zone map, Wildlife Project Record).

Road closures under other decisions (approximately 63 miles) would continue to occur as funding comes available.

Effects of Alternative Two

Under this alternative, road densities would be reduced in all subwatersheds. Year-round open road density for the planning area would range from 2.9 to 0.0 mi/mi2 (Table 4-20). Lower road densities would decrease the potential for legal take, poaching, collisions, and avoidance of roads, and increase habitat, habitat effectiveness, and security. Year-round road densities would be reduced by about 41% in summer range and 54% in winter range upon completion of all road management activities. Expected road densities would meet or move toward Forest Plan standards for both winter and summer range, and would meet watershed standards.

Proposed road decommissioning would return approximately 8.0 acres of roaded surface (based on average road width of 20 feet) to forage and future cover production. Vehicle traffic would be mostly eliminated from 78 miles of permanently closed roads (some with allowable administrative use) and 62 miles of seasonally closed roads. This reduction in disturbance would positively influence animals that were avoiding roads or using habitat less effectively because of current road use. The amount of the project area that would be 0.5 mile or more from an open or seasonally closed road would increase to 4,370 acres (7% of the project area – security zone map, Wildlife Project Record).

Alternatives Three and Four

Year-round open road density for the planning area would range from 2.6 to 0.0 mi/mi^2 (see Table 4-20). Lower road densities would decrease the potential for legal take, poaching, collisions, and avoidance of roads, and increase habitat, habitat effectiveness, and security. Year-round road densities would be reduced by about 49% in summer range and 63% in winter range upon completion of all road management activities. Expected road densities would meet or move toward Forest Plan standards in all areas, and would meet watershed standards.

Proposed road decommissioning would return approximately 63 acres of roaded surface to forage and/or future cover production. Vehicle traffic would be mostly eliminated from 109 miles of permanently closed and 24 miles of seasonally closed roads. This reduction in disturbance would positively influence animals that were avoiding roads or using habitat less effectively because of current road use. The amount of the project area that would be 0.5 mile or more from an open or seasonally closed road would double to 6,290 acres (about 10% of the project area – security zone map, Wildlife Project Record).

Alternative Five

Year-round open road density for the planning area would range from 4.8 to 0.0 mi/mi^2 (see Table 4-20). Lower road densities would decrease the potential for legal take, poaching, collisions, and avoidance of roads, and increase habitat, habitat effectiveness, and security. Year-round road densities would be reduced by about 14% in summer range and 13% in winter range upon completion of all road management activities. Expected road densities would move toward Forest Plan standards, but densities would continue to fail standards in six subwatersheds. Overall, expected road densities would meet watershed standards.

Proposed road decommissioning would return approximately 24 acres of roaded surface to forage and/or future cover production. Vehicle traffic would be mostly eliminated from 23 miles of permanently closed and four miles of seasonally closed roads. This reduction in disturbance would have a minor positive influence on animals that were avoiding roads or using habitat less effectively because of current road use. The amount of the project area that would be 0.5 mile or more from an open or seasonally closed road would increase slightly to 3,700 acres (6% of the project area – security zone map, Wildlife Project Record).

Alternatives Six, Seven and Seven-A

Year-round open road density for the planning area would range from 3.9 to 0.0 mi/mi^2 (see Table 4-20). Year-round road densities would be reduced by about 28% in summer range and 29% in winter range upon completion of all road management activities. Expected road densities would meet or move toward Forest Plan standards for both winter and summer range in all subwatersheds, though two subwatersheds would continue to be below standards. Overall, expected road densities would meet watershed standards.

Proposed road decommissioning would return approximately 25 acres (Alternatives Six and Seven-A) to 35 acres (Alternative Seven) of roaded surface (based on average road width of 20 feet) to forage and future cover production. Vehicle traffic would be mostly eliminated from 70 miles of permanently closed and 10 miles of seasonally closed roads. This reduction in disturbance would positively influence animals that were avoiding roads or using habitat less effectively because of current road use. The amount of the project area that would be 0.5 mile or more from an open or seasonally closed road increases to 4,370 acres (7% of the project area – security zone map, Wildlife Project Record).

Cumulative Effects

Road systems provide the benefits of access and the costs of roads and road-associated effects. Road closures (and decommissioning) associated with this project, in combination with the 63 miles of road that, under other decisions, are or will be closed, will help to reduce road-associated effects on a variety of wildlife. However, road closures could potentially change recreational uses in the project area. Off-road vehicles may be used more often than they are currently to enter areas previously accessible by open roads. The amount of potential increased use is unknown, but is expected to be limited by the number of big game tags permitted and the rural nature of the area.

Effects on Habitat-Effectiveness Index

Monitoring changes in habitat effectiveness is necessary to predict impacts of land use proposals, to evaluate success of land use plans, and to establish trends in habitat condition. Calculated HEI and related values are displayed in Tables 4-21 (summer range) and 4-22 (winter range), below.

Table 4-21. Summer Range HEI values by Alternative.

Subwatershed	Component	Alt. One	Alt. Two	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven and Seven-A	FP Standard
Boulder/Fawn	HEc	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.3
	HEs	0.34	0.35	0.34	0.35	0.34	0.34	0.35	0.3
	HEr	0.41	0.48	0.48	0.48	0.44	0.46	0.46	0.4
	HEI	0.43	0.44	0.44	0.44	0.43	0.44	0.44	0.4
Burnt Mtn.	HEc	0.52	0.53	0.52	0.53	0.53	0.52	0.53	0.3
	HEs	0.50	0.39	0.50	0.39	0.44	0.50	0.39	0.3
	HEr	0.30	0.48	0.52	0.52	0.30	0.43	0.43	0.4
	HEI	0.42	0.45	0.51	0.45	0.41	0.46	0.43	0.4
Myrtle Cr.	HEc	0.78	0.87	0.78	0.87	0.81	0.78	0.87	0.3
	HEs	0.24	0.16	0.24	0.16	0.21	0.24	0.16	0.3
	HEr	0.18	0.49	0.49	0.49	0.22	0.30	0.30	0.4
	HEI	0.34	0.41	0.44	0.41	0.35	0.39	0.36	0.4
Myrtle Park	HEc	0.58	0.63	0.58	0.63	0.61	0.58	0.63	0.3
	HEs	0.43	0.36	0.43	0.35	0.40	0.43	0.35	0.3
	HEr	0.30	0.45	0.48	0.48	0.34	0.41	0.41	0.4
	HEI	0.41	0.45	0.47	0.45	0.43	0.45	0.44	0.4
Red Hill	HEc	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.3
	HEs	0.49	0.36	0.49	0.40	0.49	0.49	0.40	0.3
	HEr	0.31	0.61	0.60	0.60	0.35	0.43	0.43	0.4
	HEI	0.42	0.46	0.52	0.47	0.43	0.45	0.43	0.4
Sage Hen Cr.	HEc	0.60	0.55	0.60	0.52	0.61	0.60	0.52	0.3
	HEs	0.69	0.69	0.69	0.64	0.75	0.69	0.64	0.3
	HEr	0.38	0.53	0.51	0.51	0.41	0.47	0.47	0.4
	HEI	0.53	0.56	0.57	0.54	0.55	0.56	0.56	0.4
Stancliffe Cr.	HEc	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.3
	HEs	0.32	0.24	0.32	0.24	0.31	0.32	0.24	0.3
	HEr	0.39	0.47	0.48	0.49	0.41	0.43	0.43	0.4
	HEI	0.40	0.39	0.42	0.39	0.40	0.41	0.38	0.4

Table 4-22. Winter Range HEI values by Alternative.

Subwatershed	Component	Alt. One	Alt. Two	Alt. Three	Alt. Four	Alt. Five	Alt. Six	Alt. Seven and Seven-A	FP Standard
Boulder/Fawn	HEc	0.61	0.61	0.61	0.64	0.61	0.61	0.64	0.4
	HEs	0.45	0.44	0.45	0.45	0.45	0.45	0.45	0.3
	HEr	0.48	0.54	0.56	0.56	0.50	0.52	0.52	0.5
	HEI*	0.48	0.49	0.50	0.50	0.48	0.49	0.49	0.5
Burnt Mtn.	HEc	0.73	0.79	0.73	0.80	0.76	0.73	0.80	0.4
	HEs	0.51	0.47	0.51	0.45	0.48	0.51	0.45	0.3
	HEr	0.47	0.76	0.78	0.78	0.49	0.54	0.54	0.5
	HEI	0.51	0.58	0.58	0.58	0.52	0.53	0.53	0.5
Myrtle Cr.	HEc	0.66	0.65	0.66	0.65	0.65	0.66	0.65	0.4
	HEs	0.42	0.42	0.42	0.41	0.42	0.42	0.41	0.3
	HEr	0.50	0.69	0.76	0.76	0.53	0.55	0.55	0.5
	HEI	0.48	0.52	0.54	0.53	0.49	0.50	0.49	0.5
Myrtle Park	HEc	0.66	0.65	0.65	0.65	0.65	0.65	0.65	0.4
	HEs	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.3
	HEr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
	HEI	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.5
Red Hill	HEc	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.4
	HEs	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.3
	HEr	0.40	0.64	0.57	0.57	0.43	0.47	0.47	0.5
	HEI	0.40	0.45	0.44	0.44	0.41	0.42	0.42	0.5
Sage Hen Cr.	HEc	0.57	0.56	0.57	0.54	0.56	0.57	0.54	0.4
	HEs	0.61	0.59	0.61	0.56	0.69	0.61	0.56	0.3
	HEr	0.40	0.54	0.55	0.55	0.45	0.49	0.49	0.5
	HEI	0.49	0.52	0.53	0.51	0.52	0.51	0.49	0.5
Stancliffe Cr.	HEc	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.4
	HEs	0.45	0.47	0.45	0.45	0.47	0.45	0.47	0.3
	HEr	0.32	0.40	0.43	0.43	0.35	0.39	0.39	0.5
	HEI	0.41	0.44	0.44	0.44	0.43	0.43	0.44	0.5

*HEf was included in total HEI calculations as a constant value of 0.40.

Direct, Indirect, and Cumulative Effects from Alternative One - No Action

Under this alternative, most values meet Forest Plan standards except for HEr in most of the winter and summer subwatersheds and HEs in Myrtle Creek-Summer. This indicates that road densities are cumulatively impacting big game habitat. The high number of open roads contributes to low HEr values in most subwatersheds. The effects of road densities on big game are discussed in "Open Road Densities and their Effects on Elk," above.

Note: *This amount does not include an additional 63 miles of roads that were designated for closure under "past" decisions. Many of these roads are drivable due, in part, to poor implementation of proposed treatments and poor tracking of actual accomplishments. Closure of these roads is still viable and is planned to occur regardless of this project's outcome.*

HEs in the Forest Service-managed portion of Red Hill (summer) meets standards, though HEs in the subwatershed as a whole does not meet standards. The lack of well-distributed cover on non-Forest Service system lands negatively affects elk habitat in this subwatershed.

Direct, Indirect, and Cumulative Effects Common to All Action Alternatives

Proposed commercial harvest would alter the amount of cover available and spacing of the remaining blocks. The amount of change would be a direct result on these variables depending on the intensity of commercial thinning and intermediate treatments. Precommercial harvest would not affect HEI variables since canopy cover and spacing would not measurably change.

Commercial harvest would cause a mixed response of HEc. Values would increase or decrease depending on the intensity of harvest in any particular subwatershed. Commercial harvest would cause a general downward trend in HEs depending on the intensity of harvest.

Road density is one of the variables that management can influence to offset changes in cover values. To improve HEr and HEI, road densities would need to be reduced. Road closures would occur across all subwatersheds, in both summer range and winter range. Proposed road closures would cause a very favorable response in HEr. Projected values would increase depending on the intensity of closures in any particular subwatershed. As each road is closed it would contribute to reaching projected HEI values. These closures would be implemented over a 5-15 year schedule. Some roads would be closed immediately while others needed for management access would be closed after completion of planned management activities. See Table 2-21, Chapter 2, for the project implementation schedule. The final value would only be realized when all proposed closures are completed and effective (approximately 5-15 years after the activities begin).

Reductions in year round road densities should improve big game habitat effectiveness as well as reducing the potential for human caused disturbance (use of road for transportation and access) in the watershed. HEI values represent the outcome upon completion of all proposed commercial harvest and road closures.

Direct, Indirect, and Cumulative Effects from Alternative Two – Proposed Action

This alternative analysis shows a mixed response in HEc, a general reduction in HEs, and improvements in HEr in all subwatershed divisions. All HEc values would remain above Forest Plan minimum standards. Commercial harvest would cause a general downward trend in HEs depending on the intensity of harvest. HEs in Myrtle Creek-summer is moved further below Forest Plan standards. HEs in Stancliffe, summer is moved below Forest Plan standards. All other values would remain above Forest Plan minimum standards. The only area that would fail to meet Forest Plan standards for HEr would be Stancliffe Creek (winter). Road closures in this area would increase HEr above existing conditions, but because of small size of the area and the retained road network, the projected value would still fall short of the minimum standard. All other projected HEr values would meet minimum standards and contribute to generally improves habitat effectiveness. Summer and winter range HEI for most subwatersheds would be improved (Tables 4-21 and 4-22), but Stancliffe Creek summer range HEI would drop below Forest Plan standards.

Changes to HEI

Commercial harvest would cause a mixed response on HEI. Values would increase or decrease depending on the intensity of harvest and road closures in any particular subwatershed. Final values for most subwatersheds would remain above Forest Plan minimum standards or be moved towards standards, except for in Stancliffe Creek (summer).

In the long-term, proposed activities would likely have a neutral effect on elk. Effective road closures would offset reductions in thermal and hiding cover. Elk would also benefit from improved forage. Based on the general improvement in HEI, the project area would continue to provide habitat for the estimated 250 adult summer elk that use the project area. No net change in the number of elk using the project area is expected due to this alternative. Proposed activities are not expected to permanently displace elk off the Forest.

Although cover is being reduced, habitat effectiveness improves in this alternative on both summer and winter range due to road closures. Elk might move from an area during treatments, but they are expected to return upon completion.

Direct, Indirect, and Cumulative Effects from Alternative Three

Existing conditions indicate that most variables are within desired ranges but HEr generally is below Forest Plan standards in the watershed. To improve HEr and HEI road densities need to be reduced. This alternative would show a general improvement in HEr and Total HEI in all subwatershed divisions.

Most values meet Forest Plan standards except for HEs, HEr, and HEI in Myrtle Creek (summer), HEr and HEI in Stancliffe Creek (winter), and HEI in Red Hill (winter). Because no cover would be removed, HEc and HEs would remain at existing values. Proposed road closures would cause a favorable response to HEr. Projected values would increase depending on the intensity of closures in any particular subwatershed. The only area that would fail to meet Forest Plan standards is Stancliffe Creek (winter). Road closures in this area would increase HEr above the existing conditions, but because of small size of the area and access needs, the projected value would still fall short of the standard. All other projected final values would meet standards and contribute to improving HEI.

Changes to HEI

HEI in Stancliffe Creek and Red Hill (winter) would remain below forest plan standards, but would be moved toward standards. HEI values for most remaining subwatersheds would also improve. With no harvest and with road closures, HEI values in all subwatersheds would meet or move toward Forest Plan standards, providing improved habitat for elk.

Similar to Alternative Two, the project area would continue to provide habitat for the estimated 250 adult summer elk that use the project area. No net change in the number of elk using the project area is expected due to this alternative.

Direct, Indirect, and Cumulative Effects From Alternative Four

Analysis shows a mixed response in HEc, a general reduction in HEs, and improvements in HEr in all subwatersheds. All HEc values would remain above Forest Plan minimum standards. HEs in Myrtle Creek (summer) existing condition is below Forest Plan Standards and would move further below, and Stancliffe (summer) would move below Forest Plan Standards. All other values would remain above Forest Plan minimum standards. The only area that would not meet Forest Plan standards for HEr is Stancliffe Creek (winter). Road closures in this area would increase HEr above the existing conditions, but because of small size of the area and the needed access, the projected value would still fall short of the standard. All other projected final values would meet standards and contribute to generally improving HEIs. Summer and winter range HEI for most subwatersheds would be improved, but Stancliffe Creek summer range HEI would drop below Forest Plan standards.

Changes to HEI

Final HEI values for summer range show a mixed trend in this total value. This is due to a general reduction in HEc and HEs across most cover blocks. Improvement in HEr would occur, but the level of change would not be enough to completely offset reductions in cover and spacing in all subwatersheds. Negative change in HEs, with a corresponding slight increase in HEr would cause Stancliffe Creek (summer) to move below Forest Plan standards.

Final HEI values for winter range show an upward trend in the value. Improvement in HEr would occur at a level that would help offset most reductions.

Similar to Alternative Two, based on the general improvement in HEI, the project area would continue to provide habitat for the estimated 250 adult summer elk that use the project area. No net change in the number of elk using the project area is expected due to this proposed alternative. Proposed activities are not expected to permanently displace elk off the Forest.

Direct, Indirect, and Cumulative Effects from Alternative Five

Analysis shows a mixed response in HEc and HEs, and minor improvements in HEr in all subwatersheds. All HEc values would remain above Forest Plan minimum standards. HEs in Myrtle Creek (summer) existing condition is below Forest Plan Standards and would move further below. All other values would remain above forest plan minimum standards. Under this alternative, there would be slight overall improvements in HEr, but the level of closures is insufficient to move several areas above standards.

Due to the limited amount of cover areas being entered under this alternative, habitat variables HEc and HEs showed only a small reduction in value in some subwatersheds, however, there was an increase in HEr in most areas. This positive response in the HEr was the result of closing or decommissioning open roads in both winter and summer range across the project area.

Changes to HEI

Commercial harvest with proposed road closures would cause a mixed response of HEI. Values would increase or decrease depending on the intensity of harvest and road closures in any particular subwatershed. Final values for all subwatersheds would remain above Forest Plan minimum standards or be moved towards standards. Proposed actions would benefit elk habitat.

Based on the improvement in HEI, the project area would continue to provide habitat for the estimated 250 adult summer elk that use the project area. No net change in the number of elk using the project area is expected due to this proposed alternative. Proposed activities are not expected to permanently displace elk off the Forest.

Direct, Indirect and Cumulative Effects from Alternative Six

Existing conditions indicate that most variables are within desired ranges but HEr generally is below standards in the watershed. To improve HEr and HEI road densities need to be reduced.

Because no cover would be removed, HEc and HEs would remain at existing values. Proposed road closures would cause a favorable response in HEr. Projected HEr values would increase in all subwatersheds, but Myrtle Creek (summer), and Red Hill, Sage Hen Creek, and Stancliffe Creek (winter) would continue to remain below Forest Plan standards for HEr.

Changes to HEI

HEI in Myrtle Creek (summer), and Boulder/Fawn, Stancliffe Creek and Red Hill (winter) would remain below forest plan standards, but would be moved toward standards. HEI values for most remaining subwatersheds would also improve. With no harvest and with road closures, HEI values in all subwatersheds would meet or move toward Forest Plan standards. Effects would be similar to those discussed under Alternative Three.

Direct, Indirect and Cumulative Effects from Alternatives Seven and Seven-A

Analysis shows a mixed response in HEc, a general reduction in HEs, and improvements in HEr in all subwatersheds. All HEc values would remain above Forest Plan minimum standards. Commercial harvest would cause a general downward trend in this HEs. HEs in Myrtle Creek (summer) and Stancliffe (summer) are moved lower or below Forest Plan Standards. All other values would remain above Forest Plan minimum standards.

Proposed road closures would cause a favorable response in HEr. Projected HEr values would increase in all subwatersheds, but Myrtle Creek (summer), and Red Hill, Sage Hen Creek, and Stancliffe Creek (winter) would continue to remain below Forest Plan standards for HEr. These alternatives show improved HEr values in both summer and winter and improved HEI in much of the winter and summer range. Summer and winter range HEI for most subwatersheds would be improved, but Stancliffe Creek (summer) HEI would drop below Forest Plan standards.

Changes to HEI

Final HEI values for summer range show a mixed trend in this total value. This is due to a general reduction in HEc and HEs across most cover blocks. Improvement in HEr would occur, but the level of change would not be enough to completely offset reductions in cover and spacing in all subwatersheds. Negative change in HEs, with a corresponding slight increase in HEr would cause Stancliffe Creek (summer) to move below Forest Plan standards.

Final HEI values for winter range show an upward trend in the value. Improvement in HEr would occur at a level that would help offset most reductions.

Similar to Alternative Four, the project area would continue to provide habitat for the estimated 250 adult summer elk that use the project area. No net change in the number of elk using the project area is expected due to these alternatives. Proposed activities are not expected to permanently displace elk off the Forest. Cover is reduced, but habitat effectiveness would improve in this alternative in most subwatersheds in summer and winter range due to road closures. Big-game animals might move from an area during treatments, but they are expected to return upon completion. Although cover would be reduced, the effect on big-game populations is not expected to be measurable.

Cumulative Effects

Natural conditions (low site potential and past fire history), past harvest and road activities, recent growth of trees in formerly non-forested areas, and increased stocking and changes in tree species composition due to past treatment or lack of treatment have lead to existing HEIs and HEI component values in the subwatersheds. The No Action alternative would likely reduce existing HEIs as canopy cover is reduced through natural mortality or stand-replacing fire (see the sections titled "Effects on Dedicated Old Growth and Replacement Old Growth" and "Effects on Late and Old Structure, Connectivity, and Fragmentation").

Past harvest (between 1982 to present) removed timber on about 15,000 acres in the Silvies Canyon project area. It's estimated that 6,000 to 10,000 of these acres may have provided marginal or satisfactory cover prior to harvest. Up to 6,000 acres of these past harvested areas have regrown or are close to regrowing into marginal cover. The proposed alternatives commercially and/or precommercially re-treat approximately 6,200 to 6,400 of these recently harvested acres. Much of this re-treatment is occurring in those areas that have regrown into marginal cover. Since these 6,000 acres are back to or close to being cover, there is no overlap in time of effects and therefore no cumulative effect on these 6,000 acres.

Alternatives Three, Five and Six would have no cumulative effect on elk through cover removal since a similar amount of cover would be available after Silvies Canyon treatments in the watershed (between 17,000 and 21,500 acres) as was present after post-1983 harvests (estimated at 15,500 to 19,500 acres). The remaining action alternatives would cumulatively add to the reduction of cover in the watershed by reducing cover to 13,600 acres (Alternatives Four, Seven and Seven-A) to 14,700 acres (Alternative Two). The degree of cumulative reduction is not considered substantial. Although cover is being reduced, habitat effectiveness improves in these alternatives on both summer and winter range due to road closures. Elk might move from an area during treatments, but they are expected to return upon completion. Although cover is being reduced, the effect on elk populations is not expected to be measurable.

Big game harvest, regulated by the State of Oregon, would continue to be the largest cumulative impact on deer and elk populations in the Silvies Canyon project area. Big game harvest is managed to maintain big game populations at objective levels set by the State. Elk have met or exceeded management objectives while mule deer remain stable, but below objectives, indicating that vegetative condition combined with big game harvest are cumulatively maintaining big game populations.

Action alternatives show a mix of increased and reduced HEIs. The reported HEI values would be maintained or slightly improved in the future as canopy cover increased. Treatments should improve elk forage, though this improvement would not show up in HEIs, as calculated here. There are no reasonably foreseeable activities planned or scheduled that would further impact HEIs. However, future maintenance treatments, if planned, would likely keep cover values at more sustainable levels, similar to those described in Alternatives Two, Four, Five, Seven and Seven-A. Since, in the past, the benefit of thermal cover to elk habitat may have been overestimated (Cook et al. 1998, Toweill and Thomas 2002), the removal of canopy cover in the action alternatives may cause less of an effect to elk than that suggested by other literature (Thomas 1979).

Cook et al. (1998) suggest that habitat managers should give more attention to forage relationships and vulnerability of ungulates to hunting and harassment when managing habitat for big game. Thermal cover would be lost in some action alternatives, but the action alternatives would improve elk forage and reduce elk vulnerability.

Effects on Calving and Fawning Habitat

A complete assessment of potential and currently used big game calving and fawning was not available for the project area. In general, calving areas are poorly defined in the watershed and transient depending on snow melt. There are no identified concentrated calving areas within the watershed. The full effects of these alternatives cannot be addressed but prescribed fire activities could have a direct impact on the structural component of calving and fawning habitat for the first few years. Then as vegetation begins to regenerate calving/fawning habitat should improve.

Effects from Alternative One – No Action

This alternative does not propose any treatments in potential calving or fawning habitat. Existing degraded hiding cover within these areas would remain in the short-term, but over time, insects and disease would naturally thin much of the remaining understory cover. This would limit effectiveness and function of cover for calving/fawning by big game. As tree mortality and insect outbreaks create open canopy condition, new understory cover would begin to develop. This increase in understory cover may provide improved security for newborn calves and fawns.

Effects Common to All Action Alternatives

In the short-term, potential or actual calving/fawning habitat may be altered by removal of understory trees. Pregnant deer and elk may have to alter their historical use patterns and find new suitable areas or utilize remaining cover. Some localized decreases in calf and fawn survival may result from competition for remaining habitat and/or utilization of poor quality habitat when other alternatives are not available. Retention of large down wood in treatment units and riparian vegetation adjacent to most units would offset some losses of understory cover from prescribed burning or other treatments. Since treatments won't occur in RHCAs (which are often used for calving/fawning) and since hiding cover would be retained in patches, these impacts would be limited in scope and very localized and would not affect overall reproductive success of local herds.

Over the next 15 to 40 years, the development of hiding cover would begin to offset the impacts of altered structural components within the burn blocks. As stands approach multi-canopy later seral stages, most of the habitat components needed to provide conditions for calving/fawning should become available. By initiating a 5 to 15 year burning cycle, the Forest Service could perpetuate these conditions over many years.

Young calves/fawns could be trapped and killed by fire, although losses would probably not be substantial. Ignition would not occur in category 1 and 2 RHCAs, which would help mitigate effects to calving and fawning habitat. Burning crews would watch for lone female elk, deer, or antelope. If crews see lone animals, they will search the immediate area for calves, fawns or kids and avoid lighting where newborns are found.

Effects on Migration And Travel Corridors

Direct, Indirect, and Cumulative Effects from Alternative One - No Action

This alternative does not propose any activities that would disrupt potential migration or travel corridors between cover and LOS stands. As habitat conditions along these corridors change under the influence of insects and disease, movement patterns may shift and naturally fragmented islands of habitat would be created that are not connected to adjacent habitat blocks.

Direct, Indirect, and Cumulative Effects Common to All Action Alternatives

These alternatives do not propose any activities that would disrupt potential migration or travel corridors. Proposed treatments would retain sufficient overstory cover to provide cover for most animals using the area. Overall, movement through the planning area would not be restricted or disrupted.

Effects on Mountain Shrubs

Effects of Alternative One – No Action

This alternative would have no direct impact on existing mountain shrubs. Existing stands of mountain mahogany would continue to decline in vigor in the short-term. With continued juniper encroachment and browsing pressure from both livestock and big game, most new growth on existing plants and seedling starts would continue to be suppressed.

Effects Common to Alternatives Two, Three, Four, Five, Seven and Seven-A

Most shrub patches (>1/4 to 2 acre) would be avoided during the burning operations. They would not be actively treated (ignited) with prescribed fire though a small amount of light intensity burning may occur on the fringes of these habitats. In these areas, shrubs would likely be killed, but burning would create a seedbed for shrub reproduction. Since 15% or less of these habitats within burn blocks are expected to burn (G. Mackey, pers. com.) and additional acreage of habitat occurs outside of burn blocks, effects to existing shrub habitats would be minor.

With the removal of overstory cover in many stands, woody vegetation previously suppressed would prosper under conditions that are more open. Additional moisture may also be available to shrubs, allowing for increased growth. The alteration of surrounding habitat after prescribed burning may result in decreased use by big game for up to two years, which could benefit shrub growth.

The density of juniper in the project area is low enough that juniper provides minimal quality and quantity of hiding cover. Removal of junipers would remove a minor amount of hiding cover, but would not affect thermal cover, since project area juniper does not provide thermal cover. Overstory and juniper removal should allow for increased growth of grass, forbs, and shrubs due to increased availability of water (Vegetation Specialists Report), which should increase forage availability for big game and livestock.

As big game acclimate to these changes in cover and as surrounding vegetation recovers over the next one to five years, the availability and use of these patches as hiding cover and browse should return to pre-treatment levels.

With increased openness, livestock would have improved access to these patches and may browse on available shrubs. This may result in high levels of competition of key forage plants including mountain shrubs.

Effects of Alternative Six

For shrubs, the effects of this alternative are expected to be similar to the other action alternatives. This alternative is expected to have minimal affects on juniper because burning would not effectively remove juniper. Effects of juniper treatment from Alternative Six would be similar to Alternative One.

Big Game Management Objectives

Effects of Alternative One – No Action

In the short-term, there would be no change in the numbers of elk and deer using the area. The vulnerability of big game to human-caused disturbance and hunting pressure would remain at current levels.

If cover conditions deteriorate as predicted, local habitat quality and quantity could be reduced. This would result in a slight reduction in the local carrying capacity and a possible decline in local herd size. This condition would continue until cover develops from remaining healthy or degraded cover.

Effects Common to All Action Alternatives

The alternatives address ODFW's concerns on variables limiting deer and elk habitat to varying degrees. All action alternatives would reduce human disturbance through road closures and would likely improve forage and shrub components, though cover components would be reduced to varying degrees. Hiding cover would be maintained at historical levels. In connectivity corridors (see Map #28), 50% of current hiding cover would be retained with most of this left unburned; in other areas, 5-20% of areas designated for precommercial thinning would be left unthinned to provide additional hiding cover (see Chapter 2, Design Features). Following prescribed burning, hiding cover is expected to be retained on at least 5-10% of treated areas. Existing hiding cover would be available in untreated areas. The effects of these alternatives on local big game populations were discussed in the preceding sections. The ability of the area to contribute to big game MOs established for the area should not measurably change. It is expected that under all alternatives, there would be no change in the numbers of elk and deer using the area.

Summary of Cumulative Effects to Big Game

Cumulative Effects Common to All Alternatives

As described under existing conditions, past treatments have reduced [thermal] cover in some subwatersheds; fire suppression in combination with a lack of treatments has increased cover in many subwatersheds. The risk of stand replacing fire has been reduced by some past treatments and increased by others. Stand-replacing events would result in the loss of most thermal and hiding cover in the area. While burned over areas are used by big game for foraging, the loss of forest habitat would impact local big game and many other species of wildlife.

Ongoing activities, in addition to fire suppression, would continue to affect big game and big game habitat. Road closures of 63 miles of road (under other decisions) would bring HEI values to those displayed under the existing condition, but road densities and HEI values would remain above Forest Plan standards.

Permitted livestock grazing would continue in the area. Appropriately managed livestock grazing can be compatible with big game management. In 1996, Myrtle, Devine and West Myrtle Allotments were assessed for the issuance of term grazing permits. In these NEPA documents, the effects of continued grazing on big game was assessed. The resulting EAs were developed to provide for continued recovery of riparian vegetation, provide for better control and distribution of livestock, and balance wildlife needs for forage with that allocated for livestock. Other allotments within the watershed are currently being managed under existing Allotment Management Plans and Annual Operating Plans.

Cumulative Effects from Alternative One - No Action

Lack of treatment in combination with ongoing management would allow many big game habitat components (cover, road densities) to remain below or go below Forest Plan standards.

Cumulative Effects Common to All Action Alternatives

Big game habitat conditions are expected to improve in the long-term because of these alternatives. This would be accomplished through a combination of restoring forest vegetation to more historical conditions and reintroducing fire into the landscape (thus creating more and higher quality forage), reducing road densities, and reducing noxious weeks.

Past vegetation management activities have reduced (thermal) cover in the project area and these project activities will continue that trend (though to a much lesser degree for Alternatives 3 and 6). Since, in the past, the benefit of thermal cover to elk habitat may have been overestimated (Cook et al. 1998, Toweill and Thomas 2002), the removal of canopy cover in the action alternatives may cause less of an effect to elk than that suggested by other literature (Thomas 1979)

Cook et al. (1998) suggest that habitat managers should give more attention to forage relationships and vulnerability of ungulates to hunting and harassment when managing habitat for big game. In combination these projects move the area toward a more healthy, sustainable forest that provides for all the needs of big game including more and higher quality forage and lower road densities. The planned activities will generally improve elk and mule deer habitat conditions through silvicultural practices that benefit wildlife though an amended Forest Plan Standards (for Alternatives Two, Four, Five, Seven and Seven-A) will be necessary.

Proposed burning activities would have additive and synergistic beneficial effects with past burning activities implemented under the Silvies South and other prescribed burns. Proposed burning will result in up to 39,300 acres burned inside the watershed. This is in addition to the approximately 7,000 acres already burned under other projects. Burning would occur in landscape level blocks ranging in size from about 900 acres to almost 7,800 acres. Within each block, burning would likely actually treat 40 to 70 percent of the total area. Burning would occur over the next 5 to 15 years. With staggered burning, not all acres would be impacted during the same burning season (see Implementation Schedule, Table 2-21, Chapter 2).

Short-term adverse effects from burning may result in additional loss of hiding cover, green trees, shrubs and wildlife trees. The long-term beneficial effect would be a reduction in the potential for stand replacement wildfire in the watershed, and improvement in forage quality and quantity.

Proposed road management activities associated with this project would have synergistic beneficial effects with road closures occurring under other decisions (considered as part of the existing condition) and with proposed vegetation management. In most areas, road closures would offset changes to cover (thermal and hiding). Road closures and decommissioning would result in a reduction in local road densities, improved habitat effectiveness, and reduced vulnerability throughout the area.

Ongoing weed treatments as well as treatments proposed in the action alternatives would benefit all wildlife by creating space for native or desired plants.

Each of the individual responses discussed above can be subjectively evaluated as favorable or deleterious. However, the most comprehensive appraisal of each alternative should look at responses collectively. The prominent preharvest stand feature was excessive tree density that had resulted in reduced overstory vigor from competitive stress, diminished health and cover of understory vegetation, and continuous ladder and crown fuels that would support stand-replacement fires. Thinning of the overstory and understory trees in excess of that needed to provide structure to the stand is essential to overcome competitive stress among desired trees, rejuvenating understory vegetation, and reducing the threat of stand replacement wildfire.

The seemingly negative specific responses described above can be viewed as necessary consequences of forest restoration that impact site features in a manner thought to resemble that of historical fires.

All actions produce an array of changes to the landscape ranging from transient to long-term, some of which would be considered positive and some negative. It is unlikely that the impacts of any alternative would reduce the overall persistence rating for big game species.

Likelihood Of Persistence

Rocky Mountain elk and mule deer are currently well distributed across western North America with few if any isolated populations. Interaction between populations, reproductive success, and survival is high and human activities pose few threats to their continued existence. The likelihood of persistence is high.

Effects of Roads on Wildlife and Habitat

Wisdom et al. (1999a) identified 13 major road-associated factors that negatively affected habitat or terrestrial wildlife found throughout the Interior Columbia Basin (Table 4-23). Most of these effects can be seen at some level in the Silvies Canyon Watershed. Effects of these factors can be direct, such as habitat loss and fragmentation, or indirect, such as population displacement or avoidance in areas near roads in relation to motorized traffic and associated human activities. Some roads were closed specifically to benefit the wildlife resource (see Appendix A); however, no site-specific data linking certain roads to negative impacts were available.

Disturbances are caused by roads themselves and by the increased contact with humans that they provide. Roads disturb wildlife habitat in a number of different ways, favoring some species while harming others. Roads offer a competitive advantage to disturbance-adapted species, which typically do not need such an advantage, while creating "sink habitat" for others; roads create both edge habitat and habitat fragmentation. Roads serve as corridors for pests and non-native plant species, but also sever the travel corridors used by some species. Road construction and failed culverts threaten aquatic populations in some areas with increased silt and sediment. The effects of human contact with wildlife range from animals being killed to habitat being destroyed by human-caused fires.

Table 4-23. Road-associated Factors that Negatively Affect Habitat or Terrestrial Wildlife

Factor	Effect
Snag Reduction	Removal of large snags for safety and for firewood.
Down Log Retention	Loss of down wood due to loss of snags removed for safety and for firewood.
Habitat Loss and Fragmentation	Loss and fragmentation due to establishment and maintenance of roads and road right-a-ways.
Negative Edge Effect	Creation of linear edge created by the road.
Overhunting	Non-sustainable or non-desirable legal harvest by hunting, as facilitated by road access. This can be compensated by controlling the number of hunting permits issued for a given area.
Overtrapping	Non-sustainable or non-desirable legal harvest by trapping, as facilitated by road access.
Poaching	Increased illegal take, as facilitated by road access
Collection	Collection of live animals for pets, as facilitated by the physical characteristics of roads or by road access.
Harassment or Disturbance	Increased disturbance at specific use sites due to human or motorized activities, as facilitated by road access.
Collisions	Death or injury resulting from a motorized vehicle running over or hitting an animal on a road.
Movement Barrier	Interference with dispersal, migratory or other movements as posed by a road itself or by human activities on or near a road or road network.
Displacement or Avoidance	Spatial shifts in populations or individual animals away from a road or road network in relation to human activities on or near a road or road network.
Chronic Negative Interaction with Humans	Increased mortality of animals due to increased contact with humans, as facilitated by road access.

Transportation System Management and Select Groups or Habitats

Temporary road construction facilitates temporary use of an area. When temporary roads are built and used, wildlife may be disturbed and collisions can occur. Habitat may be altered in the road prism. Only Alternatives Two, Four, Five, Seven, and Seven-A would have effects from temporary roads. Due to the limited amount of temporary roads proposed (2.8 to 3.5 miles), effects would be limited. In addition, roads would be closed after use and reseeded, reducing the potential for long-term effects to wildlife based on use by humans, fragmentation, and loss of forage.

Road closures reduce impacts on wildlife to varying degrees. A seasonally closed road will affect wildlife similar to an open road during the time it is open, but will reduce effects when closed. A closed road is not expected to result in effects from interactions of vehicles and wildlife (such as collisions); however since the road prism still exists, the road itself may still be a movement barrier to small mammals and people may still walk on it to hunt or recreate. Decommissioned roads reduce all road impacts to near pre-road condition because, after revegetation, the road resembles its surroundings and no longer looks like or functions like a road.

Forest Carnivores

Development and use of roads is a primary factor that influences distribution and abundance of most carnivores (Quigley and Arbelbide 1997).

Black bear, mountain lion, coyote, lynx and wolverine all show a negative response to high road densities (Joshlin and Youmans 1999). Effects of roads on carnivores and their habitat includes direct mortality from vehicle collisions, access for hunting and trapping, habitat fragmentation, species displacement and avoidance, reduction of habitat effectiveness, and direct loss of habitat to road and right-of-way construction and maintenance (Ruediger 1999, Joslin and Youmans 1999, Witmer et al. 1998).

The impacts of roads on carnivores are exponential, based on the road standard. As road standards are increased, there is generally an increase in road use and an increase of possible impacts. Open "local" roads generally have a "Moderate" impact on carnivores, unpaved main access roads have a "Moderate to High" impact, and paved 2-lane roads have a "High" impact (Ruediger 1999). At the "High to Very High" level, some carnivores may be excluded from the affected ecosystem. Roads also act as barriers to movement for some species. The effects of roads on animal movements are not well documented for species other than gray wolves and grizzly bears.

Reductions in year round road densities should improve habitat effectiveness, thereby improving the potential forage base for large forest carnivores as well as reducing the potential for human caused disturbance in the area. In general, the reduction in road densities should result in a reduction in potential human-animal conflicts.

Effects of Alternative One – No Action

Year-round road densities would remain at current levels (range from 5.1 to <0 mi/mi^2 depending on subwatershed).

Effects of the Action Alternatives

There would be a decrease in human access and a potential decrease in human-carnivore encounters relative to the road reductions discussed in the section titled "Open Road Densities and their Effects on Elk," above. Lower road densities would lead to decreased potential for legal taking, poaching, road kill, and incidental mortality.

Snags/Woodpeckers

The Malheur National Forest allows the taking of firewood for personal use as well as commercial sale. While some firewood is provided by blowdown, the majority appears to come from standing dead trees. Permitted personal use firewood cutting is allowed between the beginning of May and the end of November, but special permit cutting may be allowed in winter and spring. Firewood cutting can occur on much of the Forest. In areas with high open road densities and easy access, the likelihood that large numbers of snags will be felled for firewood increases. This has the potential to remove a good deal of shelter, food or reproduction habitat used by many species of birds, mammals and amphibians.

Access tends to dictate where woodcutters will cut snags; therefore, a reduction in open road densities would contribute to higher retention of snags in areas where road closures and decommissioning reduces access.

There is a demand for firewood and a reduction in access does contribute to higher competition between firewood cutters for available snags. This competition can lead to an increase in snag removal in more accessible areas and from restricted areas, during closed portions of the years and without permit or in excess of permit.

Effects of Alternative One – No Action

Year-round road densities for roads would remain at current levels. Removal of snags for firewood and safety would remain at current levels.

Effects of All Action Alternatives

There would be a general decrease in human access and a decrease in the number of snags removed for firewood and safety in the closed areas. The level of change is discussed in the above section. Increased snag removal would likely occur along roads left open.

Effects on Proposed, Endangered, Threatened and Sensitive Species

Surveys were conducted to determine if proposed, endangered, threatened and sensitive (PETS) species are present in the planning area, and in some cases, surrounding areas. If plant, animal, or suitable habitat presence was identified, management actions were analyzed to determine if activities would:

- Likely jeopardize the continued existence, or cause adverse modification of habitat, for species listed or species proposed to be listed as endangered or threatened by the U.S. Fish and Wildlife Service, or
- Contribute to the loss of viability of species listed as sensitive by Region 6 of the Forest Service, or any native or desired non-native species; or cause any species to move toward federal listing.

The Biological Evaluation/Biological Assessment made the following findings:

Table 4-24. Summary of Effects on PETS Species.

Species	Alt One No Action	Alt Two Proposed Action	Alt. Three	Alt Four, Seven and Seven A	Alt Five	Alt Six
gray wolf (**T**)	NE	NE	NE	NE	NE	NE
bald eagle (**T**) - nesting	NE	NLAA	NLAA	NLAA	NLAA	NLAA
bald eagle (**T**) – potential roosting	NE	NE	NE/BE	NE/BE (NE-7A)	NE/BE	NE/BE
lynx (**T**)	NE	NE	NE	NE	NE	NE
wolverine (**S**)	NI	NI	NI	NI	NI	NI
pygmy rabbit (**S**)	NI	NI	NI	NI	NI	NI
peregrine falcon (**S**)	NI	NI	NI	NI	NI	NI
western sage grouse (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
gray flycatcher (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
bufflehead (**S**)	NI	NI	NI	NI	NI	NI
Columbia spotted frog (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH

P = *Proposed*, **E** = *Endangered*, ***T*** = *Threatened*, **S** = *Sensitive*
NI = ***N****o* ***I****mpact*, ***NE*** = ***N****o* ***E****ffect*, ***BE*** = ***B****eneficial* ***E****ffect*
NLAA = *May Effect –* ***N****ot* ***L****ikely to* ***A****dversely* ***A****ffect*
MIIH = ***M****ay* ***I****mpact* ***I****ndividuals or* ***H****abitat,*
but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

Full disclosure of effects on PETS species are addressed in the Silvies Canyon Watershed Restoration Project Biological Evaluation/Biological Assessment (Appendix C).

Gray Wolf

Alternative One (No Action)

Due to the nature of the No Action alternative, and the fact that there are no wolf populations currently occupying the Malheur National Forest and no denning or rendezvous sites on the Malheur National Forest, there would be **NO EFFECT (NE)**. There are potential indirect, long-term effects from potential large-scale insect and disease outbreaks infestation and catastrophic wildfire that could occur because of not addressing current forest heath issues. The magnitude and timing of these potential impacts are unknown, but they could drastically modify potential wolf and big game habitat conditions for many years to come.

Action Alternatives

The determination for all action alternatives is **NO EFFECT (NE)** for the following reasons:

- There is an abundance of prey on the forest and timber, fuel management, and other proposed actions (juniper reduction, aspen restoration) are not expected to affect big game populations measurably; therefore prey availability is not a limiting factor.
- No wolf populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National Forest.
- Road closures would increase seclusion habitat and reduce the potential for wolf/human interactions.
- Most management activities for non-breeding populations are compatible with wolf protection and recovery.

Bald Eagle

Alternative One (No Action)

Because no proposed actions would occur in the No Action alternative, there would be **NO EFFECT (NE)** to nesting bald eagles, bald eagle nest habitat, or potential roosting habitat. However, there are potential indirect, long-term effects to habitat from probable high intensity wildfire that could occur because of not creating resilient forest ecosystems. The magnitude and timing of this potential impact is unknown, but it could drastically modify nest and roost stands and could remove nest and roost trees.

Action Alternatives

A Biological Assessment for bald eagle was completed and signed in May 2001 for commercial thinning on 29 acres and precommercial thinning on 144 acres in the BEMA, as well as the remaining activities occurring in Alternative Seven of the Silvies Canyon Watershed Restoration Project. A letter of concurrence, dated September 26, 2001, was received from the USDI Fish and Wildlife Service for this determination.

Implementation of any Action alternative (Alternatives Two, Three, Four, Five, Six, Seven and Seven-A) **MAY EFFECT but is NOT LIKELY TO ADVERSELY AFFECT (NLAA)** nesting bald eagles or occupied nesting habitat (Silvies River Nest Site #807-009). Vegetation management and fuels treatments are designed to lower the risk of wildfire initiating in forest stands adjacent to the nest stand and moving into and impacting bald eagle nesting habitat. Impacts would be greater in Alternatives Four, Seven and Seven-A than the actions on which consultation was completed, so further consultation would be needed to implement the treatments in these Alternatives in BEMA habitat. Other proposed actions would not occur within close proximity to the nest stand and would not affect bald eagles. There are inherent risks whenever forest structure is altered and when fire is used in an uncontrolled setting; however, timing of entry and careful use of fire would limit the risk to a very low level. With incorporation of mitigation measures, no adverse effects should result from implementation of the proposed actions. Potential effects from disturbance are based on a low level of risk and may not occur at all.

Implementation of restoration treatments proposed by Alternatives Three, Four, Five, Six, and Seven within the Silvies River and Myrtle Creek potential winter roosts would have **NO EFFECT** on bald eagles in the short-term. Vegetation management and fuels treatments are designed to lower the risk of stand replacement fire in these areas that could otherwise adversely affect habitat structure important for roosting. Stand restoration may have a long-term **BENEFICIAL EFFECT** on potential bald eagle winter roosting habitat by improving stand conditions.

The effect to potential roost habitat in Alternatives Two and Seven-A would be the same as for Alternative One (No Action) – **NO EFFECT** on bald eagles.

Lynx

All Alternatives

From a review of currently available research, lynx habitat was always found in association with spruce and subalpine fir habitats (Ruggiero et al. 2000). This watershed lacks any association with spruce or subalpine fir, is too dry and the site potential too limited to provide anything more than poor lynx foraging habitat or marginal connectivity/dispersal habitat. The closest area of possible lynx habitat is located over 22 miles to the north.

Research indicates that lynx need at least 15 square miles (9,600 ac) of low-hare-density habitat to support a functional home range (Ruediger et al. 2000, pg. 1-5). Reudiger et al. (2000, pgs. 7-3 through 7-4) go on to recommend that Lynx Analysis Units (LAUs) should be 16,000-25,000 acres in contiguous habitat; at least 10 mi^2 (6,400 ac) of primary vegetation should be present in the LAU to support survival and reproduction. With less than 1,400 acres of habitat available in the entire 65,000-acre watershed (294 acres of primary habitat and 1,011 of secondary habitat), the Silvies watershed/project area does not provide enough habitat to sustain a lynx home range. Throughout all versions of lynx habitat analysis, the Silvies Canyon project area was never in an LAU and was never considered to be lynx habitat because of the lack of adequate habitat. In addition, this project area is not within or adjacent to a Malheur or Ochoco National Forest LAU.

Many of the lynx records in the contiguous United States, including Oregon, are of transient animals that dispersed during cyclic population increases. Animals that are considered dispersing and found in unsuitable habitat are considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USFWS 2000).

Although there is one confirmed sighting and other unconfirmed sightings in Grant and Harney Counties, there is no indication that lynx regularly occur in or use the project area. The likelihood of lynx using or frequenting the area is expected to be very low due to the lack of lynx habitat.

Since there is not sufficient habitat in this watershed to consider this area as contributing to lynx habitat and since no lynx are expected to inhabit the project area, all alternatives would have **NO EFFECT (NE)** on lynx.

Wolverine

Alternative One (No Action)

Due to the nature of the No Action alternative, and fact that wolverine are not known to inhabit the area, Alternative One would have **NO IMPACT (NI)** on wolverine or wolverine habitat. There are potential indirect, long-term effects from potential large-scale insect and disease outbreaks infestation and catastrophic wildfire that could occur because of not addressing current forest heath issues. The magnitude and timing of these potential impacts are unknown, but they could drastically modify potential wolverine habitat conditions for many years to come.

Action Alternatives

Wolverine dispersal habitat and prey species would be maintained. The potential benefit of reduced road densities or negative impact of disturbance is extremely small and would not be measurable. Because wolverine are not known to inhabit the area, because the project area is not remote, provides no denning habitat, and provides only travel/dispersal habitat, and because activities will not affect dispersal habitat, these alternatives would have **NO IMPACT (NI)** on wolverine or wolverine habitat.

Pygmy Rabbit

Alternative One (No Action)

Because of low habitat potential and the low likelihood of pygmy rabbit occurrence in these areas there would be **NO IMPACT (NI)** from implementation of any alternative.

Action Alternatives

Because these sites are already considered to have low habitat potential, any activities that alter vegetation structure or availability would not likely further reduce its potential. Because of this low habitat potential and the low likelihood of pygmy rabbit occurrence in these areas there would be **NO IMPACT (NI)** from implementation of any action alternatives.

Peregrine Falcon

Alternative One (No Action)

Because there are no peregrine falcons present in the project area and because proposed actions would not occur in the No Action alternative, there would be **NO IMPACT (NI)** to peregrine falcons or their habitat.

Action Alternatives

There is potential habitat for peregrine falcons in the project area, but monitoring has shown that this habitat is not occupied. Because no peregrine falcons are known to be currently using the area, activities would have no effect on this species. While no peregrines are known to be present, the highest potential for effects to peregrines would come from disturbance during treatments (including precommercial thinning, commercial harvest, and prescribed fire-other treatments such as aspen and spring restoration, and road decommissioning would not occur near the nest cliff).

Peregrine falcons are sensitive to disturbance near the nest cliff during the breeding season (February 1 – August 15), but are most sensitive prior to egg laying (USDI Fish and Wildlife Service 1982). If this species were found to be nesting in the project area, activities would be restricted within one mile of the nest from 2/1 – 8/1 (Pagel 1990).

Because there are no peregrine falcons present in the project area and falcon habitat would not be altered there would be **NO IMPACT (NI)** to peregrine falcons or peregrine falcon habitat by the implementation of any alternative.

Western Sage Grouse

Alternative One (No Action)

Because no proposed actions would occur in the No Action alternative, there would be **NO IMPACT (NI).**

Action Alternatives

Most proposed vegetation management would not affect this species, but some activities are expected to provide minor benefits to potential late brood-rearing habitat and potential nesting habitat. Juniper reduction in lower elevation dry ponderosa pine/shrub steppe areas may increase the availability of late brood-rearing habitat by removing encroaching conifers from historically non-forested areas.

There are no known leks within the project area. While nesting birds have not been observed in the project area, 938 acres of potential nesting habitat occur within two miles of a reported lek. If it is determined that nesting occurs in the project area, prescribed burning in any areas with known nesting sage grouse would be done during the fall to eliminate the potential to affect nesting sage grouse. Prescribed fire would be allowed to creep into up to 15% (in area) of sagebrush stands. These measures would avoid affects on nesting sage grouse and would have a minor benefit on nesting habitat by creating a mosaic of sagebrush and grassland habitat in treated areas (Kilpatrick no date, Call and Maser 1985). Activities may disturb undetected sage grouse, but individuals would be able to move to escape fire or other disturbances.

Due to the potential for impacts, the action alternatives **MAY IMPACT INDIVIDUALS AND THEIR HABITAT, BUT WILL NOT LIKELY CONTRIBUTE TO A TREND TOWARDS FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OF THIS SPECIES (MIIH)**. Potential impacts are minor and would be an overall benefit to this species. The level of proposed treatment represents only a small percent of sagebrush habitat available in the watershed. At this level, restoration would be slightly increased at the local level, but not at the landscape level.

Gray Flycatcher

Alternative One (No Action)

Because no proposed actions would occur in the No Action alternative, there would be **NO IMPACT (NI)** directly resulting from this alternative.

Without vegetation treatment, junipers would continue to dominate some sites, reducing or preventing shrubs from re-establishing. Open juniper woodlands have the greatest potential for maximum structural diversity and habitat potential when all layers are present (Miller 1999). Over the long-term, maintaining juniper-dominated sites would fail to restore the resilient, healthy shrubland habitat that favors the gray flycatcher and other open-grassland and shrub-steppe adapted species.

There are potential indirect, long-term effects from probable high intensity wildfire that could occur because of not creating resilient forest and shrubland ecosystems. The magnitude and timing of this potential impact is unknown, but it could drastically modify large areas of arid woodland shrublands and low elevation ponderosa pine habitat. The loss of sagebrush and other shrubs from stand-replacing fire would adversely impact gray flycatchers in the short term. As the shrub and understory layers recover from the effects of a fire, this species would benefit from the creation of relatively treeless grassland/shrub-steppe areas.

Direct and Indirect Effects of Alternative Six

The low to moderate intensity burning proposed in these alternatives is not expected to reduce larger juniper. Without a substantial reduction in the density of junipers, gray flycatcher habitat would not change significantly. Effects would be similar to Alternative One.

Other Action Alternatives

Gray flycatchers would be vulnerable to loss of nest productivity from juniper removal if the activities occurred during the nesting season. Nests, eggs and nestlings could be destroyed and brooding adults could be killed during felling operations (OR-WA PIF 2001). In most cases, adult birds can escape. Juniper stands to be treated would be treated outside the nesting season or would be monitored for gray flycatcher nests, and nest trees would be protected to reduce the potential for direct effects. Proposed treatment should improve habitat for open-grassland and shrub-steppe adapted species including gray flycatchers. Thinning of juniper would likely reduce belowground competition and increased availability of soil water and nutrients to shrubs and grasses (Bates et al. 1999). This would improve foraging habitat by increasing spacing between trees, which would encourage development of sagebrush, grasses and forbs.

Under these alternatives, prescribed fire would be used as a follow-up treatment to reduce natural fuels, kill off additional young juniper in the understory, and release stored nitrogen into the system. Because of limited continuity of fuels, low to moderate burning should have little effect on remaining mature and old growth junipers, grasses, or forbs. Burning under these site conditions should result in a mosaic burn that would enhance habitat conditions for the gray flycatcher.

Due to the potential for impacts, the action alternatives **may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species**. Potential impacts are minor and would be an overall benefit to this species. The level of proposed treatment represents only a small percent of juniper habitat available in the watershed. At this level, restoration would be slightly increased at the local level, but not at the landscape level.

Bufflehead

This species does not breed in the Silvies Canyon Watershed therefore there would be **No Impact (NI)** to breeding birds regardless of the alternative selected.

This duck can be found in the watershed during the fall and possible spring migration and some birds may overwinter depending on the availability of open water. Proposed alternatives would not alter overwintering habitat used by the bufflehead. There would be **No Impact (NI)** to non-breeding birds regardless of alternative selected.

Columbia Spotted Frog

Alternative 1 (No Action)

There would be **NO IMPACT (NI)** directly resulting from the No Action alternative, but there are potential minor indirect, long-term potential effects from insects, disease, and stand-replacement wildfire because of not addressing current forest heath issues. The timing and extent of these effects is unknown.

Action Alternatives

Timber harvest activities are not planned in wet habitats used by spotted frogs. Little or no effect to frogs or frog habitat is expected from these treatments. Prescribed burn treatments and road activities have the potential to affect frogs and their habitat, though the effect is expected to be minimal. Spring and cottonwood restoration should improve water quality and may improve habitat, but the effects to frogs are not expected to be measurable. Spring developments would not dewater springs, so no effect to frog hibernation habitat is expected. Due to the potential for impacts, the action alternatives **MAY IMPACT INDIVIDUALS AND THEIR HABITAT, BUT WILL NOT LIKELY CONTRIBUTE TO A TREND TOWARDS FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OF THIS SPECIES (MIIH)**.

Effects on Management Indicator Species

Federal Regulations (36 CFR 219.27 (a)(6)) requires that all management prescriptions shall provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species and provide that habitat for species chosen under §219.19 is maintained and improved to the degree consistent with multiple-use objectives established in the plan.

Federal Regulation (36 CFR 219.19(a)) requires that each alternative shall establish objectives for the maintenance and improvement of habitat for management indicator species selected under paragraph (a)(1) of this section, to the degree consistent with overall multiple use objectives of the alternative.

Effects to Rocky Mountain elk are discussed in the section titled "Effects on Big Game and Big Game Habitat."

Effects on Indicators of Old Growth and Late- and Old-Structure Habitat

See sections titled "Effects on Dedicated Old Growth and Replacement Old Growth" and "Effects on Late and Old Structure, Connectivity, and Fragmentation" for a discussion of the effects of the alternatives on habitats used by the indicators of old growth and late- and old-structure habitats.

Pileated Woodpecker

Effects of Alternative One – No Action

Untreated stands that are experiencing reduced vigor and stand health would continue to be influenced by overstocking, fire exclusion, and drought, insect and disease related mortality.

Unless a stand-replacing event occurs, these stands should continue to provide marginal foraging habitat for resident pileated woodpeckers in the next 30 years.

The expected outcome within the foreseeable future in LOS is removal of old-forest characteristics due a stand-replacing event. Pileated woodpeckers would not have a favorable response to stand-replacing events, which would create abundant pileated woodpecker foraging opportunities, but would reduce the quality and amount of nesting habitat (Smith 2000). In such an event, large blocks of habitat that support pileated woodpeckers could be drastically altered or lost for 120 years or more.

Increased snag densities generated as LOS and old growth habitat deteriorates would benefit pileated woodpecker. However, benefits would only last for 30 years, and would come at the cost of reduced levels of large live trees.

In years with high tree densities and canopy closure (during years of low insect densities), stand structure will make these stands more suitable for pileated woodpeckers; in years of insect and disease outbreak, and subsequent defoliation, reduced canopy closure would make these stands less suitable for pileated woodpecker nesting, but still suitable for foraging.

Without an old growth and replacement old growth management strategy to maintain conditions that meet the requirements of pileated woodpecker, local viability of this species would be reduced until adjacent stands develop into LOS or until forests recover from stand-replacing events.

Effects Common to All Alternatives

Adjusted DOGs, designated/managed ROGs, and managed feeding areas should provide suitable nesting and foraging habitat capable of supporting an estimated 6-7 pair of pileated woodpeckers in the short and mid-term.

The proposed designation of five pileated woodpecker feeding areas (PWFAs) would meet Malheur Forest Plan standards (pg. IV-30, #49) for five old growth units. PWFAs and the areas in proposed ROGs (ROGs are included in the PWFAs) would equal 300 or more acres. These areas would be managed to meet the Forest Plan standard, as amended, for snags (2.39 21" or larger snags/acre). Within ROGs, the retention of snags and down logs and the mitigation that creates snags would allow these areas to provide feeding habitat for pileated woodpeckers (see effects of treatments on ROGs). The remainder of designated PWFA acreage is outside of proposed harvest units, but is mostly within prescribed fire fuel blocks (non-ROG acres of 02039 are not planned for burning). Effects to snags and down logs from burning are described in the pileated woodpecker section under Fuel Treatments. PWFAs are expected to continue to provide foraging habitat similar to existing levels. PWFA designation should not affect other wildlife species since it would not change the existing or proposed management of these areas.

These alternatives defer designation of a PWFA for DOG 02015PW. No suitable adjacent areas exist in Silvies Canyon Watershed.

Road closures in and outside DOGs could benefit pileated woodpeckers by reducing the number of snags cut for firewood. Other activities would have no measurable effect on pileated woodpeckers because treatments would occur outside habitats normally used by pileated woodpeckers.

LOS stands would be entered but forest structure would not be substantially altered, so existing conditions would persist in these stands. These areas may provide small patches of marginal nesting and foraging habitat capable of supporting one or more breeding pairs.

Direct and Indirect Effects of Alternatives Two, Four, Five, Seven and Seven-A

Silvicultural prescriptions for most units focus on commercial thinning or select harvest of conifers up to 21" dbh while retaining large, old-growth structural components and regenerating stands with early seral pine. Mechanical treatment would focus mainly on suppressed understory trees. Large and mid-story trees would be retained to provide horizontal and vertical structure to the stand. Snag habitat would be maintained at or near current levels under these alternatives.

Long-term management would strive to provide ponderosa pine forests with two or more canopy layers or younger forests that contain mature or old growth remnants and snags at or near Forest Plan standards. Average basal area after logging should be at about 60 ft^2/ac (plus or minus 20 ft^2/ac), a basal area substantially higher than the 10-25 ft^2/ac that Tiedemann et al. (2000) discussed.

In LOS stands (outside of DOGs) changes in general forest stand structure would be reflected in a reduction of canopy closure (by an estimated 20-40%), stand density, and stand level structural complexity. Managed stands would retain important old growth structural components, but may be less suitable as optimal pileated woodpecker nesting and foraging habitat. All treated LOS would retain key foraging structures so the overall availability of foraging habitat should not be substantially diminished.

While none of the action alternatives would cut snags (other than snags that pose an immediate hazard), Forest Plan snag levels would not be met because several areas do not currently meet Forest Plan snag levels (2.39 snags/ac. 21" dbh and larger).

Existing snag densities (averaging one snag per acre 15" dbh or larger) and even Forest Plan standard snag levels may not be sufficient for pileated woodpeckers. The project area is below DecAID's 50% tolerance level for snag density for pileated woodpecker (Mellen et al. 2003). However, information from Gunderson (A.G. Gunderson [USDA Forest Service] pers. comm. 2003) suggests that the drier parts of this project area (south and west exposures, moderate to steeper slopes) would have only provided snag and down wood habitat at the 30% tolerance level historically while the rest of the area may have provided habitat at the 50% to 80% tolerance level historically.

This woodpecker appears to select multistoried, mature and overmature stands for foraging and nesting but use many stand seral stages for foraging. With changes to stand structure of LOS and mid-seral stands, some foraging effort could shift from treated stands to adjacent unmanaged areas (Bull et al. 1995). Because of the retention of remnant old-growth structural components, use of treated stands as nesting and foraging areas is still expected but could be at a reduced level or frequency. This could likely affect pileated woodpeckers currently nesting outside of DOGs, bald eagle winter roost areas and the Myrtle-Silvies Roadless Area.

In response to changes in treated stands, resident pileated woodpeckers may expand their home ranges to incorporate more acreage of less productive habitat or shift established territories to adjacent untreated habitat. This species is known to maintain large home ranges so potential shifts in habitat use may be minimal.

After harvest, stand level prescribed burning and landscape level burning would occur. While prescribed burning is generally of low to moderate intensity, it often contributes to a reduction in the availability of existing down wood and snags and may cause some large tree mortality. Mortality of 21” dbh or larger trees is not expected to be over 5% (Burn objectives, Fuels Specialist Report), which would cause minimal negative effects to stand structure. While Design features and Mitigation Measures (Chapter 2) would be used to reduce potential loss of snags and down wood to burning, some larger snags and down wood may be removed through burning.

Tree mortality at or below 5% in large trees could contribute up to one large snag for every two acres in many stands within five years after treatment. Generally larger snags are removed through burning and smaller snags are recruited through burning. Induced mortality would help to offset snags lost during harvest and post-harvest burning. This “snag exchange” would offset potential losses of snags.

Stand conditions after harvest and burning are relatively short lived. Within 5 to 20 years (assuming limited additional mosaic prescribed burning in the mid-term) the residual dead overstory (existing snags retained after burning) would likely fall and become large down wood, fire caused tree mortality would be fully realized and understory pine regeneration would likely reach 5 to 15 feet tall. These conditions would provide ground based foraging cover for pileated woodpeckers, which forage on insects that have colonized large diameter down wood.

Logging would remove over-stocked trees from many stands in the project area. As a result, vigor of larger trees should increase, overall structure should become sustainable, and species composition should shift to better match site conditions. Stands should show increased resiliency, and be more sustainable.

As these treated stands mature, there should be an increase in the distribution and abundance of OFMS and OFSS stands with species composition appropriate to site conditions.

Cumulative Effects of Alternatives Two, Four, Five, Seven and Seven-A

These alternatives would begin to move stand structure and habitat towards HRV and contribute to restoring ecological balance to forest habitat. Because of proposed harvest and burning, there is an expected net loss or a reduction in value of some marginal pileated woodpecker foraging habitat outside of DOGs. Habitat conditions in these stands would be less favorable to pileated woodpeckers, but they would be more in line with historical conditions and would be more sustainable over time. Untreated stands would continue to provide marginal foraging habitat for resident pileated woodpeckers.

Management of area DOGs, ROGs, and PWFAs in combination with a network of other DOGs across the Forest and areas selected for other purposes (roadless areas, wilderness, wildlife emphasis areas, and research natural areas) should maintain habitat for old-growth associated species such as the pileated woodpecker. This management approach should maintain old-growth species at 30% or more above minimum viable population levels.

Ongoing grazing is not expected to affect pileated woodpecker and would not contribute to cumulative effects on pileated woodpeckers.

Maintenance burning may be planned in the future in these areas; burning would help retain lower fuel levels, thus maintaining reduced fire hazards. Reduced fine fuels around tree bases (due to burning proposed in this project) would help protect trees and snags from future burning. More large trees and snags would likely be retained during future burning, providing more sustainable old growth characteristics, which would benefit pileated woodpeckers.

Direct and Indirect Effects of Alternatives Three and Six

Silvicultural prescriptions for most units focus on precommercial thinning of conifers or thinning with fire to 9" dbh while retaining large, old growth structural components and most mid-story structure. Average basal area after logging should be at about 70-80 ft^2/ac, a basal area substantially higher than the 10-25 ft^2/ac that Tiedemann et al. (2000) discussed. Medium and large diameter pine would make up most of the basal area.

Alternative Six would rely on fire to thin dry pine stands while pretreating (precommercial thinning) dense mixed conifer stands. Because prescribed burning is not a precise science, mortality higher or lower than desired could occur in the 0.1-9.0" dbh size classes and more mortality could occur in larger trees depending on site and burning conditions.

Resulting changes in stand structure would be reflected in a minor reduction in canopy closure (by an estimated 0 to 5%) and minor reduced stand level structural complexity (e.g. reduction of one or more understory canopy layers and loss of some dead and defective tree habitat).

Because of the old growth structural components and most mid-story trees would be retained, use of treated stands as foraging areas is not expected to change.

Effects of fuels treatments would be similar to those described for Alternatives Four, Five, Seven and Seven-A except that stocking levels would not be reduced as much, which may increase the potential for more intense fires. This would contribute to an increased potential for loss of existing down wood and snags and fire-caused tree mortality.

Due to increased basal area, increased numbers of large and mid-sized trees may be killed because of underburning. Burn objectives are that no more than 5% of the standing large trees would be killed, so there should be minimal negative effects.

Cumulative Effects of Alternatives Three and Six

While the low intensity treatments proposed under these alternatives would not aggressively treat stands in the project area, they would begin to move many stands and habitat towards HRV.

Because of proposed treatments, there would be no net loss or a reduction in value of marginal pileated woodpecker foraging habitat present in the area. Resulting habitat conditions would not be more in line with historical conditions and would not likely increase habitat sustainability over time.

White-Headed Woodpecker

More species of vertebrates use ponderosa pine and mixed conifer forests for reproduction and feeding than any other forest type found in eastern Oregon and Washington (Thomas 1979). While this analysis focuses on the habitat and conservation needs of the white-headed woodpecker, implementation of vegetation management that preserves and restores mature single story, open ponderosa pine landscapes would have broad scale beneficial impacts on other species such as the flammulated owl, white-breasted nuthatch, pygmy nuthatch, and yellow chipmunk, which find prime habitat under the conditions described as being optimal for white-headed woodpeckers (Marshall 1997).

Effects of Alternative One – No Action

Encroachment of late-seral species into ponderosa pine-dominated stands predisposes large tracts of forest to stand-replacing fires. Such high intensity fires reduce the probability of ponderosa pine reaching larger size classes important to this woodpecker. Without thinning, density-related stress factors would reduce growth and vigor of ponderosa pine (Blair 1993) and development of old-growth ponderosa pine structure (Smith and Arno 1999).

Without treatment and with continued fire suppression, most white-headed woodpecker habitat would be lost to stand-replacing events within the foreseeable future. Stand replacement fires can benefit certain woodpecker species (Smith 2000) and this woodpecker is known to use trees recently killed by fire (Marshall 1997), but the resulting loss of large live ponderosa pine would eliminate key winter foraging habitat for this species. This could dramatically reduce population densities and local viability.

Post-fire recovery of this habitat type would take several hundred years under the best of conditions. During this time, white-headed woodpecker densities would remain very low and there is no guarantee that large park-like stands of ponderosa pine would return following a typical stand replacement fire.

White-headed woodpecker habitat would continue to degrade due to species conversion of current ponderosa pine habitat. Increased large snag recruitment in the first 20 years of ongoing management may benefit white-headed woodpeckers. Over time (30-50 years), however, a reduction in large tree and snag recruitment would reduce habitat suitability that is already marginal at best for this woodpecker. Resident pairs would have to expand their home ranges to find sufficient habitat to support breeding (Blair 1993). This would expose these birds to disproportionately greater risk of mortality and predation. Stands would continue to provide poor to marginal habitat for resident white-headed woodpeckers until a stand-replacing event occurs.

Without a management strategy to maintain and improve ponderosa pine habitat, population densities and local viability would be reduced. Ongoing fire suppression in combination with no additional treatment could drastically modify potential white-headed woodpecker habitat conditions for 150 or more years.

Direct and Indirect Effects of Alternative Two – Proposed Action

This woodpecker requires habitat restoration in terms of returning natural processes such as fire to its habitat. Thinning of small trees from ponderosa pine stand and periodic selective cutting to provide conditions for growing of widely spaced pine is often recommended to reduce fuel loads in order to reintroduce fire (Marshall 1997).

This alternative mainly removes midstory shade-tolerant species (white fir and Douglas-fir) that have encroached into historically pine-dominated sites, and also reduces white fir in mixed conifer stands.

Direct and indirect effects on white-headed woodpeckers are expected to be minimal. Little high-quality habitat is available in the project area. Stands would retain large pine, large diameter snags and other important old-growth structural components.

This alternative would retain existing desirable white-headed woodpecker habitat components in most treated stands. Resulting canopy closure, tree spacing, and species composition would be closer to levels preferred by this species and retention of large live pine would provide key winter foraging habitat.

White-headed woodpeckers can thrive in ponderosa pine habitat that has received limited timber harvest. They commonly use stands that have undergone silvicultural treatments where large diameter trees were retained (Marshall 1997).

After harvest, stand level prescribed burning and landscape level burning would occur in most treated acres as well as on the landscape level. Treatment of activity-generated slash would reduce the probability of stand-replacing fires in historical ponderosa pine habitat types that have been altered by past fire suppression and vegetation management. With continued use of prescribed fire, natural fire frequencies may be restored and natural prescribed fire could maintain more open stand conditions dominated by fire adapted vegetation.

Tree mortality at or below 5% in large trees could contribute up to one large snag for every two acres in many stands within five years after treatment. Generally larger snags are removed through burning and smaller snags are recruited through burning. Induced mortality would help to offset snags lost during harvest and post-harvest burning. This "snag exchange" would offset potential losses of white-headed woodpecker habitat in treated stands.

Road closures could benefit white-headed woodpeckers by reducing the number of snags cut for firewood. Other proposed activities would have little or no effect on white-headed woodpeckers because treatments would not involve white-headed woodpecker habitat.

Cumulative Effects of Alternative Two – Proposed Action

After treatment, stands should show increased resiliency, and be more sustainable, both biologically and structurally. As these treated stands mature, there should be an increase in the distribution and abundance of OFMS and OFSS stands with species composition appropriate to site conditions. As stands of ponderosa pine mature, the quantity and quality of white-headed woodpecker habitat would increase.

Future maintenance treatments would continue to improve and maintain habitat conditions preferred by this species.

Alternatives Three and Six

Effects of these alternatives would be similar to Alternative Two except for the intensity of prescribed stand treatment.

Proposed precommercial thinning would act as a pretreatment for prescribed burning but prescribed treatments would not affect stocking and species composition of the midstory. Thinning at this level would maintain higher mid-story tree density and canopy closure than that preferred by white-headed woodpeckers, and retention of these trees (predominately shade-tolerant species) would slow development of stand structure that would be more suitable for this woodpecker.

Over time, this treatment, in combination with subsequent maintenance burns, could contribute to the partial reestablishment of natural fire processes that once played an important role in reducing ladder fuels and stand replacement fires. However, development of this condition would be delayed by retention of midstory structure that detracts from or does not contribute to suitable habitat conditions.

Alternatives Four, Seven and Seven-A

Effects of these alternatives would be similar to Alternative Two except for the intensity of prescribed stand treatment. More acres of pine would be placed into management. This would result in future improvements in a greater portion of the watershed.

Alternative Five

Overall, effect on this alternative would be similar to Alternative Two except for the intensity of prescribed stand treatment. Slightly fewer acres of ponderosa pine would be treated under this alternative.

Three-toed Woodpecker

Effects Common to All Alternatives

While this species was documented in the project area, it is considered an incidental species to the area. In addition, there are no management activities planned in three-toed woodpecker designated habitat (DOG 01101) or surrounding forest stands. Old growth lodgepole would not be treated in any alternative. Therefore, this project is expected to have no effect on three-toed woodpecker.

Northern Goshawk

Effects of Alternative One – No Action

This alternative would perpetuate the current vegetation condition and contribute to the decline of functional goshawk habitat. Medium and large trees would grow at very slow rates. Forests would continue to provide goshawk nesting, foraging, and fledging habitat, but would tend to degrade over the next 50 years until habitat characteristics were lost to a stand-replacing event.

In years when forested stands are at the high end of canopy cover, more nest habitat may be available to goshawks. Because canopy cover will oscillate depending on insects and other environmental conditions, nesting habitat would be become unavailable after trees were defoliated or trees died. Without the removal or treatment of ground and ladder fuels the potential for landscape level stand replacement fires in goshawk nesting and foraging habitat would continue to increase. When a stand-replacing event occurs, large blocks of habitat that may support goshawk would be drastically altered or lost. Resulting even-aged forest structure that would develop as the affected area recovers would not provide suitable habitat for nesting and only marginal habitat for foraging for the next 50 to 150 years.

Effects Common to All Action Alternatives

Four of the nest sites and corresponding PFAs located outside the project boundary would not be affected by any treatments; two (Hall Creek and Lost Cabin) are completely outside the Silvies Canyon project area and two (Rainbow Spring and Five Hundred Flat) would not have treatments occurring near them. Precommercial thinning would reduce small trees on about 130-170 acres of the Crooked Creek PFA that overlaps with the Silvies Canyon project area. This treatment would have negligible impact on goshawk since it would not reduce hiding (canopy) cover for goshawk fledglings, would have a negligible impact on goshawk prey, and may improve goshawk hunting success.

Table 4-25. Goshawk nest core acres treated[1] by the action alternatives.

Nest[2]	Alternative Two		Alternatives Three and Six		Alts Four, Seven and Seven-A		Alternative Five	
	CT	PCT[3]	CT	PCT	CT	PCT[3]	CT	PCT[3]
HJ Spring (YFMS)	11 ac.	13 ac.	0 ac.	24 ac.	24 ac.	24 ac.	11 ac.	13 ac.
Van Zandt (SEO)	23 ac.	23 ac.	0 ac.	0 ac.	14 ac.	14 ac.	7 ac.	7 ac.
Bellows Spring (YFMS)	30 ac.	30 ac.	0 ac.	0 ac.	30 ac.	30 ac.	0 ac.	0 ac.
FL Spring (OFMS)	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Myrtle Creek (YFMS)	30 ac.	30 ac.	0 ac.	30 ac.	30 ac.	30 ac.	30 ac.	30 ac.
Crane Creek (OFMS)	30 ac.	30 ac.	0 ac.	30 ac.	30 ac.	30 ac.	30 ac.	30 ac.
Bennett Spring (OFMS)	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.	0 ac.
Ranger Spring (YFMS)	30 ac.	30 ac.	0 ac.	30 ac.	30 ac.	30 ac.	30 ac.	30 ac.
South Fawn (SEC)	30 ac.	30 ac.	0 ac.	11 ac.	30 ac.	30 ac.	30 ac.	30 ac.

[1]CT = commercial harvest includes commercial and intermediate thinning, PCT = precommercial thinning.
[2]Nest name and predominant structure of nest stand .
[3]In all action alternatives but Alternatives Three and Six, the amount of precommercial thinning may be the same as the amount of commercial harvest; the amount needed would be determined after commercial treatment.

Prescribed burning would not occur in identified nest core areas. Therefore, there would be no direct effects on habitat or nesting birds.

To improve stand vigor, reduce overstocking dependent mortality, manage stand structure, and improve or maintain overall stand cover, underburning would occur in most PFAs (Table 4-26). Burning activities within ¼ to 1 mile (depending on lighting method) of documented goshawk nests would not be permitted December 1 through August 30 unless nest sites are documented to be inactive. Seasonal restrictions on prescribed burning activities within the PFAs would prevent prolonged and undesirable disturbance to local goshawk pairs during bonding, nesting, and rearing periods.

Table 4-26. Prescribed Burning in Goshawk PFAs.

Nest Site	Burn Block
HJ Spring	3 (100 percent of PFA)
VanZandt	12 (100 percent of PFA)
Bellow's Spring	3 (80 percent of PFA)
FL Spring	8 (50 percent of PFA)
Crane Creek	10 (100 percent of PFA)
Myrtle Park	N/A
Bennett Spring	6 (100 percent of PFA)
Ranger Spring	12 (70 percent of PFA)
South Fawn	12 (20 percent of PFA)

Suppressed trees detract from the potential canopy development of dominant trees and increase the risk of stand replacement wildfire and disease (Reynolds et al. 1992). Removal of suppressed trees from understory and middle story tree canopies would reduce these risks. After treatment, the residual stand structure should become more vigorous as competition from the understory is reduced. This would make these stands more stable over time as the remaining trees become increasingly resilient to the effects of pathogens, drought and fire. Habitat loss due to these factors may be reduced.

Prescribed burning in the project area would mimic natural non-lethal fires and would create stands that provide excellent foraging habitat and open understory canopies that enable goshawks to find prey (Graham et al. 1995).

Prescribed burning would overlap acres treated with thinning, and burn additional acres so some additional cumulative benefits should be realized in each PFA. Mitigation would be used to provide a feedback loop on the effects of burning to ensure that adequate amounts of small trees (hiding cover) remain to provide habitat for goshawk prey species.

Treatment of surrounding habitat, designed to improve stand structure, composition and vigor, would reduce the potential that insect or disease epidemics or stand replacement fires would start in treated stands and move into core areas.

Goshawks use juniper, aspen and other nonforest vegetation types for foraging. Proposed treatments in these vegetation types should maintain prey diversity in the short term and improve prey diversity and availability in the long term. Timing restrictions would be used when necessary to prevent disturbance to active nest sites. Treatment (commercial and precommercial) of the aspen stand associated with the HJ Spring nest would have the same negative affect on goshawk (due to cover removal) as the effects of treatment described above. Precommercial treatment by itself could benefit both goshawk and aspen.

Goshawks show some tolerance towards disturbance near the nest site. Grubb et al. (1998) found that goshawk showed no adverse response to log truck noise >1/4 mile (>400 meters) away from the nest site. While the data is limited to vehicle noise, this indicates that harvest and haul activities outside of ¼ to ½ mile of the nest site should not disturb nesting goshawk.

Effects on Nest Core Areas

Nest core areas were established for all known goshawk nest sites. Commercial harvest (Alternatives Two, Four, Five, Seven and Seven-A) would occur in nest core areas as displayed in Table 4-25, above. Commercial harvest treatments would require a non-significant Forest Plan amendment to allow harvest within the 30 acres surrounding these active or historical sites. Precommercial thinning would occur in nest core areas by itself or in combination with commercial harvest as displayed in Table 4-25. There would be no direct effect to nesting goshawks from any alternative, as no actions would take place within ¼ mile of an active nest site during the breeding season.

Alternatives Two, Four, Five, Seven and Seven-A

Commercial harvest would reduce canopy cover to about 20 to 30%. Since goshawks tend to nest in stands with dense canopy cover (50-70% according to Reynolds et al. 1992), removal of canopy cover through commercial harvest would have a detrimental impact on goshawk. Generally, precommercial sized trees (8" dbh and smaller) contribute little to the primary overstory canopy; therefore, removal would have limited effect on overstory canopy closure. However, precommercial sized trees do contribute to the total canopy closure in a stand. Commercial harvest in combination with precommercial thinning would open up stands and canopy more than either treatment by itself.

Treatments would not directly impact goshawk since treatment would not occur when birds were present (see Mitigation Measures, Chapter 2). However, removal of cover in nest stands would likely make those stands unsuitable or less suitable for nesting. Goshawks that may have used these nest sites in the past may adapt to the changed condition, or may abandon nest sites where critical habitat elements (such as dense canopy cover) have been removed. Goshawks use the same nest areas year after year or in intermittent years. Retaining previously occupied nest areas may be critical for maintaining nesting populations because they contain the habitat elements that attracted the goshawk originally (Reynolds et al. 1992). Commercial harvest of seven nest stands in Alternatives Two, Four, Seven and Seven-A or six nest stands in Alternative Five would likely have a negative affect on goshawk populations in the Silvies Canyon project area.

Young, thinned forest stands grow quickly. In commercially harvested stem exclusion stands and young forest, trees would grow larger in diameter and height, and the amount of canopy cover should increase to pre-harvest levels in about 20 years. Habitat suitability based on canopy cover should recover after 20 years. In young forest, the removal of fuels through harvest would have a long-term benefit to goshawk by minimizing the potential for loss of habitat through stand-replacing events such as a wildfire.

In commercially treated old forest (OFMS) stands, canopy cover is not expected to recover to preharvest levels in the foreseeable future because old trees do not substantially increase their canopy coverage after the stand is thinned. There would be no benefit to goshawk from fuels reduction, since nesting habitat would no longer be available.

Harvest would affect goshawk prey, though little foraging is done in the nest stand. With the application of the proposed silvicultural treatments, maintenance of a large tree component in the overstory should provide habitat for a wide variety of potential goshawk prey. The loss of some mid and understory commercial sized trees in harvest units may result in lower densities of some bird species, such as bark foragers, canopy-forage gleaners, and cavity nesters (Reynolds et al. 1992). With reduced tree density and a thinner duff layer, shrubs and herbaceous vegetation would increase; this would likely lead to a short-term increase in the number of wildlife dependent on this habitat. Patches of dense understory trees (hiding cover) retained in thinned nest stands should help to maintain prey species associated with dense understories as well as provide vertical cover for fledglings. Overall there would likely be no net change in the amount of prey available to goshawk.

Because of visual limitations in dense forest, open understories enhance detection and capture of prey by goshawk (Reynolds et al. 1992). All treatments proposed would reduce tree densities, thus improve the goshawk's ability to detect prey.

Alternatives Three and Six (and untreated nests in other Action Alternatives)

Five nest stands would be treated with precommercial thinning and four would receive no vegetation treatment at all (see Table 4-25). These stands would continue to provide marginally suitable to suitable habitat for nesting goshawk in the short-term and possibly into the long-term (up to about 50 years) or as long as large, live trees are available for nesting and sufficient canopy closure remains.

Precommercial thinning would reduce understory canopy cover but is not expected to measurably reduce overstory canopy cover. Since overstory canopy would remain at or near existing levels, goshawk would benefit from precommercial thinning since precommercial thinning would maintain goshawk prey densities, enhance goshawk hunting success, and reduce hazardous fuels.

Without further treatment, large overstory trees in nest stands may be killed by insects and disease, and some stands may fall out of old growth classification, shifting from OFMS to YFMS (Vegetation Specialist's Report). A reduction in large trees would reduce habitat suitability. Canopy cover may or may not be available depending on insect infestations. Over time, and without further treatment, these stands could become ineffective as nesting habitat.

Trees in younger (SEC and SEO) nest stands (Van Zandt and South Fawn) would likely continue to grow and provide nesting habitat, though growth may be slow due to high tree densities. Potential for insect outbreaks, which could result in removal of canopy cover, would continue to increase.

Effects on Post-Fledging Areas

None of the PFAs in the project area meet Forest Plan/Regional Forester's Forest Plan Amendment #2 standards for the amount of large old forest required in PFAs. However, only six acres of treatment are proposed in OFMS in goshawk PFAs (see footnote to Table 4-27, below), and none of the treatments would change late old structure to a younger structure. LOS would be retained. While all treatments do retain the forest structure required by the Regional Forester's Forest Plan amendment, commercial treatment would adversely impact components of forest structure important to goshawk. Treatment of YFMS in PFAs, especially when there is not sufficient OFMS to provide high quality goshawk habitat, would affect goshawk by reducing the quality of available habitat.

Table 4-27. Acres of YFMS/OFMS/OFSS in existing (610 acre) PFAs and percentage YFMS treated with commercial harvest in PFAs *.

PFA	Existing (Alt 1) YFMS/OFMS/ OFSS	All Action Alts YFMS/ OFMS/OFSS remaining**	YFMS treated			
			Alt Two	Alts Three and Six	Alts Four, Seven and Seven-A	Alt Five
HJ Spring	257 ac (42%)	257 ac (42%)	100 ac (16%)	0 ac (0%)	127 ac (21%)	119 ac (20%)
Van Zandt	49 ac (8%)	49 ac (8%)	49 ac (8%)	0 ac (0%)	49 ac (8%)	49 ac (8%)
Bellows Spring	273 ac (45%)	273 ac (45%)	154 ac (25%)	0 ac (0%)	154 ac (25%)	0 ac (0%)
FL Spring	453 ac (74%)	453 ac (74%)	45 ac (7%)	0 ac (0%)	45 ac (7%)	12 ac (2%)
Myrtle Creek	140 ac (23%)	140 ac (23%)	130 ac (21%)	0 ac (0%)	130 ac (21%)	130 ac (21%)
Crane Creek	433 ac (71%)	433 ac (71%)	96 ac (16%)	0 ac (0%)	173 ac (29%)	21 ac (4%)
Bennett Spring	326 ac (54%)	326 ac (54%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
Ranger Spring	367ac (60%)	367ac (60%)	83 ac (14%)	0 ac (0%)	159 ac (26%)	83 ac (14%)
South Fawn	61 ac (10%)	61 ac (10%)	49 ac (8%)	0 ac (0%)	49 ac (8%)	49 ac (8%)

*Commercial harvest includes commercial and intermediate thinning. Juniper reduction was not included as commercial harvest since juniper is not used by goshawk fledglings for cover.
**Only six acres of OFMS/OFSS are proposed for treatment in PFAs; 4 acres are in Crane Cr., 2 acres are in Ranger Spring. The remaining acres of treatment are in YFMS.

Table 4-28. Acres of young forest in existing (610 acre) PFAs, percentage of young forest treated with commercial harvest in PFAs *.

PFA	Existing (Alt 1) young forest	Young forest (SEC/SEO/UR)			
		Alt Two	Alts Three and Six	Alts Four, Seven and Seven-A	Alt Five
HJ Spring	210 ac (35%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
Van Zandt	452 ac (74%)	265 ac (43%)	0 ac (0%)	268 ac (44%)	172 ac (28%)
Bellows Spring	220 ac (36%)	135 ac (22%)	0 ac (0%)	135 ac (22%)	88 ac (14%)
FL Spring	47 ac (8%)	28 ac (5%)	0 ac (0%)	28 ac (5%)	0 ac (0%)
Myrtle Creek	125 ac (21%)	29 ac (5%)	0 ac (0%)	29 ac (5%)	29 ac (5%)
Crane Creek	133 ac (22%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
Bennett Spring	61 ac (10%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
Ranger Spring	121 ac (20%)	0 ac (0%)	0 ac (0%)	117 ac (19%)	0 ac (0%)
South Fawn	407 ac (66%)	209 ac (34%)	0 ac (0%)	274 ac (45%)	209 ac (34%)

*Commercial harvest includes commercial and intermediate thinning. Juniper reduction was not included as commercial harvest since juniper is not used by goshawk fledglings for cover.

Effects of Alternative Two – Proposed Action

Commercial harvest is proposed within eight of the nine PFAs (610 acres surrounding the 30-acre nest site) in the project area (Tables 4-27 and 4-28). Precommercial thinning would occur in most forest structures in HJ Spring (4% of the PFA), Bellow's Spring (1%), FL Spring (10%), Crane Creek (28%), Ranger Spring (48%), South Fawn (19%) and Van Zandt (9%).

In PFAs, the Malheur Forest Plan, as amended, requires that 60% of the PFA be in late and old forest structure. To provide protective cover for goshawk fledglings, dense overstory canopy cover should be retained (Reynolds et al. 1992). Forest on the Malheur National Forest can generally provide about 40% canopy cover. Mature and old forest in PFAs should also have well developed understories that provide habitat for goshawk prey.

Commercial and precommercial treatments in Alternative Two would retain the overall forest structure. However, commercial harvest would reduce canopy cover to about 20 to 30%. Since young goshawk need overstory canopy cover as protection from predators, canopy cover removal makes birds more vulnerable to predation (Reynolds et al. 1992). The quality of fledging areas and amount of potential goshawk nesting habitat (outside of nest core areas) would decrease in stands treated with commercial harvest in the short-term because of the reduction in canopy cover.

Generally, precommercial sized trees (8" dbh and smaller) contribute little to the primary overstory canopy; therefore, removal would have limited effect on overstory canopy closure. However, precommercial sized trees do contribute to the total canopy closure in a stand. Commercial harvest in combination with precommercial thinning would open up stands and canopy more than either treatment by itself.

Treatments would not directly impact goshawk since treatment would not occur when birds were present (see Chapter 2 Mitigation Measures). However, removal of cover in post-fledging stands, particularly in mature and old forest structure, would likely make those stands unsuitable or less suitable for providing protection for fledglings. Goshawk may continue to use these sites but fledgling survival rates could be reduced, or goshawk may abandon habitat where critical habitat elements (such as dense canopy cover) have been removed. Commercial harvest in seven PFAs would likely negatively affect goshawk populations in the Silvies Canyon project area (see below).

Commercial harvest in five PFAs would have substantial adverse short-term (20 years) effects on goshawk by removing canopy cover to a level below that needed by fledgling goshawk over large portions of the PFAs. HJ Spring, Van Zandt, Bellows Spring, Myrtle Creek, and South Fawn PFAs contain less than adequate YFMS/OFMS/OFSS structure for goshawk and portions of this structure are planned for treatment (see Table 4-27). Commercial harvest would treat about ½ of the YFMS structure in the HJ Spring PFA and the Bellows Spring PFA. Only about 26% (157 ac.) of HJ Spring PFA and about 20% (119 ac.) of the Bellows Spring PFA would provide adequate cover for fledgling goshawk after treatments; this falls well below the Southwest Recommendations (of 60% of the PFA being in YFMS/OFMS/OFSS structures-Reynolds et al. 1992) for goshawk habitat. All or most of the existing acres of YFMS would be commercially harvested in the Van Zandt PFA and the South Fawn PFA, and more than half of the young forest (SEC/SEO/UR) in these PFAs would be commercially harvested (Table 4-28). Only 29% (187 ac.) of the Van Zandt PFA and 32% (198 ac.) of the South Fawn PFA would remain untreated, and all of this would be young forest, which generally is not considered suitable fledgling habitat. Most of the existing acres of YFMS would be commercially harvested in the Myrtle Creek PFA, and some of the young forest in this PFA would be commercially harvested (Table 4-28). Only about 2% (10 ac.) of Myrtle Creek PFA would provide adequate cover for fledgling goshawk after treatments; about 16% (96 ac.) of this PFA would remain as untreated young forest, which generally is not considered suitable fledgling habitat. These PFAs have inadequate YFMS/OMS/OFSS structure in the PFA, and between half and all of the YFMS would be treated. Few areas of cover would be provided for fledglings, making them very vulnerable to predation.

Commercial harvest in two PFAs would have moderate adverse short-term (20 years) effects on goshawk by removing canopy cover to a level below that needed by fledgling goshawk over limited portions of the PFAs. Crane Creek and Ranger Spring do not meet Forest Plan standards, as amended, for the amount of old forest habitat available in goshawk PFAs (see Chapter 3, Table

3-16), but these PFAs provide YFMS/OFMS in excess of Southwest Recommendations (Reynolds et al. 1992) of 60% of the PFA. However, treatments would reduce the amount of habitat providing quality fledgling canopy cover to below Reynolds et al.'s (1992) recommendations. Commercial harvest would treat around ¼ of the old forest structure in the Crane Creek and Ranger Spring PFAs. About 55% (333 ac.) of Crane Creek PFA and about 46% (282 ac.) of the Ranger Spring PFA would continue to provide existing cover for fledgling goshawk after treatments; these values are close to, but are still slightly below the Reynolds et al. (1992) recommendations. Several of the commercial harvest units in the Ranger Spring PFA are being proposed to enhance bald eagle nesting habitat. These treatments would reduce the quality of goshawk habitat. Similar to Alternative One, forest health in untreated stands would continue to decline unless further treatment was proposed.

Two PFAs would be wholly or largely unaffected by commercial harvest. Bennett Spring PFA would remain unharvested (including precommercial thinning, see Tables 4-27 and 4-28) so no direct effects would occur from harvest. No indirect effects are expected from lack of harvest because much of this PFA has been treated recently with prescribed burning. Burning reduced tree density to a more natural condition that is more resilient and less fire prone than other parts of the project area. (see Tables 4-27 and 4-28). Commercial harvest would reduce canopy cover in FL Spring on a limited number of acres of YFMS and in young forest structures; however, about 68% of the PFA would remain untreated YFMS and OFMS, leaving existing, moderate to high canopy cover intact. Because of the vast amount of untreated YFMS and OFMS remaining available for fledgling goshawk hiding cover, commercial harvest would have little effect on goshawk in this PFA. According to the SW Management Recommendations (Reynolds et al. 1992), PFAs should provide adequate cover for goshawk nesting and fledglings. However, similar to Alternative One, forest health in these stands would continue to decline unless further treatment was proposed.

The short-term effect of harvest would be detrimental to goshawk, but young, thinned stands grow quickly. In commercially harvested stem exclusion forest and young forest, trees would grow larger in diameter and height, and the amount of canopy cover should increase to pre-harvest levels in about 20 years. Habitat suitability based on canopy cover should recover after 20 years. In young forest, the removal of fuels through harvest would have a long-term benefit to goshawk by minimizing the potential for loss of habitat through stand-replacing events such as a wildfire. Since only six acres of OFMS would be treated in goshawk PFAs, the effect of reduced cover in these stands would be extremely minor. In the long term, more nesting habitat and higher quality fledgling habitat may be provided in all treated stands as trees grow to larger diameters (Reynolds et al. 1992).

Prey availability an important factor in maintenance of goshawk habitat (Reynolds et al. 1992). Harvest would affect goshawk prey; effects would be similar to those discussed under "Effects on Nest Core Areas." Overall, there would likely be no net change in the amount of prey available to goshawks.

Some treatments would occur in wildlife corridors. Corridor treatments would retain higher canopy cover and more hiding cover than treatments in other stands. This added diversity would likely benefit goshawk prey and increase hiding cover for fledgling goshawks, but may make prey detection and hunting more difficult in wildlife corridor stands.

Commercial harvest combined with precommercial thinning would reduce the total canopy closure in a stand more than either treatment by itself. Combined, these treatments increase the likelihood that fledgling goshawk would be vulnerable to predation due to lack of canopy cover (see above). Precommercial thinning alone (without commercial treatment) would reduce understory canopy cover but is not expected to measurably reduce overstory canopy cover. Since overstory canopy would remain at or near existing levels, goshawk would benefit from precommercial thinning by itself since precommercial thinning would maintain goshawk prey densities, enhance goshawk hunting success, and reduce hazardous fuels.

Reynolds et al. (1992) stated that thinning from below (removing understory trees) is preferred for maintaining desired forest structure, and variable spacing of trees is preferred for developing groups of trees with interlocking crowns. Proposed silvicultural treatments follow this recommendation, though treatments are substantially more extensive than those suggested by Reynolds et al. (1992). In the short term, commercial harvest aggressively treats goshawk habitat and would be detrimental to goshawks in five of the nine PFAs. On two of the nine PFAs (Crane Creek and Ranger Spring), commercial harvest treats limited goshawk habitat and would be slightly detrimental to goshawks in these PFAs. On two of the nine goshawk PFAs (FL Spring and Bennett Spring), treatments would optimize or maintain conditions for goshawk to persist (Desimone 1997).

In the long-term (over 20 years) proposed treatments could benefit goshawk habitat by helping preserve stand integrity, maintaining moderate overstory canopy closure, and maintaining connectivity to alternate nest stands. They would also help contribute to maintaining a mosaic of forest conditions in the area that would support goshawk as well as its prey species.

Effects of Alternatives Three and Six

Precommercial thinning is proposed within eight of the nine PFAs (610 acres surrounding the 30-acre nest site) in the project area (see Tables 4-27 and 4-28). PCT would occur in most forest structures in HJ Spring (19% of the PFA), Bellow's Spring (1%), FL Spring (23%-Alt 3, 0%-Alt 6), Myrtle Creek (27%), Crane Creek (46%), Ranger Spring (67%), South Fawn (39%-Alt 3, 13%-Alt 6) and Van Zandt (17%-Alt 3, 0%-Alt 6).

Under these alternatives, no commercial treatment would occur. Only PCT and juniper reduction would occur. All acres would continue to provide cover from predators for fledglings, though in most places the condition of overstory trees would continue to deteriorate similar to conditions in Alternative One.

More thinning would occur in Alternative Three than in Alternative Six. In Alternative Six, FL Spring and Van Zandt PFAs would not be treated so the result would be the same as the No Action alternative (Alternative One). Bellow's Spring PFA would have so few acres entered that the result would be the same as Alternative One.

The remaining PFAs would have 13 - 67 % of the area treated with precommercial thinning. The effect of this treatment would be similar to that of Alternative Two. Precommercial thinning alone (without commercial treatment) would reduce understory canopy cover but is not expected to measurably reduce overstory canopy cover. Since overstory canopy would remain at or near existing levels, goshawk would benefit from precommercial thinning since it would maintain goshawk prey densities, enhance goshawk hunting success, and reduce hazardous fuels.

Effects of Alternatives Four, Seven and Seven-A

Commercial harvest is proposed within eight of the nine PFAs (610 acres surrounding the 30-acre nest site) in the project area. Precommercial thinning would occur in most forest structures in HJ Spring (0% of the PFA), Bellow's Spring (1%), FL Spring (11%), Crane Creek (15%), Ranger Spring (0%), South Fawn (19%) and Van Zandt (7%).

Effects of these alternatives would be similar to Alternative Two except that YFMS structure would be more intensively treated with commercial harvest in HJ Spring, Crane Creek, and Ranger Spring PFAs. The increased acres of commercial harvest in seven of the nine PFAs would have adverse short-term (20 years) effects on goshawk by removing canopy cover to a level below that needed by fledgling goshawk over large portions of the PFAs. Commercial harvest would treat ½ of the YFMS structure in the HJ Spring PFA leaving only about 21% (130 ac.) of HJ Spring PFA to provide adequate cover for fledgling goshawk after treatments. Commercial harvest in these alternatives would treat over 40% of the YFMS structure in the Crane Creek and Ranger Spring PFAs. About 42% (256 ac.) of Crane Creek PFA and about 34% (206 ac.) of the Ranger Spring PFA would continue to provide existing cover for fledgling goshawk after treatments; these values are below the Southwest Recommendations (of 60% of the PFA being in YFMS/OFMS/OFSS structures that provide quality fledgling canopy-Reynolds et al. (1992)). Most young forest in Ranger Spring (117 of 121 ac.) would also be commercially harvested. Several of the commercial harvest units in the Ranger Spring PFA are being proposed to enhance bald eagle nesting habitat. These treatments would benefit bald eagle, but reduce the quality of goshawk habitat.

These alternatives would have a greater negative effect in the short-term to goshawk than Alternative Two, but potentially have a greater benefit to goshawk habitat in the long-term because they improve forest conditions over a larger area.

Effects of Alternative Five

Commercial harvest is proposed within eight of the nine PFAs (610 acres surrounding the 30-acre nest site) in the project area. Precommercial thinning would occur in most forest structures in HJ Spring (4% of the PFA), Bellow's Spring (1%), FL Spring (11%), Crane Creek (28%), Ranger Spring (48%), South Fawn (19%) and Van Zandt (10%).

Effects of this alternative would be the same as Alternative Two for Myrtle Creek, Bennett Spring, Ranger Spring, and South Fawn PFAs since the treatments are the same. Effects of treatments would be similar to Alternative Two, though commercial treatment is reduced from Alternative Two in Van Zandt, Bellow's Spring, FL Spring, and Crane Creek PFAs and increased from Alternative Two in HJ Spring. Commercial harvest in four PFAs (HJ Spring, Van Zandt, Myrtle Creek, and South Fawn) would have adverse short-term (20 years) effects on goshawk by removing canopy cover to a level below that needed by fledgling goshawk over large portions of the PFAs. Commercial harvest in two PFAs (Bellow's Spring and Ranger Spring) would have adverse short-term (20 years) effects on goshawk by removing canopy cover to a level below that needed by fledgling goshawk over limited portions of the PFAs. Three PFAs would be wholly or largely unaffected by commercial harvest. Bennett Spring PFA would remain untreated and be unaffected by treatments or lack of treatment (see Tables 4-27 and 4-28).

Commercial harvest would reduce canopy cover in FL Spring and Crane Creek PFAs on a limited number of acres of YFMS; however, about 72% and 67% of the PFAs would remain untreated YFMS/OFMS structure, leaving existing, moderate to high canopy cover intact. Because of the vast amount of untreated YFMS/OFMS remaining available for fledgling goshawk hiding cover, commercial harvest would have little effect on goshawk in these PFAs. According to the SW Management Recommendations (Reynolds et al. 1992), these PFAs should provide adequate cover for goshawk nesting and fledglings. However, similar to Alternative One, forest health in untreated stands would continue to decline unless further treatment was proposed.

Effects of precommercial thinning would be the same as Alternative Two.

Cumulative Effects of the Action Alternatives

Alternatives One, Three and Six have the lowest potential to contribute to short-term cumulative effects on goshawk but also have the highest long-term potential to contribute to cumulative effects by allowing a long-term reduction goshawk habitat quality. The remaining Action alternatives would negatively impact goshawk in the short-term, but could provide more sustainable habitat in the long term. The action alternatives would all begin to move stand structure and habitat towards HRV and contribute to restoring ecological balance to forest habitat, but proposed commercial harvesting would result in an expected net loss or a reduction in value of goshawk habitat.

Past management has reduced the existing canopy cover in parts of the Silvies Canyon project area including areas potentially used by goshawk (see Big Game Existing Conditions and Effects). Since proposed commercial harvest would substantially reduce canopy cover in nest and PFA areas, proposed commercial harvest treatments in combination with past treatments would reduce goshawk habitat and therefore likely reduce the area's goshawk nesting capacity until canopy cover increases to pre-harvest levels and functions as goshawk habitat (about 20 years in YFMS/SE forest). In goshawk nest stands that are OFMS, canopy cover is not expected to return to pre-harvest levels and the area would not function as goshawk nesting habitat in the future, potentially reducing the area's goshawk nesting capacity. Past and proposed precommercial thinning (by itself) contributes to an overall benefit to goshawk.

Ongoing grazing would continue in the project area. Grazing can reduce ground vegetation and shrubs and impact riparian habitat, which in turn can affect goshawk prey species. However, managed grazing is not expected to contribute to cumulative effects on goshawk or their prey species.

Maintenance burning may be planned in the future in these areas; burning would help retain lower fuel levels, thus maintaining reduced fire hazards. Reduced fine fuels around tree bases (due to burning proposed in this project) would help protect trees and snags from future burning. More large trees and snags would likely be retained during future burning, providing more sustainable old growth characteristics, which could benefit goshawk.

American Marten

Effects Common to All Alternatives

Marten have not been observed in or near the Silvies Canyon project area, the project area is outside the known range of marten, and there is little potential habitat for marten in the project area. Therefore, marten are not likely to be present in the project area and this project is expected to have no effect on American marten.

Effects on Indicators of Dead and Defective Tree Habitat

This section will look at the effects on specific MIS woodpeckers. See the section titled "Effects on Indicators of Old Growth and Late- and Old-Structure Habitat" for discussion of pileated, white-headed and three-toed woodpeckers.

Black-backed Woodpecker

Effects of Alternative One

Under this alternative, the project area would continue to experience reduced vigor because of overstocking, fire exclusion, and high levels of past and potential insect and disease related mortality. Stands that are heavily overstocked and stressed would continue to be vulnerable to insect outbreaks and disease above endemic levels.

Fuel loading would remain high and contribute to the high potential for stand replacement fires. In the event of such a fire, large blocks of forest habitat would be drastically altered. Fire-killed trees would be abundant; bark beetles infest trees for a period of several years after they have been killed by fire, providing foraging habitat for this and several other woodpeckers for 10-20 years (Smith 2000, Marshall 1992).

Until a stand-replacing event, predicted changes over the next 50 years (oscillating canopy closure, lost understory and mid-story trees, and a reduction in large tree and snag recruitment), could reduce the suitability of some habitat elements but dead and defective tree habitat used for nesting and foraging would likely remain available.

Because this species thrives under conditions that produce abundant bark beetle larvae (stand replacement fire, insect infestations, and overstocked stands) resident black-backed woodpeckers would benefit from deterioration of forest stands.

Direct and Indirect Effects of Alternatives Two, Four, Five, Seven and Seven-A

Forest practices that focus on removing trees before they become susceptible to bark beetles and salvage logging of beetle attacked or killed trees and fire killed trees can be counterproductive to maintaining the black-backed woodpecker (Marshall 1992b). This impact can vary depending of the intensity and scope of treatment.

Silvicultural Treatments

Silvicultural prescriptions for most units focus on commercial thinning or select harvest of conifers up to 21" dbh while retaining large, old-growth structural components (large diameter trees, snags, old stumps, and down wood) and regenerating stands with early seral pine. Mechanical treatment would focus mainly on suppressed understory trees. Large and mid-story trees would be retained to provide horizontal and vertical structure to the stand. Snag habitat should be maintained at current levels under these alternatives. Long-term management would strive to provide snags at Forest Plan standard levels (2.39 21" or larger snags per acre).

Changes in stand structure would be reflected in a reduction of canopy closure (of 20 to 40%), stand density, and stand level structural complexity (e.g. removal or reduction of one or more understory canopy layers, creation of canopy gaps and loss of some dead and defective tree habitat). Stands would retain important old-growth structural components, but may be less suitable as optimal black-backed woodpecker foraging habitat because managed conditions would not favor eruptions of bark beetles. With changes to stand structure of LOS and mid-seral stands, most foraging effort may shift from treated stands to adjacent untreated areas. Because of the retention of remnant old-growth structural components, use of treated stands as nesting and foraging areas is still expected but could be at a reduced level and frequency.

In response to changes in treated stands, resident black-backed woodpeckers may expand their home ranges to incorporate more acreage of less productive habitat or move established territories to adjacent untreated habitat. This species is known to maintain large home ranges (Marshall 1992b) so potential shifts in habitat use may be minimal.

Data in DecAID (Mellen et al. 2003) suggest that some areas should have pockets of snags with very high densities. Marshall (1992b) suggests that snag retention at the 60% level is not likely to be sufficient for species that are highly dependent on wood-boring insects. Typically post-fire habitat conditions are considered ideal for black-backed woodpeckers, but DecAID suggests that post-fire snag densities of 25 to 80 snags per acre, 10" dbh or greater would provide for use only up to about the 50% tolerance level. This snag level is higher than could be managed for in treated or untreated stands.

Many acres of forest experiencing reduced vigor because of overstocking, fire exclusion, and high levels of past and potential insect and disease related mortality would not be treated. Untreated areas include most of the two three-toed woodpecker lodgepole old growth stands (159 acres) that exist in the northern (Blue Mountain) portion of the watershed, the Myrtle-Silvies semi-primitive area, stands where treatment was deferred, and stands not needing treatment.

While this species is present in all major forest types (Bull et al. 1986) lodgepole pine appears to be preferred for foraging Marshall 1992b). Untreated portions of this key forest type and other untreated areas would continue to provide foraging habitat for resident black-backed woodpeckers.

Fuels Treatments

Effects of fuels treatments would be as described in the section titled "Effects on Dead and Defective Tree Habitat (Snags) and Dead and Down Wood Habitat." During prescribed fire, small pockets of snags may be created; this could benefit black-backed woodpeckers. Bark beetles could infest dead trees, but because of the limited number of dead large trees, the benefit to black-backed woodpeckers would be minor.

Stand conditions after harvest and burning are relatively short lived. Within 5 to 20 years the residual dead overstory (existing snags retained after burning) would likely fall and become large down wood, and fire caused tree mortality would be fully realized.

Prescribed burning and landscape level burning would not occur in lodgepole stands or the Myrtle-Silvies Roadless Area.

Effects of Other Proposed Activities

Other proposed activities (spring, aspen, and cottonwood restoration, and juniper reduction) would somewhat increase snag and down wood levels but would occur in habitat generally not used by black-backed woodpeckers. These activities would have little or no impact on black-backed woodpeckers or their habitat.

Cumulative Effects of Alternatives Two, Four, Five, Seven and Seven-A

Marshall et al (2003) concluded that black-backed woodpeckers are uncommon in the Blue Mountains. Past and ongoing extensive eruptions of bark beetles may be causing an increase in this species population density and distribution.

Logging in the project area would remove over-stocked trees from many stands in the project area. As a result, vigor of larger trees should increase, overall structure should become sustainable, species composition should improve, and insects and disease should stabilize at endemic levels. Stands should show increased resiliency, and be more sustainable and stable, both biological and structurally. As these treated stands mature, there should be a stable supply of snags as normal mortality occurs. This should provide stable endemic levels of insects and support densities of this woodpecker that resemble historical levels.

While the intermediate intensity treatments proposed under this alternative do not aggressively treat all priority stands in the project area, they begin to move many stand and habitats towards HRV. It also contributes to restoring ecological balance to forest habitat, allows reestablishment of natural fire regimes, and reduces the need for aggressive fire suppression.

No snags or down wood would be actively treated as part of the vegetation management or fuels reduction prescriptions (see Design Features, Chapter 2). This habitat would be retained for PCEs, secondary cavity users and other wildlife that requires this habitat. Personal use firewood cutting, commercial firewood cutting, and removal of hazard snags across the watershed would remove some snags retained by management and reduce the distribution of snag habitat across the area. Reduced road densities and related access should reduce this impact.

Lodgepole stands in the northern portion of the watershed are popular firewood cutting areas and large numbers of post and poles are removed for personal use. This activity would continue to remove dead and dying lodgepole pine trees that would or could provide food sources for bark beetles. This in turn, would impact this woodpecker by removing or limiting the availability of its prey base. The level of this impact likely contributes to natural and management induced limitations on this species.

Effects of Alternatives Three and Six

Under this alternative, treatments focus on precommercial thinning to reduce ladder fuels. Approximately 15 acres of lodgepole would be precommercially thinned. This should reduce some of the density-induced stress on overstory lodgepole but retained trees would remain very susceptible to bark beetles.

The overall effects of thinning would be similar to those of Alternative One. Overall effects of fuels treatments would be similar to Alternative Two except for the intensity of prescribed stand treatment.

Hairy Woodpecker

Effects of Alternative One – No Action

Upland areas would continue to experience reduced vigor because of overstocking, fire exclusion, and high levels of past and potential insect and disease related mortality. Stands that are heavily overstocked and stressed would continue to be highly vulnerable to insect outbreaks and disease. Tree mortality caused by high insect populations should create a great deal of habitat for this species.

Aspen and cottonwood stands provide a special habitat need for many wildlife and plant species. Stand level restoration treatments, protection, and landscape level prescribed fire would not be used to rejuvenate degraded aspen stands. Cottonwood habitats would not be restored. As these stands continue to decline in vigor or vanish, aspen dependant and cottonwood-associated species including several species of woodpecker would be adversely impacted.

Direct and Indirect Effects Common to All Action Alternatives

All action alternatives would maintain breeding densities similar to densities found in untreated forests.

This species can be impacted when all decayed trees are removed from its habitat (The Nature Conservancy 1999). Under these alternatives, old-growth structure, including snags and snag replacements would be retained in treatment units. Snag habitat would be maintained at current levels and managed to provide Forest Plan standard levels (2.39 21" dbh or larger snags per acre) in the long-term. By providing snags at this level, snags should not be a limiting factor for this woodpecker.

This species shows a positive correlation with burning (The Nature Conservancy 1999). The effect of burning on old forest, snag and down wood retention and creation are discussed in MIS, Snags, and Down Wood. The expected "snag exchange" should offset potential losses of snags if the ratio of fire caused snag recruitment exceeds losses. Prescribed burning should create stand conditions that benefit this species.

With stand level restoration treatments as well as treatments designed to improve and increase aspen and cottonwood habitats, an overall increase in the availability of deciduous trees such as aspen and cottonwood of various successional stages should be seen. Snag creation in aspen and cottonwood would benefit this species by making more snags available for foraging and nesting (snags 12" dbh and larger are at the 50-80% tolerance level for foraging and 30-50% tolerance level for nesting according to DecAID (Mellen et al. 2003)). Woodpeckers that use these stands should benefit directly from these treatments now and in the long-term.

Cumulative Effects Common to All Action Alternatives

Logging in this watershed would remove overstocked trees from many stands in the project area. As a result, vigor of larger trees should increase, overall structure should become sustainable, species composition should improve, and insects and disease should stabilize at endemic levels. Stands should show increased resiliency, and be more sustainable and stable, both biologically and structurally. As these treated stands mature, there should be a stable supply of snags as normal mortality occurs. This should provide stable endemic levels of insects and support densities of this woodpecker that resemble historical levels.

While the treatments proposed under these alternatives do not aggressively treat all priority stands in the project area, they begin to move many stand and habitats towards HRV. Treatments also contribute to restoring ecological balance to forest habitat, allowing reestablishment of natural fire regimes, and reducing the need for aggressive fire suppression to varying degrees

No snags or down wood would be actively treated as part of the vegetation management or fuels reduction prescriptions. Regional direction for retention of snags and down wood would be applied to retain this habitat for PCEs, secondary cavity users and other wildlife that requires this habitat. Personal use firewood cutting, commercial firewood cutting, and removal of hazard snags across the watershed would remove some snags retained by management and reduce the distribution of snag habitat across the area. Reduced road densities and related access should reduce this impact.

Downy Woodpecker

The effects of all alternatives would be similar to those described for hairy woodpeckers.

Lewis' Woodpecker

The effects of all alternatives would be similar to those described for white-headed woodpeckers.

Underburning or any management method that improves the condition of the shrub understory is beneficial to the Lewis' woodpecker (Galen 1989).

Common Flicker

All alternatives would maintain breeding densities similar to densities found in untreated forests. The ability to use most types of habitat for foraging and reproduction makes this species very adaptable and less vulnerable to the effects of timber management or changes to the forest. No measurable change in habitat suitability or local species viability should occur. Similar to the effects of other actions on Hairy Woodpecker, snag creation in aspen, cottonwood, spring and ROG areas could benefit flickers.

Red-naped Sapsucker

Due to the prevalent use of aspen as nest trees, maintenance or regeneration of aspen is important. High snag densities also appear to improve red-naped sapsucker habitat. The No Action alternative would increase snag densities but would lead to a reduction or loss of aspen and cottonwood. As aspen and cottonwood continue to decline in vigor or vanish, this woodpecker would be adversely impacted.

All action alternatives would improve the condition and availability of aspen, maintain or improve the densities of snags, and retain important old-growth stand structure across the watershed, which should benefit this species and not likely reduce current density or distribution.

Williamson's Sapsucker

Effects of Alternative One – No Action

Effects are the same as described in the black-backed woodpecker section, Alternative One.

Effects Common to All Action Alternatives

Thomas et al. (1979) suggest that snag retention at the 40-60% level is sufficient for this species. Conway and Martin (1993) support this by suggesting managing for clumped large snags at a rate of about two snags per acre, especially within drainages and low-laying areas. When existing snags are retained and long-term snag densities are provided at Forest Plan standard levels (2.39 21" or larger snags per acre), snag availability should not be a limiting factor for this species.

Restoration of aspen within the watershed is expected to be very beneficial to this species, due to the woodpeckers' preference for aspen as nest trees. Restoration of existing aspen and probable increases in the availability and distribution of aspen should ensure that this key nesting habitat type is available to this species.

This species may benefit to a small degree after burning. The expected "snag exchange" should offset potential losses in local Williamson's sapsucker densities if the ratio of fire-caused snag recruitment exceeds losses. Additionally, dead trees could be infested by bark beetles, but because the number of dead large trees would be limited, the benefit to Williamson's sapsucker would be minor.

Large blocks of LOS would be retained under all action alternatives. This would provide mature forest stands capable of supporting this sapsucker. All action alternatives would improve the condition and availability of aspen and maintain or improve the densities of snags in the watershed. Treatments under all action alternatives are expected to have no net change on this species and treated stands should be able to support possibly up to 3.9+ pair/100 acres.

Effects on Featured Species

Blue Grouse

Effects of Alternative One – No Action

Under this alternative, many forest stands currently in a densely stocked, closed canopy condition would alternate in and out of this condition and many other stands would progress to this condition. In years with high tree densities and canopy closure (during years of low insect densities), stand structure will be less suitable for blue grouse. In years of insect and disease outbreak, and subsequent defoliation, reduced canopy closure may allow for development of open stand structure and, possibly, limited growth of large trees needed by this grouse.

Effects Common to All Action Alternatives

Some wintering habitat would be reduced by treatments; however, the area that would be affected by each of the alternatives is relatively small when compared to the total habitat that is available in the planning area. Mitigation (Chapter 2 of the EIS) would retain blue grouse winter roost habitat at Forest Plan levels. Due to the abundance of Douglas-fir mistletoe, silvicultural and fire activities would not reduce habitat to an extent that will affect population viability. Spring, summer and fall habitat would be improved by an increase in shrubs and forbs through opened tree canopies providing more light and moisture to the understory.

Pronghorn Antelope

Effects of Alternative One – No Action

Under this alternative there would be no management to reduce juniper. As encroachment and increased juniper canopy cover occur, with resulting loss of shrubs and forbs, the suitability of this area for pronghorn would decrease.

Effects Common to Action Alternatives Two, Three, Four, Five, Seven and Seven-A

Junipers less than 12-18" dbh would be removed on 500 or more acres depending on the alternative. Alternatives Four, Seven and Seven-A would reduce juniper encroachment to the greatest extent with 715 acres proposed for thinning. Bates et al. (1999) found that thinning encouraged development of bluegrass, perennial bunchgrasses, annual forbs, total ground cover, and biomass. This occurred on both grazed and ungrazed sites. Removal of juniper reduces belowground competition and increases availability of soil water and nutrients to understory species, which explains understory response after cutting. This vegetation response would benefit pronghorn. Fuel treatments in shrublands, meadows, and sagebrush habitats may kill a minor amount of sagebrush and other forage species, negatively impacting pronghorn. Mitigation measures designed to protect shrub habitats and sage grouse would help to keep impacts at very low levels.

Weed treatments proposed in the action alternatives in pronghorn habitat are along roads and would be done manually. Pronghorn may experience localized minor disturbance near roads, similar to disturbance from normal road use, but weed treatments should benefit pronghorn foraging habitat by creating space for native or desired plants.

Effects of Alternative Six

While burning may reduce a small number of young junipers, it is not expected to reduce larger juniper. Effects would be similar to those of Alternative One.

Osprey

Effects of Alternative One – No Action

Effects of this alternative on the large old trees and snags used for nesting habitat are the same as described in the section titled "Effects on Late and Old Structure (LOS), Connectivity and Fragmentation." The long-term effect of No Action is a loss of large trees and snags with a resultant loss of potential nest sites.

Effects Common to All Action Alternatives

There would be no direct effect to osprey or their nesting habitat from silvicultural treatments, as all action alternatives focus on removing mid-story shade tolerant species. Stand treatment would retain important old-growth structural components such as large pine and large diameter snags. There would be no cutting of trees greater than 21" dbh. Disturbance of active nests would not occur since management activities are restricted within ½ mile of active nests during the breeding season, April through August. Nests and nest site characteristics would be retained since treatment would not occur within 100' of nest sites. Treatment of surrounding habitat, designed to improve stand structure, composition and vigor would reduce the potential that stand replacement fires would remove nest trees and riparian vegetation.

After harvest, stand level prescribed burning and landscape level burning would occur in most treated acres as well as on the landscape level, which would reduce the probability of stand-replacing fires in osprey nest stands.

Some large trees or clumps of trees may be killed by prescribed burning regardless of the timing of the underburn or other conditions. Tree mortality of 21" dbh or larger trees is not expected to be over 5% (Burn objectives, Fuels Specialist Report), which would cause minimal negative effects to stand structure. Tree mortality at or below 5% in large trees could contribute up to one large snag for every two acres in many stands within five years after treatment. Generally larger snags are removed through burning and smaller snags are recruited through burning. Induced mortality could help to offset snags lost during harvest and post-harvest burning. This "snag exchange" should offset potential losses of suitable nest trees.

Effects of Other Proposed Activities on Featured Species

Proposed juniper treatments have the potential to affect pronghorn antelope (see discussion on Pronghorn Antelope, above). Other proposed activities (such as spring, aspen, and cottonwood restoration, juniper reduction, and weed treatment) may provide enhanced habitat diversity, but would have no measurable effect on featured species or their habitat.

Cumulative Effects on Featured Species

After treatment, stands should show increased resiliency, and be more sustainable, both biologically and structurally. As these treated stands mature, there should be an increase in the distribution and abundance of OFMS and OFSS stands with species composition appropriate to site conditions.

While the intermediate intensity treatments proposed under these alternatives do not aggressively treat all priority stands in the project area, they begin to move stand structure, habitat and wildlife populations towards HRV. They also contribute to restoring ecological balance to forest habitat. Because of treatments, all habitat elements important to featured species (including sagebrush, Douglas-fir mistletoe, and large nest trees) would be less prone to removal due to a fire spreading into these habitats.

Permitted livestock grazing would continue in the area. Grazing would have no effect on osprey. At moderate grazing levels, livestock grazing can be compatible with grouse and antelope management. Grazing is not expected to contribute to cumulative effects on these species. New and ongoing weed treatments should benefit all wildlife species by creating space for native or desired plants.

Proposed harvest and burning should result in a net increase and improvement in large nest trees and open sagebrush habitat, and a potential increase in local viability of osprey and pronghorn. Viability of blue grouse should be maintained at existing levels.

Effects on Local Land Birds Including Neotropical Migratory Birds

In 1918, the MBTA (Migratory Bird Treaty Act, 16 U.S.C. 703-712; 50 CFR 21; and 50 CFR 13) was passed to enforce a treaty between the United States, Mexico, and Canada. This law addressed the issue of poaching migratory birds. Under the MBTA, it is unlawful "by any means or manner, to pursue, hunt, take, capture (or) kill" migratory birds except as permitted by regulation (16 U.S.C. 703-704). The regulations at 50 CFR 21.11 prohibit the take, possession, import, export, transport, sale, purchase, barter, or offering of these birds, except under a valid permit or as permitted the in the implementing regulations (Director's Order No. 131). The Regulation implementing the MBTA defines "take" as to pursue, hunt, shoot, wound, kill, trap, capture or collect NTMBs (50 CFR 10.12).

Forest Service compliance with the MBTA has been challenged several times with regard to the "take" provision. Recently (July 2000), a United States Court of Appeals for the District of Columbia ruled that Federal Agencies are subject to provisions of the Migratory Bird Treaty Act.

Current Forest Service policy regarding bird conservation and the MBTA is:

- Permits must be obtained from the FWS for banding, capturing, or any other activity where there is intentional killing of birds, including control of depredating birds.
- The FS must analyze the effects of actions on migratory birds and document such effects in a NEPA document.
- Negative effects to birds should be mitigated to the extent possible and where possible, plans to benefit birds should be incorporated in project or activity design.
- There currently is no process for reviewing projects with FWS or applying for a permit for "unintentional" take. The FWS will be providing additional guidance regarding the permits for Federal Agencies through the formation of an interagency working group.

General Effects

Direct, Indirect, and Cumulative Effects of Alternative One – No Action

This alternative would have no direct effects on any NTMB species. Indirect effects to birds from this alternative are substantial.

In the short term, NTMBs that favor denser understory structures would benefit from No Action, while species that prefer open to park-like conditions would fare less well. Bird species composition would shift away from those species that used the project area historically (target species such as white-headed woodpecker, flammulated owl, chipping sparrow) to species that use denser, mixed conifer stands (non-target species such as Vaux's swift, Townsend's warbler, red-breasted nuthatch) (OR-WA Partners In Flight 2001).

Through on-going fire suppression and the lack of management actions that reduce fuels and improve forest health, all species' habitats would be expected to be degraded by stand-replacing events within the foreseeable future. Some habitats, particularly large old forest structure, and associated bird populations would be drastically altered by stand-replacing fires. Fires would likely kill some birds, but most would be able to fly to other areas to escape the fire. Some species would benefit in the first 30 years after a fire (e.g. black-backed woodpecker, bluebirds, and olive-sided flycatcher); other species would have negative or mixed reactions (e.g. pileated woodpecker, hermit thrush, and chipping sparrow) (Kotliar et al. 2002; Smith 2000). Bird habitat would recover over the next 30-120+ years as forests and aspen regenerate. Some habitats, such as riparian areas, may have only partial habitat changes due to fire, but may be completely altered by other stand-replacing events like insect defoliation. All stand-replacing events would change population levels of native birds, some species increasing and others decreasing, for 10 to 120 plus years.

Changes would occur because of the No Action alternative. However, this alternative is not expected to contribute to cumulative effects.

Direct and Indirect Effects of the Action Alternatives

All action alternatives incorporate Partners In Flight (PIF) (Altman 2000 - Rocky Mountains Landbird Conservation Plan) strategy elements in their design and should help assure local viability of species associated with habitats historically found in the Silvies Canyon project area. Biological objectives and conservation strategies from that plan (Altman 2000) such as retaining large trees, retaining and creating snags, and implementing road closures would be used to help support conservation of landbirds.

The majority of birds on the Malheur National Forest are NTMBs that migrate to the forest each year to breed. Many of these birds nest either on the ground or within the lower or mid-canopies of trees. Nesting generally begins in June in the project area (R. Sutcliffe, pers. obs.).

Birds that nest on the ground or in the low to mid-canopy would be vulnerable to loss of nest productivity from timber harvest (commercial harvest and precommercial thinning) and prescribed burning if the activities occur during the nesting season. Nests, eggs and nestlings could be destroyed and brooding adults could be killed during felling and burning operations (OR-WA PIF 2001). In most cases, adult birds can escape. Disturbance from harvest or burning could lead to nest abandonment and subsequent loss of nestlings.

Some loss of ground nesting birds can be expected because of prescribed burning during the nesting season. Turner (2001) found a 20% loss of artificial ground nests during low-intensity spring prescribed fires, although artificial nests were distributed at greater densities than natural nests would be. Spring prescribed fire may cause some mortality of young in early nests, but this is not necessarily a devastating effect to bird populations (R. Sallabanks [Idaho Dept. of Fish and Game] pers. comm. 2003). If a nest burns, in most cases, breeding opportunities are still available.

Adult birds escape the direct effects of the burn by leaving. Adult birds appear to be fairly resilient to spring prescribed burning, with renesting in remaining habitat common among neotropical migratory birds that suffer early-season nest failure (R. Sallabanks [Idaho Dept. of Fish and Game] pers. comm. 2003). Fall burning would have little direct effect on birds, because even young birds would be developed enough to fly away and escape a fire. The direct loss of adult birds and young through management is likely less of an effect to bird populations than the loss of habitat (R. Sallabanks [Idaho Dept. of Fish and Game] pers. comm. 2003).

Harvest and prescribed burning would alter bird habitat. In the first few years after harvest or burning, understory trees, shrubs and forbs would be reduced or removed, reducing nesting and feeding habitat for species that use the lower forest layers. Commercial harvest would remove some midstory and understory tree habitat. Because of changes to habitat, effects to birds could continue into the following seasons with reduced or improved recruitment throughout the area (OR-WA PIF 2001).

Weed treatments proposed in the action alternatives would all be done mechanically (no herbicides would be used). Birds may experience localized minor disturbance, but weed treatments should benefit all birds by creating space for native or desired plants.

Intermediate Thinning Practices

Comparatively little information exists on responses of forest birds to intermediate thinning, but some effects at the landscape level and stand level can be inferred from what is known about avian habitat associations (Martin and Finch 1995).

In most cases, intermediate thinning maintains a specific tree-diameter distribution in the stand through periodic removal of selected trees. Intermediate thinned stands typically retain much of the structure that can support mature forest-bird communities, and provide habitat for many species that use the ground-shrub-sapling layer. Such management would have both positive and adverse effect on some NTMBs.

Some species populations ("non-target species" such as red-breasted nuthatch, warbling vireo, American robin) would be reduced by this dry forest restoration while many other species native to dry forest (such as white-headed woodpecker, flammulated owl, chipping sparrow) would benefit (Altman 2000, OR-WA PIF 2001, Tiedemann et al. 2000). OR-WA PIF (2001) considers the alteration/loss of habitat for non-target species to be of low concern because:

- these [non-target] species are opportunistically present in Dry Forest sites, and generally not of conservation concern in this habitat because of their primary association with other forest types;
- the long-term benefit of habitat enhancement for target Dry Forest species outweighs the impacts of habitat loss for non-target species; and
- restoration of Dry Forest habitats is among the highest priorities for bird conservation in western North America.

With the application of the proposed intermediate thinning, maintenance of a large tree component in the overstory should provide a less dense but still functional habitat for canopy dwelling NTMBs. However, the loss of some mid and understory commercial sized trees in intermediate thinning stands is likely to result in lower densities of bark foragers (mostly resident species), canopy-forage gleaners, and cavity nesting species. The few studies that have compared selection cutting or partial cuts to unlogged stands have found that some bark foragers and foliage gleaners decrease, and some ground and shrub foragers or nesters increase.

Canopy gaps resulting from harvest of single trees or groups of trees provide habitat for a variety of NTMBs associated with young second growth forests or gaps in older forests. Many second-growth associated NTMBs need canopy gaps for breeding and likely benefit from harvest created gaps. In addition, many dry forest and area-sensitive species are adapted to internal forest disturbances such as tree-fall gaps, created by natural events, harvest, or prescribed burning. If the gaps created by harvest are not extensive, the effects of created gaps are expected to be minimal, but beneficial to species such as flammulated owl.

Canopy gaps resulting from commercial harvest should be minimal in the overstory. Most harvest would occur in the understory layers. As part of dry forest restoration, this harvest will benefit target species in the long term and reduce habitat for non-target species.

Source habitats typically used by dense forest-interior species are not abundant in the Silvies Canyon Watershed. Because of past management and natural conditions there is little interior conifer forest habitat in the area. There are some relatively large blocks of interior-forest within the Myrtle-Silvies Semiprimative Area, which would continue to provide some nesting habitat to non-target species.

Precommercial Thinning and Pile Burning

Precommercial thinning is an integral part of dry forest restoration. In the long-term thinning would benefit target species that prefer more open understories (including flammulated owls and chipping sparrow). In the short-term, thinning could reduce nests and nesting success of chipping sparrows and non-target bird species that nest in understories.

Magnitude of Treatments

The following discussions show the magnitude of potential effects by considering the timing of treatment, the amount of treatment, and the positive or negative effect for birds.

Timing

Both positive and negative effects are expected for NTMBs both in the short-term (first year or two after treatments) and in the long-term (anywhere from five to over 100 years).

The timing of treatments (burning, harvesting, thinning) and their intensity would have different effects on NTMBs. In all cases, if treatments occur during the nesting season (usually June 1 to July 15), birds present in the treated area would be negatively affected in the short-term due to impacts of disturbance and habitat removal on nest success and mortality. Because of the high potential for short-term negative impacts to NTMBs, most burning and precommercial thinning would not be planned to occur during the breeding season. Burning usually occurs in the early spring on the Emigrant Creek Ranger District; in nine out of years, prescribed burning ignition is completed by June 1 (G. Mackey, pers. com.). This would reduce the impact by generally avoiding nesting activities early in the year. If this were the case, the expected loss of NTMB reproduction for that year would be much less than with a late spring burn when the NTMBs are well into their nesting/brooding activities (OR-WA PIF 2001).

Fall burns may be planned in the future to better mimic what is believed to be the natural fire history of the area. However, due to excessive fuel loading in the project area, fall burning would have to be proceeded by at least one spring burn in any given area. This would reduce the potential of an escaped prescribed fire and the loss of valuable wildlife habitat.

Precommercial thinning would be limited during the breeding season (see Mitigation Measures). NTMB reproduction would be negatively affected on no more than 2,500 acres (4% of the project area) each spring.

Because fire restrictions and wet conditions generally shut down commercial harvest in the late summer/early fall and early spring, most commercial harvest would occur during the late fall and winter and during the bird breeding season. Harvest would have short-term negative impacts on bird reproduction if it occurred during the breeding season, long-term benefits for target species, and long-term negative impacts on non-target species that depend on more dense, closed canopy forest.

OR-WA PIF (2001) acknowledges that spring burning and mechanical treatments may impact landbird habitat and reproduction, but supports these treatments because of their long-term habitat and population benefits to dry forest birds (i.e. white-headed woodpecker, chipping sparrow, Townsend's solitaire, gray flycatcher).

Extent

The effects related to these action alternatives are lumped together because the relative effects related to implementation of the proposed harvest actions are similar. The magnitudes of the alternatives differ. See Table 2-21 (Chapter 2) for the project implementation schedule.

Under **Alternative Two** intermediate thinning would occur on about 14,348 acres. Commercial treatment would occur on about 22% of the project area over a four to seven year period (four separate timber sales in different portions of the watershed and other projects). Precommercial thinning would occur on about 23% of the project area over 10-15 years.

Under **Alternatives Four, Seven and Seven-A**, intermediate thinning would occur on about **17,005 acres**. Commercial treatment would occur on about 26% of the project area over a three to five year period (four timber sales and other projects). Precommercial thinning would occur on about 25% of the project area over 10-15 years.

Under **Alternative Five**, intermediate thinning would occur on about 11,044 acres. Commercial treatment would occur on about 17% of the project area over a three to five year period (four timber sales and other projects). Precommercial thinning would occur on about 21% of the project area over 10-15 years.

Under Alternatives Three and Six, no commercial treatment would be done, but precommercial thinning would occur on about 16,060 acres and 10,799 acres, 25% and 17% respectively, over about 10 years.

Alternatives Two, Four, Seven and Seven-A have the highest potential to negatively affect reproduction in the short-term and positively/negatively affect habitat in the long-term (dependent on bird species - see direct and indirect effects sections above). These alternatives treat 51-55% of the project area over 10-15 years. The remaining action alternatives treat 17-45% of the project area. In all alternatives, 45% or more of the area would remain untreated, providing refugia during treatment and areas of source habitat for species associated with dry forest (OR-WA PIF 2001). In addition, mitigation measures would assure that patches of precommercial-size trees would remain in treated stands in and adjacent to wildlife corridors. Under all action alternatives the affect to nesting by precommercial thinning would also be limited by mitigation measures that limit the amount of treatment (to 2,500 ac. per spring) and provide a method to maintain effects within that limit.

Fuels Treatment

Effects of All Action Alternatives

Prescribed burning improves wildlife habitat, reduces fuels, disposes of logging slash, prepares sites for seedlings or planting, regenerates fire dependent conifers, hardwoods, and herbaceous plants, manages competing vegetation, controls insects and disease, improves forage, and enhances aesthetic appearances of the forest understory. In this project area, natural fuel prescribed burning would be done mainly to benefit wildlife, restore fire-dependent plant communities by removing fire-intolerant species such as white fir, and reduce hazardous fuels.

Table 4-29 displays the extent of burning in the Silvies Canyon project area. Prescribed burning would create a mosaic of burned and unburned areas both within Burn Blocks and in the project area as a whole. One prescribed burn objective is to burn 40-70% of any block (leaving 30-60% of any block unburned). Thus, "Total Acres in Burn Blocks (the top line of Table 4-29) does not display the actual number of acres that are expected to burn; instead, this total acreage represents the outline within which burning will be contained. For example, burn blocks in Alternatives Two, Three, Four and Seven cover 39,277 acres (60%) of the project area. Due to the mosaic nature of burning, only 15,700 to 27,500 acres (24-42%) of the project area would actually be blackened, leaving 58-76% of the project area unburned.

Most prescribed burning would occur in the spring because spring-like conditions are preferable to have control over the intensity of the fire. Block 6 (5,526 acres) could be burned in the fall (and likely would be) because it has been treated recently with prescribed fire. Parts of other blocks would also be burned in the fall to protect other resources, such as bald eagle and goshawk nests. See "Magnitude of Treatments-Timing" for effects of spring burning on birds.

Table 4-29. Prescribed Burn Extent by Alternative.

Activity	Alts Two, Three, Four and Seven	Alt. Five	Alt. Six	Alt. Seven-A
Total Acres in Burn Blocks (% of project area)	39,277 (60%)	25,311 (39%)	33,374 (51%)	33,751 (52%)
Actual acres expected to burn (% of project area)*	15,711 – 27,494 (24-42%)	10125 – 17718 (16-27%)	13,350 – 23,362 (20-36%)	13,501 – 23,626 (21-36%)
Actual acres expected to burn in spring (% of project area)*	13,500-23,626 (21%-36%)	7,914-13,850 (12%-21%)	11,139-19,494 (17%-30%)	13,501-23,626 (21-36%)
Range of actual acres treated per spring	1,491 - 5,459 (2% - 8%)	358 – 5,459 (<1% - 8%)	0 – 5,459 (0 – 8%)	1,491 – 5,459 (2 – 8%)

*Actual acres expected to burn is based on burn objective which is to burn 40-70% of the block

Alternatives Two, Three, Four, Six, Seven and Seven-A would burn similar amounts of the project area, blackening 13,500 to 27,500 acres (24-42% of the project area) over an eight or nine year period. These alternatives have the highest potential to positively/negatively affect habitat in the long-term (dependent on bird species-see direct and indirect effects sections above). Alternative Six would burn up to 19,500 acres (30% of the area) in the spring versus up to 23,600 acres (36% of the area) for the other alternatives; therefore, Alternative Six has a reduced risk of affecting bird reproduction since fewer acres would be treated in the spring. Alternative Five proposes to burn up to 17,800 (27%) acres, with 7,900-13,900 acres burned in the spring over six years (12%-21% of the area). Of all the alternatives, Alternative Five would benefit fewer target species in the long-term, but would also have the lowest potential to negatively affect existing bird species reproduction. Because PIF (Altman 2000, OR-WA PIF 2001) recommends restoring large blocks of dry forest with prescribed fire, Alternatives Two, Three, Four, Six, Seven and Seven-A would have the most long-term benefit for dry forest (target) bird species. The reduction in burn acres (between DEIS and FEIS) reduced the amount of spring burning that would occur, thus reducing the potential beneficial and negative effects to nesting and resident birds.

In all action alternatives, prescribed burning would blacken between 400 and 5,500 acres each spring (<1-8% of the 65,200 acres in the FSS portion of the area). Because of weather conditions, fire managers may be unable to burn each year or may only treat a portion of a burn block. The treatments may be spread out, potentially with a year or more without burning, over 15 years. Assuming herbaceous plant recovery within three years, less than 20% of the project area would have reduced habitat quality at any time during the project due to prescribed fire. In all alternatives, 58-73% or more of the area would remain untreated by fire because of the mosaic nature of burning within blocks and the lack of proposed burning in some parts of the project area. Unburned areas would provide refugia during treatment and areas of source habitat for bird species to recolonize treated areas (OR-WA PIF 2001). In addition, mitigation measures would assure that patches of understory cover would remain in treated stands in and adjacent to wildlife corridors.

With prescribed burning of aspen stands, and other restoration work in progress, an overall increase in the availability of aspen of various successional stages should be seen. This would have beneficial long-term effects on aspen and aspen-associated species. Riparian, shrub, and scabland habitats would not be actively treated (ignited) with prescribed fire although a small amount of light intensity burning may occur on the fringes of these habitats (see Mitigation Measures, Chapter 2). Since 15% or less of these habitats within burn blocks are expected to burn (G. Mackey, pers. com.) and additional acreage of habitat occurs outside of burn blocks, effects to bird species habitats (and bird populations) in these types would be minor.

In these alternatives, some acres to be prescribed burned overlap with precommercially thinned units. Some acres in these units will be burned twice; the first entry (pile burning) is a fuel pretreatment with short-term localized effects (limited to the pile and a few feet around it for about a day), and the second entry is burning areas between piles (see effects above). These treatments would not cause additive effects to birds.

Effects on Neotropical Migratory Birds of Concern

Partners in Flight developed Bird Conservation Plans for all physiological areas within the United States, including the Central Rocky Mountains (Physiologic Area 64), which includes the Blue Mountains (Altman 2000). This plan included most of the following species as focal species for a variety of habitats. To help assure local viability of these species, all action alternatives incorporate PIF dry forest strategy (Altman 2000) elements in their design, such as:

- “Use prescribed fire and/or thinning…where appropriate to reduce fuel loads and accelerate development of late-seral conditions.”
- “Implement road closures…to limit access to snags.”
- “Retain all large trees…and all existing snags...”
- “Initiate snag creation and recruitment where necessary.”

The USFWS (2002) “Birds of Conservation Concern” list was consulted in accordance with Executive Order 13186; effects of management were analyzed on species expected to be present.

Swainson's Thrush and Hermit Thrush

Alternative One would not directly impact forest habitats that might be used by these species. Lack of management may put habitat at risk through wildfire, insects, and disease.

Action alternatives would have little effect on these species due to the restricted amount of associated habitat in the Silvies Canyon watershed. Most suitable habitat is represented by aspen (currently in marginal to poor condition) and riparian shrub habitat. Restoration of aspen within the watershed would benefit these species, making more and higher quality habitat available. Spring restoration may also improve the quantity and quality of these species' habitat. Application of RHCA buffers would maintain forest habitat conditions along streams for nesting habitat. Prescribed burns may creep into riparian areas, which may impact nesting birds dependent on the timing of the burn and early nesting activity. Nesting season is mid-May to mid-July with a peak in mid-June (Sharp 1992). Since little burning would occur in riparian habitat, it is unlikely that burning would impact a significant number of nesting birds or nests. Renesting later in the season is also a possibility if fire should destroy a nest (R. Sallabanks [Idaho Dept. of Fish and Game] pers. comm. 2003).

Olive-sided Flycatcher and Vaux's Swift

These species are associated with moist forest, which does not in the Silvies Canyon project area. PIF (Altman 2000, OR-WA PIF 2001) would not consider these species a focal or target species for management in the project area due to the lack of habitat.

None of the alternatives (including Alternative One) would affect habitat associated with these species. Treatments in the action alternatives may reduce the quality and quantity of habitat in places where these species are using the current vegetation opportunistically since forest habitat would be moved toward dry forest species (ponderosa pine, larch) and away from wet forest species (white fir). However, OR-WA PIF (2001) considers the alteration/loss of habitat for non-target species to be of low concern as compared to the long-term habitat and population benefits to dry forest target species.

Chipping Sparrow

Alternative One would not directly impact forest habitats that might be used by this species. Lack of management may put habitat at risk through wildfire, insects, and disease. The high density of regenerating pine would continue to exceed the sparrow's habitat requirements and could negatively impact chipping sparrow populations (Altman 2000).

Precommercial thinning and burning in the action alternatives would reduce understory fir and pine regeneration, opening up the understory but leaving patches of understory trees. Chipping sparrows prefer an open understory with pockets of regenerating pine, so treatments would benefit this target species in the long-term (Altman 2000, OR-WA PIF 2001). In the short-term, however, thinning could reduce nests and nesting success of chipping sparrows since they nest in the understory. Under all action alternatives mitigation measures and project design would assure that patches of precommercial-size trees would remain in and adjacent to treated areas limiting negative effects by providing refugia and nesting sites during treatment and areas of source habitat after treatment (OR-WA PIF 2001). Negative effects to nesting due to precommercial thinning would also be limited by mitigation measures that both limit the amount of treatment (to 2,500 ac. per spring) and provide a feedback loop to maintain effects within that limit. Despite the potential for negative effects of spring burning and mechanical treatments, OR-WA PIF (2001) supports these treatments because of their long-term habitat and population benefits to chipping sparrow.

Williamson's Sapsucker

The effects of proposed management activities on this species are addressed in the MIS section.

Flammulated Owl

The effects of proposed management activities on this species are similar to those described for the white-headed woodpecker.

Veery and Red-eyed Vireo

Effects to these species are expected to be similar to those described for the Swainson's thrush. Benefits to veery from aspen and spring restoration would occur relatively quickly (likely within five years after treatment). Benefits to red-eyed vireo would occur over time as aspen begin to provide canopy cover.

Loggerhead Shrike

Areas that may provide nesting habitat, such as productive riparian shrublands or possibly mountain mahogany, would not be treated with harvest or prescribed fire in any alternative; no effect would occur from these activities. In the action alternatives, opening up forested stands (reducing basal area and/or reducing canopy cover) may make habitat more suitable for shrike since shrike prefer very open stands. Overall, proposed actions could benefit loggerhead shrike.

Brewer's Sparrow and Sage Sparrow

The effects of proposed management activities on these species are similar to those described for the Western sage grouse and gray flycatcher.

Long-billed Curlew

Areas that may provide habitat, such as Crane Flat and Myrtle Park, would not be treated with harvest in any alternative; no effect would occur from these activities. Prescribed burning would be avoided in meadows and prairies, though burning could occur along the edges of these habitats. Since the amount of burning would be minimal, the negative and positive effects to curlew of burning (such as disturbance, or increased grass/forb production) are expected to be minimal.

Cumulative Effects

Bird species that historically preferred open, park-like ponderosa pine forests and open mixed conifer stands have been negatively affected by contemporary forest management practices that emphasized extensive even-aged management, fire exclusion or suppression, and continuous or long-term grazing (Altman 2000). These practices produced a closed forest of dense, young to mid-aged trees with limited understory diversity, fragmented landscapes and, removed much of the structure that provided diversity at the stand-level and at the landscape-level.

While this project aims to restore dry forest and other habitats, restoration will take time. In acres with multiple treatments (11,000 to 21,000 acres or 11-33% of the project area), vegetation (and therefore habitat) recovery may occur briefly between treatments or may be delayed until treatments are completed. This may slow the recovery of target species. However, the restoration of dry forest is a PIF priority (OR-WA PIF 2001). Burning and harvesting have been planned to meet PIF conservation strategies (low intensity and severity, retaining snags and large trees, mosaic patterns with refuge areas of untreated habitat, among others) and should allow for restoration while reducing impacts on nesting birds. Grazing can impact migratory birds and their habitat. Livestock grazing would continue in the project area. Grazing, as managed in the project area, should not contribute to cumulative effects. Overall, the prescribed treatments in the project area are expected to benefit avian populations (OR-WA PIF 2001, Altman 2000).

Recent declines in population size of NTMBs have been attributed to problems on the breeding grounds as well as nonbreeding grounds (Martin and Finch 1995). It is extremely difficult to predict outcomes of localized management actions when the majority of birds on the Malheur National Forest are NTMBs that migrate to areas that are outside the United States during part of the year.

Effects on Dedicated Old Growth (DOG) and Replacement Old Growth (ROG)

Effects of Alternative One – No Action

This alternative would not directly affect DOGs that exist within the planning area because no treatment would occur. Unless a stand-replacing event (fire, bug-kill, windstorm, etc.) occurs in these stands, five of the seven DOGs would continue to provide habitat for old-growth associated species for the next 20 to 30 years. Two of the seven DOGs (02016 and 02017) would continue to provide habitat for about 40-50 years. ROGs would not be designated, so those areas would not be managed to provide for future old growth.

Fire suppression and a lack of fuels treatment or prescribed burning in most of the DOGs has led to high and increasing tree densities, ladder fuels, and ground fuels. With ongoing fire suppression only one outcome of the no-action alternative is expected within the foreseeable future (within about 50 years): removal of some or all old-growth characteristics, such as large trees, snags, and canopy cover through a combination of stress, insects, and disease and through stand-replacing fires or other stand-replacing events.

Recent prescribed burning in DOGs 02016 and 02017 reduced understory vegetation and fire hazard, and somewhat increased growth rates of remaining trees. Moderate densities of small tree and ground fuels still remain higher than desired in these two DOGs; in the absence of periodic underburns, these stands are also at risk to stand-replacing wildfires.

The effects of stand-replacing fires would be expected to be similar to those seen on other 2002 Malheur National Forest fires (Flagtail, Easy, and Monument), including:

- Loss of most live trees of all sizes and associated loss of cover (thermal and hiding cover),
- Creation of a multitude of various sized snags, increase in snag density until snags fall down (Knotts (1997) concluded that most snags will fall within 10 to 30 years),
- Salvage harvest of fire-killed trees, and
- Lack of old-forest characteristics (large trees, large snags, and associated wildlife species) for 120 years or more.

The recent history of fires on the Malheur National Forest indicates that with current fuel loads, stand-replacing fires are probable in the project area.

Until stand-replacing fires occur, much of the existing DOG and potential ROG habitat would continue to decline into a less productive condition that may not provide all habitat components for some old-growth dependent or associated wildlife. Old growth structure (large, live overstory trees and large snags) would gradually decrease after about 20 years of ongoing management without additional treatment. Large live overstory trees (usually pine) would die from stress, insect infestations, and disease; midstory trees (usually fir) would grow into or replace large trees, but at a slower rate than they do now because of increased competition for water and increased tree kill by beetles, tussock moth, and spruce budworm. As large overstory trees are lost to insects and disease, some stands might not continue to meet the old growth classification, shifting from OFMS to YFMS (Vegetation Specialist's Report).

Large snag and down wood recruitment would increase in the first 20 years of no-action as large overstory trees die from stress, insect infestations, and disease. These snags would likely stand for an additional 10-15 years, increasing snag levels above current conditions for about 30 years. Large snag recruitment would be reduced in the last 30 years (of the fifty prior to expected stand-replacing fires) as fewer large trees would be available to turn into snags. Increased snag densities would benefit many old-growth associated species. However, benefits would only last for 30 years, and would come at the cost of reduced levels of large live trees.

Depending on the condition of insect outbreaks, canopy cover would oscillate between about 40-60% in DOGs. As discussed, tree densities would continue to increase, resulting in increased canopy cover. At the same time, the probability of tussock moth and spruce budworm outbreaks increases with increasing tree densities. Insect outbreaks would likely occur in drought years when trees are under the most stress; one or several outbreaks are expected to occur over the next 50 years. Insect outbreaks would lead to trees being defoliated and killed, and to canopy cover being reduced. An alternating pattern of dense and light canopy cover would be expected to continue until stand-replacing fires or other stand-replacing events remove all or most of the trees that provide cover.

This alternative does not contribute to restoring ecological resiliency to forest habitat in the project area. Without a management strategy to maintain conditions that meet the management requirements of old-growth associated species, local populations of these species would be reduced until adjacent stands develop into late and old structure (LOS) or until forests recover from stand-replacing events.

Cumulative Effects of the No Action Alternative

Recent prescribed burning in DOGs 02016 and 02017 has reduced fuel loads and ladder fuels in these two DOGs. This prescribed burning provided a 10-20 year increase in these DOGs' vigor and resilience, and a reduction in their risk of stand-replacing fire. However, with no treatment and continued growth, these DOGs would be in a similar condition as the other DOGs within 10-20 years. Other DOGs have not been treated recently.

With no other past, present, or reasonably foreseeable actions in DOGS there are no cumulative effects. However, on a Forest-wide scale, burning of these DOGs or their replacements through a stand-replacing event would make it more difficult to meet Forest's strategy for old growth. When

DOGs and their replacements are burned by stand-replacement fire, they would no longer contribute to the network of managed DOG/ROG across the landscape. If possible these would replaced with stands outside the wildfire area; however, this might not always be possible.

Effects of the Action Alternatives

Reconfiguration of DOGs and Designation of ROGs

These alternatives would adjust existing boundaries of DOG 02011PW, 012PW, 015PW, 016PW, and 039PW to align DOG boundaries to existing GIS vegetation polygon layers and/or physical boundaries, such as roads. Logical breaks of vegetation polygons were used if splitting stand polygons was appropriate.

In addition, about 75 acres (16%) that is classified as YFMS of DOG 02017, would be reallocated as part of the corresponding proposed ROG. This would move this acreage into active management for development of future old growth.

Table 4-30. DOG Acres.

DOG #	Existing Acres	Adjusted acres
02011	344	376
02012	482	454
02015	684	715
02016	515	516
02017	475	398*
02039	286	289
TOTAL	2,786	2,748*

* Acreage decreased because 75 acres were reallocated to ROG 02017.

Table 4-31. ROG Acres.

ROG #	Existing Acres	Adjusted acres
02011	0	170
02012	0	265
02016	0	276
02017	0	221*
02039	0	214
TOTAL	0	1,146

* Acreage includes 75 acres reallocated from DOG 02017.

This action would result in a 38-acre reduction in total acres of DOG, and a 1,146-acre increase in total acres of ROG (see Tables 4-30 and 4-31). These actions do not relocate existing DOGs. These actions would benefit the DOG network by moving this area towards Forest Plan direction to provide and designate replacement old growth.

Reallocation of 75 acres of DOG 02017 would result in no change in total acres of old-growth habitat currently available in DOG 02017, since the reallocated acres are young forest and do not meet management direction. By allowing stands that don't meet habitat requirements for old-growth associated species to be managed as ROG, this action provides more options to allow for active management of this area.

The goal of adjusting DOG lines was to better define DOG boundaries, not to increase or decrease the size of DOGs. However, adjusting DOG lines would slightly increase the size of DOG 02039, moving it toward the Forest Plan standard, and would somewhat compensate for DOG acres lost to reallocating acres of DOG to ROG.

Adjusting DOG lines and reallocating 75 acres to ROG 02017 would have a negligible beneficial effect on old growth associated species. The 38-acre total decrease in Dedicated Old Growth seems like a small loss in habitat. However, adjusting DOG lines made several DOGs slightly larger. In addition, part of the 16-acre DOG reduction is reallocation of 75 acres to ROG 02017. This reallocation would result in no change in total acres of old-growth habitat currently available, since the reallocated acres are young forest that do not provide high quality pileated woodpecker habitat. Thus, the final effect of adjusting DOG boundaries is a 38-acre decrease in DOG but a net increase of 37 acres in high quality old-growth habitat within DOGs with a negligible effect on pileated woodpecker and other old-growth associated species.

These alternatives defer designation of a ROG for DOG 02015PW. No suitable adjacent areas exist in Silvies Canyon Watershed. DOG 01101 (Blue Mountain) has a ROG already established outside of the watershed.

Effects of Treatments on DOGs

Three DOGs, 01101, 02011 and 02012, would not be treated. Without future treatment, effects to these three DOGs would be similar to those described under the No Action alternative.

DOGs 02015 and 02039 would be precommercially thinned then prescribed burned through fire creeping between burn piles. With current fuel loads and the presence of above historical levels of ladder fuels, the ability of management to keep fire in the designated location and at the desired intensity would be limited. Prescribed burning would be continued in DOGs 02016 and 02017.

The intensity of these burns would be low enough to avoid mortality of mid-story and overstory trees but high enough to further thin understory trees. Treatments would simulate a natural low intensity/high frequency fire regime (see Fire Specialist's Report for definitions). Burn plans and burn monitoring would be reviewed annually to assure effects stay within prescriptions and to adjust burn methods, if needed (see Migratory Bird and Hiding Cover Mitigation, Chapter 2).

Reduction in Canopy Closure: There could be a slight reduction in canopy closure following thinning and burning due to the removal of suppressed understory trees. This change in canopy closure could result in a slight increase in ambient and ground temperature as more light is allowed through the canopy. The level of change would be very limited due to the nature of the treatment. Generally, precommercial sized trees contribute little to the primary overstory canopy; therefore, removal would have limited effect on canopy structure and microclimate conditions.

Simplification of Stand Structure: In dry forests, multilayered structure was historically rare. This was due to frequent low intensity fire that cleaned out the understory without impacting fire resistant overstory trees (Kohm and Franklin 1997). With fire suppression, unsustainable understory layers made up of shade-tolerant, fire-intolerant species developed. Historically this area's OFMS may have had a multiple-aged overstory that was also maintained by frequent fires (Vegetation Specialist's Report).

In these alternatives, precommercial thinning and burning would remove a portion of the shade-tolerant structure from the understory. This would result in a slight simplification or a reduction in existing canopy layers. Depending on the existing density of the understory, amount removed, and amount retained in wildlife clumps, precommercial removal in combination with burning could potentially convert a multilayered stand to a two-layered stand.

With retention of some of the understory (see Design Criteria for Big Game Cover, Chapter 2), a portion of the lower canopy would be retained to provide for future replacement trees and canopy structure for understory associated wildlife. The resulting vertical structure would approach that found prior to modern fire suppression and provide more sustainable structure over time.

Retention-based harvest would retain sufficient structural elements (large and intermediate trees, snags, and down wood); treatment would not convert stand seral stage or structure. Overall, stand structure would remain intact, continue to function as old growth, and support old growth associated species (Bull and Holthausen 1992).

Increased Stand Vigor: The residual stand should become somewhat more vigorous as competition from the understory is reduced (Tappeiner and Latham 1999, Smith and Arno 1999, Hatz 1991). This would make these stands more stable over time as the remaining trees become increasingly resilient to the effects of pathogens, drought and fire. Habitat loss from these factors could be reduced or at least the impacts could be limited.

The level of improvement would be limited because of the proposed treatments would deal with one element of overstocking and species compositions. Excessive stocking of mid-sized trees would remain and continue to compete with overstory trees.

Increased production of Herbs and Shrubs: Limited increased light penetration to the ground and a reduction in understory conifers would allow for a small amount of increased growth of understory grasses, forbs and shrubs (Smith and Arno 1999). This would result in a minor increase of forage availability for ungulates and cover for ground nesting and foraging wildlife.

Residual Structural Elements: All treatments would focus on suppressed understory trees. All large and mid-story tree cohorts would be retained to provide horizontal and vertical structure to the stand.

No snags or down wood would be actively treated as part of the vegetation management or fuels reduction prescriptions (see Design Features, Chapter 2). Some snags might be burned down during prescribed burning activities, but burning would create new snags. Dead and defective tree habitat would be retained at current levels. The net effect is that the existing levels of snags would remain after activities are completed.

Prescribed burning would kill some large trees or clumps of trees, though burning would be conducted under conditions that are least likely to kill large trees. Tree mortality of 21" dbh or larger trees is not expected to be over 5% (Burn objectives, Fuels Specialist Report), which would cause minimal negative effects to stand structure. Tree mortality at or below 5% of overstory trees would likely benefit wildlife by creating additional snags.

Reduction of Fuel Levels: These alternatives would result in an overall reduction of fuel levels throughout the stands and would reduce the risk of a stand-replacing fire (Graham et al. 1999, Kohm and Franklin 1997). Through the removal of smaller diameter dead and dying trees from the understory, ladder fuels capable of carrying a ground fire into the canopy would be reduced.

Landscape Level Burning: Once the initial restoration treatments have been completed, it should be feasible to maintain and manage old growth by using landscape prescribed fires, with or without additional silvicultural treatments (Smith and Arno 1999).

Effects of Other Proposed Actions on DOGs

Only DOGs 02039 and 02015 have other activities (such as roads and access changes and noxious weed treatment) proposed in or adjacent to them. The other DOGs would not be affected by other proposed activities because such activities would not occur in or near them. Permanent road closures in DOG 02039 (0.1 mile in Alternative Five, 0.5 miles in the remaining alternatives) would slightly reduce road-associated influences on this DOG, benefiting this DOG and associated species (see section titled "Effects of Roads on Wildlife and Habitat"). Mechanical weed treatments in DOG 02015 should benefit native plants in this DOG by reducing weeds and weed spread. No other DOG has a known noxious weed infestation. Spring and aspen restoration, and juniper reduction would also occur in DOG 02015. Treatments would return these small inclusions to healthier conditions that more closely resemble historical conditions. Retaining springs, aspen, and juniper would benefit this DOG by maintaining the natural diversity of habitats.

Cumulative Effects of Treatments on DOGs

Thinning as a preparation for reintroduction of prescribed fires can enhance old-growth conditions and habitat for species associated with late seral conditions, particularly if critical structural components are retained.

All Action Alternatives approach old growth management in a prudent manner. Proposed thinning treatments would occur in two of the seven DOGs that occur in the Silvies Canyon Watershed. Two additional DOGs would be managed with low intensity prescribed burning. The remaining DOGs would receive no active treatment at this time or in the foreseeable future. In addition, other large tracts of LOS occur within the Myrtle-Silvies Semi-Primitive Area. Most of these areas would not be actively managed at this time.

Maintenance burning may be planned in the future in these areas; burning would help retain lower fuel levels, thus maintaining reduced fire hazards. Reduced fine fuels around tree bases (due to burning proposed in this project) would help protect trees and snags from future burning. More large trees and snags would likely be retained during future burning, providing more sustainable old growth characteristics.

Effects of Treatments on ROGs

The goals of these treatments are development of suitable old-growth habitat within 20 to 40 years after treatment. This would likely coincide with the projected loss of old-growth characteristics of untreated DOGs in the watershed. The development of new old-growth habitat would allow for future reconfiguration of associated DOGs that provide habitat for old-growth associated and dependent species.

Thinning is a silvicultural tool which can be used to modify current stand structures and promote a more balanced structure in areas with either excess small trees or currently lacking in large tree component (Edminster and Olsen 1996). Under Alternatives Two, Four, Five, Seven and Seven-A, thinning is proposed in both young stands and in mature stands of trees.

Thinning of Young Forest ROG Stands (SE and YFMS)

This section applies to ROG # 02017, 02039, and parts of 02012 and 02016.

Wildlife generally respond not to stand age but to ecological characteristics (Hayes et al. 1997). Many of these characteristics vary with stand age, but management activities can change stand structure and the rate and direction of ecological succession. Large trees, snags and down wood habitat would be retained at current levels, while stand structure, diversity and cover would be altered in the short-term.

Commercial thinning in stem exclusion stands (ROG 02039) could change the stand from closed canopy to open canopy. In the remaining ROGs (YMFS stands), changes may simplify the structure but because of the low intensity of proposed treatment would not be to a level where it would alter overall stand structure or function (Vegetation Specialist Report).

Thinning young stands may provide growing conditions that more closely approximate those historically found in developing old-growth stands, thereby accelerating development of structure found in late seral forests (Hayes et al. 1997). Although thinning can reduce the total volume of wood in a stand, it promotes rapid growth of individual trees by reducing competition for light and water (Tappeiner and Latham 1999, Hayes et al. 1997, Edminster and Olsen 1996, Hatz 1991).

Thinning dense stands that are in mid-seral stages can increase the potential for windthrow, particularly on exposed sites and along ridgetops (Hayes et al. 1997). While this event is costly to wood production, it can create beneficial gaps in the retained canopy and provides coarse woody material to the forest floor.

Wildlife use of or movement through these ROG units may be limited, depending on the animal's sensitivity to changes in stand structure or a reduced level of canopy closure. Sufficient stand structure would be retained to provide habitat for most species that use this habitat type.

Over the next 20 to 40 years, stand structure and canopy closure should increase and the area should develop in to a more complex old-growth condition, characteristics important in replacement old growth, which should be sustainable over the next 60 or more years.

While thinning may affect these ROG stands in varying ways, there are no wildlife species that are unique to mid-seral stands with limited understory development (Wisdom et al. 2000, Hayes et al. 1997). Therefore, proposed treatment of these stands would have no adverse effect on specific species regardless of intensity of treatment. In addition, thinning at proposed levels would likely enhance future habitat for species associated with late seral conditions, particularly if critical structural components are retained (Hayes et al. 1997).

Thinning of Mature Forest ROG Stands (OFMS)

This section applies to ROG #02011, and parts of 02012 and 02016.

In later stages of stand development, thinning may lead to stands that resemble historical stand conditions that were once found across much of the watershed. Treated stands would have a well-developed understory beneath an open overstory made up of a few large trees per acre. After treatment, the resulting stand structure should more resemble a multistoried, uneven-aged stand (Hayes et al 1997).

Mechanical treatment would focus mainly on suppressed understory trees. Large and most mid-story trees would be retained to provide horizontal and vertical structure in the stand.

Thinning of shade tolerant conifers from stands of old trees can be beneficial to the large tree component by increasing vigor and possibly longevity of older trees (Tappeiner and Latham 1999). With appropriate harvest methods, thinning of trees from stands of old growth does not appear to damage old trees.

Effects would be similar to those described under "Effects of Treatments on DOGs." There would be no adverse effects to species associated with mature forest because OFMS would retain its old-growth structure (Vegetation Specialist Report) and because the snags or down wood component would not be actively treated as part of the vegetation management or fuels reduction prescriptions. Snag and down wood mitigation would assure that snags are retained. Regional direction for retention of down wood would be applied to retain this habitat component for primary cavity excavators (PCEs), secondary cavity users and other wildlife that require this habitat (see Design Criteria and Mitigation Measures, Chapter 2). If historical levels of snags were not present upon completion of fuels treatments, additional snags would be created to provide habitat for these species at historical levels. Snag creation may move ROGs towards Forest Plan standards for snags if sufficient 21" dbh live trees are available for snag creation. But even if snags 12" to 21" dbh were created, snag creation would help provide habitat for snag-dependent species.

Fuel Treatments

Similar to DOGs, fuel loads in ROGs are above historical levels. The excessive stocking of understory trees in ROGs precludes returning fire without a preparatory treatment.

Through the removal of smaller diameter dead and dying trees from the understory, accumulations of ladder fuels that are capable of carrying a ground fire into the canopy would be reduced. Follow-up slash treatments would treat hand piled activity generated slash. Some fire creep is expected between piles depending on concentration of natural fuels and seasonal burning conditions. This treatment would result in an overall reduction of fuel levels throughout the stand and would reduce the risk of a stand-replacing fire (Graham et al. 1999, Kohm and Franklin 1997).

All ROG units would be follow-up burned with low intensity prescribed fire to reduce fuel loading between burned piles. This treatment should simulate fire burning under a natural fire regime.

Effects of burning in ROGs would be similar to effects in DOGs.

Effects of Other Proposed Actions on ROGs

Only ROG 02012 has other activities proposed in or adjacent to it. The other ROGs would not be affected by other proposed activities because such activities would not occur in or near them. Permanent road closures in ROG 02012 would reduce road-associated influences on this ROG, benefiting this ROG in the long-term. No additional activities will occur in this ROG.

Cumulative Effects of the Action Alternatives

These ROG areas currently have no special land designation and have been affected by many forms of past management (including activities such as road construction and use, timber harvest, and fire suppression). Following their designation, they would be managed as replacement old growth (MA 13, Forest Plan IV-105-107). Maintenance burning may be planned in these areas; burning would help retain lower fuel levels, thus reducing future fire hazards. Future burning would be less likely to kill large trees or remove snags because of reduced fine fuels around tree bases.

These alternatives allow for future options in managing DOGs in the watershed. With vegetation management of replacement old growth, changes in existing mid and late-seral habitat should create high quality old-growth habitat in the long-term (20-40 years).

By providing old-growth replacement acreage, possible damage or probable deterioration of existing DOG can be mitigated by manipulating DOG boundaries. This would allow for long-term perpetuation of habitat that supports wildlife species that are associated with mature forest conditions.

These proposed actions would provide for more ecosystem diversity. Active management of DOGs should contribute to a network of other managed DOGs in other watersheds and across the landscape. With management of these areas and proper management of connective habitat, old-growth species viability may be stabilized or improved.

Effects on Late and Old Structure (LOS), Connectivity, and Fragmentation

Structural retention can enhance the movement of organisms within a managed landscape (Rochelle et al. 1999, Franklin 1993). Conditions in the dominant patch type are the most important factor controlling connectivity in that landscape, including dispersion and migration of most organisms (Franklin 1993). The Regional Forester's Forest Plan Amendment (RFA) #2 requires that blocks of LOS habitat have a high degree of connectivity between them. Standards require that we maintain connectivity between LOS and DOGs by linking them in at least two different directions (see Map #28). Conditions of the connecting stands must be those in which medium diameter or larger trees are common, canopy closures are within the top 1/3 of the site potential, and stand widths are 400 feet wide at their narrowest point.

The fragmentation process is the breaking apart of a given area of habitat into smaller, simpler pieces. It can be defined as a product of forested vegetation being removed through natural means (wildfires, windthrow, or landslides) or human means (timber harvest). Historically, Northwest forests were naturally fragmented by disturbances such as fire and disease. Past fire suppression in dry eastside forests, has "de-fragmented" the natural landscape and contributed to fuel distribution patterns that increase the potential for large wildfires (Rochelle et al. 1999).

Fragmentation usually co-occurs with habitat loss. The response of vertebrate populations differs, however, and for most species, the effects of habitat loss are greater than the effects of changes in habitat patterns.

Effects of Alternative One – No Action

This alternative would not directly affect any late seral stage habitat (late and old forest) that exists within the planning area or connective habitat between LOS habitat blocks because no treatment would occur. It would not directly create fragmentation of habitat within the project area. Unless a stand-replacing event occurs in these stands, LOS would continue to provide habitat for LOS associated species for the next 20 to 30 years.

Similar to the effects of No Action on old growth (see section titled "Effects on Dedicated Old Growth and Replacement Old Growth"), the expected outcome within the foreseeable future in LOS is removal of old-forest characteristics due a stand-replacing event. The probability of stand-replacing fires or other events in LOS blocks and connectivity corridors would continue to increase without the removal or treatment of accumulated fuels and trees. Wildfire or other stand-replacing events would increase the habitat fragmentation in the project area.

Until a stand-replacing event occurs, effects of No Action on Warm-Dry LOS are expected to be similar to effects on DOGs in terms of increasing tree densities, tree species conversion, competition for water, and resultant decreased vigor and increased mortality of trees. The effects of No Action to Warm-Dry LOS snag levels and canopy cover would be similar to the effects in DOGs. Much of the existing LOS and connective habitat would continue to deteriorate into a poorer condition. LOS associated snag-dependent species would likely benefit in the first 30 years from the increase in snags, but would may not be maintained into the future because of reduced snag and large green tree levels.

Cumulative Effects of Alternative One – No Action

Almost 15,000 acres of forested habitat was harvested in the project area after 1982. Harvest ranged from selection cuts and commercial thins to clearcuts; harvest occurred in a variety of structures (not all was LOS). Of this, 168 acres of LOS that was harvested retained LOS structure.

High fuel levels were left after most of these treatments (Fuels Specialist Report). On the 168 acres of LOS and many of the remaining treated acres, the immediate hazard of stand-replacing fire is elevated, because a fire start would be more likely to spread, less easy to control, and be hotter than in an area with less fuels. With no treatment, these LOS and other stands would have extremely high fuel loads and be at highest risk of stand-removal by fire.

All treated acres would continue to move toward older structures until a stand replacement event occurs. With no other past, present, or reasonably foreseeable actions in LOS, the no-action alternative does not contribute to additional cumulative effects.

Effects Common to All Action Alternatives

Under Alternatives Two, Four, Five, Seven and Seven-A, existing LOS habitat would be entered with the goal of restoring environmental processes associated with healthy, structurally complex LOS within site potential. Structural elements would be retained to achieve the management objective of providing structural habitat.

Under these alternatives, between 2,699 and 3,651 acres (29-39%) of available LOS would be treated through thinning to maintain uneven-aged structure without promoting regeneration, commercial thinning, and precommercial thinning to reduce ladder fuels (see Table 4-34). Prescribed burning would occur on about 65% of the LOS. Between 2,256 and 3,155 acres would receive both vegetation management treatments and prescribed burning.

Under Alternative Three, 3,420 acres (37%) and under Alternative Six, 2,485 acres (27%) of total LOS available in the watershed would be treated with precommercial thinning. Treatment focuses on precommercial thinning to reduce ladder fuels. Prescribed burning would occur on about 65% of the LOS present. Approximately 2,923 acres (Alternative Three) or 2,485 acres (Alternative Six) would receive both vegetation management treatments and landscape-level prescribed burning.

Under all action alternatives, the remaining LOS would receive no treatments. Much of this acreage is located within the Myrtle-Silvies Roadless Area. These areas would continue to be influenced by stocking induced tree mortality and the exclusion of fire.

Table 4-32 summarizes the proposed treatments in LOS stands.

Table 4-32. Treatment in LOS by Alternative*.

Treatment Type	Alt. Two Treatment Acres	Alt. Three Treatment Acres	Alts Four, Seven and Seven-A Treatment Acres	Alt. Five Treatment Acres	Alt. Six Treatment Acres
Intermediate treatment	1,703	0	1,901	962	0
Commercial thin	345	0	426	305	0
Precommercial thin	837	3,420	1,325	1,432	2,485
Total Harvest	2,885	3,420	3,651	2,699	2,485
Prescribed burning	6,033	6,033	6,033	6,033	5,894

*There are approximately 9,255 acres of LOS in the entire Silvies Canyon project area.

Under all action alternatives, modified commercial thinning, precommercial thinning, and prescribed burning would remove a limited number of trees and thus a limited amount of canopy cover and hiding cover in connectivity corridors. The tree density and fuel levels remaining would be higher in corridors than in surrounding treated stands. Remaining basal area would average 70-80 ft^2 in corridors, corresponding to about 21-31% canopy cover, compared to an average of 50-60 ft^2 (13-22% canopy cover) in other treated stands.

Mitigation measures (Chapter 2 of the EIS) would ensure adequate retention of canopy cover and hiding cover to meet Forest Plan standards in connectivity corridors. Due to modified treatment in the corridors, canopy closure in the corridors should meet the Forest Plan standard of remaining in the top 1/3 of site potential after treatment. Connectivity corridors and adjacent stands would have higher amounts of interspersed hiding cover than surrounding treated stands (see Mitigation Measures). Because connectivity standards would be met by all action alternatives, all action alternatives would provide adequate habitat connectivity. Reduced commercial thinning and increased ladder fuels/small trees would make these stands more susceptible to stand-replacing fire and density-induced stress than fully-treated stands; however, treatment should provide 10 to 15 years of protection from fire and density-induced stress. Commercial thinning (in Alternatives Two, Four, Five, Seven and Seven-A) would remove some understory trees and precommercial thinning would remove 50% of the small trees in corridors, leaving patches of hiding cover but still reducing ladder fuels and stress. Additionally, treatment of surrounding stands would make it less likely that a fire would spread into these stands.

Residual structural elements would be retained in all treated connecting habitat following the RFA #2 standards. These retained elements include large diameter trees, snags, down wood, retained (hiding) cover patches, and canopy closure. These elements should function as stepping-stones for dispersing organisms.

Both forested stands and Riparian Habitat Conservation Areas (RHCA) have been utilized for connectivity corridors. No commercial harvest activities would occur within RHCAs. Untreated forest patches, which would retain more structural diversity, would also provide additional structural and microclimatically moderate habitat that would not be provided by individual structures. This would increase the potential of the managed landscape in the Silvies Canyon Watershed to provide connectivity for many organisms.

Road closures, weed treatment, juniper reduction, and spring, cottonwood, and aspen restoration would occur in connectivity corridors on a limited basis. These activities would cause minor disturbance (for one to several days) in corridors, but would provide long-term benefits by maintaining natural diversity in corridors, providing high quality foraging habitat, and reducing road-associated influences. Fencing associated with aspen, cottonwood, and spring restoration could block the movement of larger animals such as big game, but effects are expected to be minimal since fenced areas would be small enough to walk around and no fences would completely span a corridor.

Commercial thinning, intermediate treatments, and other activities proposed under the action alternatives would not cause any additional habitat fragmentation in the project area.

Additional cumulative effects are similar to those described under LOS, Action Alternatives.

Effects of Alternative Two – Proposed Action

Silvicultural Practices

Recent research on forest ecosystems has clarified the importance of structural complexity to forest ecosystem function and the maintenance of biological diversity. Snags, woody material on the forest floor, multiple canopy layers, varying size and condition of live trees, and the presence of canopy gaps are some important structural elements that contribute to this complexity. Retention of these structures aids in the rapid reestablishment of ecosystems that have high levels of structural, functional and compositional diversity (Kohm and Franklin 1997).

Treatments proposed in this alternative would incorporate a strategy to maintain or quickly restore environmental values associated with structurally complex forests. This approach would provide for the following:

Lifeboating/Refugia Habitat - Habitat that provides structural elements, microclimatic conditions, and foraging opportunities that fulfill habitat requirements of various organisms, and provides a source for reestablishing species once the new forest stand and other suitable habitat conditions are reestablished.

Recent research suggests that removal of trees from stands of old trees can be accomplished with little risk to existing habitat and possible benefits to old tree vigor and longevity (Bull et al. 1995, Kohm and Franklin 1997, Hayes et al. 1997, Tappeiner and Latham 1999). Proposed treatments should increase stand vigor in the larger trees, improve future crown development, and decrease density dependant mortality among larger trees, while retaining existing old-growth structural components and characteristics (see Design Criteria and Mitigation Measures for snags and down logs, Chapter 2).

However, Hayes et al. (1997) caution managers about placing all available LOS under management because of a lack of knowledge of long-term response of LOS to management. This alternative would treat about 35% of the existing LOS in the project area.

Enrichment - Retention of key structures at the time of harvest can result in future stands with much higher levels of structural diversity and therefore habitat carrying capacity (Kohn and Franklin 1997).

Enhancing Connectivity - Retention of live trees and key structures would provide a matrix of forest habitat that would facilitate dispersion of organisms.

Harvest of LOS would reduce stand density, reduce canopy closure (by an estimated 20-40% – see Vegetation Specialist's Report), and simplify stand structure (see Effects of treatments on DOGs). However, a variety of individual and stand-level structural features would be conserved during harvest to enrich stand structure and maintain forest habitat matrices. They include (as referenced in Kohn and Franklin 1997):

- **Large Live Trees** - Large trees over 21" dbh would be retained during harvest. Smaller dominant and strong codominant trees of varying condition would be retained to maintain structural diversity in harvest units.

- **Snags** - Existing snags would be retained in harvest units unless they pose an unavoidable safety hazard to operations or public safety. Green replacement trees would be retained to provide snags in the future. In addition, burn piles in units would be built away from snags, which may help protect these snags during burn operations (see Design Criteria and Mitigation Measures, Chapter 2).

- **Down Wood** - Down wood would be retained at Forest Plan levels (see Chapter 2 Design Features) in treatment units. Prescribed burning could reduce this level by as much as 60 percent. Often fire creates snags, which become down wood within 5 to 10 years of burning. This would replace most down wood lost during initial burning.

- **Undisturbed Layers of the Forest Floor** - Typical harvest systems disturb limited amounts of the forest floor and most ground disturbance occurs in skid trails and landings. Ground disturbance would not exceed 20% of the area, therefore limiting the impact.

Landscape level mosaic prescribed burning typically affects only portions of the forest floor. Prescribed burn objectives are that 30 to 60% of a burn unit would not be burned during any given burn project. This would leave a mosaic of burned and unburned/undisturbed forest floor across an area.

- **Multiple Stand Layers** - Thinning from below and precommercial thinning would reduce the density of understory layers but not likely eliminate canopy layers. Wildlife cover patches would be retained throughout most units. This would provide understory forest aggregates that would provide additional structure to the remaining understory.

Fuel Treatment
Because of excessive stocking of mid-sized and smaller trees, returning fire into LOS without preparatory silvicultural treatments would either be ineffective (failing to thin to desired levels) or too destructive (causing mass tree morality). Low to moderate intensity prescribed underburn would be used as a follow-up to mechanical treatments on most acres. This treatment would reduce remaining understory vegetation densities and fuel loading to more historical levels.

Cumulative Effects of Alternative Two – The Proposed Action
Once the initial restoration treatments are completed, it should be easier to maintain the stands in a natural structure at low risk of severe wildfire or insect/disease epidemics by continuing use of prescribed burning. Follow-up burning should occur every 10-15 years to maintain stand integrity and desired habitat conditions.

Direct, Indirect, and Cumulative Effects of Alternatives Three and Six
While the treatments proposed under this alternative do not aggressively treat high priority stands in the project area, they do begin to move structure in treated stands toward HRV, and contribute to restoring ecological balance to forest habitat in the project area. Stands that were experiencing reduced vigor and stand health because of overstocking, fire exclusion, and insect and disease-related mortality would continue to be influenced by these forces, but the level of influence would be somewhat reduced for approximately 10 years.

Using precommercial thinning as a pretreatment for prescribed burning should reduce the potential for fires burning out of prescription and causing modification of LOS structure.

Precommercial thinning of trees less than 9" dbh would only slightly alter the current canopy closure and basal density of most of the stands. This treatment would not cause any additional fragmentation in the area.

Direct, Indirect, and Cumulative Effects of Alternatives Four, Seven and Seven-A
While the amount of acres treated is the greatest under these alternatives, the intensity of treatment would be similar to that described in Alternative Two. Overall, effects would be similar.

Direct, Indirect, and Cumulative Effects of Alternative Five
While the amount of acres treated is slightly decreased under this alternative, the intensity of treatment would be similar to Alternative Two. Overall, effects would be similar.

Effects on Unique and Special Habitats

Effects on Caves, Talus and Cliffs/Outcrops/Rimrock

There are no known deep caves in the project area. There is a shallow ice cave that is regularly used by recreationists. Because of high human use of this cave, most wildlife use is precluded.

There are no major areas of talus in the project area.

Other than the cliffs in Silvies and Myrtle Canyon, there are only minor rock outcrops in the planning area. Typically, they are found along major ridgelines and ridge noses. Outcrops that qualify as important geomorphic features may be identified during project implementation and would be avoided or protected through site-specific mitigation measures as per Forest Plan Standards.

Effects on Riparian Habitats

Direct and Indirect Effects of Alternative One – No Action

No restoration activities would take place in riparian habitats. Effects to riparian habitat in the project area would be as described in the section titled "Effects on Watershed/Fish Habitat (Issue 3)" in the subsection "Upland and Riparian Vegetation" under the No Action alternative.

As insects and disease continue to affect the area, habitat surrounding these sites would be degraded. This could possibly influence the wildlife use pattern of some of these microsites. Changes would be gradual because all surrounding vegetation would not be affected at one time and dead or dying trees would continue to provide some cover over the next several years. Animals using these habitats would probably experience little effect from this gradual change in surrounding cover in the short-term.

Over the next 5-10 years, changes in surrounding vegetation and structure may alter microclimate conditions within these sites. Sites such as rock outcrops and springs would receive less overall use and may not be able to provide habitat conditions that some habitat specialists use. This condition would likely persist until quality cover develops from the surviving vegetation.

Potential change in patterns of use and microsite conditions of unique and sensitive habitats represent a very minor change in use of this habitat across the area and surrounding watershed in the short-term.

There are indirect, long-term effects from insects and disease outbreaks and stand replacement events that would occur because of not addressing current forest heath issues. The magnitude and timing of these impacts are unknown, but they could drastically modify riparian habitat and microsite conditions for many years to come.

Cumulative Effects of Alternative One – No Action

Past management has affected riparian habitats (see Hydrology and Fisheries Specialists' Reports). The effects of grazing and cottonwood planting and protection would likely continue. No other reasonably foreseeable actions or cumulative effects are expected.

Effects Common to All Action Alternatives

In order to maintain options for species conservation in the future, protective buffers that have been amended to the current Forest Plan standards would be used to provide protection of seeps, springs, and other types of wetland not incorporated into stream/RHCA buffers. A no-cut buffer of 100' slope distance from the outer edge of the wetland would be established for all sites associated with harvest units.

Through avoidance, there would be no direct effect on upland springs. Although all riparian habitats would be avoided or buffered during stand treatments, the altering of surrounding habitat may change use patterns of animals sensitive to changes in habitat. In addition, microsite environmental conditions may be slightly influenced by edge effect created by partially opening up adjacent blocks of habitat. This may also change the levels of use and/or species using these microsites.

In 5-10 years, surrounding understory vegetation should recover from harvest activities and use of these sites by wildlife highly sensitive to changes in habitat structure could return to pre-treatment levels. As the surrounding treated habitat becomes more vigorous, microsite environmental conditions should become more sustainable.

As insects and disease continue to affect the habitat within buffer areas, habitat conditions could be degraded. This could possibly influence wildlife use patterns of some of these sites. Changes would be gradual because surrounding vegetation would not all be affected at one time and dead or dying trees would continue to provide some cover. Animals using these habitats would probably experience little effect from these gradual changes in surrounding cover.

The 100-foot buffers around 46 springs (44 springs in Alternative Seven-A) would receive non-commercial restoration treatments to enhance wildlife habitat on a total of about 50 acres. Thinned trees left jackstrawed may provide habitat for spring/riparian-associated species such as small mammals and amphibians. Increased water, increased light, and reduced grazing may lead to increased riparian vegetation, including deciduous trees, which would improve conditions for riparian dependent species.

Noncommercial restoration treatments would occur in two cottonwood stands. Maintenance or expansion of cottonwood would improve conditions for riparian dependent species.

The proposed natural fuels reduction is not expected to consume large woody material, snags, or riparian shrubs in the RHCAs. The likelihood of direct adverse effects to seeps, springs and other wetlands is low since fire intensity is expected to be very low once it reaches the riparian zone. Most riparian vegetation has a positive fire response. Any burned riparian vegetation should regenerate quickly and improve the riparian condition.

Effects on Aspen

Effects of the alternatives on aspen are described in the Silviculture, Fisheries and Wildlife Specialists' Reports and the section titled "Effects on Vegetation Condition." The effects on wildlife are briefly summarized here; the effects of aspen treatments on wildlife are more fully described in each of the species' effects sections.

Direct and Indirect Effects of Alternative One – No Action

Aspen would not be directly affected by this alternative. Mature aspen trees would continue to decline and regeneration would be low or nonexistent. Several of the smaller, older and more decadent aspens sites could disappear from the project area. The variety of wildlife species that use aspen, including red-naped sapsucker, Williamson's sapsucker, downy woodpecker, Swainson's thrush, and various bat species, would likely be adversely affected by its decline.

Cumulative Effects of Alternative One

Since 1990, aspen restoration projects across the Forest, including removal of encroaching conifers, restoration of fire, and protection of regeneration to reduce browsing, are beginning to slow or reverse the decline of this species. Selection of the No Action alternative under this proposal would likely only lead to the disappearance of aspen from the project area.

Effects of the Action Alternatives

Removal of encroaching conifers from aspen may simplify vertical structural diversity of the stand. Ramble (2000) determined that conifers within aspen stands do not contribute to avian species richness or diversity of birds and in most cases speed up successional processes by providing seed sources for new conifers. He recommends removal of all conifers from aspen if the objective is to manage for aspen. Removal could include commercial and non-commercial removal, cut and leave, and/or creation of snags from resident conifers.

Aspen stands would be released from competition with conifer trees, leading to an increase in aspen vigor and numbers. Suckering/regeneration would be stimulated. Protection from grazing by cattle, deer, and elk would increase the number of aspen suckers that are able to grow into mature trees, increasing the size of aspen patches. All aspens stands are likely to benefit from fencing regardless of the kind of fence constructed. Once new regeneration grows sufficiently tall to withstand browsing pressure, fences would be removed or no longer be maintained. The variety of wildlife species that use aspen would likely benefit from expansion of aspen.

Cumulative Effects of the Action Alternatives

Along with past, present and future Forest-wide aspen restoration, these alternatives would benefit aspen and aspen-associated species across the Forest.

Effects on Dead and Defective Tree Habitat (Snags) and Dead and Down Wood Habitat

Direct and Indirect Effects Alternative One – No Action

Based on available data and ocular estimation, past forestry practices and low site productivity has resulted in an overall snag (trees likely to die within five years) density that does not meet Forest Plan standards and corresponds to the 30-50% tolerance level for white-headed woodpecker according to DecAID (Mellen et al. 2003). The project area is well below the 50% tolerance level for snag density for pileated woodpecker. However, information from Gunderson (A.G. Gunderson [USDA Forest Service] pers. comm. 2003) suggests that the drier parts of this project area (south and west exposures, moderate to steeper slopes) would have only provided snag and down wood habitat at the 30% tolerance level historically while the rest of the area may have provided habitat at the 50% to 80% tolerance level historically.

The No Action alternative would maintain existing snag or defective tree habitat in the planning area. If environmental stresses such as drought, high levels of competition in overstocked stands, and/or insects and disease continue at predicted levels, high levels of tree mortality should be expected in the near future (see the section titled "Effects on Dedicated Old Growth and Replacement Old Growth"). This would result in an increase in the availability of dead tree habitat and a greater population density of species associated with or dependent on this habitat.

Over the next 20 years, many large live trees would die and would provide snags in the short-term. Younger trees are not expected to grow into large trees in this timeframe to become large snags. As these snags fall down (most would be down in about 30 years), the area would generally decline in the availability of large snag habitat, and increase in down wood habitat.

After about 30 years, this reduced number and recruitment of large snags would likely cause a decline in population levels of some primary and secondary cavity users. Depending on the rate of decay, down wood habitat would follow this trend with a lag time of 10 to 20 years.

Within 50 years, stand-replacement events are expected to occur (see the section titled "Effects on Dedicated Old Growth and Replacement Old Growth"). A stand-replacing fire would consume most of the existing dead and defective tree habitat and habitat that supports many forest species would be drastically altered. Newly created fire-killed snags would provide abundant habitat for a variety of wildlife (Smith 2000). Cavity excavators would increase during the first few years with other cavity users following a few years later.

This benefit would be short-term, as fire created snags fall and are not replaced (Martin and Finch 1995). Monitoring of recent large-scale wildfires on the Emigrant Creek Ranger District indicates that residency time (time snags remain standing) of most fire-killed snags is 10 to 12 years. About 70 - 90% of the fire-killed snags observed have broken off or have fallen over. Some snags would remain up to 30 years. Populations of cavity excavators are still predicted to be high but would decline over time.

Within the foreseeable future, stand-replacing fire or insect kill would create areas of increased snag density for up to 30 years. After snags fell, large snag habitat would not recover for 120 or more years as trees grow into larger size classes.

Cumulative Effects of Alternative One – No Action

The current low level of snags in the project area is due in part to low site-potential as well as past forestry practices. The No Action alternative would not contribute to additional cumulative effects on snags, down wood, or MIS species, though No Action would lead to an alternating pattern of high snag densities followed by low snag densities until forests recover from stand-replacing events. MIS populations dependent on snags would likely follow the same pattern.

Direct and Indirect Effects Common to All Action Alternatives

Silvicultural Treatments

To maintain future options and increase the probability of maintaining viable populations of PCE, all snags would be retained in harvest units and the area would be managed with the goal of providing snags at the Forest Plan standard. These alternatives attempt to follow RFA # 2 by retaining as many snags as possible.

Sufficient live green replacement trees of varying vigor and age class would be retained to meet forest green tree retention guidelines. On average, the number of green replacement trees retained in harvested areas would be about 2 ½ times the number required by the standard (about 45 trees retained versus 18 required); in some areas to be harvested, almost four times the required number of green tree replacements would be retained.

Under normal conditions, some snags could be cut as management activities (harvest, burning, hazard tree removal, and permitted firewood cutting) occur. Snags could be felled during harvest and post-harvest activities if they pose a hazard to operations or public safety. In Alternatives Four, Seven and Seven-A, about 16,000 acres of commercial harvest would occur, providing more potential for the felling of snags than in Alternatives Two and Five (which commercially harvest about 14,000, and 10,000 acres, respectively). Felling snags for safety could potentially reduce snag densities below current levels, but snag felling in these alternatives would result in a minor increase in down wood due to a mitigation measure that requires that cut snags be left to provide down wood. Snags would not likely be felled due to silvicultural practices in Alternatives Three and Six, since no commercial harvest would occur. Snags and down wood could be removed for firewood in all action alternatives, potentially reducing snag densities and down wood levels. All action alternatives would retain green replacement trees above Forest Plan standards to provide for management of future snag levels at or above Forest Plan standards. The proposed level of green tree replacements in all action alternatives would allow for management of snags and down wood at the 50% to 80% tolerance level or higher for white-headed woodpecker and closer to the 50% tolerance level for pileated woodpecker (Mellen et al. 2003).

Loss of snags (through hazard tree removal and firewood cutting) could indirectly affect primary cavity excavator species by removing some snags that may be used for nesting, courtship, or foraging. The overall change in habitat availability and primary cavity excavator populations should be slight because the level of probable snag reduction is expected to be low. Most Malheur National Forest MIS woodpeckers are moderately adaptive and not overly vulnerable to habitat manipulation (Thomas et al. 1976) and should be able to adjust to minor changes in the availability of snags and changes to their habitats. In the short term, the project area should continue to provide habitat at the 30-50% tolerance level for white-headed woodpecker. The project area would remain below the 50% tolerance level for snag density for pileated woodpecker (Mellen et al. 2003).

Minor changes in the availability of dead and defective tree habitat from existing levels to post-treatment/managed levels would have little affect on secondary cavity excavators and cavity dwellers. Species such as the northern flying squirrel (*Glaucomys sabrinus)*, chickadee (*Tamiasciurus hudsonicus*), pygmy nuthatch (*Sitta pygmaea*), flammulated owl (*Otus flammeolus*), mountain bluebird (*Sialia currucoide*s), and many other species may be affected by changes in snag availability, but little effect is expected.

Fuels Treatments

Prescribed fire can alter or remove vertical and horizontal stand structure including snags and down wood (Tiedemann et al. 2000). Studies by Hardy and Reinhardt (1998), document loss of existing snags during prescribed burning and recruitment of new snags through fire-caused mortality. The level of loss and replacement is dependent on fire intensity, time of year, local weather conditions, and fuel load.

While prescribed burning is generally of low intensity, it often contributes to a reduction in the availability of existing down wood (both hard and soft logs) and snags and may cause localized single or clumped tree mortality.

Some large trees may be killed by prescribed burning regardless of the timing of the underburn or other conditions. Tree mortality of 21" dbh or larger trees is not expected to be over 5% (Burn objectives, Fuels Specialist Report), which would cause minimal negative effects to stand structure. Tree mortality at or below 5% could contribute up to one snag for every two acres in many stands within five years after treatment. This induced mortality could help to offset snags lost during harvest and post-harvest burning. More burning would occur in Alternatives Two, Three, Four and Seven than in the other action alternatives, so more snags would be created in these alternatives than in the remaining alternatives.

Many soft snags and class 3 logs could be partially or completely consumed during prescribed burning (Block and Finch 1997). This decrease may be alleviated in subsequent years as fire-killed trees die and snags fall. While fire does not provide down wood similar to that burned (lacks decay in sapwood) it provides hiding cover and thermal cover. As the log decays over time, it would provide sites for feeding and reproduction. Post-treatment monitoring of snag densities would be done in the project area to determine the need for snag/down wood creation as described in the Mitigation Measures (Chapter 2) and for future treatments to recruit snags or down wood.

Many species tend to have no adverse response to burning or do not tend to avoid burned areas (Smith 2000). Miller, Rose and Svejcar (1998) found that prescribed fire does not affect the abundance of birds using burned areas, but burning did alter species composition. Some species, including black-backed and Lewis' woodpeckers may increase their use of areas after burning. This influx is a response to increased forage and nesting opportunities created by fire killed or stressed trees and changes in accumulations of ground litter and ladder fuels, senescent shrubs and dense regeneration.

Other Proposed Activities

See the section titled "Effects of Roads on Wildlife and Habitat" for a discussion of how road activities affect snag and down wood levels. Weed treatment would have no effect on snags and down wood. Snags and down wood would be created through spring, aspen, and cottonwood restoration, as well as in ROG areas. It's predicted that most of these snags would be less than 21" dbh because of the lack of live 21" dbh trees in these areas. Though creation of snags smaller than 21" would not move the area toward Forest Plan standards, snags of this size would benefit species such as hairy woodpecker by making more snags available for foraging and nesting (see discussion on hairy woodpecker in the section titled "Effects on Indicators of Dead and Defective Tree Habitat"). Some 21" dbh or larger snags would be created in the project area, helping to move some areas towards Forest Plan standards. Down wood would likely meet Forest Plan standards after restoration treatments in most areas, benefiting woodpeckers and other down wood-related species. Some snags may be created through juniper reduction (and subsequent burning); these snags would generally be smaller diameter juniper.

Cumulative Effects Common to All Alternatives

The application of the RFA #2 should result in the retention of dead and defective tree and down wood habitat at higher levels than those retained prior to this Forest Plan amendment. Overall snag and down wood levels are not expected to change due to the proposed activities. Proposed actions in the alternatives should not contribute to cumulative effects on snags and down wood.

Vegetation management and occasional fires, (natural and prescribed) can improve habitat for certain wildlife, slow the spread of tree diseases, recycle nutrients and stimulate growth of many fire adapted plants. Implementation of stand manipulation and prescribed burning would likely accomplish this and help restore sustainable forest conditions.

Effects on Other Habitats

Elk wallows, animal dens, and other unique or special habitats may be identified during management activities and would be protected through the development of site-specific mitigation measures as needed. Protection of these sites should ensure continued use of these habitat features.

Consistency with Direction and Regulations

All action alternatives would require one or more non-significant, site-specific Forest Plan amendments to be consistent with the Malheur National Forest Land and Resource Management Plan as amended. All action alternatives would require an amendment that would allow Dedicated Old Growth areas to be reconfigured. Alternatives Two, Four, Five, Seven and Seven-A would require two additional amendments. These alternatives are not consistent with the Forest Plan as amended because they would harvest trees within goshawk 30-acre nest core areas. These alternatives would also reduce big game cover, habitat effectiveness index (HEI), and/or components of HEI below Forest Plan standards or below existing conditions that do not meet standards. Other than these exceptions, proposed activities comply with Forest Plan standards for wildlife.

Effects on Recreation

The principle method for analyzing environmental consequences on recreation in the project area is based on the desire or expectation of forest visitors for specific types of experiences and settings. These settings and experience opportunities can be described using the Recreation Opportunity Spectrum (ROS) guidelines. The effects on the recreational resource can be assessed by analyzing the change in the acres of each ROS class that would result under each alternative. A change in ROS class would reflect a change in the available recreation opportunities. Small acre shifts from one opportunity class to another would not individually have much effect on the recreation resources; however, large acre shifts from the non-motorized to the motorized would potentially limit opportunities for solitude and activities associated with unmodified settings. Evaluation of the effects of the alternatives is based on: changes in the ROS; harvest in currently important recreation places, changes in access to dispersed recreation sites, and other activities.

Recreation Opportunity Spectrum (ROS)

The project area is managed as semi-primitive non-motorized, semi-primitive motorized, roaded natural, and roaded modified as stated in the Forest Plan. Recreation opportunities are divided between the motorized (53,676 acres) and non-motorized (9,882 acres) categories. The project area has motorized opportunities from previous timber harvesting activities; however, past Access Management Plans have reduced these roaded opportunities over the last few years.

Under all alternatives, the project area would continue to provide a wide range of recreation opportunities, activities, settings, and experiences; however, the roaded settings clearly dominate. All action alternatives generally result in no change, or a small decrease in roaded settings.

Timber harvest and associated activities could temporarily and permanently change the ROS settings. Road closures could reduce opportunities for roaded recreation and at the same time increase opportunities for solitude. Timber harvest activities could change the visual quality of recreation places in the short term, if activities can be seen or heard by recreationists.

All action alternatives include approximately 36 acres of semi-primitive motorized setting within MA-10 and the Myrtle-Silvies Roadless Area. No activities are proposed within the 36 acres of semi-primitive motorized setting. Since no activities are proposed in this setting there would be no effect. Recreation user experiences would not change within this setting under any of the alternatives.

Direct, Indirect and Cumulative Effects From Alternative One - No Action

Under the No Action Alternative, there would be no planned activities. The roaded modified and roaded natural settings would retain their current attraction for those individuals seeking opportunities.

Direct, Indirect and Cumulative Effects Common to All Action Alternatives

Currently, the remaining unroaded settings are in the semi-primitive non-motorized class. Under all action alternatives there would be no shifts of acres from unroaded to roaded.

The appearance and recreational experience of roaded modified would change due to road closures under the Proposed Action and Alternatives Three, Four, Five, Six, Seven and Seven-A. Users seeking roaded access and a more modified environment would find fewer opportunities available to them as road closure activities take place.

Direct, Indirect and Cumulative Effects From Alternative Two - The Proposed Action

Proposed harvest and vegetation management activities would change the recreation experience in the roaded modified and the roaded natural areas; however, these changes are consistent with Forest Plan direction. Harvest activities and precommercial thinning would change roaded natural settings to roaded modified for 10 to 20 years. Proposed road closures would reduce access for roaded recreational activities. Landscape burning would change the appearance and recreational experience within the semi-primitive non-motorized setting for about five years.

Direct, Indirect and Cumulative Effects From Alternatives Three and Six

Precommercial thinning and landscape-scale prescribed burning would change the recreation experience within the semi-primitive area for five to ten years; however, these changes are consistent with Forest Plan direction. Landscape scale burning would be more natural appearing than the precommercial thinning. No commercial harvest is proposed in these two alternatives, so the recreation experience in roaded modified and roaded natural settings would remain unchanged.

Direct, Indirect and Cumulative Effects From Alternatives Four, Five, Seven, and Seven-A

Harvest and vegetation activities proposed under these alternatives would change the recreational opportunities, appearance and recreational experience the most; however, these changes are consistent with Forest Plan direction. Settings most affected are roaded natural and roaded modified. Precommercial thinning and landscape burning would alter the appearance and recreational experience within the semi-primitive non-motorized setting for five to ten years. Harvest activities and precommercial thinning would change the roaded natural setting to roaded modified for 10 to 20 years. Alternative Five proposes fewer road closures; therefore, it would provide more access for roaded recreational activities.

Table 4-33. Estimated ROS Acres by Alternative.

ROS Setting	Alt. One – No Action	Alt. Two – Proposed Action	Alt. Three	Alt. Four, Seven and Seven-A	Alt. Five	Alt. Six
Semi-Primitive Non-Motorized and Semi-Primitive Motorized	9,928	9,928	9,928	9,928	9,928	9,928
Roaded Natural	26,575	10,630	15,945	9301	14,616	26,575
Roaded Modified	27,065	43,010	37,695	44,339	39,024	27,065
Total Acres	63,568	63,568	63,568	63,568	63,568	63,568

Vegetative manipulation, i.e.. commercial and precommercial thinning activities would change Roaded Natural characteristics to Roaded Modified characteristics for approximately 10 to 20 years.

Impacts on Recreation Places

Roaded modified and roaded natural recreation places are specific areas where a wide range of recreation activities occurs. Roaded access, quality and setting of the environment around recreation places play an important role in the type of recreational activities chosen, as well as the quality of the recreation experience.

Timber harvest and associated activities could temporarily and permanently change the ROS settings within recreation places. Road closures could reduce opportunities for roaded recreation and at the same time increase opportunities for solitude. Timber harvest activities could change the visual quality of recreation places in the short term, if activities can be seen or heard by recreationists. Of these proposed activities, road closures would have the greatest affect on dispersed campsites. There are 37 known dispersed campsites within the project area.

Direct, Indirect and Cumulative Effects From Alternative One - No Action

Under the No Action alternative, there would be no direct or indirect effects on recreation places. However, motorized access to two dispersed campsites would be disallowed due to prior road closures that were either never implemented or breached. The existing characteristics of the remaining 35 recreation places within the watershed would remain the same.

Direct, Indirect and Cumulative Effects Common to All Action Alternatives

To analyze the effects of the seven alternatives, recreation places were assigned one of two categories: freshwater and land-based recreation.

Freshwater-based Recreation

Recreation along the rivers and streams includes fishing, hunting, hiking, and camping. Activities proposed within the roadless area would be apparent to recreationists in the area during implementation and could disrupt their activities. Various activities in the rest of the project area, under all action alternatives, would be apparent to recreationists as they drive to and from the roadless area. Effects would vary by alternative only by the amount and location of the activities.

Land-based Recreation

All action alternatives would have varying effects on the existing conditions of land-based recreation places. The most popular land-based recreational activities are hunting, dispersed camping, viewing scenery, hiking, firewood gathering, driving for pleasure, and snow play. Alternatives Three and Four would have the most affect on roaded access to dispersed campsites, reducing motorized access to seventeen known dispersed campsites. Alternative Two - The Proposed Action would reduce motorized access to eight known dispersed campsites and The Preferred Alternative and Alternatives Six and Seven-A would reduce motorized access to three known dispersed campsites. Under Alternative Five, the effects on dispersed campsites are the same as the no action.

Changes in Recreational Experiences within the Roadless Area

Road closures, pre-commercial thinning, spring restoration, and prescribed burning within the Myrtle-Silvies Roadless Area would change the visual quality and remote character currently found there.

Direct, Indirect and Cumulative Effects From Alternative One - No Action

Freshwater-based Recreation

Under the No Action alternative, there would be no direct effects to the resources. No new road closures would be implemented, no timber harvest would occur; the existing characteristics of the Myrtle-Silvies Roadless Area would be as described below.

Remoteness: The roadless area would continue to provide outstanding opportunities for outdoor recreation. There would be no effect on remoteness.

Solitude: Most of the roadless area would continue to provide moderate opportunities for solitude due to existing topography and vegetative screening.

Primitive Recreation Opportunities: Opportunities for achieving a primitive experience are limited by the roadless area's shape and size in relation to existing access outside the roadless boundary. This alternative would not affect existing boundaries or opportunities for experiencing a challenging, natural appearing environment within the roadless area.

Natural Integrity: Ecological processes in the roadless area have been slightly altered by grazing, recreational use, and fire suppression. This alternative would have no effect on the natural integrity of the roadless area.

Apparent Naturalness: Evidence of human use and activities are substantially unnoticeable on most of the roadless landscape. Human impacts scattered throughout the roadless area include cattle grazing, fences, hiking trails, and old jeep trails. The most visible impacts are old road tracks that have not healed over completely through portions of the roadless area. These impacts would remain unchanged.

Land Based Recreation

Remoteness, Solitude, and Primitive Recreation Opportunities: Under the No Action alternative, there would be no direct, indirect, or cumulative effects to the resources. No activities would occur; the existing characteristics of the area would remain as they presently exist.

Direct, Indirect and Cumulative Effects Common to All Action Alternatives

Freshwater-based Recreation

Remoteness, Solitude, and Primitive Recreation Opportunities: No commercial harvest activities would occur within the roadless area. Commercial harvest of stands adjacent to the roadless area, as well as spring restoration, precommercial thinning and landscape burning within the roadless area may result in direct and indirect short-term effects on remoteness within the area. Potential effects include increased sights and sounds of commercial harvest outside of the roadless area, people, and equipment adjacent to and within the roadless area. These effects would be of short duration during implementation.

Natural Integrity: Ecological processes in the roadless area have been slightly altered by grazing, recreational use, and fire suppression. Landscape scale burning, precommercial thinning and riparian habitat (spring) restoration would begin to restore the natural ecological processes; however, precommercial thinning and spring restoration would appear unnatural to some users.

Apparent Naturalness: The landscape burning, pre-commercial thinning and riparian habitat (spring) restoration proposed by these alternatives would have effects on the apparent naturalness of the roadless area. Long-term effects would be a more natural appearing landscape as fire is reintroduced to the area.

Land Based Recreation

Remoteness, Solitude, and Primitive Recreation Opportunities: The increased sights and sounds of people and equipment during vegetation management activities would result in direct, short-term effects on the qualities of remoteness and solitude.

Consistency with Direction and Regulations

All action alternatives would be consistent with applicable Forest Plan recreation standards (standards 6-12, FP IV-25).

Effects on Cultural Resources

The three categories of heritage resources, prehistoric sites, historic sites and traditional cultural properties, could be affected both negatively and positively by the proposed alternatives. For example, prehistoric sites within the Silvies Canyon planning area are mostly lithic scatter sites, that is, sites containing flaked stone tools, associated debitage, and groundstone tools. The integrity of these sites would generally not be adversely impacted by precommercial thinning, or by low-intensity, short-duration prescribed burning. These sites may be directly adversely affected, however, by ground disturbing activities involving machinery such as feller-bunchers, grapplers, and skidders or by catastrophic fire events. Machinery crushes artifacts and disturbs their spatial relationships, thus compromising the site's ability to yield valid scientific data. Very hot, or long duration fires can actually melt or disfigure artifacts to the point that they become unrecognizable, or no longer can yield useful information. Several of the methods used for dating archaeological materials or settings rely on relatively stable environmental conditions, and high temperatures can effectively “reset” those chronological indicators. Historic sites in this area often involve wooden structures such as old cabins, fence lines and corrals, and could be adversely affected by fire, heavy equipment operations, or tree falling. Traditional cultural properties may be areas used in the past and the present for the gathering of plants for food, medicine, or other purposes. Ground disturbance from machinery and fires occurring before plants are dormant could severely negatively impact these sites.

The possible positive effects that could be realized from the proposed activities mainly involve a lowering of potential direct and indirect effects from catastrophic fire, through the removal of over-abundant fuels, soil stabilization, and the planting or restoration of hardwoods and forage plants. Fires that burn very hot or of long duration could destroy artifacts directly, and subsequent soil destabilization and erosion could exacerbate the situation. Therefore, the removal of these overabundant fuels may prove key to the continued existence of many sites.

Direct, Indirect and Cumulative Effects From Alternative One - No Action

This alternative would be expected to have no direct effects on heritage sites within the project area, since none of the actions proposed in the other alternatives would take place. However, in terms of indirect effects, this is probably the least attractive of the proposed alternatives from a heritage perspective. This is because under Alternative One, no fuel treatments would take place, thus exacerbating an already highly volatile fuels situation. As recent events have demonstrated, areas with high fuel loading like much of the Silvies Canyon planning area are highly susceptible to catastrophic fires, which can cause soil destabilization and severe erosion. Erosion could heavily damage or completely destroy archaeological sites. Activities related to wildland fire suppression efforts, such as digging fire line by hand or machine, could also damage sites. Additionally, under Alternative One, no riparian restoration would occur. Riparian restoration is very much supported by this heritage program.

Direct and Indirect Effects Common to All Action Alternatives

In terms of archaeological site stabilization and protection, alternatives that propose to treat the current fuel loads in the project area through thinning and prescribed burning are preferable to the No Action alternative.

Restoration of Riparian (Spring) Habitat

Provided the district archaeologist is contacted prior to the implementation of the proposed activities and appropriate mitigation occurs, the activities proposed in this project would have no direct effects on heritage properties. In general, the falling of small trees is not detrimental to sites, so long as machine piling is not allowed, or materials are not dragged through the site. In some cases, such as when sites located in riparian areas are subjected to heavy trampling by grazing animals, trees that are fallen and left laying act to mitigate, to some degree, the trampling. Historic dendroglyph (writing and pictures carved into the bark of trees) sites are often located within aspen stands. Many of the older sites are disappearing, since the trees bearing the dendroglyphs are becoming old, and the carvings are either becoming illegible or the trees are dying and the bark is falling off of them. In such cases we may consider the careful recordation of the site, including sketching and photographing the glyphs, to be mitigation. In cases where the glyphs are still readable and the host trees still vigorous, a site can still be treated with no negative effect provided that care is taken so that the felled conifers do not scrape against the aspens.

The proposed fencing around five springs should have no direct effect on heritage sites, since ground disturbance is minimal. There can be the indirect effect of trampling damage from livestock once a fence is built, since livestock often walk parallel to a fence line, adjacent to the fence. If the fence is constructed through a site, or in such as manner as it directs the livestock to walk through a site, severe damage can occur to that site through trampling. Again, the district archaeologist should be made aware of fence-building activities prior to implementation, so that proper monitoring and mitigation can be accomplished. Four springs are proposed for spring improvements, which include the installation of spring boxes, lines and troughs. Since cultural sites are often located at or near springs, a potential for adverse effect exists when spring development is undertaken. However, through careful survey, testing, planning and monitoring during implementation, these effects can be mitigated. It may be more desirable to impact a site lightly during development than to allow the site to suffer continued damage from animals coming to the spring to drink.

Aspen and Cottonwood Restoration
Possible adverse direct effects from aspen restoration activities could occur if thinning were to take place in a dendroglyph site in an aspen grove if, during the course of conifer thinning, conifers fell against aspens carrying dendroglyphs. Also, motorized vehicles, if used during thinning activities, could adversely affect lithic sites. No Effect is expected so long as heritage resources design features are followed.

Noxious Weed Treatments
Treatment to reduce or eliminate noxious weeds within the Silvies Canyon project area would have the positive effect of reducing the competition of invasive plants against native species, many of which have traditional and ongoing cultural importance to Native American groups.

Road Closures and Decommissioning
Direct deleterious effects to heritage properties could occur during road closure and decommissioning if heavy equipment is allowed to operate within sites. Following the heritage resources design features will prevent this from happening.

Juniper Reduction
Operating mechanized equipment over heritage sites located within juniper reduction areas could directly impact those sites. Following the heritage resources design features will prevent this from happening.

Road Maintenance and Temporary Access Roads
In the past some roads were built either adjacent to or through sensitive heritage sites. Additional ground disturbing activities in these locations, as from maintenance, could be detrimental. The building of temporary roads through heritage sites would seriously compromise the integrity of those sites, and building roads immediately adjacent to sites could cause serious harm if

precautions aren't taken. Following the heritage resources design features will ensure no effect to heritage resources.

Post and Pole
Operation of mechanized vehicles through heritage sites would damage them. Following the design features will ensure no effect to heritage resources.

Precommercial Thinning and Associated Fuels Treatment
In general, chainsaw falling and hand piling of small trees in sites would not negatively impact those sites. The operation of grapple piling machines through sites would cause direct damage to their integrity. Burning of large piles created by machines could also damage sites. Following the design features will ensure no effect to heritage resources.

Landscape Scale Fuels Treatment
Prescribed burning normally will not compromise the integrity of lithic scatter sites, providing burn temperatures are kept low and exposure times short. Many historic structures are susceptible to damage from fire, however, as are some prehistoric features, and at times, traditional cultural properties. Following the design features will ensure no effect to heritage resources.

Direct and Indirect Effects Common To Alternatives Two, Four, Five, Seven and Seven-A
Operating mechanized equipment over heritage sites located within commercial harvest units could directly impact those sites. Further, soil compaction and the ensuing potential for erosion could cause additional deterioration of site integrity. The burning of large slash piles located over heritage sites could directly and negatively affect the integrity of those sites. Following the design features will ensure no effect to heritage resources.

Cumulative Effects From the Action Alternatives
Of primary importance in the consideration of cumulative effects on heritage resources is that archaeological sites are not renewable. Evidence destroyed or altered, without prior scientific recordation, is lost forever. Any significant disturbance to sites will effect, and often skew, data. Any activity that takes place over or near a site could potentially affect it. Continued activities in that same area could have deleterious effects to the integrity of that site, and could reduce or eliminate the scientific value of that site, unless design criteria are followed.

All the action alternatives propose treatments that would ultimately reduce fuel loading, which is desirable for the continued integrity and protection of heritage properties. All of the activities specific to the proposed action alternatives, such as commercial harvest, commercial and precommercial thinning, and controlled burning, are expected to have no effect on heritage resources, given adherence to proposed cultural resources design criteria.

Summary
Provided the specialists involved with the implementation of the activities proposed in all the alternatives coordinate with the archaeologist prior to implementation and adhere to the design features specified, it is expected that there will be no adverse effects to heritage resources within the project area.

Consistency with Direction and Regulations

National Historic Preservation Act

Intensive survey of over 50,000 acres has resulted in the discovery and recordation of 255 heritage sites, of which 176 are eligible for inclusion to the National Register of Historic Places, 14 are considered ineligible, and the eligibility of 22 remains undetermined, awaiting further investigation. All sites that have been evaluated as eligible or potentially eligible would be strictly avoided during ground-disturbing activity. Log landings or other ground-disturbing activities would not be permitted in the vicinity of eligible historic properties.

Prior to project implementation, State Historic Preservation Office consultation will be completed under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), The Advisory Council on Historic Preservation, and the Oregon State Historic Preservation Officer regarding Cultural Resource Management on National Forests in the State of Oregon, dated March 10, 1995, pursuant to the stipulated Forest Archeologist review dated November 15, 1996.

Tribal Interests

The "inherently sovereign" status of federally recognized Indian tribes requires that land managing agencies consult with tribes on a government-to-government basis over planned actions that may affect tribal interests. Some examples of tribal interests include: traditional cultural practices, ethnohabitats, sacred sites, certain plant and animal resources, and socio-economic opportunities. The Malheur National Forest Land and Resource Management Plan also directs the Forest to consult with tribes about the effects of projects planned within their areas of historic interest (Malheur LRMP 1990).

Consultation with the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Burns Paiute Tribe occurred at early stages of the planning process. To date, tribal consultation efforts consist of scoping letters mailed to each potentially affected tribal council, e-mails sent to tribal resource specialists, and face-to-face meetings with resource specialists. The Burns Paiute tribe expressed a general concern regarding access management within the project area.

Effects on Scenery Management

Portions of the watershed within Management Area 14 (Viewshed Corridors) encompass those middleground areas that are seen, or potentially seen from Highway 395. The management goal for Management Area 14 is to manage corridor viewsheds with primary consideration given to their scenic quality and the growth of large diameter trees. Current Forest Plan direction for the portions of the watershed within MA 14 is to manage middlegrounds as slightly altered (partial retention visual quality objective) in Sensitivity Level 1 corridors. Under the new Scenery Management System (SMS), manage to a moderate Scenic Integrity Objective (SIO) in the middleground. Management activities may be evident, but subordinate to the characteristic landscape (FSM 2382.21(3)).

Direct, Indirect and Cumulative Effects from Alternative One - No Action

Because no additional activities would occur, there would be no change to the project area's scenic character. The visual objective of managing to a moderate scenic integrity objective in the middleground would be met. In the long term, if mortality increases, there could be a gradual change in color and texture. The green background could gradually change to a gray color until the dead trees fall down and are replaced by new trees. If a stand replacement fire were to occur, there would be a dramatic change in color and texture.

Direct and Indirect Effects from the Proposed Action

Under the Proposed Action there would be 109 acres of commercial thinning, 228 acres of precommercial thinning and 270 acres of prescribed burning within MA 14.

Direct and Indirect Effects from Alternative Three

Under Alternative Three there would be 253 acres of precommercial thinning and 270 acres of prescribed burning within MA 14.

Direct and Indirect Effects from Alternatives Four, Seven and Seven-A

Under Alternatives Four, Seven and Seven-A there would be 246 acres of commercial thinning, 92 acres of precommercial thinning and 270 acres of prescribed burning within MA 14.

Direct and Indirect Effects from Alternative Five

Under Alternative Five there would be 26 acres of commercial thinning, 229 acres of precommercial thinning and 219 acres of prescribed burning within MA 14.

Direct and Indirect Effects from Alternative Six

Under Alternative Six there would be 250 acres of precommercial thinning and 270 acres of prescribed burning within MA 14.

Direct, Indirect, and Cumulative Effects From the Action Alternatives

There would be no affect on MA 14 (Visual Corridors) from commercial or precommercial thinning because no openings would be created. The visual objective of managing to a moderate scenic integrity objective in the middleground would be met because harvest activities would not substantially alter the tree canopy densities. Travelers on Highway 395 should not notice any changes to the landscape but may see smoke during prescribed burning operations. The scenery would remain relatively unchanged for a long period of time because mortality is not likely to occur to a level that would affect the scenic characteristics of the landscape. The likelihood for any dramatic changes from a wildfire would also be greatly reduced.

The action alternatives vary in the length of time each would affect the scenic characteristics of the landscape; that is, how long the scenic characteristics could be sustained. Alternatives Four, Seven, Seven-A, Two and Five would have the longest period of time in which the scenic characteristics of the landscape would remain relatively unchanged, because they treat vegetation at the highest levels. Alternatives Ten and Three would have the shortest period of time in which the scenic characteristics of the landscape would remain relatively unchanged because they treat vegetation conditions using less intensive and extensive methods.

Prescribed burning would have a short-term affect on visual quality. Travelers on Highway 395 would be able to see smoke columns. Prescribed fire should be of low intensity with minimal scorch and should not be noticeable or would appear natural to most individuals from Highway 395.

Consistency with Direction and Regulations

Visual Quality Objectives (VQOs) are minimum objectives and can be managed to a higher level where feasible. The proposed treatments identified in all the action alternatives would meet Forest Plan standards.

Summary of Cumulative Effects

Cumulative effects of past, present, and reasonably foreseeable future actions for individual resources were discussed under each resource section in FEIS Chapter 4. This analysis will assume the selection of Alternative Seven, the Preferred Alternative. The following discussion focuses on the cumulative effects of the proposed Silvies Canyon Watershed Restoration Project in conjunction with ongoing and recently finalized projects, programs and uses in the Silvies Canyon Watershed.

During the past 100 years timber harvesting, livestock grazing, noxious weeds, stream dewatering, fire suppression, road construction on erosive soils, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes in overland and stream flows affecting riparian and aquatic habitat. These changes are having negative affects on water quality, and aquatic species. Fire exclusion in the 20th century resulted in dense understories that may be detrimentally affecting late season flow in streams. These factors have also changed the composition and structure of forested stands; in general, stands are denser and compositions include more late-seral species than would have been found historically. There is less acreage of old structure forest, and remnant late- and old-structure stands contain more understory than historically. Areas that were historically nonforested, such as riparian areas, shrublands and herblands, are now experiencing encroachment by juniper and other conifers; the total area of forested land within the project area is higher than the historic condition. While wildfire, insects and diseases have always been part of the watershed's ecosystem, the last 100 years of management have changed forest conditions to the point where those factors can combine to create unnaturally high risk of stand-replacing events.

Current and ongoing uses in and around the project area include permitted livestock grazing, recreation (including hunting, fishing, gathering of forest products, hiking, on- and off-road vehicle use, and camping), and firewood gathering. Recently completed environmental decisions approved closure and/or decommissioning of 63 miles of open road and manual treatment of 65 noxious weed sites. Foreseeable future actions include ongoing road maintenance, road closures, removals and/or replacements of culverts, increasing recreation levels, and additional vegetation and fuels treatments 25-30 years after the completion of this project. In the event of stand-replacing wildfire or insect/disease outbreak, it is likely that restoration projects, including timber salvage and reforestation, would occur. Risk of stand-replacing events should be reduced following project implementation.

Other Environmental Considerations

Possible Conflicts with the Plans and Policies of Others

The assessment of environmental effects of actions proposed in the alternatives developed for the Silvies Canyon Watershed Restoration Project assumes compliance with State and Federal Laws, National Policies, and Regional Standards and Guidelines. The alternatives comply with the Malheur National Forest Land and Resource Management Plan except for the following:

- The Preferred Alternative, the Proposed Action, Alternative Four, Five, and Seven-A would require a non-significant, site-specific Forest plan amendment for reducing big game cover, habitat effectiveness index (HEI), and components of HEI below the Forest Plan standards or below existing conditions that do not meet standards.
- The Preferred Alternative, the Proposed Action, Alternative Four, Five, and Seven-A would require a non-significant, site-specific Forest plan amendment to allow harvest within the 30-acre nest habitat surrounding goshawk nest trees.
- Alternative Four would require a Forest Plan amendment for cutting trees greater than 21 inches dbh within aspen stands.
- Alternatives Three and Six would require a non-significant, site-specific Forest Plan amendment for precommercial thinning trees greater than 7" dbh. This activity does not meet forest-wide standards for utilization (Standard #97).
- All Action Alternatives would require a non-significant, site-specific Forest Plan amendment for reconfiguration of DOG areas.

Unforeseen weather conditions during fuels reduction activities could result in conflicts with Department of Environmental Quality air quality standards. This would be a short-term effect.

All alternatives have been designed to meet forest worker state safety codes in accordance with the Oregon Occupational Safety and Health Code, Division 6, Forest Activities, effective January 1, 1992. Local safety hazards would be dealt with on a case-by-case basis.

The Relationship between Short-Term and Long-Term Productivity

Long-term productivity/sustainability is the inherent potential of the land (ecosystem) to produce a certain level of vegetation and associated processes, such as wildlife, water, and clean air indefinitely into the future. Fixed components influencing productivity include: local climate, topographic features, and soil type. Components affecting productivity that can be changed include: soil volume, soil porosity, soil water availability, soil chemistry, and soil biology. There is potential for direct, indirect, and cumulative effects on soil from harvest related activities. Losses of long-term productivity are expected to be mitigated by proposed measures, particularly those calling for restrictions of mechanical equipment on soils identified as having a high compaction rating, designated skid trails and landings, retention of large woody debris and green tree retention, protection of all streams and cultural resources. Effects vary by alternative with the amount of management activities and were addressed throughout Chapter 4.

Another component of sustainability related to potential long-term productivity is achievement of the potential productivity. The achievement of the potential cannot only be influenced by logging, but also by natural forces such as fire and insects. It is possible to maintain the potential productivity of an area by minimizing or avoiding activities, and then lose the attainment of the productive potential for water production, big game habitat, or visual resources through large-scale insect activity or stand replacement fire.

Proposals in this project strive to not only maintain long-term productivity but to assist in making sure conditions are maintained that are conducive to enabling the ecosystem to achieve a high level of the potential.

Proposed activities would create stand conditions that are better able to withstand catastrophic levels of insect or fire activity. This would be accomplished by activities that would modify certain areas towards a condition characterized as having fewer trees per acre, a greater percentage of ponderosa pine versus fir species, less of a multi-layered condition, lower fuel loadings, and larger diameter trees.

Irreversible and Irretrievable Commitments of Resources

An irretrievable commitment of a resource is defined as the opportunity foregone by a particular choice of resource use. A number of these irretrievable commitments are made in the alternatives.

Decommissioning roads would be considered an irretrievable commitment. Terminating the roads function by blocking the entrance, re-vegetating, removing fills and culverts, and pulling back unstable road shoulders precludes its use as a road.

Alternatives proposing harvest would also involve surfacing portions of roads with crushed rock to facilitate log transport. This rock would be produced at existing sites within the watershed. Although the overall supply of rock suitable for road surfacing in the watershed would not be significantly depleted by any of the commercial harvest proposing alternatives, the use of road rock is considered to be an irretrievable commitment of resources. These resources are retrievable to the extent that rock placed on a road can be recovered and reused on another road. The commercial harvest proposing alternatives would commit rock for use in road reconstruction and maintenance.

Irreversible commitments are decisions affecting non-renewable resources such as soils, wetlands, unroaded areas, and cultural resources. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or because the resource has been destroyed or removed.

Loss of cultural resource sites resulting from accidental damage or vandalism would be an irreversible commitment of resources. Extensive cultural resource field surveys and deferral of harvest in all areas where significant cultural resources were found provide reasonable assurance that there would be no irreversible loss of cultural resources.

Probable Adverse Impacts That Cannot Be Avoided

Selection of any of the Action Alternatives could result in some unavoidable environmental effects. These effects (following) should not be significant and should not affect long-term productivity:

- Short-term disturbance and/or displacement of fish and wildlife may occur.
- Decommissioning roads within RHCAs would temporarily increase fine sediment delivery to streams. This may displace fish, reduce reproduction success, and cause a reduction in pool and interstitial habitat in stream sections where proposed decommissioned roads are located. However, use of BMPs would reduce impacts to streams.
- Sediment production would exceed natural rates as long as timber is harvested and other soil and vegetation disturbing activities take place. Sediment would be produced by surface erosion and channel erosion. Best Management Practices and mitigation measures identified in Chapter 2 are designed to minimize negative impacts.
- Due to whole tree yarding operations, where 80% of created slash would be brought to the landings, estimated landing size would generally be 0.5 to 0.75 acre in size. Soil compaction and sterilization is expected, along with the potential formation of hydrophobic soil layers due to the intensity and duration of burning large slash piles. Mitigation measures identified in Chapter 2 are designed to mitigate negative impacts.
- Fire hazard and resistance to control would increase in the short-term after precommercial thinning as the result of ground level accumulations of thinning slash. Fire ignition risk would also increase as a result of more people using the areas during and after management activities. Wildfire can cause localized loss of soil, wildlife habitat, and vegetation, and further increases the potential for increased peak stream flows.
- Air quality may be reduced on a temporary, recurring basis from smoke emissions during prescribed burning of natural fuels and activity created slash. Increased traffic from logging trucks and other equipment could also reduce air quality on a temporary, recurring basis from increased exhaust emissions or dust. These would be primarily localized effects, and would not significantly affect the air sheds around the Burns/Hines communities, or the Strawberry Mountain Wilderness Area, but could affect Forest visitors.
- Noise levels may be increased in the watershed and areas near the primary haul routes. Forest visitors could be affected by increased traffic noise and equipment in the areas of operation, which would vary by harvest unit or project location.
- The natural landscape may appear altered following timber harvest, post-harvest stand treatments, fuel treatment activities, and implementation of various resource improvement projects.

Selection of the No Action Alternative could also result in some unavoidable environmental effects. These effects (following) should not be significant and should not affect long-term productivity:

- Stands of trees within and adjacent to the watershed could become more susceptible to increased infestation by insects and disease, resulting in accelerated mortality rates.

Increased numbers of dead trees would increase fuel loads within the watershed and increase the chance of large stand replacement wildfire.

- The twelve roads identified as contributing fine sediment directly into stream channels would remain open and continue to degrade aquatic habitat.

Threatened and Endangered Species and Critical Habitat

There would be no adverse impacts to any federally listed threatened or endangered species or critical habitat as a result of this project. The discussion of the effects of the alternatives on threatened, endangered, or sensitive species is presented in the section titled "Effects on Proposed, Endangered, Threatened and Sensitive Species" in Chapter 4 and the Biological Evaluation/Assessment found in Appendix C.

Natural or Depletable Resource Requirements and Conservation Potential

All alternatives considered in detail are designed to conform to applicable laws and regulations pertaining to natural or depletable resources, including minerals and energy resources. Regulations of mineral and energy activities on the National Forest, under the U.S. Mining Laws Act of 1872 and the Mineral Leasing Act of 1920, are shared with the Bureau of Land Management (BLM). The demand for access to National Forest lands for the purpose of mineral and energy exploration and development is expected to increase over time.

The Action Alternatives propose varying levels and types of road closures that would decrease opportunities for access to the National Forest within the Silvies Canyon watershed. This decreased access may result in decreased activity with regard to both known and potential mineral or energy resource occurrences. The actual potential for decreased mineral or energy resource activity in the Silvies Canyon watershed is not known, nor can an accurate estimate be made.

Urban Quality, Historic and Cultural Resources

The Silvies Canyon watershed contains no urban areas. Therefore, the only applicable concern under this topic is with historical and cultural resources. The goal of the Forest Service's Cultural Resource Management Program is to preserve significant cultural resources in their field setting and ensure they remain available in the future for research, social/cultural purposes, recreation, and education. The direct, indirect, and cumulative effects of the alternatives on cultural resources have been evaluated. The results of this evaluation are the determination that there are adequate standards, guidelines and procedures to protect cultural resources and to meet the goals of the Cultural Resource Management Program. Effects to cultural resource are disclosed in the section titled "Effects on Cultural Resources" on page 178.

Consumers, Civil Rights, Minorities and Women

There are no known direct or adverse effects on women, minority groups, or civil rights of individuals or groups. Action alternatives are governed by sale or service contracts, which contain non-discrimination requirements to prevent adverse impacts to these groups. The No Action Alternative, and Alternatives Three and Six may have some short-term adverse impacts on the local community by not contributing to the 25 percent fund.

Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income populations. In this assessment, elderly people, especially those on low-incomes that are fixed, were also identified with potential to be impacted by various alternatives. There is no quantifiable information on how much use the area receives from these populations other than the information shared by the Burns Paiute Tribe. None of the alternatives would prevent continuation of these traditional practices. The anticipated direct and indirect social effects to these populations are primarily due to change of motorized access from road closures and decommissionings proposed in the action alternatives. This change from road to non-road access would have its greatest effect on the young, elderly, and disabled. Those with other forms of non-motorized transportation – horses, off-highway vehicles, mountain bicycles, et cetera – would be less affected than those without these opportunities. The action alternatives change access on approximately 37 miles of road (Alternative 5), 87 miles of road (Alternatives 6, 7 & 7a), 143 miles of road (Alternative 2), and 160 miles of road (Alternatives 3 & 4). Because there are still areas in and next to the project area where road access is not changed and because tribal members and others can request a permit to use a closed road, the social effects are not anticipated to be disproportionately high or adverse to these populations.

Prime Farmland, Rangeland and Forestland

The analysis area does not contain any prime farmland or rangeland. Prime forestland does not apply to lands within the National Forest system. In all alternatives, National Forest lands would be managed with sensitivity to the effects on adjacent lands. Therefore, actions taken under any of the alternatives will have no known impact on farmland, rangeland, or forestland inside or outside the National Forest.

Energy Requirements and Conservation Potential

There are no unusual energy requirements for implementing any of the alternatives. The energy consumption associated with the alternatives, as well as the differences between the alternatives, is insignificant.

Wetlands and Floodplains

Executive Orders 11988 and 11190 require protection of wetlands and floodplains. Wetlands in the Silvies Canyon watershed are generally stream channel-associated seeps and springs. Riparian Habitat Conservation Areas as established by INFISH, protect these areas. No adverse environmental effects on floodplains and wetlands are anticipated with the implementation of any proposed alternatives.

Chapter 5

Glossary

Access Management Plan: The development of travel management policies that consider the development, maintenance, and protection of all forest resources.

Affected Environment: The biological, social, economic, and physical aspects of the environment that will or may be changed by proposed actions.

Air Quality: The composition of air with respect to quantities of pollutants therein, used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

Allotment (grazing): A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands administered by the Forest Service.

Alternative: In an EIS, one of a number of possible options for responding to the purpose and need for action.

Ambient air: Any unconfined portion of the atmosphere: open air and surrounding air. Often used interchangeably with "outdoor air."

Analysis Area: A delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives; and (2) economic and social impacts.

Animal Unit Month (AUM): The amount of feed or forage required by one animal unit grazing on a pasture for one month.

Annual (plant): A plant whose life cycle is completed in one year or season.

Appropriated Funds: Money made available by Congress for the various activities of the National Forest System and other Federal agencies.

Arterial Road: A road that provides service to large land areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. It is usually developed and operated for long-term land and resource management purposes and constant service.

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Artifact: A sample object (such as a tool or ornament) showing early human workmanship or modifications.

Assessment: The collection, integration, examination, and evaluation of information and values.

Bankfull width: The width of a stream channel measured between the tops of the most prominent banks on either side of the stream. Also refers to the width of the stream at the normal flood flow.

Basal Area: In forests, the cross-sectional area of a tree trunk measured at breast height (4.5 feet), usually expressed in square feet per acre.

Bedload: Sediment moving on or near a streambed.

Best Management Practices (BMP): Practices designed to prevent or reduce water pollution.

Big Game: Those species of large mammals normally managed as a sport hunting resource.

Big Game Winter Range: The area available to and used by big game through the winter season.

Biological Diversity: (1) The distribution and abundance of plant and animal communities. (2) The variety of life forms and processes, including a complexity of species, communities, gene pools, and ecological functions.

Biophysical Environment: The biophysical environment is composed of its geologic, geoclimatic, climatic, potential vegetation, soil, and hydrologic systems. They help describe terrestrial and aquatic ecosystems that behave in a similar manner, and have similar hazards and management limitations. Areas with common characteristics respond to disturbance processes and management activities in a similar manner.

Biophysical characteristics such as climate, potential vegetation, and geology do not change redily over time. Therefore, they provide a useful basis for comparing elements that do not change over time (e.g. vegetation) in response to disturbance or management activities.

Board Foot: A unit of wood 12" x 12" x 1".

Buffers: Strips of land left untreated along streams or if treated, the objective of the treatment is to improve riparian condition.

Category 1: INFISH classification referring to permanently flowing, fish-bearing streams.

Category 2: INFISH classification referring to permanently flowing, nonfish-bearing stream.

Category 3: INFISH classification referring to ponds, lakes, reservoirs, and wetlands greater than one acre in size.

Category 4: INFISH classification referring to seasonally flowing or intermittent streams, wetlands less than on acre in size, landslides, and landslide-prone areas.

Cavity: A hollow in a tree used by birds or mammals for roosting and reproduction.

Channel (stream): The deepest part of a stream or riverbed through which the main current of water flows.

Channelization: Human-caused alterations to a stream channel that cause the channel to be fixed in place, such as levees, dikes, trenching, and rip-rap.

Class I Area: Under the 1977 Clean Air Act amendments, all international parks, national parks larger than 6,000 acres, and national wilderness areas larger than 5,000 acres which existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional air pollution that can be added to these areas.

Clean Water Act of 1987: Amends the Federal Water Pollution Control Act of July 9, 1956. The purpose of the 1956 act is to enhance the quality and value of the water resource, and to establish a national policy for the prevention, control, and abatement of water pollution. Among the important provisions are authority for the State and Federal Governments to establish water quality standards; provision for water pollution grants for research and development, control programs, construction of treatment works, and comprehensive programs for water pollution control; enforcement measures against pollution from Federal facilities; and provision for the control of pollution by oil, hazardous substances, or sewage from vessels. The basic act (Public Law 84-660) is amended by the Federal Water Pollution Control Act/Amendments of 1961 (Public Law 87-88); Water Quality Act of 1965 (Public Law 89-234); Clean Water Restoration Act of 1966 (Public Law 89-753Z); Title I, Water Quality Improvement Act of 1970 (Public Law 91-224); Title I, National Environmental Policy Act of 1969 (Public Law 91-224); Federal Water Pollution Act of 1969 (Public Law 91-224); Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500); Clean Water Act of 1977 (Public Law 95-217); Clean Water Act of 1987.

Closed Road: A road on which motorized traffic has been excluded by regulation, barricade, blockage, or by obscuring the entrance. A closed road is still an operating facility on which motorized traffic has been removed (year-long or seasonal) and remains on the Forest Road Transportation System.

Collector Roads: These roads serve smaller land areas than a Forest arterial road, and are usually connected to a Forest arterial road or a public highway. Collects traffic from Forest local roads and/or terminal facilities. The location and standard are influenced by both long term, multi-resource 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.

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Commercial Thin: A type of commercial harvesting that removes commercial sized (7" - 21" dbh) trees from a stand for the purpose of increasing the spacing between residual trees. Trees of undesirable form or condition would be removed by cutting from below.

Compaction: Making soil hard and dense, decreasing its ability to support vegetation because the soil can hold less water and air and because roots have trouble penetrating the soil.

Composition (species): The mix of different species that make up a plant or animal community, and their relative abundance.

Connectivity: The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.

Cover: (1) Trees, shrubs, rocks, or other landscape features that allow an animal to partly or fully conceal itself. (2) The area of ground covered by plants of one or more species.

Four levels of cover are defined for elk as follows:

- **Satisfactory Cover:** For elk, a stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or more than 50 percent for ponderosa pine, and 60 percent for mixed conifer. Satisfactory cover typically exists as a multi-storied stand and would meet elk hiding cover criteria.
- **Marginal Cover:** For elk, a stand of coniferous trees 10 or more feet tall, with an average canopy closure equal to or more than 40 percent.
- **Hiding Cover:** Vegetation capable of hiding 90 percent of a standing adult deer or elk from human view at 200 feet.
- **Thermal Cover:** Vegetative cover used by animals to lessen effects of weather.

Cubic Foot: The amount of timber equivalent to a piece of wood one foot by one foot by one foot.

Cultural Resource: The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.

Cumulative Effects: Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Diameter At Breast Height (dbh): The diameter of a tree measured 4-1/2 feet above the ground.

Decommissioned Roads: Roads over which travel has been and will continue to be denied, the entrance is obscured, and the wheel tracks or pathway are no longer continuous and suitable for travel. It includes roads obliterated by natural processes such as revegetation or other natural occurrences, and for which the drainage is not in need of further attention. A decommissioned road has been returned to the resource management purposes established for that area. Decommission by natural processes may have to be supplemented by artificial methods to get "vegetative cover within ten years" after the last activity, as required by the National Forest Management Act. Decommissioned roads will be removed from the Forest Road Transportation System.

DecAID: An internet-based computer program being developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats. The tool synthesizes published literature, research data, wildlife databases, and expert judgment and experience (Mellen et al. 2003). DecAID presents information on wildlife use based on snag density and snag diameter. This information is presented at three statistical levels: low (30% tolerance level), moderate (50% tolerance level), and high (80% tolerance level). A tolerance level can also be defined as an "assurance of use" or the likelihood that individuals in a population of a selected species will use an area given a specified snag size and density.

Density (stand): The number of trees growing in a given area, usually expressed in terms of trees per acre.

Desired Condition: (1) A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved. (2) A description of the landscape as it could reasonably be expected to appear at the end of the planning period, if the plan goals, objectives, standards, and guidelines for that landscape are fully achieved.

Direct Effects: Impacts on the environment that are caused by the action and occur at the same time and place.

Dispersed recreation: Recreation that does not occur in a developed recreation site; for example, hunting or backpacking.

Diversity: The distribution and abundance of different plant and animal communities and species within an area.

Draft Environmental Impact Statement (DEIS): 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 comment and review.

Downed Woody Material: The accumulation of dead woody material on the forest floor that provides habitat for terrestrial wildlife.

Duff: The partially decomposed organic material of the forest floor that lies beneath freshly fallen leaves, needles, twigs, stems and bark.

Ecosystem: A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

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Ecosystem Health (Forest Health): The state of an ecosystem in which structure and functions are sufficiently resilient to allow the maintenance of biological diversity over time and through a range of disturbances.

Effects: Environmental changes resulting from a proposed action. See direct effects, indirect effects, and cumulative effects.

Elk Wallow: A depression, pool of water, or wet area produced or utilized by elk during the breeding season.

Embeddedness: The degree to which stream substrate (boulders, cobble, gravel) is surrounded or covered by fine sediment.

Endangered Species: A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Endemic Infestations: Native or confined to a certain area, region, or county.

Environmental Impact Statement (EIS): A document prepared by a Federal agency on the environmental effects of its proposals for major actions used as a tool for decision-making. It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

Epidemic: Occurrence of insects or disease contained in population and location above a normal, balanced level.

Erosion: The group of processes whereby earthy or rocky material is worn away by natural sources such as wind, water, or ice and removed from any part of the earth's surface.

Erosion Pavement: A layer or residue of more resistant material left exposed by the erosion of materials overlying it.

Extirpation: Loss of populations from all or part of a species' range within a specified area.

Final Environmental Impact Statement (FEIS): The final 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 comment and review.

Fines (sediment): Sediment particles smaller than 0.2 inch. Excessive fines can trap newly hatched fish and decrease the amount of water percolating through spawning gravels. High fine sediment loads slow plant growth and reduce available food, oxygen, and light.

Fire-Dependent Systems: Forests, grasslands, and other ecosystems historically composed of species of plants that evolved with and are maintained by fire regimes.

Fire Regime: The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.

Fire Return Interval: The average time between fires in a given area.

Forage: Forage refers specifically to all browse and non-woody plants that are available to livestock or wildlife.

Forb: Any herbaceous plant other than true grasses, sedges, or rushes.

Forest Land: Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use. Lands developed for non-forest use include areas for crops, improved pasture, residential or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width.

Forest Land Use Plan (Forest Plan): A plan that gathers and coordinates the direction to be followed in the overall management of a National Forest. The implementation plan of a selected alternative for management of a National Forest.

Forest-Wide Standards: An indication or outline of policy or conduct dealing with the basic management of the Forest. Forest-wide management standards apply to all areas of the Forest regardless of the other management prescriptions applied.

Fragmentation (habitat): The break-up of a large land area (such as a forest) into smaller patches isolated by areas converted to a different land type. The opposite of connectivity.

Fuel: Plants, both living and dead, and woody vegetative materials that are capable of burning.

Fuel Hazard: An accumulation of vegetative fuel that has a high risk of ignition or difficulty of suppression.

Fuel Ladder: Vegetative structures or conditions such as low-growing tree branches, shrubs, or smaller trees that allow fire to move vertically from a surface fire to a crown fire.

Fuel load: The dry weight of combustible materials per unit area; usually expressed as tons per acre.

Fuel Treatment: The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

Geographic Information System (GIS): An information processing technology to input, store, manipulate, analyze, and display data; a system of computer maps with corresponding site-specific information that can be combined electronically to provide reports and maps.

Habitat: The natural abode of a plant or animal including all biological and climatic factors affecting life.

Habitat Capability: The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish, or plant population. It is measured in terms of potential population numbers.

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Hard Snag: A snag composed primarily of sound wood, particularly sound sapwood that is generally merchantable.

Harvest: Felling and removal of trees from the forest.

Herbicide: A chemical compound used to kill or control growth of undesirable plant species.

Hiding Cover: Vegetation capable of hiding 90 percent of a standing adult deer or elk from human view at 200 feet.

Historical Period: In this EIS, refers to information recorded during the early decades of Euroamerican settlement of the area, approximately the mid 1800s, prior to major changes caused by this settlement and by subsequent patterns of land and resource use.

Historic Range of Variability (HRV): The natural fluctuation of ecological and physical processes and functions that would have occurred during a specific period of time. In this EIS, refers to the range of conditions that are likely to have occurred prior to settlement of the area by Euroamericans (approximately the mid-1800s), which would have varied within certain limits over time. HRV is discussed in this document only as a reference point, to establish a baseline set of conditions for which sufficient scientific or historical information is available to enable comparison to current conditions.

Hydrophobic Soil: A condition in which soil becomes water-repellent, the capacity of soil to hold water is reduced, and chances for erosion are increased.

Impact, Economic, Direct: Impact caused directly by forest product harvest or processing or forest uses.

Impact, Economic, Indirect: Impacts that arise from supporting industries selling goods or services to directly affected industries.

Impact, Economic, Induced: Impacts resulting from employees or owners of directly or indirectly affected industries spending their income within the economy.

Implement: To carry out.

Indirect Effects: Impacts on the environment that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

Industry: A class of firms engaged in raw material production, manufacture, or trade.

Infiltration: The passage of water or absorption of water into the soil surface.

Infiltration Rates: Maximum rate at which soil under specified conditions can absorb rain or shallow impounded water, expressed in quantity of water absorbed by the soil per unit of time.

INFISH: Interim Inland Native Fish Strategy for the Intermountain, Northern, and Pacific Northwest Regions (Forest Service).

Interdisciplinary Team (IDT): A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view to bear on the problem.

Intermediate Thin: A type of commercial harvesting that removes commercial sized (7" – 21") trees from a stand for the purpose increasing the spacing between residual trees and moving the composition of the residual trees towards historical species composition. Trees of undesirable species, form, or condition are removed by cutting from below.

Intermittent Stream: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow.

Irretrievable: Applies primarily to the use of nonrenewable 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 time periods. Irreversible also includes loss of future options.

Issue: A matter of controversy, dispute, or general concern over resource management activities or land uses. To be considered a "significant" environmental impact statement issue, it must be well defined, relevant to the proposed action, and within the ability of the agency to address through alternative management strategies.

Ladder Fuels: Natural fuels, such as standing dead trees with low, brown-needled limbs or leaning dead trees, that provide fire an opportunity to reach the crowns of standing live trees.

Large Woody Debris (LWD): Pieces of wood that are of a large enough size to affect stream channel morphology.

Late and Old Structure (LOS): This is a term used in the Regional Forester's Forest Plan Amendment #2 which refers to timber stands where large trees are common.

Lek: A site where birds (primarily grouse) traditionally gather for sexual display and courtship.

Litter: The uppermost layer or organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

Local Roads: Roads constructed and maintained for, and frequented by, the activities of a given resource element. These roads connect terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard usually are determined by the requirement of a specific resource activity rather than by travel efficiency.

Lop and Scatter: Cutting branches, tops, and small trees after felling, so that the resultant slash will lie close to the ground.

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Lowdry: The lowdry sub zone is a moisture limited environment composed of ponderosa pine climax in association with grasses and dry site shrubs.

Maintenance Burning: An area is within or near the historic range of variability. A prescribed fire would reduce or maintain surface fuel loading and ladder fuels to the historic range of variability.

Management Area: An area with similar management objectives and a common management prescription.

Management Indicator Species: A species that is presumed to be sensitive to habitat changes; population changes of indicator species are believed to best indicate the effects of land management activities.

Management Prescription: Management practices and intensities selected and scheduled for application in a specific area to attain multiple use and other goals and objectives.

Middleground: The visible terrain between the foreground and the background in a viewed landscape. The area located from ¼ to 3-5 miles from the viewer.

Mitigation: Avoiding or minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.

Mixed Conifer: Stand containing a mixture of tree species including, but not limited to, ponderosa pine, western larch, white fir, Douglas-fir, and lodgepole pine.

Monitoring: A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring allows detection of undesirable and desirable changes so that management actions can be modified or designed to achieve desired goals and objectives while avoiding adverse effects to ecosystems.

Mosaic: A pattern of vegetation in which two or more kinds of communities are interspersed in patches, such as clumps of shrubs with grassland between.

Multiple Burning: More than one prescribed burns to accomplish or move an area to the next level of stage burns. Each stage may need multiple burns to accomplish these objectives.

Multiple Use: The management of all renewable surface resources of the National Forests 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 with the combination of uses that will give the greatest dollar return or the greatest unit output.

Mycorrhizae: The symbiotic relationship between certain fungi and the roots of certain plants, especially trees, important for plants to take nutrients from soil.

National Environmental Policy Act (NEPA): An act of congress passed in 1969 declaring a national policy to encourage productive and enjoyable harmony between people and the environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of people, and to enrich the understanding of the ecological systems and natural resources important to the nation, among other purposes.

National Forest Management Act (NFMA): A law passed in 1976 requiring the preparation of Forest Service regional guides and forest plans and the preparation of regulations to guide that development.

National Forest System (NFS) Land: Federal lands that have been designated by Executive order or statute as National Forest, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands.

No Action Alternative: The most likely condition expected to exist in the future if the current management direction would continue unchanged.

Non-Sawtimber: Trees not suitable in size and quality for producing logs. Non-sawtimber can be processed into wood fiber.

Noxious Weed: A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

Old Growth: For all National Forests in the Pacific Northwest Region, an old-growth stand is defined as any stand of trees 10 acres or greater generally containing the following characteristics:

- Stands contain mature and over-mature trees in the overstory and are well into the mature growth stage (see Handbook of Terminology, Society of American Foresters).
- Stands will usually contain a multi-layered canopy and trees of several age classes.
- Standing dead trees and down material are present.
- Evidence of human activities may be present but may not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

Old Forest: (a) *Old single story forest* refers to mature forest characterized by a single canopy layer consisting of large or old trees. Understory trees are often absent, or present in randomly spaced patches. It generally consists of widely spaced, shade-intolerant species, such as ponderosa pine and western larch, adapted to a nonlethal, high frequency fire regime. (b) *Old multi-story forest* refers to mature forest characterized by two or more canopy layers with generally large or old trees in the upper canopy. Understory trees are also usually present, as a result of a lack of frequent disturbance to the understory. It can include both shade-tolerant and shade-intolerant species, and is generally adapted to a mixed fire regime of both lethal and nonlethal fires. Other characteristics of old forests include: variability in tree size; increasing numbers of snags and coarse woody debris; increasing appearance of decadence, such as broken tops, sparse crowns, and decay in roots and stems; canopy gaps and understory patchiness; and old trees relative to the site and species.

Open Road: A road, or segment thereof, that is open to use.

Open Road Density: The miles of open road in a specific area of land.

Over-mature: The stage at which a tree declines in vigor and soundness (e.g., past the period of rapid height growth.

Overstory: The uppermost canopy of the forest when there is more than one level of vegetation.

Park-like Stand: Stand having scattered large overstory trees, few or no understory trees, and open growing conditions usually maintained by frequent ground fires.

Partial Retention: See Visual Quality Objectives.

Particulates: solid particles or liquid droplets suspended or carried in the air.

Perennial Stream: Streams that flow continuously throughout most of the year.

Potential Vegetation: Vegetation that would likely develop if all successional sequences were completed without human interference under present site conditions.

Potential Vegetation Group (PVG): A group of potential vegetation types, grouped on the basis of similar general moisture or temperature environment and similar types of life forms.

Preferred Alternative: The alternative identified in a Draft Environmental Impact Statement, which has been initially selected by the agency as the most acceptable resolution to the problems identified in the purpose and need.

Prescribed Fire: Intentional use of fire under specified conditions to achieve specific management objectives.

Prescription: See Management Prescription.

Primary Transportation System: Includes Arterial and Collector roads.

Proper Functioning Condition (PFC): Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses and stabilize stream banks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. *The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation.*

Proposed Action: In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency intends to undertake or implement and which is the subject of an environmental analysis.

Proposed Species: Any species that is proposed by the Fish and Wildlife Service or the National Marine Fisheries Service to be listed as threatened or endangered under the Endangered Species Act.

Ramet: An independent member of a clone.

Record of Decision (ROD): A document separate from but associated with an Environmental Impact Statement that states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not (40 CFR 1505.2).

Recreation Opportunity Spectrum (ROS): A system for planning and managing recreation resources. Land delineations that identify a variety of recreation experience opportunities categorized into 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.

Replacement Old Growth (ROG) Stands: Stands that will replace old growth stands when old growth stands no longer meet old growth requirements.

Restoration: Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting or continue to act following disturbance as if the disturbances were absent. Restoration management activities can be either active (such as control of noxious weeds, thinning of over-dense stands of trees, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation oriented).

Retention (VQO): See Visual Quality Objectives.

Riparian Area: Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Riparian Habitat Conservation Areas (RHCAs): Portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris, and nutrient delivery systems.

Riparian Management Objectives (RMOs): Quantifiable measures of stream and stream-side conditions that define good fish habitat, and serve as indicators against which attainment, or progress toward attainment, of the goals will be measured.

Ripping: The mechanical penetration and shearing of soils to depths of 8 to 18 inches for the purpose of breaking up compacted soil to facilitate penetration of plant roots, water, organic matter, and nutrients.

Road: A classified road is a least 50 inches wide and constructed and maintained for vehicle use. An unclassified road is considered a road that was not constructed, maintained, or intended for highway use.

Road Density: The measure of the degree to which the length of road miles occupies a given land area (e.g., 1 mi./sq. mi. is 1 mile of road within a given square mile).

Roadless Area: A National Forest area that (1) is larger than 5,000 acres or, if smaller than 5,000 acres, is contiguous to a designated wilderness or primitive area; (2) contains no roads; and (3) has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System.

Road Improvement: See Road Reconstruction.

Road Maintenance: The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective (FSM 7712.3).

Road Realignment: See Road Reconstruction.

Road Reconstruction: Activity that results in an increase of an existing classified road as defined below:

a. Road improvement: Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function.
b. Road realignment: Activity that results in a new location of an existing road or portions of an existing road and treatment of the old roadway (36 CFR 212.1).

Runoff: The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

Sawtimber: Trees suitable in size and quality for producing logs that can be processed into lumber.

Scenic Integrity Objectives (SIO): The degree of direct human-caused deviations in the landscape, such as road construction, timber harvesting, or activity debris. Indirect deviations, such as landscape created by human suppression of the natural role of fire, are not included.

Scoping Process: An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly (CEQ regulations, 40 CFR 1501.7).

Sediment: Solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site of origin by air, water, gravity, or ice.

Sedimentation: The action or process of forming or depositing sediment.

Sensitive Species: Species identified by a Forest Service regional forester or BLM state director for which population viability is a concern either (a) because of significant current or predicted downward trends in population numbers or density, or (b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Seral: Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid seral in a forest would refer to pole or medium sawtimber growth stages; late or old seral refers to plants present during a later stage of plant community succession (such as mature and old forest stages).

Seral Stage: The developmental phase of a forest stand or rangeland with characteristic structure and plant species composition.

Shade-Intolerant: Species of plants that do not grow well in or die from the effects of too much shade. Generally these are fire-tolerant species.

Shade-Tolerant: Species of plants that can develop and grow in the shade of other plants. Generally these are fire-intolerant species.

Slash: The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees.

Snag: A standing dead tree usually greater than 6 feet in height and 4 inches in diameter at breast height. Snags are important as habitat for a variety of wildlife species and their prey.

Social Stability: The maintenance of existing interactions between local groups affected by the continuity of social and economic values within a community.

Soil Compaction: An increase in soil bulk density of 20 percent or more from the undisturbed level of volcanic ash soils. For other soils, it is an increase in soil bulk density of 15 percent or more from the undisturbed level.

Soil Erosion: See Erosion.

Soil Productivity: The capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content).

5 GLOSSARY

Stage Burning: Using prescribed fire to move a designated area from one stage to the next stage. Each burn would move the ecosystem closer to the historic range of variability. The three stages of burning are:

- Jackpot or light burning in deep litter layer, heavy surface fuel loading, and ladder fuels.
- Underburning areas with a mixture of a thin litter layer with open grass areas, some pockets of heavy fuel loading and deep litter layer, opening stand densities, and decreasing more of the ladder fuels.
- Underburning with high intensity fire, 2 to 4 foot flame height, in open grasses stands.

Stand: A community of trees or other vegetative growth occupying a specific area and sufficiently uniform in composition (species), age, spatial arrangement, and conditions as to be distinguishable from the other growth on adjoining lands, so forming a silvicultural or management entity.

Stand Composition: The vegetative species that make up the stand.

Stand Density: Refers to the number of trees growing in a given area, usually expressed in trees per acre.

Stand Replacement Fire: In forests, fires in which less than 20 percent of the basil area or less than 10 percent of the canopy cover remains; in rangelands, fires in which most of the shrub overstory or encroaching trees are killed.

Stand Structure: The mix and distribution of tree sizes, layers, and ages in a forest. Some stands are all one size (single-story), some are two-story, and some are a mix of trees of different ages and sizes (multi-story).

Stocking: A measure of timber stand density as it reaches to the optimum or desired density to achieve a given management objective.

Subwatershed: A drainage area of approximately 20,000 acres, equivalent to a 6^{th}-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6^{th}-field HUC) are contained within watershed (5^{th}-field HUC), which in turn are contained within a subbasin (4^{th}-field HUC).

Succession: A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as seral stages.

Successional Stage: A phase in the gradual supplanting of one community of plants by another.

Surface Erosion: The detachment and transport of individual soil particles by wind, water, or gravity.

Temporary Road: Those roads needed only for the purchaser's or permittee's use. The Forest Service and the purchaser or permittee must agree to location and clearing widths. Temporary roads are used for a single, short-term use (e.g., to haul timber from landings to Forest development roads, access to build water developments, etc.).

Thinning: An operation to remove trees from a forest for the purpose of reducing fuel, maintaining stand vigor, regulating stand density/composition, or for other resource benefits. Precommercial thinning refers to the removal of trees usually less than 7 or 9 inches dbh. Commercial thinning refers to the removal of trees generally greater than 7 or 9 inches dbh.

Threatened Species: Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Tier: In an EIS, refers to incorporating by reference the analyses in an EIS of a broader scope. For example, a Forest Service project-level EIS could tier to the analysis in a Forest Plan EIS; a Forest Plan EIS could tier to a Regional Guide EIS.

Tolerance Level: An "assurance of use" or the likelihood that individuals in a population of a selected species will use an area given a specified snag size and density.

Understory: The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Understory Burning: A low intensity fire that burns beneath the canopy of a timber stand. It can occur during the course of a wildfire as well as under prescribed fire conditions.

Updry: The updry sub zone is a moisture limited environment but not as severly as the lowdry sub zone. The updry sub zone is comprised of ponderosa pine climax in association with wetter shrubs, Douglas-fir climax sites, white fir climax sites, and very few lodgepole areas that are most often transitioning to white fir.

Viability: The likelihood of continued existence in an area for some specified period of time.

Visual Quality Objectives (VQOs): A desired level of management based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape.

- Preservation – Allows only ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited. This objective applies to specially classified areas, including wilderness.
- Retention – Provides for management activities that are not visually evident. Management activities are permitted, but the results of those activities on the natural landscape must not be evident to the average viewer.
- Partial Retention – Management activities may be evident to the viewer but must remain visually subordinate to the surrounding landscape.
- Modification – Management activities may visually dominate the natural surrounding landscape but must borrow from naturally established form, line, color, and texture.
- Maximum Modification – Land management activities can dominate the natural landscape to greater extent than in the modification objective, except as viewed from

background when visual characteristic must be those of natural occurrences within the surrounding area.

Water Bar: A structure constructed across roads and skid trails to divert the surface runoff of water.

Watershed: (1) The region draining into a river, river system, or body of water. (2) In this EIS, a watershed also refers specifically to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Whole Tree Yarding: Felling and transporting the whole tree without the stump, but with its crown, for trimming and bucking at a landing.

Wildfire: A human or naturally caused fire that does not meet land management objectives.

Winter Range: The area, usually at lower elevations, occupied by migratory deer and elk during the winter months.

Yarding: The operation of hauling timber from the stump to a collection point.

Yarding With Tops Attached: Transporting the crown attached to the last log. The last log is trimmed and bucked at the landing. This is done to trees that are too large for whole tree yarding.

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5 LIST OF PREPARERS

List of Preparers

Interdisciplinary Team (IDT) Members

Lori Bailey	IDT Leader, Writer/Editor, Botanist – Bachelor of Science, Forest Biology, Utah State University. Fifteen years of Forest Service Experience. Contributed to Roadless Area, Scenery Management, Botany, Recreation and Nonforest Vegetation sections.
Marcy Boehme	Writer/Editor – Bachelor of Science, Wildlife, Humboldt State University. Ten years of Forest Service Experience. Edited Final Draft.
Judy Kerr	Engineering Technician. Thirteen years of Forest Service experience. Contributed to Access and Travel Management sections.
Gene Mackey	Fire/Fuels Planner – Associate of Science, Forestry/Range; Associate of Science, Outdoor Recreation, Treasure Valley Community College. Twenty years of Forest Service experience. Contributed to Fire, Fuels and Air Quality sections.
Roy Schwenke	Silviculturist – Bachelor of Science, Forestry, Iowa State University; Silviculture Institute, Oregon State University/University of Washington. Twenty years of Forest Service experience. Contributed to Vegetation sections.
Rick Vetter	Fish Biologist – Bachelor of Science, Range/Wildlife Management, Utah State University 1978. Twenty-six years of Forest Service, BLM and FWS Experience. Contributed to Watershed and Fish Habitat sections.

Other Specialists/Contributors/Reviewers

Name	Title	Specialty[1]
Bailey, Margaret	District Ranger	
Braymen, Janet	GIS Coordinator	GIS
Burman, Karlene	Archeology Technician	Cultural Resources
Cossette, Steve	Forest Planner, NEPA/Appeals Coordinator	NEPA
Dreher, Eric	GIS Specialist	GIS
Erickson, John	Timber/Access Management Assistant	
Friedrichsen, Tom	Hydrologist	Watershed and Soils
Goodman, Bill	Hydrologist	Watershed and Soils
Haines, Karen	Wildlife Biologist	Wildlife
Hallisey, Judy	Hydrologist	Watershed and Soils
Hensley, Jerry	Acting Ecosystem Staff Officer	
Hill, David	Acting Fuels Planner	Fuels
Jerofke, Rick	Wildlife Biologist	Wildlife
Keniston, Jim	District Ranger	Socio-Economics
Klink, Jay	Planner	Writer/Editor
Kohrman, Elaine	Economist	Socio-Economics
Meurisse, Robert T.	Soils Scientist	Soils
Miller, Alan	Fish Biologist	Fish Habitat
Miller, Cheri	Wildlife Biologist	Wildlife
Ogden, Roger	Regional NEPA Coordinator	NEPA
Ordonez, Lisa	Botanist	Sensitive Plants
Powers, Lyle	Forest Planner	
Putz, Michelle	Writer/Editor	Wildlife
Spor, Phil	Sale Administrator	Recreation
Supulski, Bill	Ecosystem Management Staff	NEPA
Suther, Joan	Planning Assistant	NEPA
Wood, Bonnie	Former Malheur Forest Supervisor	
Yates, Gene	Forest Botanist	Noxious Weeds
Zelley, L	Range Conservationist	Range Resources/ Noxious Weeds

[1] - Specialty refers to the section(s) of the EIS the individual contributed.

Distribution List

List of agencies, organizations, and persons to whom copies of this draft environmental impact statement were sent.

Agencies

Advisory Council on Historic Preservation
EPA, Office of Environmental Review
EPA, Regional Office, Region X
EPA, Seattle Office, Elaine Somers
Federal Aviation Administration, Northwest Region
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Federal Highway Administration, Western Resource Center
General Services Administration, Office of Planning & Analysis
National Marine Fisheries Division
Northwest Power Planning Council
Oregon Department of Environmental Quality, Bend Office
Oregon Department of Fish and Wildlife, Malheur Watershed District
Oregon Department of Forestry, Resources Library
Oregon Department of Parks and Recreation, Planning and Development Section
Oregon Natural Resource, Department of Fish and Wildlife
Oregon Natural Resource, Department of Fish and Wildlife, Habitat Conservation Division
Oregon Natural Resource, Department of Geology & Mineral Industries
Oregon Natural Resource, Department of Land Conservation and Development
Oregon Natural Resource, Division of State Lands
Oregon Natural Resource, Governor's Forest Advisor
Oregon Natural Resource, Planning & Development Section, Parks and Recreation Department
Oregon Natural Resource, Rural Development Section
Oregon Natural Resource, State Economist
Oregon Natural Resource, Water Resources Department
State of Idaho, Division of Environmental Quality
Surface Transportation Board, Energy and Environment
U.S. Department of Defense, U.S. Army Engineers Division, North Pacific, CENPD
U.S. Department of Energy, Office of Environmental Compliance
U.S. Department of Housing & Urban Development
U.S. Naval Observatory, Naval Oceanography Division
USDA Forest Service, Pacific Northwest Region, Environmental Coordination
USDA, Animal & Plant Health Inspection Service
USDA, National Agricultural Library Head, Acquisitions and Serials Branch
USDA, National Resource Conservation Service, Ecological Sciences Division
USDA, Office of Civil Rights
USDA, Office of Equal Opportunity
USDA, OPA Publication Stockroom
USDA, Policy and Planning Division, Office of Civil Rights
USDI, Bureau of Land Management, Burns District
USDI, Office of Environmental Policy & Compliance

Western Resource Center

Tribes
Burns Paiute Tribe

Organizations and Businesses
Blue Mountains Biodiversity Project
Forest Conservation Council, Southeastern Regional Office
Forest Conservation Council, Western Regional Office
Grant County Conservationists
KLE Enterprises, Inc.
Malheur Lumber Company
Malheur Timber Operators
Malheur Wildlife Associates
Ochoco Lumber Company
Oregon Natural Resources Council Action, Western Field Office
Southworth Brothers, Inc.
The Lands Council
TI Ranch

Individuals
Bauer, John and Carolyn
Bellisario, Ronald
Carter, Matt
Clark, Mike
Clemens, Tim
Clemens, Tom and Lois
Cowing, Clyde and Teresa
Culp, Mike and Pat
Day, Mark
Drinkwater, Jim, Cheryl, Jack and Betty
Edwards, Jack
Garvey, Lydia
Hill, Tim and Erma
Johnson, Garth
Krauel, Robert J.
Landwehr, Don
Lonsdale, Sandy
Miller, Joe and Ingamoe
Moore, Lonny
Mrs. Schlaich's Class, High Lakes Elementary School
Oren, Izzy
Pike, Vic
Randall, Evan
Solomon, Laurie
Southworth, Jack and Teresa
Starbuck, Dorothy
Weil, Mike

5 DISTRIBUTION LIST

White, Jon and Margarita
Wood-Campbell, Karen
Yockim, Ronald S.

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Proposed Action (Alt. 2)			
Access and Travel Management			
Road Number	Length (miles)	Closure Type	Purpose of Closure
3100033	0.11	Permanent Closure	WL
3100036	0.87	Permanent Closure	WL
3100036	0.85	Permanent Closure	WL
3100088	0.44	Permanent Closure	SR
3100090	0.34	Permanent Closure	WL
3100096	0.37	Permanent Closure	WL
3100104	0.99	Permanent Closure	WL
3100105	0.44	Permanent Closure	WL
3100193	0.21	Permanent Closure	WL
3100195	2.19	Seasonal Closure	SR/WL/RM
3100196	0.54	Seasonal Closure	SR/WL/RM
3100208	0.77	Permanent Closure	WL
3100212	0.25	Permanent Closure	WL
3100218	1.12	Seasonal Closure	SR/WL/RM
3100223	0.25	Permanent Closure	WL
3100224	0.31	Permanent Closure	WL/SR
3100243	0.52	Permanent Closure	SR
3100249	0.11	Permanent Closure	WL
3100250	0.29	Permanent Closure	WL
3100259	0.15	Permanent Closure	WL
3100271	0.80	Permanent Closure	SR
3100273	0.44	Permanent Closure	WL
3100286	0.83	Permanent Closure	SR/WL
3100288	0.09	Permanent Closure	WL
3100290	0.09	Permanent Closure	SR
3100294	0.10	Permanent Closure	WL
3100296	0.74	Permanent Closure	SR
3100305	0.32	Permanent Closure	WL
3100306	0.15	Permanent Closure	WL
3100319	0.13	Permanent Closure	WL
3100321	0.41	Permanent Closure	SR
3100334	0.13	Seasonal Closure	SR/WL/RM
3100343	0.04	Seasonal Closure	SR/WL/RM
3100381	0.36	Permanent Closure	WL
3100415	0.33	Permanent Closure	SR
3100430	0.32	Permanent Closure	WL
3100431	0.34	Permanent Closure	WL
3100436	0.18	Permanent Closure	WL
3100437	0.27	Permanent Closure	WL
3100559	0.27	Permanent Closure	SR
3100571	0.26	Permanent Closure	WL
3100601	0.20	Permanent Closure	WL
3100601	0.39	Permanent Closure	SR
3100612	0.09	Permanent Closure	WL
3100719	0.18	Permanent Closure	WL
3100728	0.15	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3100770	0.40	Permanent Closure	WL
3100820	0.15	Permanent Closure	WL
3100843	0.24	Permanent Closure	WL
3100846	0.28	Permanent Closure	WL
3100847	0.00	Permanent Closure	WL
3100858	0.11	Permanent Closure	SR
3100859	0.19	Permanent Closure	WL
3100860	2.34	Seasonal Closure	SR/WL/RM
3100866	0.16	Permanent Closure	SR
3100866	0.27	Permanent Closure	WL
3100870	0.58	Seasonal Closure	SR/WL/RM
3100873	0.07	Seasonal Closure	SR/WL/RM
3100874	0.70	Permanent Closure	WL
3100898	0.46	Seasonal Closure	SR/WL/RM
3100937	0.82	Seasonal Closure	SR/WL/RM
3100938	1.42	Permanent Closure	WL
3100939	0.22	Seasonal Closure	SR/WL/RM
3100953	0.47	Decommission	SR
3100955	0.21	Decommission	SR
3100957	0.90	Decommission	SR
3100964	0.10	Permanent Closure	SR
3100969	0.56	Permanent Closure	SR
3100982	0.47	Permanent Closure	WL
3110110	0.61	Permanent Closure	WL
3110111	0.22	Permanent Closure	WL
3110140	0.16	Permanent Closure	SR
3110176	0.66	Signed Year Round Closure	WL
3110181	0.46	Permanent Closure	WL
3110182	0.48	Permanent Closure	WL
3110186	0.11	Permanent Closure	WL
3110820	0.17	Permanent Closure	WL
3110986	0.13	Permanent Closure	WL
3120123	0.20	Permanent Closure	WL
3120124	0.45	Permanent Closure	SR
3120126	0.42	Permanent Closure	SR
3120143	0.21	Permanent Closure	WL
3120144	0.13	Permanent Closure	WL
3120163	0.24	Permanent Closure	WL
3120163	0.37	Permanent Closure	WL
3120166	0.60	Permanent Closure	WL
3120172	0.72	Permanent Closure	WL
3120173	0.05	Permanent Closure	WL
3120236	0.13	Permanent Closure	WL
3120279	0.42	Permanent Closure	WL
3125000	2.92	Seasonal Closure	SR/WL/RM
3125051	0.58	Permanent Closure	WL
3125121	0.18	Seasonal Closure	SR/WL/RM
3125150	0.55	Seasonal Closure	SR/WL/RM
3125151	0.14	Seasonal Closure	SR/WL/RM
3125152	0.10	Seasonal Closure	SR/WL/RM

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Road Number	Length (miles)	Closure Type	Purpose of Closure
3125153	0.06	Seasonal Closure	SR/WL/RM
3125240	0.41	Seasonal Closure	SR/WL/RM
3125244	1.37	Seasonal Closure	SR/WL/RM
3125413	0.69	Seasonal Closure	SR/WL/RM
3125435	0.15	Seasonal Closure	SR/WL/RM
3125436	0.25	Seasonal Closure	SR/WL/RM
3125487	0.42	Seasonal Closure	SR/WL/RM
3125527	0.70	Permanent Closure	WL
3125531	0.30	Permanent Closure	WL
3125533	0.34	Permanent Closure	WL
3125553	0.29	Seasonal Closure	SR/WL/RM
3125555	0.74	Seasonal Closure	SR/WL/RM
3125556	0.20	Seasonal Closure	SR/WL/RM
3125670	0.22	Seasonal Closure	SR/WL/RM
3125744	0.11	Seasonal Closure	SR/WL/RM
3125749	1.28	Seasonal Closure	SR/WL/RM
3125751	0.20	Seasonal Closure	SR/WL/RM
3125755	0.43	Seasonal Closure	SR/WL/RM
3125756	0.20	Seasonal Closure	SR/WL/RM
3125761	0.09	Seasonal Closure	SR/WL/RM
3125764	0.27	Seasonal Closure	SR/WL/RM
3125767	0.20	Seasonal Closure	SR/WL/RM
3125789	1.13	Seasonal Closure	SR/WL/RM
3125794	0.75	Seasonal Closure	SR/WL/RM
3125798	1.88	Seasonal Closure	SR/WL/RM
3125911	0.17	Permanent Closure	WL
3125912	2.12	Seasonal Closure	SR/WL/RM
3125913	0.63	Permanent Closure	WL
3125916	0.62	Seasonal Closure	SR/WL/RM
3125918	1.74	Seasonal Closure	SR/WL/RM
3125920	1.18	Permanent Closure	SR
3125924	1.30	Permanent Closure	WL
3125924	0.25	Permanent Closure	SR
3125926	0.22	Permanent Closure	WL
3125927	0.16	Seasonal Closure	SR/WL/RM
3125929	0.13	Permanent Closure	WL
3125930	0.30	Seasonal Closure	SR/WL/RM
3125931	0.32	Permanent Closure	WL
3125943	0.50	Permanent Closure	WL
3125947	0.21	Permanent Closure	WL
3125951	0.80	Seasonal Closure	SR/WL/RM
3125952	0.25	Permanent Closure	WL
3125971	1.81	Seasonal Closure	SR/WL/RM
3125972	0.14	Seasonal Closure	SR/WL/RM
3125975	0.07	Permanent Closure	WL
3125977	0.39	Seasonal Closure	SR/WL/RM
3125978	0.49	Permanent Closure	WL
3125979	1.89	Seasonal Closure	SR/WL/RM
3125980	0.20	Seasonal Closure	SR/WL/RM
3125981	2.80	Seasonal Closure	SR/WL/RM

Road Number	Length (miles)	Closure Type	Purpose of Closure
3125983	1.43	Seasonal Closure	SR/WL/RM
3125987	0.14	Seasonal Closure	SR/WL/RM
3125988	0.29	Seasonal Closure	SR/WL/RM
3125989	0.18	Seasonal Closure	SR/WL/RM
3125990	0.09	Seasonal Closure	SR/WL/RM
3125991	0.37	Seasonal Closure	SR/WL/RM
3125993	0.34	Seasonal Closure	SR/WL/RM
3125997	0.32	Seasonal Closure	SR/WL/RM
3130055	1.13	Permanent Closure	WL
3130066	0.13	Permanent Closure	WL
3130074	0.48	Permanent Closure	WL
3130077	0.34	Permanent Closure	WL
3130079	0.22	Permanent Closure	WL
3130085	0.74	Permanent Closure	WL
3130101	0.60	Decommission	SR
3130130	0.31	Permanent Closure	WL
3130616	0.67	Permanent Closure	WL
3130617	0.19	Permanent Closure	WL
3130988	0.61	Permanent Closure	WL
3130990	0.15	Permanent Closure	WL
3130992	1.31	Permanent Closure	WL
3130993	0.39	Permanent Closure	WL
3130994	0.40	Permanent Closure	WL
3140049	0.17	Permanent Closure	WL
3140051	0.06	Permanent Closure	WL
3140081	0.03	Permanent Closure	WL
3140108	0.22	Permanent Closure	WL
3140110	0.31	Permanent Closure	WL
3140120	0.93	Seasonal Closure	SR/WL/RM
3140121	0.99	Decommission	SR
3140123	0.77	Signed Year Round Closure	WL
3140125	0.59	Signed Year Round Closure	WL
3140205	0.40	Permanent Closure	WL
3140207	0.13	Permanent Closure	WL
3140211	0.55	Permanent Closure	WL
3140214	0.53	Seasonal Closure	SR/WL/RM
3140218	0.28	Permanent Closure	SR
3140220	0.19	Permanent Closure	WL
3140221	0.11	Seasonal Closure	SR/WL/RM
3145389	0.79	Seasonal Closure	SR/WL/RM
3700100	1.06	Seasonal Closure	SR/WL/RM
3700117	0.60	Permanent Closure	WL
3700120	0.44	Permanent Closure	SR
3700138	0.16	Permanent Closure	WL
3700162	0.29	Permanent Closure	WL
3700163	0.15	Permanent Closure	WL
3700167	0.28	Permanent Closure	SR
3700172	0.55	Permanent Closure	WL
3700176	0.54	Permanent Closure	WL
3700177	0.41	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700178	0.19	Permanent Closure	WL
3700185	0.12	Permanent Closure	SR
3700185	0.98	Permanent Closure	WL
3700189	0.43	Permanent Closure	SR
3700190	0.34	Permanent Closure	SR
3700191	0.31	Permanent Closure	WL
3700195	0.63	Permanent Closure	SR
3700198	0.16	Permanent Closure	SR
3700206	0.48	Permanent Closure	WL
3700208	0.33	Permanent Closure	SR
3700210	0.61	Permanent Closure	WL
3700211	0.20	Permanent Closure	WL
3700235	0.09	Permanent Closure	SR
3700262	0.11	Permanent Closure	WL
3700264	0.15	Permanent Closure	WL
3700282	0.28	Permanent Closure	WL
3700283	0.17	Permanent Closure	WL
3700293	0.14	Permanent Closure	WL
3700297	0.39	Permanent Closure	WL
3700302	0.20	Permanent Closure	WL
3700303	0.51	Permanent Closure	WL
3700304	0.27	Permanent Closure	WL
3700311	0.60	Seasonal Closure	SR/WL/RM
3700313	0.24	Permanent Closure	WL
3700320	1.05	Permanent Closure	WL
3700321	0.30	Permanent Closure	WL
3700322	0.39	Permanent Closure	SR
3700323	0.19	Permanent Closure	WL
3700325	0.44	Permanent Closure	WL
3700327	0.22	Permanent Closure	WL
3700329	0.20	Permanent Closure	WL
3700330	0.42	Permanent Closure	WL
3700331	0.06	Permanent Closure	WL
3700333	0.08	Permanent Closure	WL
3700339	0.18	Permanent Closure	WL
3700340	0.32	Permanent Closure	WL
3700341	0.55	Permanent Closure	WL
3700345	0.53	Permanent Closure	WL
3700348	0.32	Permanent Closure	WL
3700358	0.17	Permanent Closure	WL
3700363	0.24	Permanent Closure	SR
3700375	0.07	Permanent Closure	WL
3700376	0.12	Permanent Closure	WL
3700378	0.19	Permanent Closure	SR
3700379	0.79	Permanent Closure	SR
3700380	0.12	Permanent Closure	WL
3700381	0.19	Permanent Closure	SR
3700392	0.17	Permanent Closure	WL
3700393	0.23	Permanent Closure	WL
3700396	0.06	Permanent Closure	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700425	0.26	Permanent Closure	WL
3700436	0.16	Permanent Closure	SR
3700437	0.11	Permanent Closure	WL
3700438	0.20	Permanent Closure	SR
3700505	0.20	Seasonal Closure	SR/WL/RM
3700562	0.22	Permanent Closure	WL
3700564	0.51	Permanent Closure	WL
3700641	0.49	Signed Year Round Closure	admin
3700861	2.32	Seasonal Closure	SR/WL/RM
3700941	0.44	Permanent Closure	WL
3700980	0.23	Permanent Closure	WL
3746338	0.09	Permanent Closure	WL
3746339	0.74	Permanent Closure	WL
3746675	1.38	Seasonal Closure	SR/WL/RM
3746681	1.37	Seasonal Closure	SR/WL/RM
3746683	1.16	Permanent Closure	SR
3746689	0.44	Seasonal Closure	SR/WL/RM
3746694	0.39	Permanent Closure	WL
3746696	0.34	Permanent Closure	WL
3746702	0.43	Seasonal Closure	SR/WL/RM
3746703	0.86	Seasonal Closure	SR/WL/RM
3746704	1.32	Seasonal Closure	SR/WL/RM
3746705	0.12	Permanent Closure	WL
3746707	1.24	Seasonal Closure	SR/WL/RM
3746709	0.30	Permanent Closure	WL
3746710	0.21	Permanent Closure	WL
3746711	0.15	Permanent Closure	WL
3746712	0.39	Permanent Closure	WL
3746713	2.86	Seasonal Closure	SR/WL/RM
3746720	0.79	Seasonal Closure	SR/WL/RM
3746722	0.17	Permanent Closure	WL
3746724	0.08	Permanent Closure	WL
3746726	0.55	Permanent Closure	WL
3746728	0.30	Permanent Closure	WL
3746732	0.11	Permanent Closure	WL
3746734	0.47	Permanent Closure	WL
3746734	0.18	Permanent Closure	SR
3746737	0.24	Permanent Closure	WL
3746739	0.53	Permanent Closure	WL
3746740	0.32	Permanent Closure	SR
3746743	0.85	Seasonal Closure	SR/WL/RM
3746746	0.21	Permanent Closure	SR
3746752	0.45	Permanent Closure	WL
3746754	0.23	Seasonal Closure	SR/WL/RM
3746756	0.23	Seasonal Closure	SR/WL/RM
3746760	0.57	Seasonal Closure	SR/WL/RM
3746763	0.55	Permanent Closure	WL
3746764	0.56	Permanent Closure	WL
3746765	0.18	Permanent Closure	WL
3746766	0.17	Permanent Closure	WL

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Road Number	Length (miles)	Closure Type	Purpose of Closure
3746978	0.74	Seasonal Closure	SR/WL/RM
3746981	0.16	Permanent Closure	WL
3746982	0.17	Seasonal Closure	SR/WL/RM
3746983	0.58	Seasonal Closure	SR/WL/RM
3746985	0.36	Seasonal Closure	SR/WL/RM
3746989	0.11	Permanent Closure	WL
3765138	1.06	Seasonal Closure	SR/WL/RM
3765139	0.49	Permanent Closure	WL
3765140	0.35	Permanent Closure	WL
3765915	0.13	Permanent Closure	WL
3765917	0.74	Permanent Closure	WL
3765919	0.75	Permanent Closure	WL
3765940	0.12	Permanent Closure	WL
3765955	0.09	Permanent Closure	WL
		SR = Sediment Reduction	
		WL = Wildlife	
		RM = Road Maintenance	
		Admin = Administrative Need	

Road Number	Length (miles)	Closure Type	Purpose of Closure
Alternatives 3 and 4			
Access and Travel Management			
3100033	0.11	Permanent Closure	WL
3100035	1.13	Permanent Closure	SR
3100036	0.85	Permanent Closure	WL
3100088	0.44	Permanent Closure	SR
3100090	0.34	Permanent Closure	WL
3100093	0.09	Permanent Closure	WL
3100095	1.10	Decommission	SR
3100096	0.37	Permanent Closure	WL
3100104	0.99	Permanent Closure	WL
3100105	0.44	Permanent Closure	WL
3100193	0.21	Permanent Closure	WL
3100195	1.58	Permanent Closure	SR
3100196	0.54	Decommission	SR
3100208	0.77	Permanent Closure	WL
3100210	0.20	Decommission	SR
3100212	0.25	Permanent Closure	WL
3100218	1.12	Permanent Closure	WL
3100223	0.25	Permanent Closure	WL
3100224	0.26	Permanent Closure	WL
3100224	0.05	Permanent Closure	SR
3100243	0.52	Permanent Closure	SR
3100248	0.27	Permanent Closure	WL
3100248	0.14	Permanent Closure	WL
3100248	0.29	Permanent Closure	SR
3100248	0.45	Permanent Closure	WL
3100249	0.11	Permanent Closure	WL
3100250	0.29	Permanent Closure	WL
3100259	0.15	Permanent Closure	WL
3100260	0.43	Permanent Closure	WL
3100271	0.80	Decommission	SR
3100286	0.76	Decommission	SR
3100286	0.01	Permanent Closure	WL
3100286	0.06	Decommission	SR
3100288	0.09	Permanent Closure	WL
3100290	0.09	Permanent Closure	SR
3100294	0.10	Permanent Closure	WL
3100296	0.21	Permanent Closure	SR
3100296	0.53	Permanent Closure	WL
3100305	0.32	Permanent Closure	WL
3100306	0.15	Permanent Closure	WL
3100319	0.13	Permanent Closure	WL
3100321	0.41	Permanent Closure	SR
3100334	0.13	Permanent Closure	WL
3100381	0.36	Permanent Closure	WL
3100415	0.33	Permanent Closure	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3100430	0.32	Permanent Closure	WL
3100431	0.34	Permanent Closure	WL
3100435	0.03	Permanent Closure	SR
3100436	0.18	Permanent Closure	WL
3100437	0.27	Permanent Closure	WL
3100557	0.13	Permanent Closure	WL
3100559	0.27	Permanent Closure	SR
3100571	0.26	Permanent Closure	WL
3100601	0.20	Permanent Closure	WL
3100601	0.39	Permanent Closure	SR
3100612	0.09	Permanent Closure	WL
3100719	0.18	Permanent Closure	WL
3100728	0.15	Permanent Closure	WL
3100745	0.49	Decommission	SR
3100759	0.38	Decommission	SR
3100770	0.40	Permanent Closure	WL
3100820	0.15	Permanent Closure	WL
3100843	0.24	Permanent Closure	WL
3100846	0.28	Permanent Closure	WL
3100847	0.00	Permanent Closure	WL
3100858	0.11	Permanent Closure	SR
3100859	0.19	Permanent Closure	WL
3100860	1.98	Decommission	SR
3100860	0.02	Seasonal Closure	SR/WL/R
3100860	0.33	Decommission	SR
3100864	0.93	Decommission	SR
3100866	0.16	Permanent Closure	SR
3100866	0.27	Permanent Closure	WL
3100870	0.58	Permanent Closure	WL
3100873	0.07	Permanent Closure	WL
3100874	0.70	Permanent Closure	WL
3100885	0.19	Permanent Closure	WL
3100895	0.83	Permanent Closure	WL
3100895	0.35	Permanent Closure	SR
3100898	0.46	Permanent Closure	WL
3100937	0.82	Permanent Closure	WL
3100938	1.42	Permanent Closure	WL
3100939	0.22	Permanent Closure	WL
3100953	0.47	Permanent Closure	WL
3100955	0.21	Decommission	SR
3100957	0.90	Decommission	SR
3100963	0.02	Decommission	SR
3100964	0.10	Permanent Closure	SR
3100969	0.56	Permanent Closure	SR
3100982	0.47	Permanent Closure	WL
3110109	0.41	Decommission	SR
3110110	0.61	Permanent Closure	WL
3110111	0.22	Permanent Closure	WL
3110140	0.16	Decommission	SR
3110176	0.66	Signed Year Round Closure	WL

Appendix A

Road Number	Length (miles)	Closure Type	Purpose of Closure
3110181	0.46	Permanent Closure	WL
3110182	0.48	Permanent Closure	WL
3110185	0.70	Permanent Closure	WL
3110186	0.11	Permanent Closure	WL
3110232	0.46	Permanent Closure	WL
3110332	0.26	Permanent Closure	WL
3110820	0.17	Permanent Closure	WL
3110986	0.13	Permanent Closure	WL
3120123	0.50	Permanent Closure	WL
3120123	0.17	Permanent Closure	WL
3120124	0.45	Permanent Closure	SR
3120126	0.42	Decommission	SR
3120143	0.21	Permanent Closure	WL
3120144	0.13	Permanent Closure	WL
3120155	0.36	Permanent Closure	SR
3120155	0.49	Permanent Closure	WL
3120161	0.16	Permanent Closure	WL
3120163	0.61	Permanent Closure	WL
3120166	0.60	Permanent Closure	WL
3120172	0.72	Permanent Closure	WL
3120173	0.05	Permanent Closure	WL
3120236	0.13	Permanent Closure	WL
3120279	0.42	Permanent Closure	WL
3125000	2.92	Seasonal Closure	SR/WL/R
3125051	0.58	Permanent Closure	WL
3125051	0.35	Permanent Closure	SR
3125121	0.18	Permanent Closure	WL
3125150	0.56	Permanent Closure	WL
3125151	0.14	Permanent Closure	WL
3125152	0.10	Permanent Closure	WL
3125153	0.06	Permanent Closure	WL
3125240	0.41	Seasonal Closure	SR/WL/R
3125244	0.65	Permanent Closure	WL
3125244	0.72	Decommission	SR
3125374	0.66	Decommission	SR
3125413	0.69	Seasonal Closure	SR/WL/R
3125435	0.15	Seasonal Closure	SR/WL/R
3125436	0.25	Permanent Closure	WL
3125487	0.42	Seasonal Closure	SR/WL/R
3125527	0.70	Permanent Closure	WL
3125531	0.30	Permanent Closure	WL
3125533	0.34	Permanent Closure	WL
3125553	0.29	Permanent Closure	WL
3125555	0.74	Seasonal Closure	SR/WL/R
3125556	0.20	Permanent Closure	SR
3125670	0.22	Permanent Closure	WL
3125744	0.11	Permanent Closure	WL
3125749	0.57	Seasonal Closure	SR/WL/R
3125749	0.71	Permanent Closure	WL
3125751	0.20	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3125755	0.02	Seasonal Closure	SR/WL/R
3125755	0.41	Permanent Closure	WL
3125756	0.20	Permanent Closure	WL
3125761	0.09	Permanent Closure	WL
3125764	0.27	Permanent Closure	WL
3125767	0.20	Permanent Closure	WL
3125789	1.13	Seasonal Closure	SR/WL/R
3125794	0.75	Permanent Closure	WL
3125798	1.88	Seasonal Closure	SR/WL/R
3125911	0.17	Permanent Closure	WL
3125912	1.78	Decommission	SR
3125913	0.63	Permanent Closure	WL
3125916	0.62	Seasonal Closure	SR/WL/R
3125918	1.74	Seasonal Closure	SR/WL/R
3125920	0.41	Permanent Closure	WL
3125920	0.76	Permanent Closure	SR
3125924	1.30	Permanent Closure	WL
3125924	0.25	Permanent Closure	SR
3125926	0.22	Permanent Closure	WL
3125927	0.16	Permanent Closure	WL
3125929	0.13	Permanent Closure	WL
3125930	0.30	Permanent Closure	WL
3125931	0.32	Permanent Closure	WL
3125943	0.50	Permanent Closure	WL
3125947	0.21	Permanent Closure	WL
3125951	0.80	Permanent Closure	WL
3125952	0.25	Permanent Closure	WL
3125975	0.07	Permanent Closure	WL
3125977	0.39	Seasonal Closure	SR/WL/R
3125979	0.41	Permanent Closure	WL
3125979	0.45	Seasonal Closure	SR/WL/R
3125979	1.03	Permanent Closure	WL
3125980	0.20	Permanent Closure	WL
3125981	1.36	Permanent Closure	WL
3125981	0.18	Permanent Closure	SR
3125981	1.25	Seasonal Closure	SR/WL/R
3125983	1.43	Seasonal Closure	SR/WL/R
3125987	0.14	Permanent Closure	WL
3125988	0.29	Permanent Closure	WL
3125989	0.18	Permanent Closure	WL
3125990	0.09	Permanent Closure	WL
3125991	0.37	Seasonal Closure	SR/WL/R
3125993	0.34	Permanent Closure	WL
3125997	0.32	Permanent Closure	WL
3130055	1.13	Permanent Closure	WL
3130057	0.50	Permanent Closure	WL
3130066	0.13	Permanent Closure	WL
3130074	0.48	Permanent Closure	WL
3130077	0.34	Permanent Closure	WL
3130079	0.22	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3130085	0.74	Permanent Closure	WL
3130101	0.60	Decommission	SR
3130129	0.18	Signed Year Round Closure	WL
3130129	1.03	Decommission	SR
3130130	0.31	Permanent Closure	WL
3130616	0.67	Permanent Closure	WL
3130617	0.19	Permanent Closure	WL
3130827	0.57	Seasonal Closure	SR/WL/R
3130988	0.61	Permanent Closure	WL
3130990	0.15	Permanent Closure	WL
3130992	1.31	Permanent Closure	WL
3130993	0.39	Permanent Closure	WL
3130994	0.40	Permanent Closure	WL
3140049	0.17	Permanent Closure	WL
3140051	0.06	Permanent Closure	WL
3140081	0.01	Permanent Closure	WL
3140081	0.02	Permanent Closure	WL
3140108	0.22	Permanent Closure	WL
3140110	0.31	Permanent Closure	WL
3140120	0.93	Seasonal Closure	SR/WL/R
3140121	0.99	Decommission	SR
3140121	0.40	Signed Year Round Closure	WL
3140123	0.77	Signed Year Round Closure	WL
3140125	0.59	Signed Year Round Closure	WL
3140205	0.40	Permanent Closure	WL
3140207	0.13	Permanent Closure	WL
3140211	0.55	Permanent Closure	WL
3140214	0.53	Seasonal Closure	SR/WL/R
3140218	0.28	Decommission	SR
3140220	0.19	Permanent Closure	WL
3145389	0.79	Decommission	SR
3700100	1.06	Decommission	SR
3700117	1.30	Permanent Closure	WL
3700120	0.44	Decommission	SR
3700123	0.05	Permanent Closure	SR
3700138	0.16	Permanent Closure	WL
3700162	0.29	Permanent Closure	WL
3700163	0.15	Permanent Closure	WL
3700167	0.28	Permanent Closure	SR
3700172	0.55	Permanent Closure	WL
3700176	0.54	Permanent Closure	WL
3700177	0.41	Permanent Closure	WL
3700178	0.19	Permanent Closure	WL
3700185	0.44	Permanent Closure	WL
3700185	0.12	Permanent Closure	SR
3700185	0.54	Permanent Closure	WL
3700189	0.00	Permanent Closure	SR
3700189	0.42	Decommission	SR
3700190	0.34	Decommission	SR
3700191	0.31	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700195	0.63	Decommission	SR
3700198	0.16	Decommission	SR
3700206	0.48	Permanent Closure	WL
3700208	0.33	Permanent Closure	SR
3700210	0.61	Permanent Closure	WL
3700211	0.20	Permanent Closure	WL
3700235	0.09	Permanent Closure	SR
3700262	0.11	Permanent Closure	WL
3700264	0.15	Permanent Closure	WL
3700275	0.08	Decommission	SR
3700282	0.28	Permanent Closure	WL
3700283	0.17	Permanent Closure	WL
3700293	0.14	Permanent Closure	WL
3700294	1.54	Decommission	SR
3700297	0.39	Permanent Closure	WL
3700302	0.20	Permanent Closure	WL
3700303	0.51	Permanent Closure	WL
3700304	0.27	Permanent Closure	WL
3700306	0.08	Permanent Closure	WL
3700309	0.50	Permanent Closure	WL
3700311	0.52	Permanent Closure	WL
3700311	0.07	Permanent Closure	SR
3700313	0.24	Permanent Closure	WL
3700320	1.05	Permanent Closure	WL
3700321	0.30	Permanent Closure	WL
3700323	0.19	Permanent Closure	WL
3700325	0.44	Permanent Closure	WL
3700326	0.09	Permanent Closure	SR
3700326	0.52	Permanent Closure	WL
3700327	0.22	Permanent Closure	WL
3700328	0.40	Permanent Closure	WL
3700328	0.07	Permanent Closure	SR
3700329	0.20	Permanent Closure	WL
3700330	0.42	Permanent Closure	WL
3700331	0.06	Permanent Closure	WL
3700333	0.08	Permanent Closure	WL
3700339	0.18	Permanent Closure	WL
3700340	0.32	Permanent Closure	WL
3700341	0.55	Permanent Closure	WL
3700345	0.53	Permanent Closure	WL
3700348	0.32	Permanent Closure	WL
3700358	0.17	Permanent Closure	WL
3700363	0.24	Permanent Closure	SR
3700375	0.07	Permanent Closure	WL
3700376	0.12	Permanent Closure	WL
3700378	0.19	Permanent Closure	SR
3700379	0.79	Decommission	SR
3700380	0.12	Permanent Closure	WL
3700381	0.19	Permanent Closure	SR
3700392	0.17	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700393	0.23	Permanent Closure	WL
3700396	0.06	Permanent Closure	SR
3700425	0.26	Permanent Closure	WL
3700436	0.16	Permanent Closure	SR
3700437	0.11	Permanent Closure	WL
3700438	0.20	Permanent Closure	SR
3700505	0.20	Permanent Closure	WL
3700562	0.22	Permanent Closure	WL
3700564	0.51	Permanent Closure	WL
3700641	0.49	Signed Year Round Closure	admin
3700861	2.32	Decommission	SR
3700941	0.44	Permanent Closure	WL
3700980	0.23	Permanent Closure	WL
3746338	0.09	Permanent Closure	WL
3746339	0.74	Permanent Closure	WL
3746675	1.15	Seasonal Closure	SR/WL/R
3746675	0.23	Permanent Closure	WL
3746681	1.37	Seasonal Closure	SR/WL/R
3746683	1.16	Permanent Closure	SR
3746689	0.44	Seasonal Closure	SR/WL/R
3746694	0.39	Permanent Closure	WL
3746696	0.34	Permanent Closure	WL
3746702	0.43	Decommission	SR
3746703	0.86	Permanent Closure	WL
3746704	1.32	Permanent Closure	WL
3746705	0.12	Permanent Closure	WL
3746707	1.24	Permanent Closure	SR
3746709	0.30	Permanent Closure	WL
3746710	0.21	Permanent Closure	WL
3746711	0.15	Permanent Closure	WL
3746712	0.39	Permanent Closure	WL
3746713	2.86	Seasonal Closure	SR/WL/R
3746720	0.79	Permanent Closure	WL
3746722	0.17	Permanent Closure	WL
3746724	0.08	Permanent Closure	WL
3746726	0.55	Permanent Closure	WL
3746728	0.30	Permanent Closure	WL
3746732	0.11	Permanent Closure	WL
3746734	0.47	Permanent Closure	WL
3746734	0.18	Permanent Closure	SR
3746737	0.24	Permanent Closure	WL
3746739	0.53	Permanent Closure	WL
3746740	0.32	Permanent Closure	SR
3746741	0.58	Signed Year Round Closure	WL
3746741	0.25	Signed Year Round Closure	WL
3746743	0.85	Signed Year Round Closure	WL
3746746	0.21	Signed Year Round Closure	WL
3746752	0.45	Permanent Closure	WL
3746754	0.23	Permanent Closure	WL
3746756	0.23	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3746760	0.57	Permanent Closure	WL
3746763	0.55	Permanent Closure	WL
3746764	0.56	Permanent Closure	WL
3746765	0.18	Permanent Closure	WL
3746766	0.17	Permanent Closure	WL
3746978	0.74	Permanent Closure	SR
3746980	0.88	Permanent Closure	WL
3746981	0.16	Permanent Closure	WL
3746982	0.17	Permanent Closure	WL
3746983	0.58	Seasonal Closure	SR/WL/R
3746985	0.36	Permanent Closure	WL
3746989	0.11	Permanent Closure	WL
3765135	0.37	Decommission	SR
3765137	0.31	Permanent Closure	WL
3765138	1.06	Seasonal Closure	SR/WL/R
3765139	0.49	Permanent Closure	WL
3765140	0.35	Permanent Closure	WL
3765915	0.13	Permanent Closure	WL
3765917	0.74	Permanent Closure	WL
3765919	0.75	Permanent Closure	WL
3765940	0.12	Permanent Closure	WL
3765955	0.09	Permanent Closure	WL
		SR = Sediment Reduction	
		WL = Wildlife	
		RM = Road Maintenance	
		Admin = Administrative Need	

Road Number	Length (miles)	Closure Type	Purpose of Closure
	Alternative 5		
	Access and Travel Management		
3100090	0.29	Permanent Closure	WL
3100243	0.52	Permanent Closure	SR
3100249	0.11	Permanent Closure	WL
3100250	0.29	Permanent Closure	WL
3100259	0.15	Permanent Closure	WL
3100288	0.09	Permanent Closure	WL
3100306	0.15	Permanent Closure	WL
3100319	0.13	Permanent Closure	WL
3100321	0.41	Permanent Closure	SR
3100436	0.18	Permanent Closure	WL
3100437	0.27	Permanent Closure	WL
3100557	0.13	Permanent Closure	WL
3100559	0.27	Permanent Closure	SR
3100612	0.09	Permanent Closure	WL
3100728	0.15	Permanent Closure	WL
3100745	0.49	Decommission	SR
3100858	0.11	Permanent Closure	SR
3100859	0.19	Permanent Closure	WL
3100860	0.24	Decommission	SR
3100864	0.93	Decommission	SR
3100868	0.20	Permanent Closure	WL
3100873	0.07	Permanent Closure	WL
3100885	0.19	Permanent Closure	WL
3100895	0.83	Permanent Closure	WL
3100895	0.35	Permanent Closure	SR
3100943	0.09	Permanent Closure	WL
3100953	0.47	Decommission	SR
3100955	0.21	Decommission	SR
3100957	0.90	Decommission	SR
3110140	0.16	Permanent Closure	SR
3110186	0.11	Permanent Closure	WL
3120126	0.42	Decommission	SR
3120143	0.21	Permanent Closure	WL
3120144	0.13	Permanent Closure	WL
3125051	0.58	Permanent Closure	WL
3125121	0.18	Permanent Closure	WL
3125151	0.14	Permanent Closure	WL
3125152	0.10	Permanent Closure	WL
3125153	0.06	Permanent Closure	WL
3125244	0.72	Decommission	SR
3125751	0.20	Permanent Closure	WL
3125756	0.20	Permanent Closure	WL
3125912	1.78	Decommission	SR
3125912	0.34	Seasonal Closure	SR/WL/R
3125920	0.60	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3125924	0.54	Permanent Closure	WL
3125929	0.13	Permanent Closure	WL
3125930	0.30	Permanent Closure	WL
3125975	0.07	Permanent Closure	WL
3125987	0.14	Permanent Closure	WL
3125988	0.14	Permanent Closure	WL
3125990	0.09	Permanent Closure	WL
3130066	0.13	Permanent Closure	WL
3130101	0.60	Decommission	SR
3130130	0.31	Permanent Closure	WL
3130242	0.14	Decommission	SR
3130616	0.36	Permanent Closure	WL
3130617	0.19	Permanent Closure	WL
3130994	0.40	Permanent Closure	WL
3140049	0.17	Permanent Closure	WL
3140051	0.06	Permanent Closure	WL
3140108	0.22	Permanent Closure	WL
3140110	0.31	Permanent Closure	WL
3140121	0.99	Permanent Closure	SR
3140207	0.13	Permanent Closure	WL
3140220	0.19	Permanent Closure	WL
3700100	1.06	Decommission	SR
3700117	0.13	Permanent Closure	WL
3700138	0.16	Permanent Closure	WL
3700163	0.07	Permanent Closure	WL
3700167	0.28	Decommission	SR
3700172	0.21	Permanent Closure	WL
3700178	0.19	Permanent Closure	WL
3700189	0.42	Permanent Closure	SR
3700190	0.34	Permanent Closure	SR
3700195	0.63	Decommission	SR
3700198	0.16	Decommission	SR
3700206	0.15	Permanent Closure	WL
3700208	0.33	Permanent Closure	SR
3700235	0.09	Permanent Closure	SR
3700262	0.11	Permanent Closure	WL
3700264	0.11	Permanent Closure	WL
3700275	0.08	Decommission	SR
3700282	0.18	Permanent Closure	WL
3700294	1.54	Seasonal Closure	SR/WL/R
3700306	0.08	Permanent Closure	WL
3700323	0.19	Permanent Closure	WL
3700328	0.13	Permanent Closure	WL
3700329	0.20	Permanent Closure	WL
3700330	0.23	Permanent Closure	WL
3700331	0.06	Permanent Closure	WL
3700333	0.08	Permanent Closure	WL
3700341	0.07	Permanent Closure	WL
3700363	0.24	Permanent Closure	SR
3700376	0.12	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700380	0.12	Permanent Closure	WL
3700392	0.17	Permanent Closure	WL
3700393	0.23	Permanent Closure	WL
3700425	0.22	Permanent Closure	WL
3700437	0.11	Permanent Closure	WL
3700438	0.20	Permanent Closure	SR
3700505	0.20	Permanent Closure	WL
3700562	0.13	Permanent Closure	WL
3700641	0.49	Signed Year Round Closure	Admin
3700861	2.32	Seasonal Closure	SR/WL/R
3746338	0.09	Permanent Closure	WL
3746694	0.39	Permanent Closure	WL
3746696	0.34	Permanent Closure	WL
3746705	0.12	Permanent Closure	WL
3746707	1.24	Permanent Closure	SR
3746710	0.21	Permanent Closure	WL
3746711	0.15	Permanent Closure	WL
3746732	0.11	Permanent Closure	WL
3746746	0.21	Permanent Closure	SR
3746756	0.12	Permanent Closure	WL
3746760	0.25	Permanent Closure	WL
3746765	0.18	Permanent Closure	WL
3746766	0.17	Permanent Closure	WL
3746978	0.05	Permanent Closure	SR
3746981	0.16	Permanent Closure	WL
3746982	0.17	Permanent Closure	WL
3746989	0.11	Permanent Closure	WL
3765955	0.09	Permanent Closure	WL
		SR = Sediment Reduction	
		WL = Wildlife	
		RM = Road Maintenance	
		Admin = Administrative Need	

Road Number	Length (miles)	Closure Type	Purpose of Closure
Alternatives 6 and 7a			
Access and Travel Management			
3100033	0.11	Permanent Closure	WL
3100036	0.85	Permanent Closure	WL
3100090	0.34	Permanent Closure	WL
3100096	0.37	Permanent Closure	WL
3100104	0.99	Permanent Closure	WL
3100105	0.44	Permanent Closure	WL
3100193	0.21	Permanent Closure	WL
3100195	2.19	Seasonal Closure	SR/WL/R
3100208	0.77	Permanent Closure	WL
3100210	0.20	Permanent Closure	SR
3100212	0.25	Permanent Closure	WL
3100223	0.25	Permanent Closure	WL
3100224	0.26	Permanent Closure	WL
3100224	0.05	Permanent Closure	SR
3100243	0.52	Permanent Closure	SR
3100249	0.11	Permanent Closure	WL
3100250	0.29	Permanent Closure	WL
3100259	0.15	Permanent Closure	WL
3100273	0.44	Permanent Closure	WL
3100286	0.83	Reconstruct	SR
3100288	0.09	Permanent Closure	WL
3100294	0.10	Permanent Closure	WL
3100305	0.32	Permanent Closure	WL
3100306	0.15	Permanent Closure	WL
3100319	0.13	Permanent Closure	WL
3100321	0.41	Permanent Closure	SR
3100334	0.13	Permanent Closure	WL
3100415	0.33	Permanent Closure	SR
3100430	0.32	Permanent Closure	WL
3100436	0.18	Permanent Closure	WL
3100437	0.27	Permanent Closure	WL
3100557	0.13	Permanent Closure	WL
3100559	0.27	Permanent Closure	SR
3100571	0.26	Permanent Closure	WL
3100601	0.20	Permanent Closure	WL
3100601	0.39	Permanent Closure	SR
3100612	0.09	Permanent Closure	WL
3100728	0.15	Permanent Closure	WL
3100745	0.49	Decommission	SR
3100843	0.24	Permanent Closure	WL
3100858	0.11	Permanent Closure	SR
3100859	0.19	Permanent Closure	WL
3100860	2.33	Reconstruct	SR
3100860	2.34	Seasonal Closure	SR/WL/R
3100864	0.93	Decommission	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3100866	0.16	Permanent Closure	SR
3100866	0.27	Permanent Closure	WL
3100868	0.20	Permanent Closure	WL
3100870	0.58	Permanent Closure	WL
3100873	0.07	Permanent Closure	WL
3100885	0.19	Permanent Closure	WL
3100895	0.83	Permanent Closure	WL
3100895	0.35	Permanent Closure	SR
3100939	0.22	Permanent Closure	WL
3100943	0.09	Permanent Closure	WL
3100953	0.47	Decommission	SR
3100955	0.21	Decommission	SR
3100957	0.90	Decommission	SR
3100963	0.02	Permanent Closure	SR
3100964	0.10	Permanent Closure	SR
3110111	0.22	Permanent Closure	WL
3110140	0.16	Permanent Closure	SR
3110176	0.09	Permanent Closure	WL
3110181	0.46	Permanent Closure	WL
3110186	0.11	Permanent Closure	WL
3110986	0.13	Permanent Closure	WL
3120123	0.03	Permanent Closure	WL
3120123	0.17	Permanent Closure	WL
3120126	0.42	Decommission	SR
3120143	0.21	Permanent Closure	WL
3120144	0.13	Permanent Closure	WL
3120155	0.36	Permanent Closure	SR
3120155	0.49	Permanent Closure	WL
3120166	0.60	Permanent Closure	WL
3120172	0.72	Permanent Closure	WL
3120173	0.05	Permanent Closure	WL
3120236	0.13	Permanent Closure	WL
3120279	0.42	Permanent Closure	WL
3125051	0.58	Permanent Closure	WL
3125121	0.18	Permanent Closure	WL
3125150	0.56	Permanent Closure	WL
3125151	0.14	Permanent Closure	WL
3125152	0.10	Permanent Closure	WL
3125153	0.06	Permanent Closure	WL
3125240	0.41	Permanent Closure	WL
3125244	0.72	Decommission	SR
3125435	0.15	Permanent Closure	WL
3125436	0.25	Permanent Closure	WL
3125527	0.69	Permanent Closure	WL
3125531	0.30	Permanent Closure	WL
3125533	0.34	Permanent Closure	WL
3125553	0.29	Permanent Closure	WL
3125555	0.74	Permanent Closure	SR
3125556	0.20	Permanent Closure	SR
3125670	0.22	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3125744	0.11	Permanent Closure	WL
3125749	0.71	Permanent Closure	WL
3125751	0.20	Permanent Closure	WL
3125755	0.43	Permanent Closure	WL
3125756	0.20	Permanent Closure	WL
3125761	0.09	Permanent Closure	WL
3125764	0.27	Permanent Closure	WL
3125767	0.20	Permanent Closure	WL
3125794	0.10	Permanent Closure	WL
3125911	0.17	Permanent Closure	WL
3125912	2.12	Reconstruct	SR
3125920	1.01	Permanent Closure	WL
3125920	0.13	Permanent Closure	SR
3125924	1.30	Permanent Closure	WL
3125924	0.25	Permanent Closure	SR
3125926	0.22	Permanent Closure	WL
3125927	0.16	Permanent Closure	WL
3125929	0.13	Permanent Closure	WL
3125930	0.30	Permanent Closure	WL
3125931	0.32	Permanent Closure	WL
3125943	0.50	Permanent Closure	WL
3125947	0.21	Permanent Closure	WL
3125951	0.80	Seasonal Closure	SR/WL/R
3125952	0.25	Permanent Closure	WL
3125971	1.81	Reconstruct	SR
3125972	0.14	Permanent Closure	WL
3125975	0.07	Permanent Closure	WL
3125979	0.41	Permanent Closure	WL
3125979	1.03	Permanent Closure	WL
3125980	0.20	Permanent Closure	WL
3125987	0.14	Permanent Closure	WL
3125988	0.29	Permanent Closure	WL
3125989	0.18	Permanent Closure	WL
3125990	0.09	Permanent Closure	WL
3125993	0.34	Permanent Closure	WL
3125997	0.32	Permanent Closure	WL
3130055	1.13	Permanent Closure	WL
3130066	0.13	Permanent Closure	WL
3130074	0.51	Permanent Closure	WL
3130077	0.34	Permanent Closure	WL
3130079	0.22	Permanent Closure	WL
3130101	0.60	Decommission	SR
3130129	2.72	Reconstruct	SR
3130130	0.31	Permanent Closure	WL
3130242	0.14	Decommission	SR
3130616	0.67	Permanent Closure	WL
3130617	0.19	Permanent Closure	WL
3130990	0.15	Permanent Closure	WL
3130993	0.39	Permanent Closure	WL
3130994	0.40	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3140049	0.17	Permanent Closure	WL
3140051	0.06	Permanent Closure	WL
3140108	0.22	Permanent Closure	WL
3140110	0.31	Permanent Closure	WL
3140121	0.99	Permanent Closure	SR
3140123	0.37	Signed Year Round Closure	WL
3140205	0.40	Permanent Closure	WL
3140207	0.13	Permanent Closure	WL
3140214	0.53	Seasonal Closure	SR/WL/R
3140218	0.28	Permanent Closure	SR
3140220	0.19	Permanent Closure	WL
3140221	0.11	Permanent Closure	SR
3700100	1.06	Decommission	SR
3700117	1.30	Permanent Closure	WL
3700120	0.44	Permanent Closure	SR
3700138	0.16	Permanent Closure	WL
3700163	0.07	Permanent Closure	WL
3700167	0.28	Decommission	SR
3700172	0.55	Permanent Closure	WL
3700176	0.54	Permanent Closure	WL
3700177	0.41	Permanent Closure	WL
3700178	0.19	Permanent Closure	WL
3700185	0.12	Permanent Closure	SR
3700189	0.42	Permanent Closure	SR
3700190	0.34	Permanent Closure	SR
3700192	0.03	Permanent Closure	SR
3700195	0.63	Decommission	SR
3700198	0.16	Decommission	SR
3700206	0.15	Permanent Closure	WL
3700208	0.33	Permanent Closure	SR
3700235	0.09	Permanent Closure	SR
3700262	0.11	Permanent Closure	WL
3700264	0.11	Permanent Closure	WL
3700275	0.08	Decommission	SR
3700282	0.28	Permanent Closure	WL
3700283	0.17	Permanent Closure	WL
3700294	1.54	Seasonal Closure	SR/WL/R
3700302	0.20	Permanent Closure	WL
3700303	0.51	Permanent Closure	WL
3700306	0.08	Permanent Closure	WL
3700320	0.97	Permanent Closure	WL
3700321	0.30	Permanent Closure	WL
3700322	0.39	Permanent Closure	SR
3700323	0.19	Permanent Closure	WL
3700327	0.22	Permanent Closure	WL
3700328	0.40	Permanent Closure	WL
3700328	0.07	Permanent Closure	SR
3700329	0.20	Permanent Closure	WL
3700330	0.42	Permanent Closure	WL
3700331	0.06	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700333	0.08	Permanent Closure	WL
3700339	0.18	Permanent Closure	WL
3700340	0.32	Permanent Closure	WL
3700341	0.55	Permanent Closure	WL
3700348	0.32	Permanent Closure	WL
3700358	0.17	Permanent Closure	WL
3700363	0.24	Permanent Closure	SR
3700375	0.07	Permanent Closure	WL
3700376	0.12	Permanent Closure	WL
3700379	0.61	Permanent Closure	SR
3700379	0.18	Decommission	SR
3700380	0.12	Permanent Closure	WL
3700381	0.19	Permanent Closure	SR
3700392	0.17	Permanent Closure	WL
3700393	0.23	Permanent Closure	WL
3700396	0.11	Permanent Closure	SR
3700425	0.26	Permanent Closure	WL
3700436	0.16	Permanent Closure	SR
3700437	0.11	Permanent Closure	WL
3700438	0.20	Permanent Closure	SR
3700505	0.20	Permanent Closure	WL
3700562	0.13	Permanent Closure	WL
3700564	0.51	Permanent Closure	WL
3700641	0.49	Signed Year Round Closure	admin
3700861	2.32	Seasonal Closure	SR/WL/R
3700941	0.44	Permanent Closure	WL
3700980	0.23	Permanent Closure	WL
3746338	0.09	Permanent Closure	WL
3746675	0.23	Permanent Closure	WL
3746683	1.16	Permanent Closure	SR
3746694	0.39	Permanent Closure	WL
3746696	0.34	Permanent Closure	WL
3746702	0.43	Permanent Closure	SR
3746705	0.12	Permanent Closure	WL
3746707	1.24	Permanent Closure	SR
3746709	0.30	Permanent Closure	WL
3746710	0.21	Permanent Closure	WL
3746711	0.15	Permanent Closure	WL
3746712	0.39	Permanent Closure	WL
3746722	0.17	Permanent Closure	WL
3746724	0.08	Permanent Closure	WL
3746726	0.55	Permanent Closure	WL
3746728	0.30	Permanent Closure	WL
3746732	0.11	Permanent Closure	WL
3746734	0.47	Permanent Closure	WL
3746734	0.18	Permanent Closure	SR
3746737	0.24	Permanent Closure	WL
3746739	0.53	Permanent Closure	WL
3746740	0.32	Permanent Closure	SR
3746746	0.21	Permanent Closure	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3746756	0.12	Permanent Closure	WL
3746760	0.25	Permanent Closure	WL
3746765	0.18	Permanent Closure	WL
3746766	0.17	Permanent Closure	WL
3746978	0.05	Permanent Closure	SR
3746981	0.16	Permanent Closure	WL
3746982	0.17	Permanent Closure	WL
3746985	0.36	Permanent Closure	WL
3746989	0.11	Permanent Closure	WL
3765139	0.49	Permanent Closure	WL
3765140	0.35	Permanent Closure	WL
3765915	0.13	Permanent Closure	WL
3765940	0.12	Permanent Closure	WL
3765955	0.09	Permanent Closure	WL
		SR = Sediment Reduction	
		WL = Wildlife	
		RM = Road Maintenance	
		Admin = Administrative Need	

Road Number	Length (miles)	Closure Type	Purpose of Closure
Preferred Alternative (Alt. 7)			
Access and Travel Management			
3100033	0.11	Permanent Closure	WL
3100035	4.00	Decommission	SR
3100036	0.85	Permanent Closure	WL
3100090	0.34	Permanent Closure	WL
3100096	0.37	Permanent Closure	WL
3100104	0.99	Permanent Closure	WL
3100105	0.44	Permanent Closure	WL
3100193	0.21	Permanent Closure	WL
3100195	2.19	Seasonal Closure	SR/WL/R
3100208	0.77	Permanent Closure	WL
3100210	0.20	Permanent Closure	SR
3100212	0.25	Permanent Closure	WL
3100223	0.25	Permanent Closure	WL
3100224	0.26	Permanent Closure	WL
3100224	0.05	Permanent Closure	SR
3100243	0.52	Permanent Closure	SR
3100249	0.11	Permanent Closure	WL
3100250	0.29	Permanent Closure	WL
3100259	0.15	Permanent Closure	WL
3100273	0.44	Permanent Closure	WL
3100286	0.83	Reconstruct	SR
3100288	0.09	Permanent Closure	WL
3100294	0.10	Permanent Closure	WL
3100305	0.32	Permanent Closure	WL
3100306	0.15	Permanent Closure	WL
3100319	0.13	Permanent Closure	WL
3100321	0.41	Permanent Closure	SR
3100334	0.13	Permanent Closure	WL
3100415	0.33	Permanent Closure	SR
3100430	0.32	Permanent Closure	WL
3100436	0.18	Permanent Closure	WL
3100437	0.27	Permanent Closure	WL
3100557	0.13	Permanent Closure	WL
3100559	0.27	Permanent Closure	SR
3100571	0.26	Permanent Closure	WL
3100601	0.20	Permanent Closure	WL
3100601	0.39	Permanent Closure	SR
3100612	0.09	Permanent Closure	WL
3100728	0.15	Permanent Closure	WL
3100745	0.49	Decommission	SR
3100843	0.24	Permanent Closure	WL
3100858	0.11	Permanent Closure	SR
3100859	0.19	Permanent Closure	WL
3100860	2.33	Reconstruct	SR
3100860	2.34	Seasonal Closure	SR/WL/R

Road Number	Length (miles)	Closure Type	Purpose of Closure
3100864	0.93	Decommission	SR
3100866	0.16	Permanent Closure	SR
3100866	0.27	Permanent Closure	WL
3100868	0.20	Permanent Closure	WL
3100870	0.58	Permanent Closure	WL
3100873	0.07	Permanent Closure	WL
3100885	0.19	Permanent Closure	WL
3100895	0.83	Permanent Closure	WL
3100895	0.35	Permanent Closure	SR
3100939	0.22	Permanent Closure	WL
3100943	0.09	Permanent Closure	WL
3100953	0.47	Decommission	SR
3100955	0.21	Decommission	SR
3100957	0.90	Decommission	SR
3100963	0.02	Permanent Closure	SR
3100964	0.10	Permanent Closure	SR
3110111	0.22	Permanent Closure	WL
3110140	0.16	Permanent Closure	SR
3110176	0.09	Permanent Closure	WL
3110181	0.46	Permanent Closure	WL
3110186	0.11	Permanent Closure	WL
3110986	0.13	Permanent Closure	WL
3120123	0.03	Permanent Closure	WL
3120123	0.17	Permanent Closure	WL
3120126	0.42	Decommission	SR
3120143	0.21	Permanent Closure	WL
3120144	0.13	Permanent Closure	WL
3120155	0.36	Permanent Closure	SR
3120155	0.49	Permanent Closure	WL
3120166	0.60	Permanent Closure	WL
3120172	0.72	Permanent Closure	WL
3120173	0.05	Permanent Closure	WL
3120236	0.13	Permanent Closure	WL
3120279	0.42	Permanent Closure	WL
3125051	0.58	Permanent Closure	WL
3125121	0.18	Permanent Closure	WL
3125150	0.56	Permanent Closure	WL
3125151	0.14	Permanent Closure	WL
3125152	0.10	Permanent Closure	WL
3125153	0.06	Permanent Closure	WL
3125240	0.41	Permanent Closure	WL
3125244	0.72	Decommission	SR
3125435	0.15	Permanent Closure	WL
3125436	0.25	Permanent Closure	WL
3125527	0.69	Permanent Closure	WL
3125531	0.30	Permanent Closure	WL
3125533	0.34	Permanent Closure	WL
3125553	0.29	Permanent Closure	WL
3125555	0.74	Permanent Closure	SR
3125556	0.20	Permanent Closure	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3125670	0.22	Permanent Closure	WL
3125744	0.11	Permanent Closure	WL
3125749	0.71	Permanent Closure	WL
3125751	0.20	Permanent Closure	WL
3125755	0.43	Permanent Closure	WL
3125756	0.20	Permanent Closure	WL
3125761	0.09	Permanent Closure	WL
3125764	0.27	Permanent Closure	WL
3125767	0.20	Permanent Closure	WL
3125794	0.10	Permanent Closure	WL
3125911	0.17	Permanent Closure	WL
3125912	2.12	Reconstruct	SR
3125920	1.01	Permanent Closure	WL
3125920	0.13	Permanent Closure	SR
3125924	1.30	Permanent Closure	WL
3125924	0.25	Permanent Closure	SR
3125926	0.22	Permanent Closure	WL
3125927	0.16	Permanent Closure	WL
3125929	0.13	Permanent Closure	WL
3125930	0.30	Permanent Closure	WL
3125931	0.32	Permanent Closure	WL
3125943	0.50	Permanent Closure	WL
3125947	0.21	Permanent Closure	WL
3125951	0.80	Seasonal Closure	SR/WL/R
3125952	0.25	Permanent Closure	WL
3125971	1.81	Reconstruct	SR
3125972	0.14	Permanent Closure	WL
3125975	0.07	Permanent Closure	WL
3125979	0.41	Permanent Closure	WL
3125979	1.03	Permanent Closure	WL
3125980	0.20	Permanent Closure	WL
3125987	0.14	Permanent Closure	WL
3125988	0.29	Permanent Closure	WL
3125989	0.18	Permanent Closure	WL
3125990	0.09	Permanent Closure	WL
3125993	0.34	Permanent Closure	WL
3125997	0.32	Permanent Closure	WL
3130055	1.13	Permanent Closure	WL
3130066	0.13	Permanent Closure	WL
3130074	0.51	Permanent Closure	WL
3130077	0.34	Permanent Closure	WL
3130079	0.22	Permanent Closure	WL
3130101	0.60	Decommission	SR
3130129	2.72	Reconstruct	SR
3130130	0.31	Permanent Closure	WL
3130242	0.14	Decommission	SR
3130616	0.67	Permanent Closure	WL
3130617	0.19	Permanent Closure	WL
3130990	0.15	Permanent Closure	WL
3130993	0.39	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3130994	0.40	Permanent Closure	WL
3140049	0.17	Permanent Closure	WL
3140051	0.06	Permanent Closure	WL
3140108	0.22	Permanent Closure	WL
3140110	0.31	Permanent Closure	WL
3140121	0.99	Permanent Closure	SR
3140123	0.37	Signed Year Round Closure	WL
3140205	0.40	Permanent Closure	WL
3140207	0.13	Permanent Closure	WL
3140214	0.53	Seasonal Closure	SR/WL/R
3140218	0.28	Permanent Closure	SR
3140220	0.19	Permanent Closure	WL
3140221	0.11	Permanent Closure	SR
3700100	1.06	Decommission	SR
3700117	1.30	Permanent Closure	WL
3700120	0.44	Permanent Closure	SR
3700138	0.16	Permanent Closure	WL
3700163	0.07	Permanent Closure	WL
3700167	0.28	Decommission	SR
3700172	0.55	Permanent Closure	WL
3700176	0.54	Permanent Closure	WL
3700177	0.41	Permanent Closure	WL
3700178	0.19	Permanent Closure	WL
3700185	0.12	Permanent Closure	SR
3700189	0.42	Permanent Closure	SR
3700190	0.34	Permanent Closure	SR
3700192	0.03	Permanent Closure	SR
3700195	0.63	Decommission	SR
3700198	0.16	Decommission	SR
3700206	0.15	Permanent Closure	WL
3700208	0.33	Permanent Closure	SR
3700235	0.09	Permanent Closure	SR
3700262	0.11	Permanent Closure	WL
3700264	0.11	Permanent Closure	WL
3700275	0.08	Decommission	SR
3700282	0.28	Permanent Closure	WL
3700283	0.17	Permanent Closure	WL
3700294	1.54	Seasonal Closure	SR/WL/R
3700302	0.20	Permanent Closure	WL
3700303	0.51	Permanent Closure	WL
3700306	0.08	Permanent Closure	WL
3700320	0.97	Permanent Closure	WL
3700321	0.30	Permanent Closure	WL
3700322	0.39	Permanent Closure	SR
3700323	0.19	Permanent Closure	WL
3700327	0.22	Permanent Closure	WL
3700328	0.40	Permanent Closure	WL
3700328	0.07	Permanent Closure	SR
3700329	0.20	Permanent Closure	WL
3700330	0.42	Permanent Closure	WL

Road Number	Length (miles)	Closure Type	Purpose of Closure
3700331	0.06	Permanent Closure	WL
3700333	0.08	Permanent Closure	WL
3700339	0.18	Permanent Closure	WL
3700340	0.32	Permanent Closure	WL
3700341	0.55	Permanent Closure	WL
3700348	0.32	Permanent Closure	WL
3700358	0.17	Permanent Closure	WL
3700363	0.24	Permanent Closure	SR
3700375	0.07	Permanent Closure	WL
3700376	0.12	Permanent Closure	WL
3700379	0.61	Permanent Closure	SR
3700379	0.18	Decommission	SR
3700380	0.12	Permanent Closure	WL
3700381	0.19	Permanent Closure	SR
3700392	0.17	Permanent Closure	WL
3700393	0.23	Permanent Closure	WL
3700396	0.11	Permanent Closure	SR
3700425	0.26	Permanent Closure	WL
3700436	0.16	Permanent Closure	SR
3700437	0.11	Permanent Closure	WL
3700438	0.20	Permanent Closure	SR
3700505	0.20	Permanent Closure	WL
3700562	0.13	Permanent Closure	WL
3700564	0.51	Permanent Closure	WL
3700641	0.49	Signed Year Round Closure	Admin
3700861	2.32	Seasonal Closure	SR/WL/R
3700941	0.44	Permanent Closure	WL
3700980	0.23	Permanent Closure	WL
3746338	0.09	Permanent Closure	WL
3746675	0.23	Permanent Closure	WL
3746683	1.16	Permanent Closure	SR
3746694	0.39	Permanent Closure	WL
3746696	0.34	Permanent Closure	WL
3746702	0.43	Permanent Closure	SR
3746705	0.12	Permanent Closure	WL
3746707	1.24	Permanent Closure	SR
3746709	0.30	Permanent Closure	WL
3746710	0.21	Permanent Closure	WL
3746711	0.15	Permanent Closure	WL
3746712	0.39	Permanent Closure	WL
3746722	0.17	Permanent Closure	WL
3746724	0.08	Permanent Closure	WL
3746726	0.55	Permanent Closure	WL
3746728	0.30	Permanent Closure	WL
3746732	0.11	Permanent Closure	WL
3746734	0.47	Permanent Closure	WL
3746734	0.18	Permanent Closure	SR
3746737	0.24	Permanent Closure	WL
3746739	0.53	Permanent Closure	WL
3746740	0.32	Permanent Closure	SR

Road Number	Length (miles)	Closure Type	Purpose of Closure
3746746	0.21	Permanent Closure	SR
3746756	0.12	Permanent Closure	WL
3746760	0.25	Permanent Closure	WL
3746765	0.18	Permanent Closure	WL
3746766	0.17	Permanent Closure	WL
3746978	0.05	Permanent Closure	SR
3746981	0.16	Permanent Closure	WL
3746982	0.17	Permanent Closure	WL
3746985	0.36	Permanent Closure	WL
3746989	0.11	Permanent Closure	WL
3765139	0.49	Permanent Closure	WL
3765140	0.35	Permanent Closure	WL
3765915	0.13	Permanent Closure	WL
3765940	0.12	Permanent Closure	WL
3765955	0.09	Permanent Closure	WL
		SR = Sediment Reduction	
		WL = Wildlife	
		RM = Road Maintenance	
		Admin = Administrative Need	

SILVIES CANYON ROADS ANALYSIS

JULY 2002

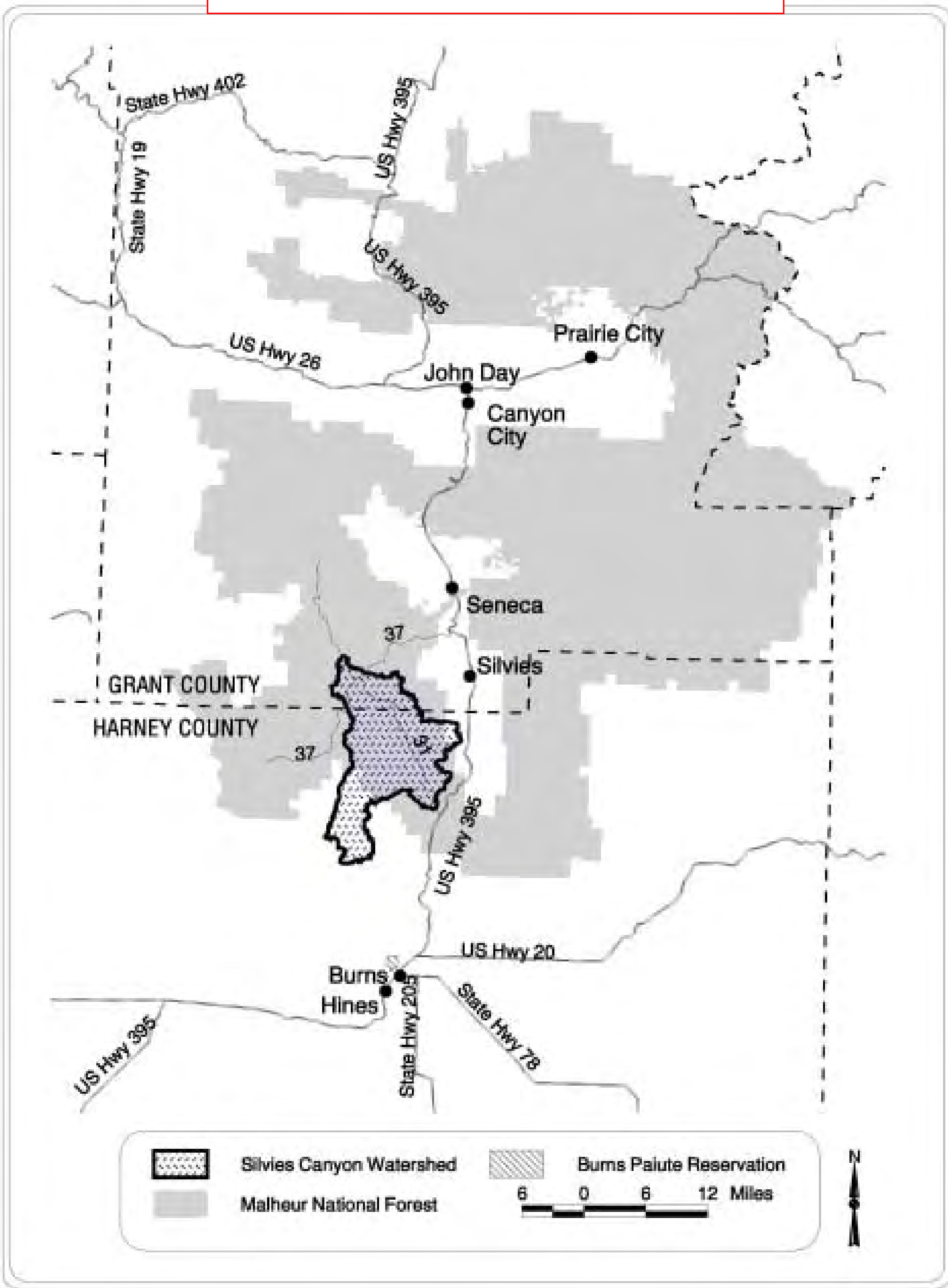
SILVIES CANYON WATERSHED RESTORATION PROJECT

ROADS ANALYSIS
July 2002

Prepared by ___________________________________ Date ________________
Engineering/Writer-Editor

Approved by___________________________________ Date ________________
Emigrant Creek District Ranger

SILVIES CANYON WATERSHED AREA MAP



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Silvies Canyon Watershed Roads Analysis

Background and Purpose

Land management strategies and the road maintenance budget have changed significantly during the past decade. On March 3, 2000, the Forest Service published its proposed transportation system policy revisions in the Federal Register (65 FR 43). Decisions to decommission, reconstruct, construct, and maintain roads are to be informed by a science based roads analysis. Miscellaneous Report FS-643, **Roads Analysis: Informing Decisions About Managing the National Forest Transportation System,** was published in August of 1999, and describes in detail the roads analysis process. **FSM 7700 (1/12/2001), Chapter 7710, Transportation Atlas, Records, and Analysis, Section 77**12, provides direction and policy related to transportation analysis and the roads analysis process.

Road systems are expensive, valuable, and potentially damaging, and an important stewardship element of Forest Land Management. The intent of a Roads Analysis is to look at the current road system, and whether it needs to be changed to reduce impacts, maintenance costs, and better fit today's needs. Roads Analyses should identify roads with little utility and high resource impacts, and roads with high utility and high resource impacts, and draw distinctions between benefits and effects.

The Roads Analysis process should focus on identifying the "minimum road system" needed for safe and efficient travel and for administration, utilization, and protection of National Forest System Lands, and produce a strategy that can be used to resize and change the existing road system to fit today's needs, which can be used when (funding) opportunities arise.

The results of a Roads Analysis are intended to guide future actions, not prevent them.

The purpose of a Roads Analysis is to ensure the Forest Transportation System:

- Provides safe access and meets the needs of communities and Forest users;
- Facilitates the implementation of the Land and Resource Management Plan (LRMP);
- Allows for economical and efficient management within likely budget levels:
- Meets current and future resource management objectives;
- Begins to reverse adverse ecological impacts, to the extent practicable.

Development of This Roads Analysis

The Roads Analysis for the Silvies Canyon Watershed began as an Access and Travel Management (ATM) Plan that addressed every road in the project area. Maps and road lists with proposed closures can be found in the Watershed Analysis (November 2000) or the Draft Environmental Impact Statement (DEIS) (February 2001) and are included by reference in this Roads Analysis. At the time the project began it was assumed the project would be completed before a Roads Analysis was required, but steps were taken so that the analysis could easily be used for a Roads Analysis.

Figure 4-1, Page 4-7, of the DEIS is a Summary of Effect to the ATM and road treatment comparisons between alternatives that were offered in the DEIS.

One of the assumptions that were made from the beginning of the process is that the main roads would be addressed in a Forest Wide Roads Analysis and the Silvies Canyon site-specific analysis would not change the existing road management objectives for those roads.

Previous Analysis and Decisions

Sixty-three miles of existing roads within the Silvies Canyon Watershed Analysis (WA) area have either previously been identified as closed, or proposed to be closed under past environmental documents, historic closures, or closures which have been breached.

The **Silvies Canyon Watershed Analysis w**as completed in November of 2000, which covered the approximate 65,000 acres within the jurisdiction and administration of the Malheur National Forest (reference map #3 in the WA). This analysis made a number of recommendations related to roads and road management, one of which was to update ATM plans for the analysis area. A DEIS for the Silvies Canyon Watershed Restoration Project was completed in February 2001, with an accompanying Summary document. A Combined Biological Evaluation/Biological Assessment (BA/BE) was included in the DEIS as Appendix C. A Supplemental DEIS was completed in November 2001.

The **Joaquin Commercial Thinning Review (Decision Notice and Finding of No Significant Impact)** dated April 14, 1992, and supporting Environment Assessment made the decision to close numerous FS Roads. This environmental document is discussed in Summary and Recommendations, pages 12 and 13.

Location and Scope

The Silvies Canyon Roads Analysis area is located about 20 air miles north of Burns, Oregon. The analysis area includes all of seven subwatersheds that are within the Silvies Canyon Watershed, Silvies Sub-Basin of the Oregon Closed Basin (reference Map #1 and Map #2 of the Silvies Canyon Watershed Analysis). Table 1 displays the approximate number of acres in each subwatershed. Currently there are approximately 312 miles of open roads, excluding the 63 miles which were identified for closure under previous decisions.

Table 1 – Subwatersheds Within the Watershed

Subwatershed	Subwatershed #	Acres*
Boulder/Fawn	60909	9,251
Burnt Mt	60913	9,512
Myrtle Creek	60903	7,713
Myrtle Park	60905	19,571
Red Hill	60901	18,490
Sage Hen Creek	60906	9,953
Stancliff Creek	60911	7,011

*Includes other ownership

Objectives

The primary objectives of this Roads Analysis are to:

- Identify the need for changes by comparing the current road system to the desired condition;
- Improve watershed conditions and reduce road related impacts, specifically addressing impacts to water quality, fish habitat, and wildlife habitat.
- Balance the need for access with the need to minimize risks by examining ecological, social and economic issues related to roads;
- Furnish maps, tables, and narratives or references that display and describe transportation management recommendations and opportunities that will address future access needs, probable road maintenance funding, and environmental concerns.

Existing Road System Conditions (including benefits, problems, and risks):

Most of the current roads were constructed primarily to support fire suppression (see Step 4, page 10 of the WA) and timber-related land management objectives. Each mile of constructed road is dependent on annual maintenance to keep the road safe for users, environmental risks to an acceptable level, and to protect the road investment. These roads were constructed with the expectation that timber-based land allocations would generate funding for annual road maintenance on a long-term basis.

The **Land and Resource Management Plan** (LRMP) for the Malheur National Forest (1990) displayed projected timber harvest of over 200 MMBF annually. Amendments to the plan, listing of Threatened and Endangered (T&E) species, and other recent developments have limited the amount of annual timber harvest from the Forest. As a result, the opportunities to reconstruct or maintain roads through timber sales activities have declined proportionally during the past decade. The Cooperative Work Forest Service (CWFS) trust funds that were collected through deposits generated from log haul have also declined substantially within the same timeframe.

A cursory comparison between the total funding the Forest receives to perform road maintenance today compared to the available funding a decade ago indicates that the total amount has not changed significantly. One of the major changes has been the increase in road maintenance needed because timber sale activity that maintained many of the roads has decreased. The Forest has recently acquired the added road maintenance responsibilities for the Snow Mountain District, which added over 2000 miles of roads to the maintenance program. So while the cost per mile to accomplish road maintenance has risen steadily over the past decade, the total funding has not. The bottom line is that the Forest has far less funds available to maintain a larger number of road miles, and receives limited contributions through timber sale activities to help accomplish the work.

In recent years, most of the available funding has been directed towards maintaining the Forest Arterial and Collector roads (Level 3 to 5 roads), which receive the highest traffic use. The maintenance needs of local roads (Level 1 and 2 roads) have usually been deferred, because the funds to maintain the roads to standard are simply unavailable. The overall result is that most of the Forest road system is in a downward or deteriorating condition, and this is particularly true for many Level 2 roads, which remain open despite receiving very little routine maintenance. (See Table 2 on page 9 for maintenance levels within the Silvies Canyon Watershed Analysis Area.) Specifically noted here is Forest Road 3130, which has two segments, 2.9 miles of Level 3 and 6.2 miles of Level 2. This is a loop road that accesses several parcels of private property and is to remain open. The Level 3 portion has received maintenance within the last 4 years. The Level 2 portion has received no maintenance and has areas of highly erosive soils, with plugged culverts, sediment-filled side ditches, buried catch basins, and severe rutting.

The road system continues to serve a wide variety of resources, including recreation, timber, range, and private property. Other man-made routes within the analysis area include trails, snowmobile routes, mountain bike trails, railroad grades, and irrigation diversions and ditches. Approximately 11,776 acres of roadless area are contained within the Silvies and Myrtle Creek drainages.

Stream reaches have been impacted by road location, construction, and maintenance (or lack of maintenance). Many native surface roads are less than 300 feet from tributaries and springs. Some of these roads directly influence channel morphology, reduce sinuosity, limit woody debris recruitment, reducing pool frequency, increase width/depth ratios, and contribute sediment to the stream channel. There are approximately 33 miles of roads within riparian habitat conservation area (RHCAs) that have the potential for contributing sedimentation due to lack of vegetative cover between the road and stream to filter sediment, grade of road, or lack of adequate drainage. Specifically, twelve roads were identified during watershed surveys as contributing fine sediment directly into stream channels and degrading aquatic habitat (see Table 3-3, page 3-14, and Table 4-1, page 4-14 of the DEIS). Closing or decommissioning roads within RHCAs would reduce road related impacts, specifically negative impacts to water quality, fish habitat, and wildlife habitat. There is a need to minimize road-related sediment delivery to water sources by storm-proofing (closing, decommissioning or improving) specified segments identified in the road condition inventory as having improperly functioning drainage features.

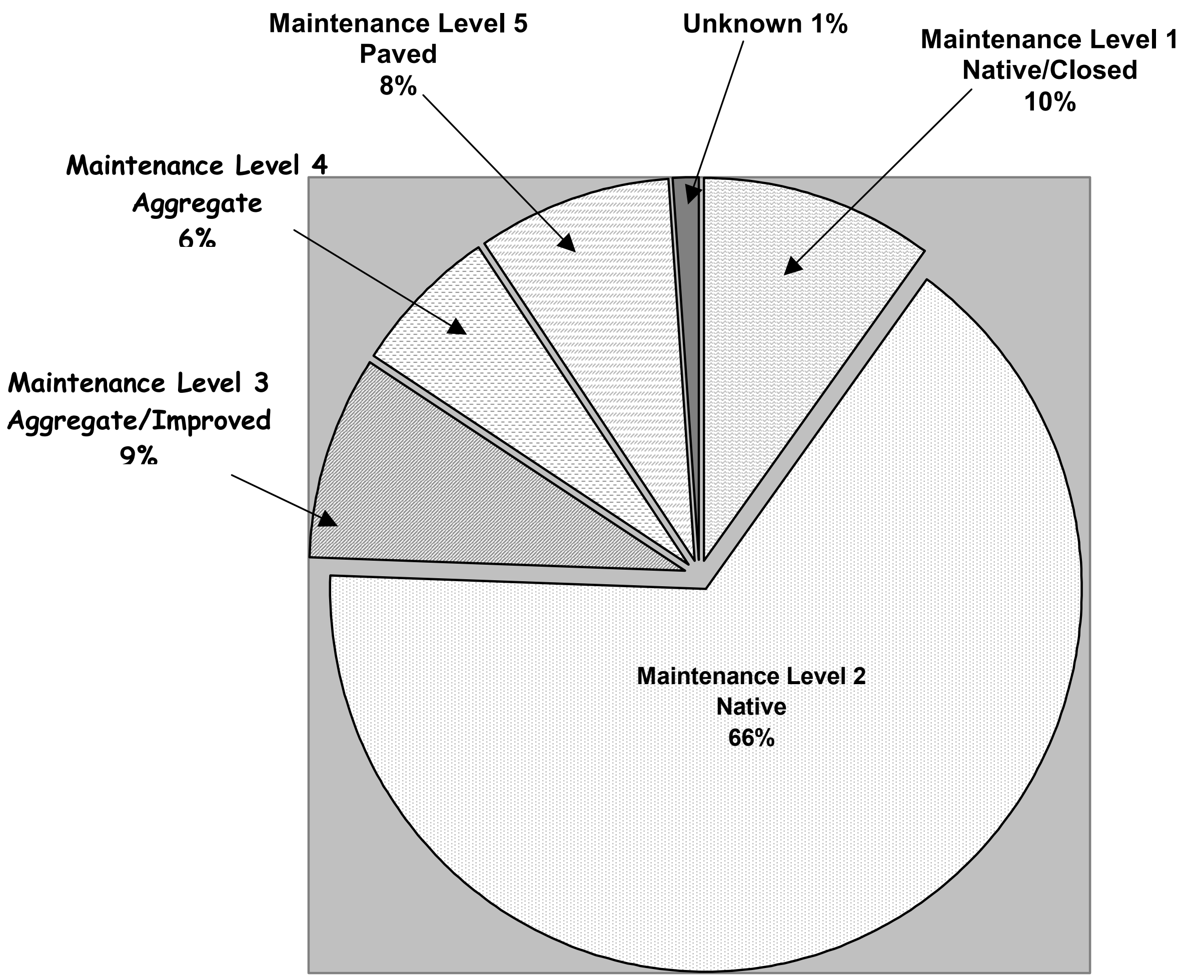

Table 2: Road Maintenance Levels Within the Silvies Canyon Watershed Analysis Area

Erosive soils cover 61% of the watershed within Forest boundaries, or approximately 40,000 acres. Approximately 168 miles of native surfaced roads lie within these erosive soil areas (reference map #9, Silvies Canyon WA)

The standard Cumulative Watershed Effects methodology used on the Malheur National Forest is the Equivalent Roaded Area (ERA) model, more fully described on page 3-13 of the DEIS. The model is an indexed measure of watershed risk based on current watershed disturbance. It evaluates risk as a percentage of the area that is occupied by roads. Table 3-4, page 3-13, of the DEIS shows that, in this case, for current conditions the ERA is well below the threshold of concern in all subwatersheds. Pages 4-24 through

4-25 of the DEIS give an expanded look at the calculated cumulative effects for the various alternative actions.

Table 3: Current Road Densities for Silvies Canyon

Subwatershed	Summer Range (mi/ m^2)	Winter Range (mi/ m^2)
Boulder/ Fawn Cr.	2.8	2.1
Burnt Mountain	3.9	2.2
Myrtle Creek	5.2	1.9
Myrtle Park	4.0	0.0
Red Hill*	3.8	2.9
Sage Hen Creek	3.1	2.9
Stancliff Creek	3.0	3.7
Watershed Total	3.7	2.4
Forest Plan Standard#	***3.2***	***2.2***

*Project area only; # Myrtle Silvies roadless would have no roads

Desired Road System Conditions

The desired condition is to provide a road system that is safe, affordable, has minimal ecological impacts, and meets immediate and projected long-term public and resource management needs. Resource management needs are largely based on LRMP direction. The current LRMP provides general direction for transportation system management and states: "Roads will be planned, designed, constructed and maintained to the minimum level necessary to meet integrated land management objectives (i.e., the needs of all the resources)." The LRMP also includes management goals for maximum open road densities for winter range, summer range, and wildlife emphasis areas. The desired future condition road densities are 1.0 mi/mi^2 on winter range and 1.5 mi/mi^2 on summer range. This Roads Analysis focuses on recommendations (see step 6. pages 5-7 of the WA) for moving the areas transportation system towards desired conditions that are explained in the DEIS, dated February 2001.

The Emigrant Creek District Ranger expressed concern that because the Roads Analysis process tends to focus on the problems, it may understate benefits and needs for roads.

An Access Travel Management Plan for the entire watershed was outlined in the DEIS. It will need to be re-evaluated on a yearly basis to accommodate changes in use patterns. It will include a monitoring element for continued surveys of road densities, damage to road structures, and effectiveness of road closures; and recommend native surface roads for closure or repair if they are in riparian Habitat RHCAs and/or are contributing to environmental impacts. The LRMP and the Transportation BA that addresses these areas already require a yearly monitoring report.

Continuing field investigations and will be the basis for making recommendations for maintenance, deferred maintenance, and inclusion into the access travel management plan, and compile road conditions reports for all roads in the watershed. It will assure that roads identified for decommissioning or obliteration become hydrologically disconnected from the drainage network.

Fish passage surveys will be conducted roads cross perennial streams. Some fish passage surveys were done in 2001 for this area. Information from them will be used to prioritize needs.

The Roads Analysis will make recommendations for the Silvies Canyon watershed. Every year a portion of the Forest roads are field inventoried to confirm condition. Road condition reports have been compiled for almost every road in the Silvies Canyon watershed with the basic data input to the Infrastructure Application (INFRA) data system, which is used in conjunction with the Geographic Information System (GIS) to produce maps and analyze data.

Public Involvement

Public scoping for this project began in the spring of 1999. The National Environmental Policy Act (NEPA) scoping process (40 CFR 1501.7) was used to invite public participation, to refine the scope of this project, and to identify preliminary issues to be address. The Forest Service sought information, comments, and assistance from federal, state, and local agencies, and from other groups and individuals interested in or affected by the proposed action. Approximately 25 groups or individuals responded during the scoping process up to the issuance of the DEIS. The steps included in the public scoping process are included in the DEIS, pages 1-18 through 1-19

Summary and Recommendations

The Roads Analysis found that the overall restoration objective for roads is to reduce road related impacts to water quality, fish habitat, and reduce road densities for wildlife enhancement while providing adequate access to users. Specific objectives include closing, repairing, or decommissioning specific roads or segments in the project area to meet Forest Plan density for wildlife and balance maintenance needs to likely budget levels. Many of these roads are within sensitive areas such as RHCAs or are currently contributing sediment to streams. Therefore, the primary emphasis in the Roads Analysis for road closure, repair, and decommissioning is to minimize road-related sediment delivery to water sources. The objective is to minimize the effects of runoff and precipitation intercepted by road surfaces that becomes concentrated flow.

A 0.2-mile segment of Forest Service Road 3130103 was closed under the Joaquin Environmental Assessment and Decision Notice dated April 14, 1992. Several roads such as this one were identified in the Decision Notice as no longer needed for resource management.

A current analysis of this road indicates this road is needed to provide a portion of a major haul route for two proposed timber sales; and will provide a maximum economy road as required by FSM 2400, Chapter 2430. It is recommended that the 0.2 miles be opened for the duration of timber harvest activities within the Silvies planning area and then re-closed.

Road Closures and Decommissioning

Several miles of road closures and decommissioning are proposed to reduce negative impacts to water quality, fish habitat, and wildlife habitat. The DEIS displays the miles of road activities proposed by alternative. Additional maps and summary information regarding road closures and decommissioning can be found in Appendix A of the Silvies Canyon Watershed Restoration Project DEIS.

Prior Environmental Assessments (EAs) have identified, analyzed and documented decisions on roads to be closed. The decision to close these roads has been made. These roads will be treated to provide self-maintaining drainage structures to reduce sedimentation and then closed.

Roads Analysis/Road Management Terminology

Closed Road – A road on which motorized traffic has been excluded by regulation, barricade, blockage or by obscuring the entrance. A closed road is still an operating facility on which motorized traffic has been removed (year long or seasonal) and remains on the Forest Road Transportation System. **(DEIS Glossary pages 5-1 through 17)**

Decommissioned Road – Decommissioning would eliminate future use of the road with the objective of restoring hydrological function. The road would be removed from the Forest Road Transportation System. **(DEIS Glossary pages 5-1 through 17)**

Open Road – Road will be open to the general public for use without restrictive gates or prohibitive signs or regulations, other than general traffic control or restrictions based on size, weight, or class of vehicle. The road may be closed during scheduled periods, extreme weather conditions, or emergencies. **(DEIS Glossary pages 5-1 through 17)**

***Maintenance* -** The upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-controlled devices as are necessary for its safe and efficient utilization. (**36 CFR 212.1**). More specifically, maintenance is the ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective. Typical activities can include adding or repair of drainage structures such as culverts, drain dips, grade sags, rocked fords, cross ditches, surface and ditch blading, spot rocking, surface rock replacement, brushing, and other work needed for either safety or resource protection. **(Forest Roads Analysis)**

Road Reconstruction - Activity that results in improvement or realignment of an existing classified road. (**FSM 7705**)

Roads Analysis Team

Lori Bailey	Planning Forester	Administrative Uses, Recreation, Social Issues, Civil Rights
Allan Tschida	Realty Specialist	Special Uses, Transportation
Judy Kerr	Project Engineer	Writer/Editor, Minerals, Transportation
Jim Keniston	District Ranger	Economics, Social Issues
Roy Schwenke	Silviculturist	Ecosystem, Silviculture
John Erickson	Timber/Access Mgt. Asst.	Logging, Access Management
Gene Mackey	Fire/Fuels Planner	Protection
L. Zelley	Range Conservationist	Range Management
Tom Friedrickson/ Bill Goodman	Hydrologist	Aquatics, Hydrology
Roy Sutcliffe/ Rick Jerofke	Wildlife Biologist	Terrestrial Wildlife
Roy Schroeder	Archeologist	Archeology
Alan Miller	Fisheries Biologist	Fisheries, Aquatics

ANALYSIS QUESTIONS

Part of the process of a Roads Analysis is assessing benefits, problems, and risks. Miscellaneous Report FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, has a list of questions that can be used to address this. Only questions that apply to the analysis area need to be answered. The answers to the questions address the current condition in the Silvies Canyon Watershed.

EF1 – EF5	*Ecosystem Functions and Processes*
AQ1 – AQ14	*Aquatic, Riparian Zone, and Water Quality*
TW1 – TW4	*Terrestrial Wildlife*
EC1 – EC3	*Economics*
TM1 – TM3	*Timber Management*
MM1	*Minerals Management*
RM1	*Range Management*
WP1 – WP3	*Water Production*
SP1	*Special Forest Products*
SU1	*Special Use Permits*
GT1 – GT4	*General Public Transportation*
AU1 – AU2	*Administrative Use*
PT1 – PT4	*Protection*
UR1- UR5	*Unroaded Recreation*
RR1 – RR5	*Roaded Recreation*
PV1 – PV4	*Passive-Use Value*
SI1 – SI10	*Social Issues*
CR1	*Civil Rights and Environmental Justice*

ECOSYSTEM FUNCTIONS AND PROCESSES (EF)

EF1: ***What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?***

Except for the Myrtle-Silvies Roadless Area that is in the Myrtle Creek and Silvies subwatershed, there are no inventoried roadless or contiguous unroaded areas greater than 1,000 acres within the analysis area (National Roadless EIS 2001). This larger-scale question is addressed in the LRMP for the Forest. Also, reference the WA, pages 3-4 through 3-7.

EF2*: To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?*

The Silvies Canyon Project Area has 71 known noxious weed sites. Sixty-five sites are listed in the WA, pages 3-37 through 3-41, and Map #13. Six additional sites have been found since the WA was prepared. There is the potential for spread by recreational use, grazing, or other National Forest uses. An increase in spread and density of noxious weeds is expected without prevention methods or treatment measures. Herbicide will be used to treat sixty-three sites and two sites will be treated by hand pulling. This is covered pending litigation in the Forest-wide Noxious Weed Environmental Assessment (EA) (April 2000). The six new sites will be treated by hand pulling or grubbing and will be covered in Silvies EIS.

Recent programs have been initiated to help educate Forest users in methods of preventing establishment of noxious weeds. These include educational presentations on weed free feeds, and dissemination of information at trailheads.

The road system is a significant vector for noxious weeds and exotic plant species into the project area. Roads that receive much use provide a continuing seed source for new reintroduction, and recurring maintenance provide a continually disturbed substrate that is the preferred seedbed for invading noxious weeds and exotics. Once established, they provide a local seed source for subsequent spread of weeds to undisturbed forest ground.

Provisions have been added to contracts in recent years based upon the Noxious Weed Control EA, April 2000, requiring commercial off-road equipment to be cleaned before it comes onto National Forest land. This does not stop seed from being transported into the area from other users.

EF3: To what degree does the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

Road access facilitates both the chances of spreading and the control of forest insects, disease, and parasites. Whether the control is direct (such as burning or removal of infested materials) or indirect (an attempt to reduce insect and disease impact by altering stand conditions), roading facilitates these control efforts by allowing crews and equipment to easily access and treat infested sites.

EF4: ***How does the road system affect ecological disturbance in the area?***

Pre-existing roads have little impact upon insect and disease populations. New road construction can increase insect and disease populations when host material is cut and not treated or removed. Additional impact can occur when trees are damaged during construction. The damaged trees can become host trees, which serve as foci for insect and disease attack, allowing populations to build up and spread to adjacent lands.

EF5: ***What are the adverse effects of noise caused by developing, using and maintaining roads?***

Excessive noise disturbance affects the calving and nesting activities of wildlife and bird species in the area. Elk calving areas and various bird nesting sites have been identified in the Silvies Canyon WA so that those areas will be avoided during commercial activities. The average day-to-day activities on area roads, including fire woodcutting, have no long-term effects due to the low volume.

AQUATIC, RIPARIAN ZONE, AND WATER QUALITY

AQ1: ***How and where does the road system modify the surface and subsurface hydrology of the area?***

A number of roads were identified in the WA for potential impacts to aquatic habitat (USFS 2000). Criteria used to classify roads having potential impacts were: 1) roads that are within 200 ft of streams, 2) roads that are within 200 ft of streams and located on soils with medium to high surface erosion potential, or 3) roads on soils with medium to high surface erosion potential. Other sources of impacts to aquatic habitat in the project area that are road related include high road densities, numbers of stream crossings, poorly designed culverts and ditch lines, and poorly maintained road surfaces. Roads can modify surface and subsurface hydrology by producing surface runoff from impervious surfaces, by concentrating surface runoff in ditches (including runoff from draws, scabs, and wetlands – see AQ8 below), and by intercepting subsurface water and bringing it to the surface in road cut slopes. All these processes route water more quickly to streams, increasing peak flows. Increased peak flows can also result from other management activities. The influence of roads on increasing peak flows is most prevalent where roads are hydrologically connected to streams (see AQ6 below), or where they are near streams, or they concentrate water running onto or off scabs (areas with non-forest vegetation, low amounts of ground cover, and shallow, rocky soil).

The magnitude of peak flow increases is unknown, but is probably not significant enough to damage streams in properly functioning condition. This conclusion is supported by observations that in urbanizing watersheds, degradation of stream channels and fish habitat is often not measurable until impermeable surfaces approaches 10% of the land's surface. It is possible that road-related peak flow increases may damage non-functional stream channels, and that roads can decrease low flows by intercepting subsurface waters and accelerating runoff from wetlands.

AQ2: How and where does the road system generate surface erosion?

Surface erosion occurs on most roads because their surfaces, cut slopes, fill slopes, and ditches are often composed of erodible material, deficient in ground cover, which is exposed to runoff. Erosion is greatest during and immediately after road construction, and thereafter declines greatly, usually within 3 or 4 years. Factors that influence surface erosion on established roads include the road surface material, ground cover, erodibility of soils, steepness of the grade, and amount of runoff (especially where run off is routed down the road).

Roads can also increase surface erosion away from the roads by concentrating runoff onto scabs or areas where water does not readily infiltrate, and can cause rills extending far beyond the edge of the road. Road surface erosion usually has little aquatic or water quality consequences, except where roads are hydrologically connected to streams (see AQ6 below). The quantity of surface erosion entering streams is unknown, in part because of insufficient inventory of hydrological connectivity.

Generally, native surfaced roads generate more surface erosion than the surfaced roads. Roads with good drainage structure placement and function reduce surface erosion. On many of our low use, native surfaced roads, grasses on the road surface effectively limit erosion. Problems such as rutting occur on these roads when drainage structures are damaged or ineffective. The greater the existing road grades the greater chance of surface erosion.

Although there has been surface erosion on existing roads, the location of the road on the slope and the vegetative buffer between the roads and the stream, regularly allows minimal sediment to reach the stream.

AQ3: How and where does the road system affect mass wasting?

Mass wasting is not common within the analysis area, as no documented sites are known. Roads can increase the natural frequency of mass wasting by concentrating surface flows, intercepting and rerouting subsurface flows, and constructing artificial or unnaturally steep slopes, but mass wasting related to roads is rare within the analysis area.

AQ4: How and where do road-stream crossings influence local stream channels and water quality?

There are no known instances of recent culvert failure, or known records of these events for the analysis area. There are sites where culvert function needs improvement.

Culverts installed below the stream grade can create a head-cut, which can progress upstream. Also, culverts often concentrate and accelerate water running through them. In certain instances, this process may lead to entrenchment below the culvert. It may also maintain an entrenched channel, which would otherwise recover through natural processes. There are no documented instances of this in the analysis area, but it is possible there are unknown ones.

Influence of road-stream crossings on water quality is covered in AQ5, AQ6, AQ9, AQ11, and AQ12 below.

AQ5: How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters?

Road crossings, and other close approaches (usually meaning about 25 feet or less from road edge to channel edge) between roads and streams, create the greatest potential for pollutants to enter surface waters, especially where roads are hydrologically connected to streams (see AQ6 below). Dust abatement chemicals such as magnesium chloride are sometimes used with prescribed mitigations, after NEPA analysis. Herbicides for roadside weeds may present a risk for surface water pollution. Strictly following the label requirements, use of selective treatment techniques, and drift reduction techniques minimize the risk. Petroleum spills can also occur. Hazardous waste plans exist at the Forest level and are a requirement for many contracts.

AQ6: How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity (such as, delivery of sediments, chemicals, thermal increases, elevated peak flows)?

A stream system consists of streams and other places with surface runoff, including draws, wetlands, and scablands (non-forested areas). Roads are hydrologically connected at crossings and other places where roads closely approach streams, so that water and sediment from the road can directly enter a stream (see Map #20 of the Silvies Canyon WA for identified road segments contributing sediment). At crossings, the spacing of adjacent ditch relief drains and the road surface drainage controls the degree of hydrologic connectivity. Also included here are those sites where the road cut interrupts subsurface flows resulting in a spring or wet area.

Inventory of hydrological connectivity has been somewhat insufficient, but some information exists. Individual road segments can also have significant impacts to aquatic habitat.

Generally, concerns relate to native surface roads lacking in functional drainage, indicating a need for additional cross drainage structures.

As noted in AQ2 and AQ5 above, the connections can degrade water quality through road related sediment, and potentially by routing chemicals to streams. Roads in close proximity to streams can affect thermal increases, by decreasing shade and woody debris, and possibly by decreasing low flows. As noted in AQ1 above, the connections increase peak flows, and on certain stream segments, increased peak flows can increase sediment due to increased bank erosion and channel morphology changes.

AQ7: What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

Beneficial water uses include cold-water fish and aquatic life, irrigation, and recreation; these types of uses are not expected to change in the foreseeable future. Fish and aquatic life is the use most affected by road-derived pollutants. Sediment can decrease oxygen in spawning gravels. In extreme cases sediment could cover spawning gravels, decrease channel roughness, fill in pools, decrease cover, and make the stream wider, shallower, and warmer. Thermal increases can stress and even kill cold-water fish. Chemical pollutants, if they occur, could also stress and kill fish.

AQ8: How and where does the road system affect wetlands?

Roads adjacent to or lying within wetland environments disrupt natural water flow, create sediment, and introduce the potential for contamination from vehicles traveling over roads. In addition, human activities impact behavior of wildlife and aquatic species. The quality of the wetlands is impacted.

The road system provides access to some sites containing aspen clones. Many of these clones are in a decadent or declining condition with minimal reproduction. The impacts associated with road systems and human access and activities within and adjacent to these aspen clones have impacted soils, water flow (including lowering of water table), and riparian qualities, and a subsequent decline in the vigor of these unique species.

AQ9: How does the road system alter physical channel dynamics, including isolation of floodplains; constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?

Valley bottom roads and roads within RHCAs and floodplains interrupt overland flows and divert them into ditches and culverts, which can cause erosion and increase sediment delivery into streams. Soil disturbance caused by road maintenance activities and vehicle use of roads within a floodplain can increase sediment delivery into streams during runoff or flood events. Road maintenance activities can also decrease sediment. Fine organic matter and natural channel migration and development are impacted where natural water flow and hydrology are altered. Roads can restrict the ability of streams to migrate. Movement of large wood is often interrupted at road crossings, and roads allow access for wood removal from riparian areas adjacent to them. These types of impacts are most likely to occur where roads are in closest proximity to streams. See Map #24 – Silvies Canyon Watershed Roads and Stream Buffers, in the Silvies Canyon WA.

AQ10: How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

An estimated 20% of the culverts Forest-wide are not designed to accommodate predicted 100-year flood events (culverts not able to handle the 100-year flows can act as barriers and also wash out to create barriers). Forest-wide, it is estimated that as many as 85% of the culverts on fish bearing streams present a passage barrier to some life stages of fish under some flow conditions. Fish passage barriers adversely affect resident fish populations. Aquatic species in the riparian ecosystems are also affected. Some fish passage surveys were conducted in 2001 for this area and prioritizing of sites is being done.

AQ11: How does the road system affect shading, litter fall, and riparian plant communities?

Roads in RHCAs reduce shade, litter fall, and may alter riparian plant communities. The removal of tree cover and ground vegetation during road construction and maintenance removes shading and the potential for litter fall. Forest Policy for road maintenance/ reconstruction promotes removal of the minimal amount of vegetation. Roads in RHCAs also affect plant communities through soil disturbance, water flow alteration, plant community composition changes, and removal of large wood by woodcutters and campers. Roads provide access to RHCAs that can lead to development of dispersed campsites along streams, where disturbance and pollution often occur. These types of impacts are most likely to occur where roads are in close proximity to streams.

AQ12: How* and *where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

The road system provides fishermen access to streams throughout the watersheds. Road systems provide camping opportunities and can concentrate recreationists along streams. Eight of the currently mapped 37 dispersed campsites are within RHCAs (see Map #7 of the WA) and may affect water quality and fish habitat. Increased poaching, fishing pressure, and habitat loss are direct results from road system access and camping within RHCAs. Direct habitat loss occurs along streams where dispersed campgrounds exist.

AQ13: How and where does the road system facilitate the introduction of non-native aquatic species?

Road systems provide public access for fishing and camping. Both legal and illegal introductions of non-native species fish have occurred to meet these demands. Non-native species compete with native species.

AQ14: To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?

Numerous fish-bearing streams provide seasonal fishing opportunities. Table 7, Step 1, page 16 of the WA displays the Fish species found within the watershed, both native and introduced species.

TERRESTRIAL WILDLIFE

TW1: What are the direct effects of the road system on terrestrial* species *habitat?

Roads have several effects on wildlife habitat. Road construction degrades habitat and increases the likelihood of disturbance, increases competition among some species, alters animal and plant species composition, can create movement barriers, increases mortality (trapping, hunting, road kills, etc), and may increase the likelihood of poaching. Vehicle traffic on arterial and collector roads that accommodate a higher rate of travel speed can contribute to the mortality of young animals especially in the spring and early summer when young are more vulnerable to traffic.

Initial road construction causes immediate loss of habitat within the roadway, by converting habitat into non-habitat. Depending upon the amount and kind of maintenance and use, the conversion can be permanent, unless vegetation grows in the roadway again.

Greater access means reduced seclusion habitat, which is very important to some species, including, wide ranging carnivores, which use roaded areas less than unroaded areas. Roads themselves are not a problem, but the loss of seclusion habitat is.

Open road density is a critical factor in areas where plan standards are not being met. To conduct a meaningful analysis of road density on a site-specific level, road density was calculated at the subwatershed level, and further divided into winter and summer range. Based on calculated elk winter and summer range acreage and GIS data base road length analysis, open road densities range from about 5.1 to <0.1 mile per square mile (see Table 3 page 10 of this document, and Map #22 - Elk Winter Range and Subwatersheds, in the Silvies Canyon WA).

Oregon Department of Fish and Wildlife statistics indicate a healthy, viable, and abundant population of elk within the watershed. More recently, fire suppression has resulted in increases of conifers and juniper cover habitat. This increased amount of cover enables herd numbers to continue above historic population levels. Roading is not expected to increase; therefore the increased cover may promote increased herd numbers over time. (See the WA, page 36, for new research that suggests inconsequential energetic benefits of thermal cover for elk and deer.)

The Silvies Canyon WA looks at road densities relative to the impacts of big game habitat use and vulnerability. Over the entire watershed, road densities are roughly 3.9 miles per square mile in summer range, and 2.4 miles per square mile in winter range. On a more site-specific basis, road densities vary, depending heavily upon past harvest management activities, habitats (meadow habitat vs. forested habitat) and management designation (roadless areas).

Perhaps more important than the impacts of road densities is the spatial relationships of those roads upon elk habitat use and selection. Rowland et al. looked at the impact of road distribution and its impact and predictive aspects of elk habitat use (2001). They found strong correlations between the distance from a road and the likelihood of selection of habitat. Road influences were found out beyond 1000 meters in this and Wisdom et al.'s study (1998; Rowland et al., 2001). When put upon the landscape, the distribution of those roads became increasingly important in predicting elk distribution (and thus habitat use and selection). Elk were increasingly found in areas further and further away from roads, while those areas with many roads and limited distances between roads received very limited use.

Roads constructed through aspen stands can influence the clone and local water table, either can either positive or negative effects on aspen habitat. Aspen is a very important habitat type, used by many species for foraging and breeding. Some species, such as the red-napped sapsucker, are highly associated with aspen; they will occur elsewhere, but their densities are much higher in aspen. On the Malheur National Forest, some of the greatest diversity of bird species per unit area occurs in aspen stands.

Both snags and live trees are removed during road construction. Few snags are allowed to remain near open roads, because they present a hazard to the public and because they are available as firewood. Where road densities are high, the average snag density can be expected to be relatively low.

Roads can increase the amount of edge habitat for species that prefer it. This can be a disadvantage to other species as a result of increased competition.

Pools in roads or created by plugged culverts provide temporary habitat for frogs to breed. Eggs can be laid and tadpole reared in pools, which might increase habitat if young are able to mature and disperse before the pool dries. A pool that dries before the young mature can be detrimental to the population.

TW2: How does the road system facilitate human activities that affect habitat?

Roads allow higher frequency and density of humans than would occur in areas with lower road density. This increases disturbance and makes habitat less useable for some species. Near campsites, vegetation is often removed or altered. Recreationists frequently leave garbage and trash along roads and in camping areas. While bears are fairly uncommon in this area, garbage habituates animals and certain birds (i.e., ravens and jays) to human activities. Loss of snags and down wood occurs at a higher rate along roads than elsewhere.

Roads allow access to areas not otherwise accessed by those visitors who may be unwilling or physically unable, due to a handicap or age, to hike in. Roads can result in increased hunting pressure and can increase disturbance to all animals that live adjacent to roads. Increased disturbance can cause reduced reproductive success or failure for sensitive species, such as the goshawk and bald eagles.

TW3: How does the road system affect legal and illegal human activities? What are the effects on wildlife species?

Roads allow access to remove firewood and other products. They also allow range permittees access to haul material needed to maintain range improvements.

Increased road density allows increased resource extraction. When areas become more roaded, there are more opportunities for recreation. Recreationists seeking unroaded experiences may concentrate in other areas.

TW4: How does the road system directly affect unique communities or special features in the area?

When roads are built through rock outcrops, mountain mahogany or aspen stands, they can remove or alter some special habitats. Mountain mahogany is used as forage by big-game animals and breeding and foraging habitat for many other species. On the Malheur National Forest, mountain mahogany is not reproducing successfully in most areas for a variety of reasons, so the loss of individual plants or stands is important to its distribution on the forest. Aspen on the Malheur National Forest is about 5% of what was historically and now occurs only as a few individual trees or stands of a few acres. A road built through an aspen clone could potentially remove the clone. Because individual trees in clones are genetically identical, loss of the clone can mean loss of genetic material.

Most noxious weeds are introduced along roads. Roads through unique habitats increase the likelihood that noxious weeds will become established and occupy sites otherwise occupied by native species. In the past, road cut slopes were stabilized using various seed mixtures, often containing non-native species. These species now occur within the forest as well as along roads. In some cases, these species are consumed as forage and probably don't adversely affect herbivores; however, native plant species are reduced in areas occupied by non-native plants, which can result in a reduction in forage for some herbivores. For instance, cereal rye grass is not highly palatable, but it occupies areas historically occupied by native plants. On the other hand, clovers, many of which are non-native, are highly palatable and are consumed by birds and mammals.

ECONOMICS

EC1: How does the road system affect the Agency's direct cost and direct revenues used in assessing financial efficiency?

The history behind the Malheur's current road system has an important role in how we consider its financial efficiency. The Forest's roads were built primarily to access timber harvest units and for other administrative purposes. High timber revenues coupled with recreation benefits and access for firefighters made the roads financially efficient to build and maintain. With recent drastic reductions in timber harvest levels, the primary source of revenue that maintained the current road system fundamentally changed. The objective of the economic questions is to address costs, budget and overall financial efficiency of the current road system.

The current road system provides both positive and negative cash flows. The major source of revenue associated with roads is timber sales. Direct costs include recurrent road maintenance and resource restoration or protection costs related to increased motorized use in roaded areas. At present, direct costs exceed direct revenues. Given current agency funding and sources of revenue, an increase in open road mileage will compound the negative cash flow. However, these costs can be mitigated or minimized if roads are properly constructed, reconstructed, and un-needed roads are closed, inactivated, or decommissioned. All foreseeable projects are likely to result in fewer miles of high-cost open road in the analysis area.

Although the direct costs of road construction, maintenance, and mitigation measures exceed the direct revenues resulting from timber, and other commodities, many resource management objectives could not be accomplished or would cost a great deal more without an adequate road system.

EC2: How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The road user groups in the analysis area that contribute the most significant economic benefits are loggers, ranchers, fire woodcutters, and recreationists.

Recreationists, more specifically, big game hunters, contribute revenue through the purchase of equipment, supplies, and services for their activities. Non-local hunters contribute additional revenue by staying at local hotels, eating at restaurants, and shopping.

Native Americans, specifically members of the Northern Paiute Tribes, no longer live within the watershed. Tribal members do return to the area to renew their spiritual connection to historic tribal grounds, to hunt, fish, and collect plant species traditionally used in their culture. Continued access to areas which tribes consider "special" are a concern, thought exact locations of these areas is unknown and likely to remain so.

The construction and maintenance of roads within the analysis area is not expected to have a significant long-term impact on the economic benefits derived from recreation. Much of current recreation is roads oriented therefore decommissioning could result in a reduction in the total mileage of roads available for recreational use. As a result, fewer users will be able to access the forest. This may negatively impact economic benefits to the surrounding communities. Some short-term displacement of individual users may occur as a result of project related road activities.

EC3: How does the road system affect the distribution of benefits and costs among affected people?

An economic efficiency analysis was completed that focused on identifiable and quantifiable ecosystem benefits and cost for in terms of the present net value (benefits minus costs) to access maximizing net public benefits (36 CFR 219.3). Measurable and quantifiable economic market benefits identified include revenue from timber volume proposed for harvest.

Income generated through timber related jobs would benefit the local communities of the people employed as some of the money earned would be spent in the communities and have a cumulative effect on money transfer. Money spent (service contracts) to improve resources would result in healthier forests, improved watershed conditions, and potentially generate employment and income to the area. In addition to predicted economic benefits, there are future monetary benefits that cannot be calculated in the present. For example, fisheries and riparian enhancement project would affect the local economy by providing increased number of fish and wildlife, resulting in more recreational use of the area.

Table 4-12 of the DEIS, page 4-61 shows the comparison of timber harvesting and connected actions for alternatives. All amounts are approximate and are derived from the Transaction Evidence Appraisal (TEA) ECON program.

The road system allows access for the number and amount of activities that occur in the area. Without an adequate road system, the benefits and costs associated with logging, service contracts, hunters, recreational driving, firewood cutting, and other users would be reduced.

TIMBER MANAGEMENT

TM1: How does the road spacing and location affect logging system feasibility?

The existing road system spacing and location is adequate to allow feasible harvest of most timber stands with the either ground-based or skyline logging systems. However, there are a few stands that cannot currently be harvested without accessing through temporary road construction, or in a rare instance, helicopter logging. Helicopter logging costs are typically not feasible for the type of timber currently available.

Because some roads are located in riparian areas, temporary spurs and landings may need to be constructed outside the riparian area. This needs to be a consideration during project proposals.

TM2: How does the road system affect managing the suitable timber base and other lands?

The current collector system is adequate. Some local roads in riparian areas do not have suitable landing sites.

The existing road system needs a number of other changes in order to allow more efficient management. These include some reconstruction of roads to protect the road and adjacent resources that have deteriorated by deferring road maintenance.

Temporary roads can be utilized to reduce the density of system roads, and the costs associated with their maintenance. All temporary roads would be decommissioned after use. Decommissioning would eliminate future use of the road with the objective of restoring hydrological function.

TM3: How does the road system affect access to timber stands needing silviculture treatment?

The current road system is generally adequate for non-commercial silviculture treatments throughout the planning area. The access needs for commercial silviculture treatments is described in the answers to TM1 and TM2.

MINERALS MANAGEMENT

MM1: How does the road system affect access to locatable, leasable, and salable minerals?

Mining activities are limited in the Silvies Canyon watershed.

The Forest Service has a number of developed rock materials sources in the area, used primarily for aggregate surfacing for system roads. Some improvements to the existing access roads would be beneficial, but overall the access to these sources is adequate.

Table 4: SILVIES CANYON MATERIAL SOURCES

These developed/existing sources are located outside of RHCAs.
Sources are listed by Township, Range, Section, and name/road location.

T 19 S	R 31 E	Sec 4	Hall Creek Pit 3140 Road
T 19 S	R 30 E	Sec 2	Big Sage Hen (Crushed Stockpile) 3100913 Rd
T 19 S	R 30 E	Sec 35	Burnt Mt. Meadows Pit 3125 Rd
T 19 S	R 30 E	Sec 18	31 Roadside grid roll at mp 9
T 19 S	R 30 E	Sec 5	3120163 Rd
T 19 S	R 30 E	Sec 10	3100093 Rd
T 20 S	R 30 E	Sec 22	3100438 Rd
T 18 S	R 29 E	Sec 28	3100863 Rd
T 18 S	R 30 E	Sec 36	3765947 Rd
T 18 S	R 29 E	Sec 5	3700440 Rd
T 18 S	R 29 E	Sec 31	3700409/410 Rd
T 18 S	R 29 E	Sec 1	3700546 Rd
T 18 S	R 29 E	Sec 13	3746240 Rd
T 18 S	R 29 E	Sec 14	3700/3700478 Rd
T 18 S	R 29 E	Sec 14	3700480 Rd
T 18 S	R 29 E	Sec 30	3700292 Rd

RANGE MANAGEMENT

RM1: How does the road system affect access to range allotments?

The existing road system is used by both livestock permittees and for permit administration activities. Any foreseeable changes in the transportation system will maintain adequate access for these activities at an additional cost to both the Forest Service and the permittees. Road closures would possibly cause increased time and effort to administer grazing permits, forest monitoring, and managing livestock. Restricted access would require alternative transportation (i.e., horses, ORVs, etc.) for administering grazing permits and forest monitoring; and require additional time for activities such as delivering salt or fence supplies and for covering territory which full-sized vehicles accomplished in considerably less time. Improved watershed structure by closing roads could help livestock management.

WATER PRODUCTION

WP1: How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

The road system does not affect constructed water diversions, impoundments, and distribution canals or pipes. Several private ownerships dispersed throughout the watershed are authorized to withdraw water from the various creeks and streams. There is one irrigation diversion on Myrtle Creek within the watershed on private property. Once the Silvies River leaves the watershed, there are numerous irrigation diversions downstream within the Silvies sub basin. The Silvies River is also one of the major water sources for Malheur Lake and the Malheur National Wildlife Refuge located in the Oregon Closed Basin.

Numerous springs are found throughout the watershed (see Map #5 of the WA); many have been developed for livestock water sources. Springs within the Myrtle Creek and upper Stancliff areas connect to the stream network and augment flows and influence temperatures. Several springs near Sage Hen and Little Sage Hen Creeks appear to be linked with roads and may be the result of intercepted subsurface flows brought to the surface by road cuts or fills. Springs restoration activities are needed for wildlife habitat, watershed, and range betterment.

WP2: How does road development and use affect water quality in municipal watersheds?

There are no municipal watersheds in this area.

WP3: How does the road system affect access to hydroelectric power generation?

There is no hydropower facility accessed by the road systems in the analysis area.

SPECIAL FOREST PRODUCTS

SP1: How does the road system affect access for collecting forest* products*?

Virtually the entire existing road system is used for collecting special forest products for personal and commercial use such as firewood cutting, Christmas trees, post and poles, timber, etc. The existing road system is generally adequate for these activities. When roads are decommissioned or closed it reduces access for some of these uses, but many of the roads that are candidates for decommissioning are in RHCA areas, where firewood cutting is already prohibited. Any foreseeable changes in the area transportation system are expected to maintain adequate access for these activities.

SPECIAL USES PERMITS

SU1: How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

Any foreseeable changes in the existing transportation system will need to be coordinated with special-use permittees to protect existing access and prevent potential conflicts. Within this analysis area, non-recreational permitted uses include ditch easements and overhead electrical transmission lines.

Two ditch diversions are located in the Myrtle Creek drainage on National Forest System (NFS) lands in Sections 25 and 36, T.18S., R.30E. These ditches provide irrigation water to private lands. These ditches and private land inholding are accessed by Forest Development Roads (FDR's) 3765, 3765136, 895 and 230. Water rights for these ditch diversions in Myrtle Creek are 0.84 c.f.s. per acre, while another private water withdrawal located on private lands in Gold Creek is 0.10 c.f.s. There is also a non-permitted domestic spring development in the NW¼ of section 36 that provides water to an older cabin located on the private parcel with a water right of 0.002 c.f.s.

Other private water right withdrawals occur on the private lands within Myrtle Park Meadows area for irrigation of 8.0 acres and livestock use for a total of 0.08 c.f.s.

The electrical power lines run through the southeast corner of the analysis area with a 100' wide permitted corridor. These lines are accessed by FDR's 3100, 3130, 3130057, 3130074, 3130077, 3130131, 3100320, 3110, 3110230, along with cross country travel along the power line right-of-way.

Recreational permitted uses include outfitter guide permits covering large geographical areas. No adverse impacts are expected to these permitted uses from access management plans due to the mobile nature of the permitted activity.

GENERAL PUBLIC TRANSPORTATION

GT1: How does the road system connect to public road and provide primary access to communities?

FDR 31 bisects the analysis area from south to north. It is a major paved road (with short sections of aggregate surfacing) that connects State Highway 395 to County 63; FDR 37 is located in the northern end of the watershed and runs predominantly east and west, crossing FDR 31, connecting Highway 395 and FDR 47 which accesses County Road 127. FDR 37 is paved with areas of aggregate surfacing.

GT2: How does the road system connect large blocks of land in other ownership to public roads? (ad-hoc communities, subdivisions, in holdings, and so on)

Areas of Silvies Canyon watershed are in private ownership and include lands managed by the Bureau of Land Management. The main FDRs that are used to access the majority of other ownership lands are those connected to FDR 31, 3130, 3140, and 3765. Private roads are usually off these roads. Land ownership within the watershed is shown in Table 2, Step 1 – Page 2 and Map #3 of the WA. This Roads Analysis concentrates on lands managed by the Malheur National Forest.

Known or suspected FDRs used by private owners are listed below, starting in the north part of the project area:

FDR 3765 and 3765136, 3765135 are currently open and provide access to the private lands in Myrtle Park Meadows. FDR 3100210 and 3100195 could also provide access on the south side of Myrtle Creek.

FDR 3765, 3765136, 895, and 228 are open and provide access to private lands in the Myrtle Creek Drainage in T.18S., R30E., Section 36. Closed FDR 3100228 provides access to the southeast corner of the private parcel that is split off by Myrtle Creek and Gold Creek.

Access to a private parcel located in the Silvies River drainage in T.19S., R.31E., SE¼SE¼ of Section 15 is assumed to by private road through private lands off of FDR 3140.

FDR 3100, 3140, 3140121, and 3140123 provide access to private lands on the north side of the Silvies River within Section 29 of T.19S., R.31E. FDR 3100, 3100132, 3130, and 3130127 provide access to the private lands on the south side of Silvies River within Section 29, T.19S., R.31E.

FDR 3130 and 3130057 provide access to private lands in the Deer Creek drainage within section 34, T.19S., R.34E., and within section 3 of T.20S., R.31E.

Private parcel in the lower Myrtle Creek drainage, T.20S., R.30E., NW¼NW¼, has no known roads within it. A foot trail located along the stream channel is shown on the current Forest recreation map but will be omitted from future maps. Forest records indicate there is no Forest Service right-of-way on this trail through the property.

FDR 3100, 3100187, 3100089, 3100086, 3100415, 3100095, 3110, 3110232, 3110230, and 3110127 provide access to the private parcels within portions of Sections 8, 17, and 16, T.20S., R.31E.

GT3: How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?

All of the roads that are listed in Appendix A of the DEIS, that have proposed management inside the analysis area, are under Forest Service Jurisdiction. Proposed management activities are not expected to change present use as long as access to non-Federal lands is not restricted. At this time, there are no known road easement grants, RS2477 claims, or cost share roads within the project area.

GT4: How does the road system address the safety of road users?

While use of Forest Roads for logging activities has declined significantly, the Forest has been experiencing steady increases in overall recreational use. Traffic conflicts during peak use periods (hunting seasons) are expected to rise with future increases in recreational use of the analysis area, and also because as open road densities are reduced through road closures and decommissioning, more users will use fewer miles of road.

Road Condition Assessment surveys, conducted in recent years revealed substantial deferred maintenance work items related to health and safety, some of which are considered critical. Critical safety deferred maintenance work items include: aggregate placement, turnout construction/reconstruction, brushing and clearing for sight distance, hazard tree felling, and signing.

As much as current road maintenance funding levels allow, the classified roads in the analysis area are maintained and signed in accordance with their maintenance level and traffic service level. Additional reconstruction and maintenance work may be required to accommodate increased traffic use on roads that are to be left open.

ADMINISTRATIVE USE

AU1: How does the road system affect access needed for research, inventory, and monitoring?

To date the existing road system has been adequate for research, inventory, and monitoring needs. Some roads are only accessible by Off Road Vehicles (ORVs) or on foot due to washouts, fallen trees, etc. During wet weather, some native surface roads are recommended for foot traffic only to avoid further rutting and damage of road subgrades.

AU2: How does the road system affect investigative or enforcement activities?

The majority of the open and gated roads in the analysis area provide vehicular access for both investigative and enforcement activities.

PROTECTION

PT1: How does the road system affect fuels management?

Generally there is adequate access in the analysis area except in the Myrtle-Silvies roadless area.

PT2: How does the road system affect risk to fire fighters and to public safety?

Access is adequate to provide safety zones. Roads can be used if a hasty retreat is necessary, except in the roadless area. The terrain is fairly gentle in some areas, allowing easy walk-in access where roads are not available. Much of the steeper terrain is in the roadless area. Meadows, sage flats, and some old harvest areas may provide some safety zones for firefighters.

PT3: How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The 3100, 3120, 3125, and 3746 road systems and road 3700440 come near the roadless boundary and can be used to get fire fighters close to that area. Lack of roads in the roadless area may allow larger or more intense fires.

The road system provides relatively good access for ground-based equipment used in fire suppression efforts. Roads on ridges or in valley bottoms can be used as fire breaks if the surface fuel loading and ladder fuels are reduced. Pole barricades may be opened if initial attack forces have equipment to open the barricades. Berms restrict access of ground-based equipment such as engines and vehicles.

Some of the local roads are partially or fully revegetated limiting or prohibiting vehicle access, especially bigger vehicles such as engines.

Closing or decommissioning roads will require more use of aerial delivered firefighters for initial attack in wildland fire suppression.

Fires in the roadless areas with longer walk-ins can be staffed with aerial delivered resources. Water or retardant drops can be utilized to limit fire spread if they are available. Limited access into an area can increase fire suppression costs.

PT4: How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

This is not an issue except for short periods in local areas where management activities are taking place. Management activities and high recreation use periods utilize design criteria to ensure that dust abatement is included for those activity areas when deemed necessary.

UNROADED RECREATION

UR1: Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

Currently, the planning area is relatively heavily roaded, except for the Myrtle-Silvies Roadless area. There are no other inventoried roadless or contiguous unroaded areas greater than 1,000 acres within the analysis area. Several million unroaded aces occur within a 1-hour drive from this area.

The Forest Plan determined approximately 1900 Recreation Visitor Days occur annually, with approximately 75 percent of these being in a semi-primitive setting and 25 percent being in a roaded natural setting (DEIS pg. 3-5). Use sampling is being conducted which may revise these figures. Myrtle Creek Trail (from Forest Road 3100226 to Burnt Mountain Trail, aka FL Spring Trail); and West Myrtle Creek Trail (from Forest Road 3700440 to Myrtle Creek Trail) provide non-motorized access to the roadless area. Monitoring of these trails, shows recreational use in the area is light. Future demands for unroaded recreation opportunities will be addressed during the Forest Plan revision tentatively scheduled for 2004.

ROADED RECREATION

RR1: Is there now or will there be in the future excess supply or excess demand for roaded recreation opportunities?

The Silvies Canyon watershed provides a wide range of recreation opportunities, activities, settings, and experiences; however, the roaded settings clearly dominate (DEIS pg. 4-92). Future demands for roaded recreation opportunities will be addressed during the Forest Plan Revision tentatively scheduled for 2004.

RR2: Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?

Any foreseeable changes in the ATM plan for the Silvies Canyon Project analysis area are not expected to cause substantial changes in the quality or type of roaded recreation opportunities, but they will likely result in a reduction of the number of road miles open to these activities.

RR3: What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

The watershed is primarily used for dispersed recreation activities, mainly viewing scenery and wildlife, dispersed camping, fishing, hiking, and hunting. Access is key to how outdoor recreation resources are used. Dispersed recreation sites easily accessed by motorized vehicles have higher visitation rates than those located in remote, roadless areas (DEIS pg. 3-55). Adverse effects of noise and other disturbances on roaded recreation opportunities have not been documented as being an issue within the analysis area.

RR4: Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning?

The most significant use is by hunters during the big game seasons, with the heaviest use occurring from August through November. Other users include range allotment holders, recreational drivers, firewood and other miscellaneous special forest product gatherers, ATV and OHV drivers and mountain bikers. Hiking trails with roads are displayed on Map #8 of the Silvies Canyon WA.

PASSIVE-USE VALUE

PV1: Do areas planned for road construction, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species?

The pre-field database and field review of potential sensitive plant habitats identified occurrence or suspected occurrence, or potential habitat for the Proposed, Endangered, Threatened and Sensitive (PETS) species which may be affected by adverse modification of habitat is listed in the WA, Table 4, Page 10. Full disclosure of effects on PETS species are addressed in the Silvies Canyon Watershed Restoration Project Biological Assessment (Appendix C). The summary of Effects on PETS species is displayed in the DEIS, page 4-78, Table 4-17.

Some PETS species may be affected by road closures or decommissioning.

No unique habitats have been located within the watershed. Special habitats such as riparian (bogs, seeps, and springs), dead and defective tree habitat (snags), dead and down woody material (logs), edge areas, aspen stands, meadows, animal dens, and wallows, are also very important, for they provide habitat diversity, contribute to the quality and quantity of habitat, and may be an integral part of a plant or animals life cycle (DEIS, pg. 3-53). Some special habitats may be affected by road closures or decommissioning.

Cultural resource surveys have located and recorded approximately 190 archaeological sites. Road closures or decommissioning have the potential to affect archaeological sites. The sites should be protected from ground disturbing activities.

PV2: Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

American Indians have inhabited and used the surrounding central southeastern region of Oregon, and Harney Basin, in which the Silvies Canyon watershed is located, for over 10,000 years. Presently, the primary Tribal users of the watershed are the Burns Paiute

Tribe whose members continue to actively utilize the Silvies region for hunting, fishing, plant gathering, and religious purposes (Burns Paiute Tribe, 2001).

The Silvies Canyon Watershed was part of the original Malheur Reservation established in 1872. The area remains extremely important to the Burns Paiute Tribe as a source for raw materials and as a location to practice traditional cultural activities, and for spiritual reasons (SDEIS pg. 2-3).

The area is currently, as well as historically, an important source for the Burns Paiute Tribe to gather native plant and animal materials for medicine, food, traditional crafts and art. Currently, tribal members hunt for deer, elk, and groundhogs or yellowbellied marmots and fish for redband trout. In addition, tribal members gather culturally important plants, such as biscuit root, bitterroot, and wild onions. Other culturally important plants include chokecherries, willow, dogwood, camas, grasses, sagebrush, rabbit brush, dogwood, aspen, juniper, and dogbane. Finally, the Burns Paiute Tribe continues to conduct ceremonial activities within the project area. (EPA, 2002).

Some historical values may be altered by road closures and decommissions, although a non-invasive method of closure or decommissioning would be less apt to further disrupt those areas of unique cultural, traditional, symbolic, sacred, spiritual, or religious significance.

PV3: What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, traditional, or religious values for areas planned for road entry or road closure?

Prehistoric archaeological remains on the Burns Ranger District are representative of two broad cultural stages: Paleo-Indian and Archaic. The District is tied culturally primarily to the Great Basin because prehistoric people who utilized it as a hunting and gathering area were based in the Harney Valley, wintering around Harney Lake. Today, these people are represented by the Northern Paiute tribes, and in this area specifically, the Burns Paiute Tribe.

In recent years, there has been a renewed interest by the people in preserving their language, culture, and traditional life style. Younger tribal members are learning skills from their elders to carry into the future. Having roaded access to traditional plant gathering, hunting, fishing, and spiritual sites and availability of resources is of vital concern to the tribe (SDEIS pg. 2-3).

PV4: Will constructing, closing, or decommissioning roads substantially affect passive-use values?

Passive use values are off-site uses in which people receive benefits not through actively using resources or visiting the area, but through the satisfaction of knowing that it exists or that it remains for future generations. Passive off-site uses within the watershed are primarily associated with the Myrtle-Silvies Roadless Area (Socio-economic report for Silvies Canyon FEIS). Passive use values associated with the Myrtle-Silvies Roadless Area will be addressed during the Forest Plan Revision tentatively scheduled for 2004.

Road system changes will affect other passive use values to varying degrees. For example, building additional roads or increasing motorized use will favor those forest users that value motorized recreation; while closing roads and road obliteration will favor those forest users who value a non-motorized experience.

SOCIAL ISSUES

SI1: What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

Motorized access is important to many people for both non-extracting activities, as well as extracting resources, be it firewood, post/poles, mushrooms, or timber. With an increase in motorized recreation and an aging population, new conflicts have begun to emerge regarding transportation systems. The need to reduce road systems for sensitive wildlife habitat protection, watershed restoration, protection of fisheries habitat, current road maintenance funding, and prevention of soil erosion often conflicts with human desires to access the National Forests via motorized vehicles. (SDEIS pg. 2-13).

The Burns Paiute Tribe has traditionally used the Silvies Canyon Watershed for fishing, hunting, and gathering of terrestrial and aquatic resources. They have expressed concern regarding closure of roads, thus potentially limiting access to resources within the area, especially for elders who may be mobility impaired.

This question/issue is also addressed in the LRMP for the Forest (Also see PV2-PV4, SI 12-14, SI8, and SI10).

SI2: What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

As a result of publicity generated by opponents and supporters of the past access travel management planning and implementation, there is a heightened awareness on the issues of motor vehicle access on the Forest. ORV and ATV riders are strongly opposed to any loss of motorized access. Rhetoric from both sides of the issue has increased tension and contributed to an overstatement of impacts by both sides. This area historically has had ample motorized access. Any proposals to close or decommission large portions of the road system will be met with both strong support and strong opposition.

SI3: How does the road system affect access to paleontological, archaeological, and historic sites?

Page 3-57 of the Silvies Canyon DEIS discusses the prehistoric and historic sites. Some roads may adversely affect archaeological sites. There are approximately 190 archeological sites that have been located and recorded.

Road construction and reconstruction are usually designed to avoid all significant properties, or mitigated through data recovery if avoidance is not possible. Nonetheless, roads provide access to these sites and often increase the potential for looting and vandalism. Conversely, road closures would reduce the potential.

SI4: How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

The Burns Paiute Tribe has no ratified treaty. As stated in PV2, the primary Tribal users of the watershed are the Burns Paiute Tribe (Tribe). The Tribes members continue to actively utilize the Silvies region for hunting, fishing, plant gathering, and religious purposes (Burns Paiute Tribe, 2001).

Correspondence received in response to the DEIS indicated that representatives of the tribe are concerned road closures will affect the ability of elders to access special areas. Specifically, correspondence has expressed that "*Plant gathering, hunting, and fishing by tribal members are important uses of the Silvies Canyon Watershed. Every tribal family uses this region for cultural purposes. Careful consideration needs to occur if roads are closed in the Silvies Canyon watershed. Many tribal members gather plants in this area and I am concerned that their traditional cultural practices may be limited. Many of the people on the reservation that are the master artists are elders and have limited mobility. Those individuals need to be able to get to cultural plant and other sites in this region* (Burns Paiute Tribe, 2001).

SI5: How are roads that constitute historic sites affected by road management?

The Silvies Canyon Analysis does/does not contain roads that constitute historic sites.

SI6: How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

This larger-scale question is addressed in the Malheur National Forest LRMP and Silvies Canyon SDEIS, Chapter 3.

SI7: What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values.

This larger-scale question is addressed in the Malheur National Forest LRMP.

SI8: How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

There are no wilderness areas within the watershed.

SI9: What are traditional uses of animal and plant species in the area of the analysis?

Grazing, hunting, fishing, and resource extraction are traditional uses. Species of fauna which were used by bands of American Indians that utilized the Silvies Canyon Analysis Area prior to Euroamerican contact include, but are not limited to: mule deer, Rocky Mountain elk, yellow bellied marmot, various rabbits, birds, and native fish. Traditionally important plant species that occur within the analysis area include but are not limited to species such as biscuitroot, bitterroot, onion, chokecherry, and huckleberry. See also PV2

SI10: How does road management affect people's sense of place?

Sense of place is defined as the physical locations that people have invested with meaning, value, and feelings because of their experiences there. With respect to local residents and American Indians, the presence of long established families, many with ties to the land and community that cross generations; a close-knit society with a strong emotional sense of place has resulted. Interestingly, out-of-area visitors, such as hunters, who have hunted or camped in the same area for several generations also have that same strong sense of place.

All three groups know the area history and have observed changes over the years, but from different perspectives. Some, such as hunters, only see the land at one time of the year, and changes that have occurred over time may appear to be sudden actions that take them by surprise. Local residents and American Indians, who visit the area several times a year may not see the changes as sudden but may not agree with them. This is especially so when the changes directly affect their livelihood or lifestyle.

American Indians have an intimate relationship with the land's resources. Resources often have spiritual overtones and are part of American Indian sense of identity. Changes are usually viewed in how it affects their sense of identity or lifestyle, and how it might affect future generations.

Forestry and agriculture based employment and life styles have long dominated the local community economies. The gradual but marked decline over the past several decades has left a sense of frustration and bitterness toward “federal control” and national direction in the minds of many long time residents and business people (SDEIS pg. 2-14).

Roads play and important part of some peoples "sense of place". Ties to the land are based on the lifestyles of people that make their living off of the land. The existing road management benefits the majority of recreationists in the area, especially those seeking a motorized recreation type of experience. Access to the private land inholdings is by Forest Service roads.

CIVIL RIGHTS AND ENVIRONMENTAL JUSTICE

CR1: How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low income groups)?

Decisions that influence the management of road systems within the Silvies Canyon watershed have the potential to affect many people. Some people, however, are more directly affected than others because of their interest in the area. Those most directly affected by proposed road management are those whose livelihood or recreational pursuits are most closely tied to the area (SDEIS pgs. 3-1 to 3-2).

In the SDEIS (pages 3-4 to 3-5) several specific minority or disadvantaged groups, qualifying under the environmental justice executive order, were identified with potential to be impacted by activities. These are: elderly people, especially those on low, fixed incomes, low-income people in general, and the Burns Paiute Tribe. The level of motor vehicular access to specific areas would directly affect the elderly and the Burns Paiute Tribe.

APPENDIX A

Road List

SILVIES CANYON
PLANNING AREA ROADS ANALYSIS

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3100000	3883.52	2.41	4	4	AGG	Myrtle Park	5.79	
3100000	10940.35	6.80	4	4	BST	Myrtle Park		
3100000	18216.53	11.32	4	4	BST	Sage Hen Creek		
3100020	167.57	0.10	1	1	NAT	Myrtle Park		X
3100021	1711.48	1.06	2	1	NAT	Myrtle Park		
3100029	301.44	0.17	2	1	NAT	Myrtle Park		X
3100031	1028.39	0.30	1	1	NAT	Myrtle Park		X
3100033	268.27	0.17	2	1	NAT	Myrtle Park		
3100034	738.55	0.46	1	1	NAT	Myrtle Park		X
3100035	1462.25	0.91	2	1	NAT	Sage Hen Creek	1.69	X
3100035	761.28	0.47	2	1	NAT	Burnt Mountain		X
3100035	5079.37	1.80	1	1	NAT	Burnt Mountain		X
3100036	1380.15	0.86	2	1	NAT	Myrtle Park		
3100038	346.48	0.17	1	1	NAT	Myrtle Park		X
3100084	474.46	0.21	1	1	NAT	Sage Hen Creek		X
3100086	205.43	0.13	1	1	NAT	Stancliffe Creek		X
3100087	1749.30	1.09	1	1	NAT	Stancliffe Creek		X
3100088	717.94	0.45	2	2	NAT	Myrtle Park	0.21	
3100089	843.97	0.52	1	1	NAT	Stancliffe Creek		X
3100090	602.15	0.37	2	1	NAT	Sage Hen Creek		
3100092	709.21	0.40	1	1	NAT	Sage Hen Creek		X
3100093	209.29	0.13	2	2	NAT	Stancliffe Creek		
3100095	1771.59	1.10	2	2	NAT	Stancliffe Creek	0.31	
3100096	548.58	0.34	2	1	NAT	Myrtle Park		
3100101	756.37	0.47	2	2	NAT	Myrtle Park	0.16	X
3100102	1139.34	0.71	2	2	NAT	Myrtle Park	0.24	
3100102	1988.68	1.24	2	2	NAT	Sage Hen Creek		
3100104	1675.54	1.04	2	1	NAT	Sage Hen Creek		
3100105	777.38	0.48	2	1	NAT	Sage Hen Creek		
3100107	1166.78	0.70	1	1	NAT	Myrtle Park		X
3100107	53.03	0.03	1	1	NAT	Sage Hen Creek		
3100131	1393.25	0.87	1	1	NAT	Stancliffe Creek	0.45	X
3100132	730.44	0.45	1	1	NAT	Boulder Creek/Fawn Creek		
3100132	36.90	0.02	1	1	NAT	Sage Hen Creek		
3100137	268.09	0.17	1	1	NAT	Myrtle Park		
3100152	1007.05	0.63	1	1	NAT	Myrtle Park		
3100190	1590.93	0.99	1	1	NAT	Myrtle Park	0.39	X
3100193	491.50	0.31	2	1	NAT	Myrtle Park		
3100195	3587.78	2.23	2	1	NAT	Myrtle Park	0.37	
3100196	983.00	0.61	2	2	NAT	Myrtle Park		
3100208	1496.69	0.93	2	1	NAT	Myrtle Park		
3100210	1485.92	0.92	2	1	IMP	Myrtle Park	0.13	
3100210	371.31	0.23	2	1	NAT	Myrtle Park		
3100212	611.91	0.38	2	1	NAT	Myrtle Park		
3100218	1868.01	1.16	2	2	NAT	Myrtle Park		
3100219	285.47	0.18	2	2	NAT	Myrtle Park		X
3100220	264.58	0.13	1	1	NAT	Myrtle Park		X
3100222	268.64	0.17	2	2	NAT	Myrtle Park		X
3100223	394.17	0.24	2	1	NAT	Myrtle Park		
3100224	502.23	0.31	2	1	NAT	Myrtle Park	0.01	
3100225	577.08	0.36	1	1	NAT	Myrtle Park		X
3100226	429.37	0.27	3	3	BST	Myrtle Park	0.22	
3100227	446.96	0.28	1	1	NAT	Myrtle Park		X
3100228	817.66	0.47	1	1	NAT	Myrtle Park		X
3100230	836.90	0.47	2	2	NAT	Myrtle Park	0.08	X
3100239	3301.44	2.05	1	1	NAT	Myrtle Park	0.31	X
3100241	1286.26	0.80	2	2	IMP	Myrtle Park	0.17	
3100241	804.30	0.50	2	2	NAT	Myrtle Park		
3100243	909.28	0.57	2	1	NAT	Myrtle Park	0.08	
3100244	623.71	0.39	2	2	NAT	Myrtle Park		
3100245	658.16	0.38	2	2	NAT	Myrtle Park		X
3100247	378.17	0.23	1	1	NAT	Myrtle Park		X
3100248	1937.46	1.20	2	2	NAT	Myrtle Park	0.05	
3100249	420.97	0.26	2	1	NAT	Myrtle Park		
3100250	211.36	0.13	2	1	NAT	Myrtle Park		
3100259	262.97	0.16	2	1	NAT	Myrtle Park		
3100260	328.58	0.20	2	2	NAT	Myrtle Park	0.11	
3100260	2628.86	1.63	2	2	IMP	Myrtle Park		
3100261	730.27	0.45	1	1	NAT	Myrtle Park		X

SILVIES CANYON
PLANNING AREA ROADS ANALYSIS

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3100262	351.14	0.22	1	1	NAT	Myrtle Park	0.04	X
3100265	503.80	0.31	1	1	NAT	Myrtle Park	0.03	X
3100266	331.33	0.21	1	1	NAT	Myrtle Park		
3100271	1274.30	0.79	2	2	NAT	Myrtle Park	0.39	
3100273	327.44	0.20	2	1	NAT	Myrtle Park		
3100273	490.98	0.31	2	1	NAT	Myrtle Park		
3100274	384.24	0.24	1	1	NAT	Myrtle Park		X
3100275	767.12	0.48	1	1	NAT	Myrtle Park		X
3100276	816.36	0.51	1	1	NAT	Myrtle Park		X
3100277	421.70	0.26	1	1	NAT	Myrtle Park		X
3100286	1340.74	0.83	2	2	IMP	Myrtle Park	0.08	X
3100288	206.86	0.13	2	1	NAT	Myrtle Park		
3100289	458.68	0.29	2	2	NAT	Myrtle Park		
3100290	1467.03	0.91	2	2	NAT	Myrtle Park	0.24	X
3100293	322.29	0.20	1	2	NAT	Myrtle Park		X
3100294	161.03	0.10	2	1	NAT	Myrtle Park		
3100296	1200.52	0.75	2	2	NAT	Myrtle Park		
3100299	354.94	0.22	1	1	NAT	Myrtle Park		X
3100305	531.65	0.33	2	1	NAT	Myrtle Park		
3100306	288.74	0.18	2	1	NAT	Sage Hen Creek	0.08	X
3100319	191.84	0.12	2	1	NAT	Stancliffe Creek		
3100320	564.14	0.35	2	2	NAT	Stancliffe Creek	0.06	X
3100321	668.64	0.42	2	1	NAT	Stancliffe Creek	0.04	
3100334	216.43	0.13	2	1	NAT	Myrtle Park		
3100342	240.75	0.15	1	1	NAT	Myrtle Park		X
3100343	17.17	0.01	2	2	NAT	Myrtle Park		
3100381	608.61	0.38	2	2	NAT	Myrtle Park		
3100415	524.06	0.33	2	1	NAT	Stancliffe Creek	0.24	
3100424	256.29	0.16	1	1	NAT	Stancliffe Creek		X
3100426	333.85	0.18	1	1	NAT	Sage Hen Creek		X
3100429	1414.28	0.88	1	1	NAT	Sage Hen Creek		X
3100430	409.41	0.25	2	1	NAT	Sage Hen Creek		
3100431	542.85	0.34	2	2	NAT	Sage Hen Creek		
3100432	41.22	0.03	2	2	NAT	Stancliffe Creek		
3100435	275.28	0.13	1	1	NAT	Sage Hen Creek	0.09	X
3100436	312.77	0.19	2	1	NAT	Stancliffe Creek		
3100437	418.55	0.26	2	1	NAT	Stancliffe Creek		
3100545	314.73	0.20	2	2	NAT	Myrtle Park		X
3100547	394.38	0.25	1	1	NAT	Myrtle Park		X
3100551	705.80	0.44	1	1	NAT	Myrtle Park		X
3100557	267.64	0.17	2	1	NAT	Myrtle Park		
3100559	202.55	0.13	2	1	NAT	Myrtle Park	0.05	
3100559	202.63	0.13	2	1	NAT	Myrtle Park		
3100563	398.98	0.18	1	1	NAT	Myrtle Park		X
3100565	386.79	0.17	1	1	NAT	Myrtle Park		X
3100569	102.44	0.06	2	2	NAT	Sage Hen Creek		
3100570	108.71	0.07	1	1	NAT	Myrtle Park		X
3100571	419.91	0.26	2	1	NAT	Sage Hen Creek		
3100572	317.51	0.18	1	1	NAT	Sage Hen Creek		X
3100599	614.61	0.38	2	2	NAT	Myrtle Park		X
3100600	483.79	0.30	1	1	NAT	Myrtle Park		X
3100601	485.56	0.30	2	1	NAT	Sage Hen Creek	0.20	
3100601	517.71	0.32	2	1	NAT	Stancliffe Creek		
3100602	164.15	0.10	2	2	NAT	Myrtle Park		X
3100605	124.62	0.08	1	1	NAT	Myrtle Park		
3100612	204.78	0.13	2	1	NAT	Myrtle Park		
3100613	408.55	0.19	1	1	NAT	Myrtle Park		X
3100615	1467.31	0.89	2	2	NAT	Myrtle Park		X
3100616	738.95	0.38	1	1	NAT	Myrtle Park		X
3100618	67.46	0.04	1	1	NAT	Myrtle Park		X
3100618	67.81	0.04	1	1	NAT	Myrtle Park		X
3100619	643.43	0.40	2	2	NAT	Myrtle Park		X
3100620	598.56	0.37	2	2	NAT	Myrtle Park		X
3100627	248.30	0.15	1	1	NAT	Myrtle Park		X
3100719	17.93	0.01	2	2	NAT	Myrtle Park		
3100720	217.82	0.14	1	1	NAT	Myrtle Park		X
3100724	260.79	0.16	1	1	NAT	Myrtle Park		X
3100728	260.54	0.16	2	1	NAT	Myrtle Park		
3100742	1890.09	1.17	2	2	NAT	Myrtle Park	0.04	X

SILVIES CANYON
PLANNING AREA ROADS ANALYSIS

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3100744	2086.23	1.30	2	2	NAT	Sage Hen Creek		
3100745	815.27	0.51	2	1	NAT	Sage Hen Creek	0.49	X
3100747	905.03	0.48	1	1	NAT	Sage Hen Creek	0.48	X
3100758	440.30	0.27	1	1	NAT	Stancliffe Creek	0.06	X
3100759	658.32	0.41	2	2	NAT	Stancliffe Creek	0.04	
3100768	1929.90	1.20	2	2	IMP	Myrtle Park	0.08	
3100770	645.42	0.40	2	2	NAT	Myrtle Park		
3100795	401.26	0.25	1	1	NAT	Myrtle Park		X
3100820	229.29	0.14	2	2	NAT	Myrtle Park		
3100827	123.30	0.08	1	1	NAT	Myrtle Park		X
3100828	191.86	0.12	2	2	NAT	Myrtle Park	0.06	
3100843	398.60	0.25	2	1	NAT	Sage Hen Creek		
3100844	64.43	0.04	2	2	AGG	Myrtle Park		X
3100844	2672.33	1.66	2	2	AGG	Sage Hen Creek		X
3100844	1610.07	1.00	2	2	NAT	Sage Hen Creek		X
3100846	684.89	0.43	2	2	NAT	Sage Hen Creek		
3100847	428.43	0.27	2	2	NAT	Sage Hen Creek		
3100858	865.54	0.35	1	1	NAT	Sage Hen Creek	0.05	X
3100859	500.93	0.31	2	1	NAT	Sage Hen Creek		
3100860	3774.08	2.35	2	1	NAT	Sage Hen Creek	1.48	
3100862	1113.51	0.69	2	2	NAT	Myrtle Park		
3100862	636.35	0.40	2	1	NAT	Myrtle Park		
3100863	582.55	0.36	2	2	NAT	Myrtle Park		
3100864	1074.09	0.67	2	2	AGG	Myrtle Park	1.65	
3100864	3847.62	2.39	2	2	NAT	Myrtle Park		
3100866	720.98	0.45	2	1	NAT	Sage Hen Creek	0.01	
3100867	235.82	0.21	1	1	NAT	Myrtle Park		X
3100868	328.47	0.20	2	1	NAT	Myrtle Park		
3100869	830.96	0.52	2	2	NAT	Myrtle Park		
3100870	949.25	0.59	2	1	NAT	Myrtle Park		
3100872	435.26	0.27	2	1	NAT	Myrtle Park		
3100873	291.05	0.18	2	1	NAT	Myrtle Park		
3100874	901.95	0.56	2	1	NAT	Myrtle Park		
3100875	1077.66	0.67	2	2	IMP	Myrtle Park	0.05	
3100879	101.84	0.06	2	1	NAT	Myrtle Park		
3100885	468.70	0.29	2	1	NAT	Myrtle Park		
3100887	280.54	0.17	2	1	NAT	Myrtle Park		
3100888	125.74	0.08	2	1	NAT	Myrtle Park		
3100892	276.78	0.17	2	2	NAT	Myrtle Park		X
3100895	820.44	0.51	1	1	NAT	Myrtle Park	0.14	X
3100895	1339.39	0.83	2	1	NAT	Myrtle Park		X
3100898	595.79	0.37	2	2	NAT	Myrtle Park		
3100909	447.71	0.28	1	1	NAT	Myrtle Park	0.20	X
3100910	392.94	0.24	1	1	NAT	Sage Hen Creek	0.51	X
3100910	3012.87	1.87	2	2	NAT	Sage Hen Creek		X
3100911	323.33	0.20	2	2	NAT	Sage Hen Creek	0.04	X
3100913	438.02	0.27	2	2	IMP	Sage Hen Creek		
3100914	396.01	0.20	1	1	NAT	Sage Hen Creek		X
3100925	765.68	0.48	2	2	NAT	Myrtle Park		
3100931	284.78	0.18	1	1	NAT	Myrtle Park		X
3100932	241.35	0.15	1	1	NAT	Myrtle Park		X
3100935	4351.57	2.70	2	2	AGG	Myrtle Park	0.22	
3100936	116.24	0.07	2	2	IMP	Myrtle Park		
3100936	2046.39	1.27	2	2	NAT	Myrtle Park		
3100937	1338.23	0.83	2	2	NAT	Myrtle Park		
3100938	2277.10	1.41	2	2	NAT	Myrtle Park		
3100939	367.60	0.23	2	1	NAT	Myrtle Park		
3100940	248.32	0.15	1	1	NAT	Myrtle Park		X
3100942	208.68	0.13	1	1	NAT	Myrtle Park		X
3100943	142.93	0.09	2	1	NAT	Myrtle Park		X
3100953	800.98	0.50	2	1	NAT	Sage Hen Creek		
3100955	349.35	0.22	2	1	NAT	Sage Hen Creek	0.05	
3100957	1494.95	0.93	2	1	NAT	Sage Hen Creek	0.90	
3100959	725.98	0.45	2	2	NAT	Sage Hen Creek	0.03	
3100961	1757.60	1.09	2	2	NAT	Sage Hen Creek	0.21	
3100962	248.83	0.15	2	2	NAT	Sage Hen Creek		
3100963	2049.67	1.24	2	1	NAT	Sage Hen Creek	0.09	X
3100964	197.30	0.12	2	1	NAT	Sage Hen Creek	0.10	
3100967	662.00	0.41	1	1	NAT	Sage Hen Creek	0.40	X

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ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3100967	992.99	0.62	2	2	NAT	Sage Hen Creek		
3100969	910.78	0.57	2	2	NAT	Sage Hen Creek	0.05	
3100982	704.19	0.44	2	2	NAT	Myrtle Park		
3100985	333.16	0.21	1	1	NAT	Myrtle Park		X
3100986	241.97	0.15	1	1	NAT	Myrtle Park		X
3110000	2887.94	1.79	2	2	NAT	Burnt Mountain		
3110000	443.47	0.28	2	2	NAT	Stancliffe Creek		
3110109	652.74	0.41	2	2	NAT	Stancliffe Creek	0.34	
3110110	969.81	0.60	2	2	NAT	Burnt Mountain		
3110111	299.65	0.19	2	1	NAT	Red Hill		
3110127	753.78	0.47	2	2	NAT	Stancliffe Creek	0.30	
3110140	272.73	0.17	2	1	NAT	Stancliffe Creek	0.07	
3110164	271.16	0.17	2	2	NAT	Burnt Mountain		
3110176	812.13	0.50	2	1	NAT	Burnt Mountain		
3110181	833.54	0.52	2	1	NAT	Burnt Mountain		
3110182	763.66	0.47	2	2	NAT	Stancliffe Creek		
3110185	1216.21	0.76	2	2	NAT	Stancliffe Creek		
3110186	198.70	0.12	2	1	NAT	Stancliffe Creek		
3110224	2422.30	1.51	2	2	NAT	Red Hill	0.05	
3110224	1588.23	0.99	2	2	NAT	Burnt Mountain		
3110224	771.73	0.48	1	1	NAT	Burnt Mountain		
3110230	3425.37	2.13	2	2	NAT	Stancliffe Creek	0.05	
3110232	1426.31	0.89	2	2	NAT	Stancliffe Creek	0.40	
3110234	1852.21	1.15	2	2	NAT	Stancliffe Creek		
3110332	396.00	0.25	2	2	NAT	Burnt Mountain		
3110820	279.75	0.17	2	2	NAT	Burnt Mountain		
3110986	215.74	0.13	2	1	NAT	Burnt Mountain		
3120000	2028.38	1.26	2	2	NAT	Stancliffe Creek	0.80	
3120000	5802.37	3.61	2	2	NAT	Burnt Mountain		
3120123	801.10	0.50	2	1	NAT	Stancliffe Creek		
3120124	655.73	0.41	2	2	NAT	Stancliffe Creek		
3120125	237.14	0.15	2	2	NAT	Burnt Mountain	0.10	
3120125	2565.30	1.59	2	2	NAT	Stancliffe Creek		
3120126	667.52	0.41	2	1	NAT	Stancliffe Creek	0.03	
3120142	662.04	0.41	2	2	NAT	Stancliffe Creek		
3120142	1757.43	1.09	2	2	NAT	Burnt Mountain		
3120143	424.95	0.26	2	1	NAT	Burnt Mountain		
3120144	225.43	0.14	2	1	NAT	Burnt Mountain		
3120155	1046.76	0.65	2	1	NAT	Burnt Mountain	0.11	
3120155	337.11	0.21	2	1	NAT	Stancliffe Creek		
3120159	362.64	0.23	2	2	NAT	Burnt Mountain		
3120161	266.55	0.17	2	2	NAT	Burnt Mountain		
3120163	623.18	0.39	2	2	NAT	Burnt Mountain		
3120163	471.50	0.29	2	2	NAT	Stancliffe Creek		
3120166	965.23	0.60	2	1	NAT	Burnt Mountain		
3120172	597.36	0.37	2	1	NAT	Burnt Mountain		
3120173	237.88	0.15	2	1	NAT	Burnt Mountain		X
3120236	239.91	0.15	2	1	NAT	Burnt Mountain		
3120279	725.07	0.45	2	1	NAT	Burnt Mountain		
3125000	4997.39	3.11	3	3	IMP	Sage Hen Creek	0.67	
3125000	2543.95	1.58	3	3	IMP	Burnt Mountain		
3125000	1885.09	1.17	2	2	NAT	Burnt Mountain		
3125051	1519.90	0.94	2	2/1	NAT	Sage Hen Creek	0.01	
3125121	329.16	0.20	2	1	NAT	Burnt Mountain		
3125122	366.79	0.23	2	2	NAT	Sage Hen Creek		
3125150	908.91	0.56	2	1	NAT	Burnt Mountain		
3125151	154.68	0.10	2	1	NAT	Burnt Mountain		
3125152	84.25	0.05	2	1	NAT	Burnt Mountain		
3125153	95.97	0.06	2	1	NAT	Burnt Mountain		
3125240	887.70	0.55	2	1	NAT	Burnt Mountain		
3125244	2338.76	1.45	2	2/1	NAT	Sage Hen Creek	0.71	
3125374	1073.22	0.67	1	1	NAT	Burnt Mountain		X
3125413	1084.69	0.67	2	2	NAT	Burnt Mountain		X
3125413	465.17	0.29	1	1	NAT	Burnt Mountain		X
3125435	647.48	0.40	2	1	NAT	Burnt Mountain		X
3125436	410.11	0.25	2	1	NAT	Burnt Mountain		
3125437	239.84	0.15	2	2	NAT	Burnt Mountain		
3125487	686.38	0.43	2	2	NAT	Burnt Mountain		
3125525	513.12	0.32	2	2	NAT	Sage Hen Creek		

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3125526	199.75	0.12	1	1	NAT	Burnt Mountain		X
3125527	1209.28	0.75	2	1	NAT	Sage Hen Creek		
3125528	162.06	0.10	1	1	NAT	Burnt Mountain		X
3125529	403.86	0.10	1	1	NAT	Burnt Mountain		X
3125530	140.60	0.09	1	1	NAT	Burnt Mountain		X
3125531	571.21	0.35	2	1	NAT	Myrtle Creek		
3125532	431.25	0.27	2	2	NAT	Burnt Mountain		X
3125532	287.40	0.18	1	2	NAT	Burnt Mountain		
3125533	568.42	0.35	2	1	NAT	Myrtle Creek		
3125536	848.61	0.53	2	2	NAT	Burnt Mountain		
3125544	178.19	0.11	2	2	NAT	Burnt Mountain		
3125548	378.42	0.24	2	2	NAT	Burnt Mountain		
3125553	284.04	0.18	2	1	NAT	Sage Hen Creek		
3125553	156.87	0.10	2	1	NAT	Burnt Mountain		
3125555	1293.86	0.80	2	1	NAT	Burnt Mountain	0.31	
3125556	372.21	0.23	2	1	NAT	Burnt Mountain	0.20	
3125670	324.75	0.20	2	1	NAT	Burnt Mountain		
3125735	290.38	0.18	1	1	NAT	Burnt Mountain		X
3125744	214.99	0.13	2	1	NAT	Burnt Mountain		
3125749	2072.39	1.29	2	1	NAT	Burnt Mountain		
3125751	315.50	0.20	2	1	NAT	Burnt Mountain		
3125755	759.13	0.47	2	1	NAT	Burnt Mountain		
3125756	326.02	0.20	2	1	NAT	Burnt Mountain		
3125761	242.56	0.15	2	1	NAT	Burnt Mountain		
3125764	268.59	0.17	2	1	NAT	Burnt Mountain		
3125767	196.74	0.12	2	1	NAT	Sage Hen Creek		
3125767	247.29	0.15	2	1	NAT	Burnt Mountain		
3125772	428.36	0.27	1	1	NAT	Sage Hen Creek		X
3125772	233.25	0.14	1	1	NAT	Burnt Mountain		
3125789	1913.51	1.19	2	2	NAT	Burnt Mountain		
3125794	79.15	0.05	2	1	NAT	Burnt Mountain		
3125794	1176.95	0.73	2	1	NAT	Sage Hen Creek		
3125798	3040.70	1.89	2	2	NAT	Burnt Mountain		
3125798	136.81	0.09	2	2	NAT	Sage Hen Creek		
3125911	298.53	0.19	2	1	NAT	Sage Hen Creek		
3125912	1296.88	0.81	2	2	NAT	Myrtle Park	0.84	
3125912	5366.74	3.33	2	2	NAT	Sage Hen Creek		
3125913	927.66	0.58	2	2	NAT	Sage Hen Creek		
3125914	1054.16	0.66	2	2	IMP	Sage Hen Creek		
3125914	3418.09	2.12	2	2	NAT	Sage Hen Creek		
3125914	814.59	0.51	2	2	NAT	Sage Hen Creek		
3125916	214.38	0.13	2	2	NAT	Sage Hen Creek	0.03	
3125916	798.78	0.50	2	2	NAT	Myrtle Creek		
3125918	406.11	0.25	2	2	NAT	Sage Hen Creek		
3125918	2850.23	1.77	2	2	NAT	Myrtle Creek		
3125920	1904.92	1.18	2	1	NAT	Sage Hen Creek	0.16	
3125922	294.61	0.18	2	2	NAT	Sage Hen Creek	0.04	
3125923	196.25	0.12	2	2	NAT	Sage Hen Creek	0.04	
3125924	2612.75	1.62	2	1	NAT	Sage Hen Creek	0.06	
3125926	433.47	0.27	2	1	NAT	Sage Hen Creek		
3125927	235.29	0.15	2	1	NAT	Myrtle Creek		
3125927	115.72	0.07	2	1	NAT	Burnt Mountain		
3125928	460.70	0.22	2	2	NAT	Sage Hen Creek	0.08	X
3125929	222.73	0.14	2	1	NAT	Sage Hen Creek		
3125930	530.93	0.33	2	1	NAT	Burnt Mountain		
3125931	511.04	0.32	2	1	NAT	Sage Hen Creek		
3125943	818.59	0.51	2	1	NAT	Sage Hen Creek		
3125945	2312.54	1.44	2	2	NAT	Sage Hen Creek	0.04	
3125947	310.20	0.19	2	1	NAT	Sage Hen Creek		
3125951	1323.44	0.82	2	1	NAT	Sage Hen Creek		
3125952	383.80	0.24	2	1	NAT	Sage Hen Creek		
3125971	385.14	0.24	2	2	NAT	Sage Hen Creek	0.04	X
3125971	1925.97	1.20	1	2	NAT	Sage Hen Creek		X
3125971	963.01	0.60	2	2	NAT	Sage Hen Creek		X
3125972	396.11	0.25	2	1	NAT	Sage Hen Creek		
3125973	101.15	0.06	2	2	NAT	Sage Hen Creek		
3125975	157.69	0.10	2	1	IMP	Sage Hen Creek		
3125977	344.35	0.21	2	2	NAT	Burnt Mountain		
3125977	327.36	0.20	2	2	NAT	Sage Hen Creek		

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3125978	853.94	0.53	2	2	NAT	Sage Hen Creek		
3125979	686.51	0.43	2	1	NAT	Sage Hen Creek		
3125979	2404.09	1.49	2	1	NAT	Burnt Mountain		
3125980	355.21	0.22	2	1	NAT	Burnt Mountain		
3125981	23.06	0.01	2	2	NAT	Myrtle Creek	0.04	
3125981	4410.25	2.74	2	2	NAT	Burnt Mountain		
3125983	153.82	0.10	2	2	NAT	Myrtle Creek		
3125983	2083.05	1.29	2	2	NAT	Burnt Mountain		
3125987	241.37	0.15	2	1	NAT	Burnt Mountain		
3125988	466.78	0.29	2	1	NAT	Burnt Mountain		
3125989	292.31	0.18	2	1	NAT	Burnt Mountain		
3125990	154.18	0.10	2	1	NAT	Burnt Mountain		
3125991	69.88	0.04	2	2	NAT	Myrtle Creek		
3125991	566.79	0.35	2	2	NAT	Burnt Mountain		
3125993	332.87	0.21	2	1	NAT	Myrtle Creek		
3125993	299.73	0.19	2	1	NAT	Burnt Mountain		
3125997	543.00	0.34	2	1	NAT	Burnt Mountain		
3125999	659.26	0.41	1	1	NAT	Myrtle Creek		X
3125999	136.50	0.08	1	1	NAT	Burnt Mountain		X
3130000	6886.10	4.28	2	2	NAT	Boulder Creek/Fawn Creek	0.03	
3130000	39.75	0.02	2	2	NAT	Stancliffe Creek		
3130000	4501.79	2.80	3	2	IMP	Stancliffe Creek		
3130055	1825.02	1.13	2	1	NAT	Boulder Creek/Fawn Creek		
3130057	3366.03	2.09	2	2	NAT	Stancliffe Creek	0.04	
3130059	46.09	0.03	2	2	NAT	Stancliffe Creek		
3130063	196.16	0.12	1	1	NAT	Boulder Creek/Fawn Creek		
3130063	151.61	0.09	2	1	NAT	Boulder Creek/Fawn Creek		
3130066	214.23	0.13	2	1	NAT	Boulder Creek/Fawn Creek		
3130074	395.08	0.25	2	1	NAT	Stancliffe Creek		
3130077	134.70	0.08	2	1	NAT	Stancliffe Creek		
3130079	367.83	0.23	2	1	NAT	Stancliffe Creek		
3130080	355.54	0.22	1	1	NAT	Boulder Creek/Fawn Creek		X
3130080	533.15	0.33	2	2	NAT	Boulder Creek/Fawn Creek		X
3130085	1228.98	0.76	2	2	NAT	Stancliffe Creek		
3130093	2757.09	1.71	2	2	NAT	Stancliffe Creek	0.27	
3130101	998.10	0.62	2	1	NAT	Stancliffe Creek	0.46	
3130103	20.86	0.01	2	2	NAT	Stancliffe Creek		
3130106	2236.45	1.39	2	2	NAT	Stancliffe Creek		
3130107	237.92	0.15	1	1	NAT	Stancliffe Creek		X
3130127	393.40	0.24	2	2	NAT	Boulder Creek/Fawn Creek	0.46	
3130128	116.96	0.07	1	1	NAT	Boulder Creek/Fawn Creek	0.02	X
3130129	2268.70	1.41	2	2	NAT	Boulder Creek/Fawn Creek	0.57	
3130129	2417.27	1.50	2	2	NAT	Stancliffe Creek		
3130130	491.90	0.31	2	1	NAT	Boulder Creek/Fawn Creek		
3130242	218.35	0.14	2	1	NAT	Boulder Creek/Fawn Creek		
3130410	2213.43	1.38	2	2	NAT	Boulder Creek/Fawn Creek		
3130412	1261.02	0.78	2	2	NAT	Boulder Creek/Fawn Creek		
3130416	176.01	0.11	2	2	NAT	Boulder Creek/Fawn Creek		
3130616	1109.67	0.69	2	1	NAT	Stancliffe Creek		
3130617	365.51	0.23	2	1	NAT	Stancliffe Creek		
3130618	1300.38	0.81	2	2	NAT	Stancliffe Creek		
3130827	923.55	0.57	2	2	NAT	Boulder Creek/Fawn Creek		
3130987	735.99	0.46	1	1	NAT	Stancliffe Creek		X
3130988	962.82	0.60	2	2	NAT	Stancliffe Creek		
3130989	477.22	0.30	2	2	NAT	Stancliffe Creek		X
3130990	527.04	0.33	1	1	NAT	Boulder Creek/Fawn Creek		X
3130990	306.22	0.19	2	1	NAT	Boulder Creek/Fawn Creek		
3130990	13.24	0.01	2	1	NAT	Stancliffe Creek		
3130992	4029.44	2.50	2	2	NAT	Boulder Creek/Fawn Creek	0.04	
3130993	629.97	0.39	2	1	NAT	Boulder Creek/Fawn Creek		
3130994	636.51	0.40	2	1	NAT	Boulder Creek/Fawn Creek		
3140000	2691.76	1.67	3	3	AGG	Boulder Creek/Fawn Creek	0.39	
3140000	6280.77	3.90	3	3	AGG	Boulder Creek/Fawn Creek		
3140000	2241.85	1.39	3	3	AGG	Sage Hen Creek		
3140020	1371.47	0.85	2	2	NAT	Boulder Creek/Fawn Creek	0.01	
3140020	1218.90	0.76	2	2	AGG	Boulder Creek/Fawn Creek		
3140049	304.41	0.19	2	1	NAT	Boulder Creek/Fawn Creek		
3140051	113.43	0.07	2	1	NAT	Boulder Creek/Fawn Creek		
3140060	24.96	0.02	2	2	IMP	Sage Hen Creek		

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3140081	1322.17	0.82	2	2	NAT	Sage Hen Creek	0.03	X
3140081	2313.49	1.44	2	2	NAT	Myrtle Park		X
3140081	50.21	0.03	2	2	IMP	Sage Hen Creek		X
3140081	754.23	0.47	2	2	NAT	Boulder Creek/Fawn Creek		X
3140082	968.51	0.51	2	2	NAT	Myrtle Park		X
3140086	1398.61	0.87	2	2	NAT	Sage Hen Creek	0.04	
3140089	134.77	0.08	1	1	NAT	Sage Hen Creek		X
3140089	404.12	0.25	1	1	NAT	Sage Hen Creek		X
3140100	92.76	0.06	1	1	NAT	Boulder Creek/Fawn Creek		X
3140104	1470.04	0.91	2	2	NAT	Boulder Creek/Fawn Creek		
3140105	288.23	0.18	2	2	NAT	Boulder Creek/Fawn Creek		
3140105	1860.10	1.16	2	2	NAT	Sage Hen Creek		
3140108	369.90	0.23	2	1	NAT	Boulder Creek/Fawn Creek		
3140110	555.30	0.35	2	1	NAT	Boulder Creek/Fawn Creek		
3140119	218.49	0.14	1	1	NAT	Sage Hen Creek		X
3140119	675.04	0.40	1	1	NAT	Boulder Creek/Fawn Creek		X
3140120	599.72	0.37	2	2	NAT	Boulder Creek/Fawn Creek		
3140120	923.00	0.57	2	2	NAT	Sage Hen Creek		
3140121	2323.22	1.44	2	1	NAT	Boulder Creek/Fawn Creek	0.15	
3140123	1433.55	0.89	2	1	NAT	Boulder Creek/Fawn Creek		
3140125	1164.58	0.72	2	2	NAT	Boulder Creek/Fawn Creek		
3140205	672.38	0.42	2	1	NAT	Boulder Creek/Fawn Creek		
3140207	226.19	0.14	2	1	NAT	Boulder Creek/Fawn Creek		
3140210	2277.90	1.42	2	2	AGG	Boulder Creek/Fawn Creek	0.12	
3140211	941.35	0.58	2	2	NAT	Boulder Creek/Fawn Creek		
3140212	468.02	0.29	2	2	NAT	Boulder Creek/Fawn Creek		
3140214	849.53	0.53	2	1	NAT	Boulder Creek/Fawn Creek		
3140218	471.77	0.29	2	1	NAT	Boulder Creek/Fawn Creek	0.05	
3140220	230.90	0.14	2	1	NAT	Boulder Creek/Fawn Creek		
3140221	378.42	0.24	2	1	NAT	Boulder Creek/Fawn Creek	0.04	
3140408	1004.78	0.62	2	2	NAT	Boulder Creek/Fawn Creek	0.04	
3140421	116.47	0.07	2	2	IMP	Myrtle Park		
3145062	164.55	0.10	2	2	NAT	Myrtle Park	0.75	X
3145062	2082.24	1.29	1	1	NAT	Myrtle Park		X
3145065	1457.71	0.91	2	2	NAT	Myrtle Park	0.07	X
3145385	464.35	0.29	2	2	NAT	Myrtle Park		
3145387	557.43	0.35	2	2	NAT	Myrtle Park		
3145389	1190.04	0.74	2	2	NAT	Myrtle Park	0.11	
3150000	1369.51	0.85	3	3	IMP	Myrtle Park	0.06	
3150390	263.03	0.16	2	2	NAT	Myrtle Park		
3150857	206.80	0.13	2	2	NAT	Myrtle Park		
3150891	11.50	0.01	2	2	NAT	Myrtle Park		
3150948	524.67	0.33	2	2	NAT	Myrtle Park		
3700000	2305.04	1.43	4	4	AGG	Myrtle Park	1.71	
3700000	5719.92	3.55	4	4	BST	Myrtle Park		
3700070	14.13	0.01	2	2	NAT	Myrtle Park		
3700100	1730.62	1.08	2	1	NAT	Myrtle Park	0.21	
3700117	3892.02	2.42	2	1	NAT	Myrtle Park	0.28	
3700120	662.91	0.41	2	1	NAT	Myrtle Park	0.05	
3700121	315.37	0.17	1	1	NAT	Myrtle Park	0.12	X
3700122	320.55	0.10	1	1	NAT	Myrtle Park		X
3700123	82.88	0.05	2	2	NAT	Myrtle Park	0.05	
3700124	324.31	0.20	1	1	NAT	Myrtle Park		X
3700125	433.88	0.27	1	1	NAT	Myrtle Park		X
3700138	228.14	0.14	2	1	NAT	Myrtle Park		
3700162	543.48	0.34	2	1	NAT	Myrtle Park		
3700163	252.26	0.16	2	1	NAT	Myrtle Park		
3700167	408.13	0.25	2	1	NAT	Myrtle Park	0.12	
3700170	450.57	0.28	1	1	NAT	Myrtle Park	0.16	X
3700172	903.30	0.56	2	1	NAT	Myrtle Park		
3700174	409.49	0.10	1	1	NAT	Myrtle Park		X
3700176	809.60	0.50	2	1	NAT	Myrtle Park		
3700177	706.47	0.44	2	1	NAT	Myrtle Park		
3700178	342.05	0.21	2	1	NAT	Myrtle Park		
3700185	1752.98	1.09	2	1	NAT	Myrtle Park	0.05	
3700186	2795.58	1.72	1	1	NAT	Myrtle Park	0.19	X
3700187	3822.28	2.38	2	2	IMP	Myrtle Park	1.03	
3700189	632.39	0.39	2	1	NAT	Myrtle Park	0.16	
3700190	553.14	0.34	2	1	NAT	Myrtle Park	0.17	

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3700191	1022.69	0.64	2	1	NAT	Myrtle Park		
3700192	597.55	0.37	2	1	NAT	Myrtle Park	0.94	X
3700192	1344.55	0.84	1	1	NAT	Myrtle Park		
3700195	1008.41	0.63	2	1	NAT	Myrtle Park	0.15	
3700198	246.76	0.15	2	1	NAT	Myrtle Park	0.04	
3700202	294.51	0.18	2	2	NAT	Myrtle Park		
3700206	865.22	0.54	2	1	NAT	Myrtle Park		
3700208	529.16	0.33	2	1	NAT	Myrtle Park	0.02	
3700210	998.30	0.62	2	2	NAT	Myrtle Park		
3700211	343.98	0.21	2	2	NAT	Myrtle Park		
3700235	143.85	0.09	1	2	NAT	Myrtle Park	0.07	
3700262	190.44	0.12	2	1	NAT	Myrtle Park		
3700264	338.37	0.21	2	1	NAT	Myrtle Park		
3700275	302.85	0.19	2	1	NAT	Myrtle Park	0.10	
3700276	350.77	0.20	1	1	NAT	Myrtle Park	0.14	X
3700282	438.81	0.27	2	1	NAT	Myrtle Park		
3700283	208.22	0.13	2	1	NAT	Myrtle Park		
3700292	795.51	0.49	2	2	NAT	Myrtle Park		
3700292	3022.46	1.88	2	2	IMP	Myrtle Park		
3700293	367.01	0.23	2	2	NAT	Myrtle Park		
3700294	802.10	0.50	2	1	NAT	Myrtle Park	0.39	
3700294	1652.13	1.03	2	1	IMP	Myrtle Park		
3700297	757.77	0.47	2	1	NAT	Myrtle Park		
3700298	295.11	0.18	1	1	NAT	Myrtle Park	0.02	X
3700301	151.34	0.06	1	1	NAT	Myrtle Park		X
3700302	397.31	0.25	2	1	NAT	Myrtle Park		
3700303	839.58	0.52	2	1	NAT	Myrtle Park		
3700304	475.25	0.30	2	2	NAT	Myrtle Park		
3700306	519.53	0.32	2	1	NAT	Myrtle Park		
3700307	371.26	0.23	1	1	NAT	Myrtle Park		X
3700309	966.29	0.60	2	2	NAT	Myrtle Park		
3700311	1006.59	0.63	2	2	NAT	Myrtle Park	0.04	
3700312	435.71	0.27	2	2	NAT	Myrtle Park		X
3700313	383.83	0.24	2	2	NAT	Myrtle Park		
3700320	1590.40	0.99	2	1	NAT	Myrtle Park		
3700321	496.41	0.31	2	1	NAT	Myrtle Park		
3700322	639.16	0.40	2	1	NAT	Myrtle Park	0.04	
3700323	307.05	0.19	2	1	NAT	Myrtle Park		
3700324	6614.28	4.11	2	2	NAT	Myrtle Park		
3700325	699.81	0.43	2	2	NAT	Myrtle Park		
3700326	1053.96	0.65	2	2	NAT	Myrtle Park	0.04	
3700327	430.52	0.27	2	1	NAT	Myrtle Park		
3700328	817.81	0.51	2	1	NAT	Myrtle Park	0.04	
3700329	359.13	0.22	2	1	NAT	Myrtle Park		
3700330	679.97	0.42	2	1	NAT	Myrtle Park		
3700331	85.72	0.05	2	1	NAT	Myrtle Park		
3700332	282.78	0.18	1	1	NAT	Myrtle Park	0.05	X
3700333	126.92	0.08	2	1	NAT	Myrtle Park		
3700339	293.07	0.18	2	1	NAT	Myrtle Park		
3700340	503.36	0.31	2	1	NAT	Myrtle Park		
3700341	877.44	0.55	2	1	NAT	Myrtle Park		
3700342	383.42	0.24	1	1	NAT	Myrtle Park		X
3700345	867.21	0.54	2	2	NAT	Myrtle Park		
3700346	468.25	0.29	1	1	NAT	Myrtle Park		X
3700347	183.39	0.11	2	2	NAT	Myrtle Park		
3700348	540.44	0.34	2	1	NAT	Myrtle Park		
3700355	124.17	0.08	2	2	NAT	Myrtle Park		
3700358	392.27	0.24	2	1	NAT	Myrtle Park		
3700363	468.30	0.29	2	1	NAT	Myrtle Park	0.06	
3700375	66.52	0.04	2	1	NAT	Myrtle Park		
3700376	213.14	0.13	2	1	NAT	Myrtle Park		
3700377	786.64	0.49	2	1	NAT	Myrtle Park	0.27	
3700378	309.47	0.19	2	1	NAT	Myrtle Park	0.12	
3700379	1242.12	0.77	2	1	NAT	Myrtle Park	0.37	
3700380	196.77	0.12	2	1	NAT	Myrtle Park		
3700381	341.46	0.21	2	1	NAT	Myrtle Park	0.02	
3700390	602.31	0.37	2	2	NAT	Myrtle Park		X
3700392	254.38	0.16	2	1	NAT	Myrtle Park		
3700393	331.76	0.21	2	1	NAT	Myrtle Park		

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3700396	778.47	0.48	2	1	NAT	Myrtle Park	0.46	X
3700398	1111.17	0.69	2	2	NAT	Myrtle Park		
3700401	1524.43	0.88	1	1	NAT	Myrtle Park		X
3700402	506.84	0.31	1	1	NAT	Myrtle Park		X
3700425	791.36	0.49	2	1	NAT	Myrtle Park		
3700436	273.02	0.17	2	1	NAT	Myrtle Park	0.04	
3700437	174.20	0.11	2	1	NAT	Myrtle Park		
3700438	319.34	0.20	2	1	NAT	Myrtle Park	0.02	
3700440	2656.96	1.65	2	2	AGG	Myrtle Park	0.48	
3700440	147.50	0.09	2	2	NAT	Myrtle Park		
3700440	1033.34	0.64	2	1	NAT	Myrtle Park		X
3700505	324.15	0.20	2	1	NAT	Myrtle Park		
3700562	368.55	0.23	2	1	NAT	Myrtle Park		
3700564	810.86	0.50	2	1	NAT	Myrtle Park		
3700641	950.12	0.59	2	1	IMP	Myrtle Park		
3700641	422.51	0.26	2	1	NAT	Myrtle Park		X
3700671	943.44	0.59	2	2	NAT	Myrtle Park		
3700671	366.41	0.23	2	2	NAT	Myrtle Creek		
3700769	112.97	0.07	2	2	NAT	Myrtle Creek		
3700771	223.48	0.14	2	2	NAT	Myrtle Park		
3700838	715.69	0.44	2	2	NAT	Myrtle Park		
3700842	1160.07	0.72	2	2	NAT	Myrtle Park		
3700861	3756.01	2.33	2	1	NAT	Myrtle Park	1.48	
3700941	725.67	0.45	2	1	NAT	Myrtle Park		
3700980	360.59	0.22	2	1	NAT	Myrtle Park		
3746000	2610.25	1.62	3	3	AGG	Myrtle Creek	0.05	
3746000	1671.47	1.04	3	3	AGG	Red Hill		
3746000	684.00	0.43	3	3	IMP	Red Hill		
3746000	290.90	0.18	2	2	NAT	Red Hill		
3746238	969.26	0.60	1	1	NAT	Myrtle Creek	0.25	X
3746338	229.44	0.14	2	1	NAT	Red Hill		
3746339	491.72	0.31	2	1	NAT	Red Hill		
3746667	3000.72	1.86	2	2	IMP	Myrtle Creek		
3746667	1043.74	0.65	2	2	NAT	Myrtle Creek		
3746673	3369.16	2.09	2	2	IMP	Myrtle Creek		
3746673	802.22	0.50	2	2	AGG	Myrtle Creek		
3746673	965.83	0.60	2	2	NAT	Myrtle Creek		
3746675	2828.11	1.76	2	2	IMP	Myrtle Creek		
3746675	2162.68	1.34	2	1	NAT	Myrtle Creek		
3746676	204.27	0.13	1	1	NAT	Myrtle Creek		X
3746679	2105.34	1.31	2	2	IMP	Red Hill	0.07	
3746679	465.39	0.29	2	2	IMP	Myrtle Creek		
3746681	2198.39	1.37	2	2	NAT	Red Hill	0.02	
3746683	1816.16	1.13	2	1	NAT	Red Hill	0.05	
3746689	777.21	0.48	2	2	NAT	Myrtle Creek		
3746694	73.43	0.05	2	1	NAT	Red Hill		
3746696	584.30	0.36	2	1	NAT	Red Hill		
3746698	808.06	0.50	1	1	NAT	Myrtle Creek	0.11	X
3746702	850.83	0.53	2	1	NAT	Myrtle Creek	0.10	
3746703	51.14	0.03	2	1	NAT	Red Hill		
3746703	1343.47	0.83	2	1	NAT	Myrtle Creek		
3746704	2174.82	1.35	2	1	NAT	Myrtle Creek		
3746705	272.59	0.17	2	1	NAT	Myrtle Creek		
3746707	2003.35	1.24	2	1	NAT	Myrtle Creek	0.14	
3746709	594.17	0.37	2	1	NAT	Myrtle Creek		
3746710	377.15	0.23	2	1	NAT	Red Hill		
3746711	219.85	0.14	2	1	NAT	Red Hill		
3746712	431.03	0.27	2	1	NAT	Red Hill		
3746713	1139.78	0.71	2	2	NAT	Myrtle Creek		
3746713	3490.83	2.17	2	2	NAT	Red Hill		
3746720	400.94	0.25	2	2	NAT	Myrtle Creek		
3746720	913.34	0.57	2	2	NAT	Red Hill		
3746722	471.19	0.29	2	1	NAT	Red Hill		
3746724	211.43	0.13	2	1	NAT	Red Hill		
3746726	858.79	0.53	2	1	NAT	Myrtle Creek		
3746728	577.28	0.36	2	1	NAT	Myrtle Creek		
3746730	263.00	0.16	1	1	NAT	Myrtle Creek		X
3746732	214.19	0.13	2	1	NAT	Myrtle Creek		
3746734	1051.97	0.65	2	1	NAT	Myrtle Creek	0.05	

SILVIES CANYON
PLANNING AREA ROADS ANALYSIS

ROAD	LENGTH (Meters)	LENGTH (Miles)	OPER ML	OBJ ML	SURFACE	HUC6_NAME	Miles in RHCA	Closed by Previous Decision
3746737	549.83	0.34	2	1	NAT	Myrtle Creek		
3746739	771.95	0.48	2	1	NAT	Myrtle Creek		
3746739	122.05	0.08	2	1	NAT	Red Hill		
3746740	553.23	0.34	2	1	NAT	Myrtle Creek	0.17	
3746741	1379.00	0.86	2	2	NAT	Myrtle Creek	0.04	
3746742	803.72	0.50	1	1	NAT	Myrtle Creek	0.12	X
3746743	942.40	0.59	2	2	NAT	Myrtle Creek		
3746743	380.93	0.24	2	2	NAT	Myrtle Park		
3746744	330.72	0.21	2	2	NAT	Myrtle Creek		
3746746	318.19	0.20	2	1	NAT	Myrtle Creek	0.16	
3746748	320.71	0.20	1	1	NAT	Myrtle Creek		X
3746749	674.80	0.42	1	1	NAT	Myrtle Creek		X
3746750	305.69	0.17	2	2	NAT	Myrtle Creek		X
3746752	692.90	0.43	2	2	NAT	Myrtle Creek		
3746754	472.43	0.29	2	2	NAT	Myrtle Creek		
3746756	385.91	0.24	2	1	NAT	Myrtle Creek		
3746760	812.16	0.50	2	1	NAT	Myrtle Creek		
3746763	892.13	0.55	2	2	NAT	Myrtle Creek		
3746764	918.98	0.57	2	2	NAT	Myrtle Creek		
3746765	326.35	0.20	2	1	NAT	Myrtle Creek		
3746766	270.72	0.17	2	1	NAT	Myrtle Creek		
3746978	1119.52	0.70	2	1	NAT	Myrtle Creek	0.10	
3746980	1860.71	1.16	2	2	NAT	Myrtle Creek		
3746981	264.81	0.16	2	1	NAT	Myrtle Creek		
3746982	306.26	0.19	2	1	NAT	Myrtle Creek		
3746983	924.29	0.57	2	2	NAT	Myrtle Creek		
3746985	606.98	0.38	2	1	NAT	Myrtle Creek		
3746989	206.00	0.13	2	1	NAT	Myrtle Creek		
3746989	123.36	0.08	2	1	NAT	Red Hill		
3765000	8103.41	5.04	3	3	AGG	Myrtle Park	0.30	
3765103	615.09	0.38	1	1	NAT	Myrtle Park		X
3765135	626.05	0.39	2	2	NAT	Myrtle Park	0.37	
3765136	1451.53	0.90	2	2	NAT	Myrtle Park	1.13	
3765136	2809.70	1.75	2	2	AGG	Myrtle Park		
3765137	558.47	0.35	2	2	NAT	Myrtle Park		
3765138	1756.48	1.09	2	2	IMP	Myrtle Park	0.03	
3765139	776.75	0.48	2	1	NAT	Myrtle Park		
3765140	547.85	0.34	2	1	NAT	Myrtle Park		
3765303	306.96	0.19	2	2	IMP	Myrtle Park		
3765304	944.85	0.59	1	1	NAT	Myrtle Park		X
3765540	1552.66	0.96	2	2	IMP	Myrtle Park	0.01	
3765543	414.90	0.26	2	2	NAT	Myrtle Park	0.02	X
3765895	753.20	0.47	2	2	IMP	Myrtle Park	0.33	
3765897	611.82	0.38	1	1	NAT	Myrtle Park		X
3765904	259.12	0.16	2	2	NAT	Myrtle Park		
3765909	356.91	0.22	2	2	AGG	Myrtle Park		
3765915	162.36	0.10	2	1	NAT	Myrtle Park		
3765915	301.32	0.19	1	2	NAT	Myrtle Park		X
3765917	1194.75	0.74	2	2	NAT	Myrtle Park		
3765919	908.95	0.56	2	2	NAT	Myrtle Park		
3765921	455.61	0.28	1	1	NAT	Myrtle Park		X
3765923	1682.04	1.05	2	2	NAT	Myrtle Park		
3765924	353.49	0.22	1	1	NAT	Myrtle Park		X
3765925	607.49	0.38	2	2	NAT	Myrtle Park		X
3765940	204.03	0.13	2	1	NAT	Myrtle Park		
3765943	336.85	0.19	2	2	NAT	Myrtle Park		X
3765944	787.58	0.49	1	1	NAT	Myrtle Park		X
3765945	424.07	0.26	1	1	NAT	Myrtle Park	0.19	X
3765946	617.83	0.38	1	1	NAT	Myrtle Park	0.06	X
3765947	258.46	0.16	2	2	NAT	Myrtle Park		
3765953	135.79	0.08	2	2	NAT	Myrtle Park		
3765954	446.11	0.28	2	2	NAT	Myrtle Park		X
3765955	140.38	0.09	2	1	NAT	Myrtle Park		
	Total Miles	375.00		Portions of road closed are shown in the DEIS, Apendix A				

See following list for closure document information.

APPENDIX
B of A

Closed Roads

Road	Length	Miles Closed	Method of Closure	Comment
3100020	0.08	0.08	unk	Closed prior to '91
3100029	0.17	0.17	DB	Myrtle Park TS C.43 provision
3100031	0.26	0.30	unk	Closed prior to '91
3100034	0.46	0.46	PB	Myrtle Park construction contract
3100035	1.40	0.60	unk	Closed prior to '91 @ mp 0.80
3100038	0.17	0.17	PB	Myrtle Park construction contract
3100084	0.21	0.21	unk	Closed prior to '91
3100086	0.15	0.15		3100087 PB closes this road (Joaquin TS - EA/DN)
3100087	1.20	1.20	PB	CFR Wildlife Hab Protect (Joaquin TS - EA/DN)
3100089	0.60	0.60	PB	CFR Wildlife Hab Protect (Joaquin TS - EA/DN)
3100092	0.43	0.40	unk	
3100101	0.48	0.30	unk	BV TMS as closed
3100107	0.70	0.50	oblit	Closed prior to '91
3100131	1.00	1.00	DB	Closed prior to '91 (breached)
3100190	1.10	1.00	unk	Closed prior to '91
3100219	0.15	0.15	PB	Myrtle Park construction contract
3100220	0.13	0.10	unk	Closed prior to '91
3100222	0.14	0.14	DB	Myrtle Park TS C.43 provision
3100225	0.37	0.37	unk	Closed prior to '91
3100227	0.30	0.30	PB	Myrtle Park construction contract
3100228	0.47	0.30	unk	Closed prior to '91 @ mp 0.03
3100230	0.47	0.47	unk	Closed per Erickson
3100239	2.04	2.04	unk	Closed prior to '91
3100245	0.38	0.38	PB	Myrtle Park construction contract
3100247	0.45	0.20	unk	Total length unverified (TMS has .2 miles)
3100261	0.51	0.51	unk	Closed prior to '91
3100262	0.13	0.10	unk	Closed prior to '91
3100265	0.30	0.30	unk	Closed prior to '91
3100274	0.40	0.40	unk	Closed prior to '91
3100275	0.36	0.36	PB	Myrtle Park construction contract
3100276	0.56	0.56		3100275 PB closes this road
3100277	0.22	0.22	DB	Myrtle Park TS C.43 provision
3100286	0.83	0.83	DB	Myrtle Park TS C.43 provision
3100290	0.91	0.91	DB	Myrtle Park TS C.43 provision
3100293	0.21	0.20	unk	Closed prior to '91
3100299	0.10	0.10	PB	CFR Wildlife Hab Protection
3100306	0.34	0.20	unk	Closed prior to '91
3100320	0.32	0.32	NAT	Closed naturally (grown in)
3100342	0.21	0.21	unk	Closed on BV TMS
3100424	0.16	0.16	unk	Closed prior to '91
3100426	0.18	0.18	unk	Closed prior to '91 (BV)
3100429	0.89	0.89	unk	Closed prior to '91 Gold TS Decision Notice
3100435	0.13	0.10	unk	Closed prior to '91
3100545	0.20	0.20	DB	Myrtle Park TS C.43 provision
3100547	0.24	0.20	unk	Closed prior to '91
3100551	0.43	0.43	unk	Closed prior to '91
3100563	0.18	0.18		Closed by 742 PB
3100565	0.17	0.17		Closed by 742 PB
3100570	0.08	0.08	unk	Closed BV TMS

Road	Length	Miles Closed	Method of Closure	Comment
3100572	0.18	0.18	unk	Closed prior to '91
3100599	0.38	0.38	unk	Closed BV TMS
3100600	0.29	0.29	unk	Closed BV TMS
3100602	0.11	0.11	unk	Closed BV TMS
3100613	0.19	0.19	unk	Closed prior to '91 and closed more recently by 615 PB
3100615	0.89	0.89	PB	Myrtle Park construction contract
3100616	0.38	0.38	unk	Closed prior to '91
3100618	0.12	0.10	unk	Closed prior to '91
3100619	0.40	0.38		Closed by 615 PB
3100620	0.41	0.41		Closed by 615 PB
3100627	0.15	0.15	unk	Closed BV TMS
3100720	0.13	0.13	unk	Closed BV TMS
3100724	0.16	0.16	unk	Closed BV TMS
3100742	1.15	1.15	PB	Myrtle Park construction contract
3100745	0.49	0.49	NAT	Grown in naturally
3100747	0.48	0.48	NAT	Grown in naturally - closed prior to '91
3100758	0.29	0.29	PB	CFR Wildlife Hab Protection
3100774	1.19	1.19	NAT	Naturally grown in
3100795	0.25	0.25	NAT	Naturally grown in
3100827	0.09	0.09	unk	Closed prior to '91
3100844	2.63	0.70	unk	Closure proposed in Gold TS Decision Notice
3100858	0.35	0.35	unk	Closed prior to '91
3100867	0.12	0.12	unk	Closed prior to '91
3100892	0.17	0.17	unk	Closed on BV TMS
3100895	1.32	0.50	log/rock/DB	Closed prior to '91
3100909	0.28	0.28	unk	Closed on BV TMS
3100910	2.11	2.11	unk	Closed prior to '91
3100911	0.15	0.15	CMP out	CMP has been pulled
3100914	0.20	0.20	NAT	Closed prior to '91 - oblit.
3100931	0.17	0.17	unk	Closed on BV TMS
3100932	0.15	0.15	unk	Closed on BV TMS
3100940	0.14	0.14	unk	Closed on BV TMS
3100942	0.12	0.01	unk	Closed on BV TMS
3100943	0.09	0.09	unk	Closed on BV TMS
3100963	1.26	1.24	DB	Closed DB at mp 0.04
3100967	0.98	0.40	unk	Closed prior to '91 mp .6
3100985	0.21	0.21	unk	Closed on BV TMS
3100986	0.14	0.14	unk	Closed on BV TMS
3120173	0.30	0.30	unk	Closed prior to '91
3125374	0.80	0.80	unk	Closed prior to '91
3125413	1.00	1.00	unk	Closed prior to '91
3125435	0.50	0.50	unk	Closed prior to '91
3125526	0.20	0.20	unk	Closed prior to '91
3125528	0.30	0.30	unk	Closed prior to '91
3125529	0.10	0.10	unk	Closed prior to '91
3125530	0.10	0.10	unk	Closed prior to '91
3125532	0.50	0.20	unk	Closed prior to '91 @ mp .3
3125735	0.16	0.16	unk	Closed prior to '91
3125772	0.30	0.30	unk	Closed prior to '91

Road	Length	Miles Closed	Method of Closure	Comment
3125928	0.29	0.29	NAT	Naturally grown in
3125971	1.70	1.00	unk	Closed prior to '91 @ mp 1.0
3125999	0.42	0.40	unk	Closed prior to '91
3130080	0.56	0.20	unk	Closed prior to '91 @ mp 0.36
3130107	0.20	0.20	PB	CFR Wildlife Hab Protection
3130128	0.08	0.08	unk	Closed prior to '91
3130987	0.50	0.50	unk	Closed prior to '91
3130989	0.22	0.22	NAT	Naturally grown in
3130990	0.50	0.30	unk	Closed prior to '91 @ mp 0.2
3140081	2.62	2.15	Sign	Gold TS Decision Notice
3140082	0.51	0.51	oblit	Obliterated in '92 - CHANGE PARENT ROAD FROM 3145
3140089	0.30	0.30	unk	Closed prior to '91
3140100	0.10	0.10	unk	Closed prior to '91
3140119	0.54	0.40	DB	Closed prior to '91
3145062	1.40	1.10	PB	PB at mp 1.0 and DB at end of road
3145065	0.95	0.95	Sign	
3700121	0.17	0.10	unk	Closed prior to '91
3700122	0.10	0.10	unk	Closed prior to '91
3700124	0.20	0.20	unk	Closed prior to '91
3700125	0.25	0.20	unk	Closed prior to '91
3700170	0.40	0.40	unk	Closed prior to '91
3700174	0.11	0.10	unk	Closed prior to '91
3700186	1.72	1.70	unk	Closed prior to '91
3700192	1.21	1.21	unk	Closed prior to '91
3700276	0.20	0.20	unk	Closed prior to '91
3700298	0.30	0.30	unk	Closed prior to'91
3700301	0.06	0.06	PB	Myrtle Park construction contract
3700307	0.23	0.23	PB	Myrtle Park construction contract
3700312	0.27	0.27	PB	Myrtle Park construction contract
3700332	0.20	0.20	unk	Closed prior to '91
3700342	0.30	0.30	unk	Closed prior to '91
3700346	0.30	0.30	unk	Closed prior to '91
3700390	0.28	0.28	PB	Myrtle Park construction contract
3700396	0.46	0.40	unk	Closed prior to '91
3700401	0.88	0.88	unk	Closed prior to '91
3700402	0.30	0.30	unk	Closed prior to '91
3700440	2.38	0.53	CMP out	Closed mp 1.85 by fence and pulled culvert
3700641	0.75	0.13	SG	Metal gate at mp 0.62
3746238	0.70	0.70	unk	Closed prior to '91
3746676	0.30	0.30	unk	Closed prior to '91
3746698	0.52	0.50	unk	Closed priot to '91
3746730	0.16	0.16	unk	Closed prior to '91
3746742	0.48	0.48	unk	Closed prior to '91
3746748	0.17	0.10	unk	Closed prior to '91
3746749	0.40	0.40	unk	Closed prior to '91
3746750	0.17	0.17	NAT	Littered, no traffic
3765103	0.35	0.35	unk	Closed prior to '91
3765304	0.60	0.60	DB	Closed priot to '91
3765543	0.25	0.25	DB	Dirt berm and natural reprod

Road	Length	Miles Closed	Method of Closure	Comment
3765896	0.26	0.26	oblit	Is now part of 3765 reroute - remove from list
3765897	0.36	0.36	unk	Closed prior to '91
3765915	0.27	0.14	Fence	Closed at mp .13 by solid fence - no entry
3765921	0.29	0.20	unk	Closed prior to '91
3765924	0.22	0.22	unk	Closed prior to '91 as well as Myrtle Park TS C5.43
3765925	0.39	0.39	PB	Myrtle Park construction contract
3765943	0.19	0.19	oblit	Obliterated 8/10/96
3765944	0.50	0.50	PB	Closed prior to '91
3765945	0.30	0.30	NAT	Edge of 3765 road elevated - no access/Closed prior to '91
3765946	0.50	0.50	unk	Closed prior to '91 - Gold TS Decision Notice
3765954	0.28	0.28	PB x2	Myrtle Park construction contract
PB - Pole Barrier				
DB - Dirt Berm				
SG - Steel Gate				
unk - unknown (pretty sure these closures are dirt berms)				
NAT - Natural (e.g., littered, grown in, various natural occuring)				
Oblit - obliterated				
CMP - Culvert				
Closed BV TMS - The TMS map shows a road barrier in place				
C5.43 - a timber sale provision designating closure after completion of logging operations				

APPENDIX
C of A

Material Sources

Silvies Canyon Material Sources

T 19 S	R 30 E	Sec 13	Lucky Charlie Pit 3100911 Rd
T 19 S	R 31 E	Sec 4	Hall Creek Pit 3140 Road
T 19 S	R 30 E	Sec 2	Big Sage Hen (Crushed Stockpile) 3100913 Rd.
T 19 S	R 30 E	Sec 35	Burnt Mt. Meadows Pit 3125 Rd
T 19 S	R 30 E	Sec 18	31 Roadside grid roll at mp 9
T 19 S	R 30 E	Sec 5	3120163 Rd
T 19 S	R 30 E	Sec 10	3100093 Rd
T 20 S	R 30 E	Sec 22	Bottom of 31 Rd (3100438)
T 18 S	R 29 E	Sec 28	3100863 Rd.
T 18 S	R 30 E	Sec 36	3765947 Rd.
T 18 S	R 29 E	Sec 5	3700440 Rd
T 18 S	R 29 E	Sec 31	3700409/410 Rd.
T 18 S	R 29 E	Sec 1	3700546 Rd
T 18 S	R 29 E	Sec 13	3746240 Rd
T 18 S	R 29 E	Sec 14	3700/3700478 Rd
T 18 S	R 29 E	Sec 14	3700480 Rd
T 18 S	R 29 E	Sec 30	3700292 Rd

Appendix B
Proposed Vegetation Units

Table B-1 displays the proposed vegetation units, prescribed treatments, and acres of treatment by alternative. Whenever possible, an effort was made to use numbers consistent with those used in scoping. For tracking purposes, the whole numbers in the unit number generally is tied back to the unit number used during scoping.

Maps of vegetation units by subwatershed are located at the end of Appendix B.

Abbreviations Used in Table B-1:

Tr = Primary Treatment;
Ac = Acre(s);
Res Ba = Residual Basal Area after Treatment (for Alternatives 2, 4 and 5);
PCT = Pre-commercial Thin;
CT = Commercial Thin (Even-age management);
IT = Intermediate Thin (Uneven-age management without regeneration);
JR = Juniper Reduction;
AS = Aspen; When AS is in the Residual Basal Area column it prefers to aspen restoration objectives and no specific residual basal area is targeted.
***** = An * means that following the primary treatment the

unit (or part of the unit) will be pre-commercial thinned. If a primary treatment is not economically viable than the unit will be pre-commercial thinned.

- = A dash under an alternative means there is no proposed treatment for this unit.

Table B-1
Vegetation Units by Alternative

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
1.01		CT*	123	PCT	123	CT*	123	-	-	-	-	50
1.02		CT*	74	PCT	74	CT*	74	-	-	-	-	50
1.03		PCT	14	PCT	14	PCT	14	PCT	14	-	-	-
1.04		JR	4	JR	4	JR	4	JR	4	-	-	-
1.05		-	-	PCT	28	CT*	28	-	-	-	-	50
1.06		-	-	-	-	JR	15	-	-	-	-	-
1.07		-	-	JR	10	JR	10	-	-	-	-	-
3.01		CT*	200	PCT	200	CT*	200	CT*	200	-	-	50
3.02		PCT	7	PCT	7	PCT	7	PCT	7	-	-	-
3.03		-	-	-	-	JR	22	-	-	-	-	-
3.04		-	-	-	-	PCT	9	-	-	-	-	-
3.05		-	-	-	-	PCT	7	-	-	-	-	-
4.01		PCT	47	PCT	47	CT*	47	PCT	47	-	-	50
4.02		CT*	480	PCT	24	CT*	480	CT	306	-	-	50
4.03		PCT	7	PCT	7	PCT	7	PCT	7	-	-	-
4.05		JR	3	JR	3	JR	3	JR	3	-	-	-
4.06		CT	94	-	-	CT	94	CT	94	-	-	50
4.07		JR	5	JR	5	JR	5	JR	5	-	-	-
5.01		PCT	113	PCT	113	PCT	113	PCT	113	-	-	-
5.02		IT*	150	PCT	150	IT*	150	IT*	92	-	-	60
5.03		PCT	50	PCT	50	PCT	50	PCT	50	-	-	-
5.04		CT*	113	PCT	113	CT*	113	CT*	113	-	-	50
5.05		-	-	-	-	CT*	11	-	-	-	-	50
5.06		PCT	67	PCT	67	PCT	67	PCT	67	-	-	-
5.07		CT	102	-	-	CT	102	CT	102	-	-	50
5.08		CT	141	-	-	CT	141	CT	141	-	-	50
5.09		CT	206	-	-	CT	206	CT	206	-	-	50
5.1		CT	116	-	-	CT	116	CT	23	-	-	50
5.11		-	-	-	-	CT	59	-	-	-	-	50
6.01		CT*	101	PCT	17	CT*	101	CT*	101	-	-	50
6.02		PCT	63	PCT	63	PCT	63	PCT	63	-	-	-
6.03		PCT	37	PCT	37	CT*	37	PCT	37	-	-	50
6.04		PCT	39	PCT	39	PCT	39	PCT	39	-	-	-
6.05		CT	133	-	-	CT	133	CT*	74	-	-	50
6.06		CT*	158	PCT	89	CT*	158	CT*	89	-	-	50
6.07		-	-	-	-	PCT	27	-	-	-	-	-
6.08		JR	11	JR	11	JR	11	JR	11	-	-	-
6.09		CT*	94	PCT	17	CT*	94	CT*	94	-	-	50
6.1		CT	108	-	-	CT	108	CT	45	-	-	50
6.11		-	-	-	-	JR	10	-	-	-	-	-
6.12		-	-	-	-	CT	7	-	-	-	-	50
6.13		PCT	19	PCT	19	CT*	19	PCT	19	-	-	50
6.14		CT	43	-	-	CT	43	CT	20	-	-	50
6.15		PCT	11	PCT	11	PCT	11	PCT	11	-	-	-
6.16		CT	48	-	-	CT	48	CT	22	-	-	50
6.17		CT	148	-	-	CT	148	CT	105	-	-	50

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
6.18		PCT	24	PCT	9	PCT	9	PCT	9	-	-	-
6.19		PCT	44	PCT	44	PCT	44	PCT	44	-	-	-
6.2		CT*	60	PCT	51	CT*	60	CT*	55	-	-	50
6.21		JR	3	JR	3	JR	3	JR	3	-	-	-
6.22		PCT	18	PCT	18	CT*	18	PCT	18	-	-	50
6.23		JR	11	JR	11	JR	11	JR	11	-	-	-
6.24		PCT	55	PCT	55	PCT	55	PCT	55	-	-	-
6.25		CT	44	-	-	CT	44	CT	23	-	-	50
6.26		PCT	25	PCT	25	PCT	25	PCT	25	-	-	-
6.27		CT	33	-	-	CT	33	-	-	-	-	50
6.28		JR	9	JR	9	JR	9	JR	9	-	-	-
6.29		CT*	30	PCT	30	CT*	30	CT*	30	-	-	50
6.3		CT*	34	PCT	34	CT*	34	CT*	34	-	-	50
6.31		-	-	-	-	JR	15	JR	15	-	-	-
7.01		CT*	83	PCT	83	CT*	83	CT*	34	-	-	50
7.02		CT	23	-	-	CT	23	-	-	-	-	50
7.03		CT*	65	PCT	65	CT*	65	CT*	65	-	-	50
7.04		PCT	28	PCT	28	PCT	28	PCT	28	-	-	-
7.05		CT	37	-	-	CT	37	CT	37	-	-	50
7.06		PCT	61	PCT	61	CT*	61	PCT	61	-	-	50
8.01		CT	93	-	-	CT	93	CT	93	-	-	50
8.02		CT*	71	PCT	59	CT*	71	CT*	71	-	-	50
8.03		CT	22	-	-	CT	22	CT	22	-	-	50
8.04		PCT	56	PCT	56	PCT	56	PCT	56	-	-	-
8.05		CT	53	-	-	CT	53	-	-	-	-	50
8.06		CT	101	-	-	CT	101	PCT	101	-	-	50
8.07		PCT	124	PCT	124	PCT	124	PCT	124	-	-	-
8.08		PCT	109	PCT	109	PCT	109	PCT	109	-	-	-
8.09		PCT	9	PCT	9	PCT	9	PCT	9	-	-	-
8.1		PCT	5	PCT	5	PCT	5	PCT	5	-	-	-
8.11		-	-	-	-	PCT	104	-	-	-	-	-
8.12		-	-	-	-	PCT	57	-	-	-	-	-
9.01		IT*	55	PCT	55	IT*	55	IT*	19	PCT	55	50
9.02		PCT	65	PCT	65	IT*	65	PCT	65	PCT	65	50
9.03		CT	71	-	-	CT	71	CT	43	-	-	50
9.04		PCT	89	PCT	89	CT*	89	PCT	89	-	-	50
9.05		CT	33	-	-	CT	33	CT	33	-	-	50
10.01		CT*	35	PCT	35	CT*	35	CT*	35	-	-	50
10.02		IT*	40	PCT	40	IT*	40	IT*	40	PCT	40	60
10.03		IT*	58	PCT	58	IT*	58	-	-	PCT	58	60
10.04		IT*	49	PCT	49	IT*	49	-	-	PCT	49	60
10.05		PCT	95	PCT	95	IT*	95	PCT	95	PCT	95	60
10.06		CT*	41	PCT	41	CT*	41	CT*	41	-	-	50
10.07		CT*	67	PCT	67	CT*	67	CT*	67	-	-	50
10.08		PCT	15	PCT	15	PCT	15	PCT	15	-	-	-
10.09		PCT	34	PCT	34	PCT	34	PCT	34	-	-	-
10.1		PCT	5	PCT	5	PCT	5	PCT	5	-	-	-
10.11		PCT	3	PCT	3	PCT	3	PCT	3	-	-	-
10.12		-	-	-	-	IT*	7	-	-	-	-	60
10.13		-	-	-	-	CT	4	-	-	-	-	50

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
10.14		-	-	-	-	CT*	27	-	-	-	-	50
11.01		CT	119	-	-	CT	119	CT	119	-	-	60
11.02		CT	118	-	-	CT	118	CT	118	-	-	60
11.03		JR	31	JR	31	JR	31	JR	31	JR	31	-
11.04		CT*	117	PCT	117	CT*	117	CT*	117	PCT	117	50
11.05		JR	7	JR	7	JR	7	JR	7	-	-	-
11.06		JR	31	PCT	31	JR	31	JR	31	PCT	31	-
11.07		PCT	108	PCT	108	PCT	108	PCT	108	PCT	108	-
11.08		PCT	61	PCT	61	CT*	61	PCT	61	PCT	61	50
11.09		PCT	74	PCT	74	CT*	74	PCT	74	PCT	74	50
11.1		PCT	147	PCT	147	PCT	134	PCT	147	PCT	147	-
11.10a		-	-	-	-	CT	12	-	-	-	-	-
11.11		CT*	36	PCT	36	CT*	36	CT*	36	PCT	36	60
11.12		PCT	67	PCT	67	CT*	67	PCT	67	PCT	67	50
11.13		PCT	11	PCT	11	PCT	11	PCT	11	-	-	-
11.14		PCT	7	PCT	7	PCT	7	PCT	7	-	-	-
11.15		-	-	-	-	CT*	12	-	-	-	-	50
12.01		PCT	57	PCT	57	CT*	57	PCT	57	PCT	57	50
12.02		PCT	60	PCT	60	CT*	60	PCT	60	PCT	60	50
12.03		CT*	40	PCT	40	CT*	40	-	-	PCT	40	50
13.01		CT	54	-	-	CT	54	CT	54	-	-	50
13.02		CT	17	-	-	CT	17	CT	17	-	-	50
13.03		PCT	49	PCT	49	CT*	49	PCT	49	PCT	49	50
13.04		PCT	19	PCT	19	CT*	19	PCT	19	PCT	19	50
14.01		CT	214	-	-	CT	214	CT	214	-	-	60
14.02		JR	26	JR	26	JR	26	JR	26	-	-	-
14.03		CT	145	-	-	CT	145	-	-	-	-	50
15.01		CT	24	-	-	CT	24	-	-	-	-	50
15.02		CT	38	-	-	CT	38	-	-	-	-	50
15.03		CT	41	-	-	CT	41	-	-	-	-	50
16.01		JR	57	JR	57	JR	57	JR	57	-	-	-
16.02		PCT	62	PCT	62	PCT	62	PCT	60	PCT	62	-
16.03		PCT	4	PCT	4	PCT	4	PCT	4	PCT	4	-
16.04		JR	6	JR	6	JR	6	JR	6	JR	6	-
16.05		JR	1	JR	1	JR	1	-	-	-	-	-
16.06		JR	3	JR	3	JR	3	JR	3	-	-	-
16.07		JR	65	JR	65	JR	65	JR	65	-	-	-
16.08		JR	129	JR	129	JR	129	JR	129	-	-	-
17.01		PCT	85	PCT	85	CT*	85	PCT	85	-	-	50
17.02		PCT	62	PCT	62	PCT	62	PCT	62	-	-	-
17.03		IT*	8	PCT	8	IT*	8	IT*	8	-	-	50
17.04		CT	36	-	-	-	-	CT	36	-	-	50
17.05		CT	34	-	-	CT	34	CT	34	-	-	50
17.06		JR	5	JR	5	JR	5	JR	5	-	-	-
17.07		PCT	8	PCT	8	PCT	8	PCT	8	-	-	-
17.08		PCT	15	PCT	15	IT*	15	PCT	15	-	-	50
17.09		PCT	16	PCT	16	PCT	16	PCT	16	-	-	-
17.1		IT*	1	PCT	1	IT	1	-	-	-	-	AS
17.11		-	-	-	-	CT	32	-	-	-	-	50
18.01		CT*	38	PCT	38	CT*	38	PCT	38	-	-	50

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
18.02		PCT	10	PCT	10	PCT	10	PCT	10	-	-	-
18.03		IT*	96	PCT	96	IT*	96	-	-	-	-	50
18.04		IT*	35	PCT	35	IT*	35	-	-	-	-	60
18.05		CT	60	-	-	CT	60	-	-	-	-	50
18.07		-	-	-	-	CT	33	-	-	-	-	50
18.08		-	-	-	-	PCT	31	-	-	-	-	-
19.01		CT	30	-	-	CT	30	CT	30	-	-	50
19.02		PCT	54	PCT	54	PCT	54	PCT	54	-	-	-
19.03		CT*	46	PCT	46	CT*	46	-	-	-	-	50
19.04		CT*	82	PCT	82	CT*	82	CT*	82	-	-	50
19.05		CT*	15	PCT	15	CT*	15	CT*	15	-	-	50
19.06		IT*	56	PCT	56	IT*	56	IT*	56	-	-	50
19.07		PCT	81	PCT	81	CT*	81	PCT	81	-	-	50
19.08		PCT	37	PCT	37	PCT	37	PCT	37	-	-	-
19.09		CT*	48	PCT	48	CT*	48	-	-	-	-	50
20.01		PCT	52	PCT	52	CT*	52	PCT	52	-	-	50
20.02		CT*	131	PCT	131	CT*	131	CT*	131	-	-	50
20.03		CT*	39	PCT	39	CT*	39	CT*	39	-	-	50
20.04		PCT	47	PCT	47	PCT	47	PCT	47	-	-	-
20.05		CT*	52	PCT	52	CT*	52	CT*	52	-	-	50
20.06		PCT	14	PCT	14	CT*	14	PCT	14	-	-	50
20.07		PCT	19	PCT	19	PCT	19	PCT	19	-	-	-
20.08		-	-	-	-	CT	41	-	-	-	-	50
21.01		CT	35	-	-	CT	35	CT	35	-	-	50
21.02		CT*	28	PCT	28	CT*	28	CT*	28	-	-	50
21.03		PCT	13	PCT	13	CT*	13	PCT	13	-	-	50
21.04		PCT	31	PCT	31	PCT	31	PCT	31	-	-	-
21.05		CT*	57	PCT	57	CT*	57	CT*	57	-	-	50
21.06		CT*	86	PCT	86	CT*	86	CT*	86	-	-	50
21.07		CT*	27	PCT	27	CT*	27	CT*	27	-	-	50
21.08		CT*	55	PCT	55	CT*	55	CT*	55	-	-	50
21.09		CT*	32	PCT	32	CT*	32	CT*	32	-	-	50
21.1		PCT	49	PCT	49	CT*	49	PCT	49	-	-	50
21.11		-	-	-	-	CT*	31	-	-	-	-	50
21.12		-	-	-	-	JR	25	-	-	-	-	-
22.01		IT*	100	PCT	100	IT*	100	IT*	100	-	-	60
22.02		IT*	103	PCT	103	IT*	103	IT*	103	-	-	60
22.03		PCT	11	PCT	11	PCT	11	PCT	11	-	-	-
22.04		IT*	30	PCT	30	IT*	30	-	-	-	-	50
22.05		IT*	35	PCT	35	IT*	35	-	-	-	-	60
22.06		PCT	69	PCT	69	PCT	69	PCT	69	-	-	-
23.01		CT	128	-	-	CT	128	CT	128	-	-	50
23.02		IT*	17	PCT	17	IT*	17	IT*	17	PCT	17	50
23.03		PCT	57	PCT	57	IT*	57	PCT	57	PCT	57	60
23.04		IT*	26	PCT	26	IT*	26	IT*	26	PCT	26	60
23.05		JR	6	JR	6	JR	6	JR	6	-	-	-
23.06		IT*	33	PCT	33	IT*	33	IT*	33	PCT	33	60
23.07		-	-	-	-	IT*	95	-	-	-	-	50
24.01		IT*	45	PCT	45	IT*	45	-	-	-	-	60
24.02		PCT	39	PCT	39	PCT	39	PCT	39	-	-	-

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
24.03		IT*	23	PCT	23	IT*	23	IT*	23	-	-	50
24.04		IT*	117	PCT	117	IT*	117	IT*	117	-	-	50
24.05		IT*	28	PCT	28	IT*	28	IT*	28	-	-	50
24.06		IT*	33	PCT	33	IT*	33	-	-	-	-	50
24.07		IT*	14	PCT	14	IT*	14	-	-	-	-	50
24.08		-	-	-	-	IT*	16	-	-	-	-	50
24.09		IT*	38	PCT	38	IT*	46	IT*	38	-	-	50
24.11		IT*	125	PCT	125	IT*	125	IT*	125	PCT	125	50
24.12		PCT	57	PCT	57	PCT	57	PCT	57	-	-	-
24.13		IT*	7	PCT	7	IT*	7	IT*	7	-	-	50
24.14		PCT	20	PCT	20	PCT	20	PCT	20	-	-	-
24.15		JR	16	JR	16	JR	16	JR	16	-	-	-
24.16		JR	2	JR	2	JR	2	JR	2	-	-	-
24.17		PCT	6	PCT	6	PCT	6	PCT	6	PCT	6	-
24.18		CT	19	-	-	CT	19	CT	19	-	-	60
24.19		JR	6	JR	6	JR	6	JR	6	-	-	-
24.2		IT*	1	PCT	1	IT*	1	IT*	1	PCT	1	AS
24.21		PCT	40	PCT	40	PCT	40	PCT	40	PCT	40	-
24.22		JR	4	JR	4	JR	4	JR	4	-	-	-
24.23		JR	11	JR	11	JR	11	JR	11	-	-	-
24.24		PCT	10	PCT	10	PCT	10	PCT	10	PCT	10	-
24.25		IT*	73	PCT	73	IT*	73	IT*	73	PCT	73	50
24.26		IT*	287	PCT	287	IT*	287	-	-	PCT	287	60
24.27		IT*	50	PCT	50	IT*	50	IT*	50	-	-	60
24.28		PCT	34	PCT	34	PCT	34	PCT	34	-	-	-
24.29		CT*	87	PCT	87	CT*	87	CT*	87	-	-	50
24.3		PCT	38	PCT	38	PCT	38	PCT	38	-	-	-
24.31		PCT	3	PCT	3	PCT	3	PCT	3	-	-	-
24.32		IT*	52	PCT	52	IT*	52	IT*	52	-	-	50
24.33		IT*	13	PCT	13	IT*	13	IT*	13	-	-	50
24.34		PCT	10	PCT	10	PCT	10	PCT	10	-	-	-
24.35		PCT	24	PCT	24	PCT	24	PCT	24	-	-	-
24.36		PCT	39	PCT	39	PCT	39	PCT	39	-	-	-
24.37		IT*	15	PCT	15	IT*	15	IT*	15	-	-	60
24.38		PCT	27	PCT	27	PCT	27	PCT	27	-	-	-
24.39		IT*	25	PCT	25	IT*	25	IT*	25	-	-	50
24.4		JR	9	JR	9	JR	9	JR	9	-	-	-
24.41		IT*	25	PCT	25	IT*	25	IT*	25	-	-	50
24.42		IT*	28	PCT	28	IT*	28	IT*	28	-	-	50
24.43		IT*	44	PCT	44	IT*	44	IT*	44	PCT	44	50
24.44		IT*	60	PCT	60	IT*	60	IT*	60	PCT	60	60
24.45		IT*	33	PCT	33	IT*	33	IT*	33	PCT	33	60
24.46		IT*	21	PCT	21	IT*	21	IT*	21	PCT	21	50
24.47		PCT	51	PCT	51	IT*	51	PCT	51	PCT	51	50
24.48		JR	10	JR	10	JR	10	JR	10	-	-	-
24.49		CT	19	-	-	CT	19	CT	19	-	-	50
24.51		CT	23	-	-	CT	23	CT	23	-	-	50
24.52		IT*	15	PCT	15	IT*	15	IT*	15	PCT	15	60
24.53		IT*	42	PCT	42	IT*	42	IT*	42	PCT	42	50
24.54		IT*	8	PCT	8	IT*	8	IT*	8	PCT	8	50

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
24.55		IT*	20	PCT	20	IT*	20	IT*	20	PCT	20	50
24.56		-	-	-	-	IT*	52	-	-	-	-	60
24.57		-	-	-	-	IT*	68	-	-	-	-	60
25.01		IT*	22	PCT	22	IT*	22	IT*	22	-	-	50
26.01		PCT	58	PCT	58	PCT	58	PCT	58	PCT	58	-
26.02		IT*	97	PCT	97	IT*	97	IT*	97	PCT	97	60
26.03		PCT	35	PCT	35	PCT	35	PCT	35	PCT	35	-
26.04		IT*	67	PCT	67	IT*	67	IT*	67	PCT	67	60
26.05		PCT	41	PCT	41	PCT	41	PCT	41	PCT	41	-
26.06		IT*	62	PCT	62	IT*	62	-	-	PCT	62	60
26.07		IT*	3	-	-	-	-	-	-	-	-	AS
26.08		PCT	10	PCT	10	PCT	10	PCT	10	PCT	10	-
26.09		IT*	94	PCT	94	IT*	94	IT*	34	PCT	94	60
27.01		IT*	76	PCT	76	IT*	76	IT*	76	PCT	76	60
27.02		IT*	131	PCT	131	IT*	131	IT*	94	PCT	131	60
27.03		PCT	99	PCT	99	PCT	99	PCT	99	PCT	99	-
27.04		PCT	92	PCT	92	IT*	92	PCT	92	PCT	92	60
27.05		IT*	37	PCT	37	IT*	37	IT*	37	PCT	37	60
27.06		IT*	44	PCT	44	IT*	44	IT*	44	PCT	44	60
27.08		IT*	112	PCT	112	IT*	112	IT*	112	PCT	112	60
27.09		JR	19	JR	19	JR	19	JR	19	-	-	-
27.1		CT*	101	PCT	101	CT*	101	CT*	101	PCT	101	50
27.11		IT*	45	PCT	45	IT*	45	IT*	45	PCT	45	60
27.12		PCT	108	PCT	108	IT*	108	PCT	108	PCT	108	50
27.13		PCT	12	PCT	12	PCT	12	PCT	12	PCT	12	-
27.14		PCT	4	PCT	4	PCT	4	PCT	4	PCT	4	-
27.15		PCT	5	PCT	5	PCT	5	PCT	5	PCT	5	-
27.16		JR	9	JR	9	JR	9	JR	9	-	-	-
28.01		PCT	12	PCT	12	PCT	12	PCT	12	PCT	12	-
28.02		IT*	64	PCT	64	IT*	64	IT*	31	PCT	64	60
28.03		PCT	13	PCT	13	PCT	13	-	-	PCT	13	-
28.04		IT*	228	PCT	228	IT*	228	IT*	228	PCT	228	60
28.05		IT*	54	PCT	54	IT*	54	IT*	34	PCT	54	60
29.01		IT*	126	PCT	126	IT*	126	IT*	126	PCT	126	60
29.02		IT	42	PCT	42	IT	42	IT	42	PCT	42	AS
29.03		IT*	44	PCT	44	IT*	44	-	-	PCT	44	60
30.01		IT*	334	PCT	334	IT*	334	-	-	PCT	334	60
30.02		IT*	307	PCT	307	IT*	307	IT*	307	PCT	307	50
30.03		IT*	253	PCT	253	IT*	253	IT*	253	PCT	253	50
30.05		P&P*	185	PCT	185	P&P*	185	P&P*	185	PCT	185	-
30.06		P&P*	120	PCT	120	P&P*	120	P&P*	120	PCT	120	-
31.01		IT*	172	-	-	IT*	172	IT*	172	-	-	50
31.02		IT*	49	PCT	49	IT*	49	IT*	49	PCT	49	60
31.03		IT*	82	PCT	82	IT*	82	IT*	48	PCT	82	60
31.04		IT*	183	PCT	183	IT*	183	IT*	183	PCT	183	60
31.05		P&P*	44	PCT	44	P&P*	44	P&P*	44	PCT	44	-
31.06		IT*	85	PCT	85	IT*	85	IT*	85	PCT	85	60
31.07		P&P*	102	PCT	102	P&P*	102	P&P*	102	PCT	102	-
31.08		IT*	49	PCT	49	IT*	49	-	-	PCT	49	60
31.09		IT*	80	PCT	80	IT*	80	IT*	80	PCT	80	60

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
31.1		IT*	104	PCT	104	IT*	164	-	-	PCT	104	60
31.11		PCT	12	PCT	12	PCT	12	PCT	12	PCT	12	-
32.01		CT*	92	PCT	92	CT*	92	CT*	92	PCT	92	50
32.02		IT*	125	PCT	125	IT*	125	IT*	125	PCT	125	60
32.03		IT	2	PCT	2	IT	2	-	-	PCT	2	AS
32.04		CT*	52	PCT	52	CT*	52	CT*	52	PCT	52	50
32.05		IT*	71	PCT	71	IT*	71	IT*	71	PCT	71	60
32.06		IT*	17	PCT	17	IT*	17	IT*	17	PCT	17	60
32.07		IT*	11	PCT	11	IT*	11	IT*	11	PCT	11	60
32.08		PCT	87	PCT	87	IT*	87	PCT	87	PCT	87	60
32.09		IT*	217	PCT	217	IT*	217	IT*	217	PCT	217	60
32.1		IT*	59	-	-	-	-	IT*	59	-	-	60
33.01		IT*	49	PCT	49	IT*	49	IT*	49	PCT	49	60
33.02		PCT	17	PCT	17	IT*	17	PCT	17	PCT	17	60
33.03		IT*	59	PCT	59	IT*	59	IT*	59	PCT	59	60
33.04		PCT	67	PCT	67	PCT	67	PCT	67	PCT	67	-
33.05		PCT	40	PCT	40	PCT	40	PCT	40	PCT	40	-
33.06		IT*	47	PCT	47	IT*	47	IT*	47	PCT	47	60
33.07		PCT	44	PCT	44	PCT	44	PCT	44	PCT	44	-
33.08		IT*	53	PCT	53	IT*	53	-	-	PCT	53	60
33.09		PCT	47	PCT	47	PCT	47	PCT	47	PCT	47	-
33.1		IT*	74	PCT	74	IT*	74	-	-	PCT	74	60
33.11		PCT	54	PCT	54	PCT	54	PCT	54	PCT	54	-
33.12		IT*	34	PCT	34	IT*	34	IT*	34	PCT	34	60
33.13		PCT	117	PCT	117	IT*	117	PCT	117	PCT	117	60
33.14		IT*	60	PCT	60	IT*	60	IT*	60	PCT	60	60
33.15		PCT	54	PCT	54	IT*	54	PCT	54	PCT	54	60
33.16		IT*	61	PCT	61	IT*	61	IT*	61	PCT	61	60
33.18		IT*	146	PCT	146	IT*	146	-	-	PCT	146	60
33.19		IT*	61	PCT	61	IT*	61	IT*	61	PCT	61	60
33.2		IT*	80	PCT	80	IT*	80	IT*	80	PCT	80	60
34.01		PCT	166	PCT	127	PCT	166	PCT	166	PCT	127	-
35.01		PCT	593	PCT	593	PCT	593	PCT	593	PCT	593	-
35.02		JR	5	JR	5	JR	5	JR	5	-	-	-
35.03		JR	7	JR	7	JR	7	JR	7	-	-	-
35.04		JR	7	JR	7	JR	7	JR	7	-	-	-
35.05		JR	3	JR	3	JR	3	JR	3	-	-	-
36.01		IT*	119	PCT	119	IT*	119	IT*	119	PCT	119	60
36.02		IT*	68	PCT	68	IT*	68	IT*	68	PCT	68	60
36.03		PCT	63	PCT	63	IT*	63	PCT	63	PCT	63	60
36.04		JR	25	JR	25	JR	25	JR	25	-	-	-
36.05		IT*	36	PCT	36	IT*	36	IT*	36	PCT	36	60
36.06		IT*	62	PCT	62	IT*	62	IT*	62	PCT	62	60
36.07		IT*	46	PCT	46	IT*	46	IT*	46	PCT	46	60
36.08		IT*	23	PCT	23	IT*	23	IT*	23	PCT	23	60
36.09		PCT	24	PCT	24	PCT	24	PCT	24	PCT	24	-
36.1		PCT	35	PCT	35	IT*	35	PCT	35	PCT	35	60
36.11		IT*	16	PCT	16	IT*	16	IT*	16	PCT	16	60
36.12		JR	25	JR	25	JR	25	JR	25	-	-	-
36.13		PCT	41	PCT	41	IT*	41	PCT	41	PCT	41	60

		Alternative 2		Alternative 3		lternative 4, 7, 7		Alternative 5		Alternative 6		Res
Unit #		Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Tr	Ac	Ba
36.14		PCT	26	PCT	26	IT*	26	PCT	26	PCT	26	60
36.15		IT*	51	PCT	51	IT*	51	IT*	51	PCT	51	60
36.16		IT*	15	PCT	15	IT*	15	IT*	15	PCT	15	60
36.17		IT*	28	PCT	28	IT*	28	IT*	28	PCT	28	60
36.18		IT*	95	JR	95	IT*	95	IT*	95	PCT	81	60
36.19		PCT	87	PCT	87	IT*	87	PCT	87	PCT	87	60
36.2		IT*	70	PCT	70	IT*	70	IT*	70	PCT	70	60
36.21		IT*	22	PCT	22	IT*	22	IT*	22	PCT	22	60
37.01		IT*	36	PCT	36	IT*	36	IT*	36	PCT	36	60
37.02		IT*	82	PCT	82	IT*	82	IT*	82	PCT	82	60
38.01		IT*	66	PCT	51	IT*	51	IT*	51	PCT	51	60
38.01a		-	-	JR	15	JR	15	JR	15	JR	15	-
38.02		IT*	19	-	-	IT*	19	IT*	19	-	-	60
38.03		PCT	6	PCT	6	IT*	6	PCT	6	PCT	6	60
38.04		JR	9	JR	9	JR	9	JR	9	-	-	-
38.05		JR	2	JR	2	JR	2	JR	2	JR	2	-
39.01		PCT	198	PCT	198	PCT	198	PCT	198	PCT	-	-
40.01		-	-	PCT	472	PCT	468	PCT	472	PCT	472	-
41.01		-	-	PCT	258	PCT	258	PCT	258	PCT	258	-

Silvies Canyon
Aspen
Stand Treatment Needs

Proposed Treatments
- P=Precommercial Thin
- C=Reduce 7+" competing conifers
- PR=Protection
- F=Fuel Treatment

Priority of Treatment
- 1=Extremely High priority
- 2= High priority
- 3=Medium priority
- 4=Low priority

Important –When a stand is being treated all treatments listed below need to be completed for that stand. This is because it would do little good to just do the 1st treatment.

Aspen Stand	Acres	1st Treatment	2nd Treatment	3rd Treatment	4th Treatment
18292501	2.0	C3	P3	PR2	
18292502	1.7	C3	P3	PR2	
18292503	.9	C2	P2	PR2	
18300701	.2	P2	PR1		
18300710	.5	C3	P4	PR1	
18301875	.1	C1	P1	PR1	F1
18301876	.1	C1	P1	PR1	F1
18302401	.4	C2	P1	PR3	F2
18302501	1.6	C4	P4		
18302701	.2	C1	P1	PR2	F1
18302702	.3	C1	P1	PR4	F1
18302703	.3	C1	P1	PR3	F1
18302801	2.0	C3	P1	PR2	F3
18302802	1.0	C4	P2	PR2	
18302803	15.2	C4	P3	Shut Gate 1	
18302901	.7	C3	P2	PR3	
18302902	.7	C4	P2	PR2	
18302903	1.5	C4	P4	PR3	
18303001	.6	C2	P2	PR2	
18303101	3.5	C4	P3	PR3	
18303401	1.0	C2	P2	PR2	
18303601	.4	C2	P1	PR3	F2
18303602	.3	C2	P1	PR2	F1
18313001	.4	C4	PR2		
18313002	.5	C3	P1	PR2	
18313101	2.4	C3	P3	PR3	
18313102	.9	C3	P2	PR2	
18313201	6.9	C3	P4	PR2	
19300101	1.5	C2	P2	PR2	F2
19300102	4.3	C1	P1	PR3	F1
19300201	.1	C4	P2	PR1	
19300202	.3	C4	P4	PR1	
19301201	.6	C3	P2	PR2	F3
19301202	.1	C2	P3	PR1	F2
19301203	.9	C3	P3	PR1	
19301204	2.9	C3	P2	PR2	F3
19301205	.3	C3	P2	PR1	
19301206	1.9	C2	P1	PR4	F1
19301207	3.5	C3	P3	PR2	
19301208	.7	C2	P2	PR3	
19301209	.6	C2	P2	PR2	
19301210	.8	C2	P3	PR3	
19301211	.8	C2	P3	PR3	
19301212	.5	C2	P2	PR2	
19301301	11.8	C3	P3	PR3	
19301302	1.4	C4	P4	PR1	
19301303	8.8	C3	P3	PR4	

Aspen Stand	Acres	1st Treatment	2nd Treatment	3rd Treatment	4th Treatment
19301401	7.8	C4	P4	PR4	
19301402	1.3	C4	P2	PR2	
19301403	.5	C1	P1	PR2	F1
19301801	.7	C4	P1	PR3	
19302001	.4	C4	PR3		
19302002	39.4	C4	P4	PR4	
19302301	1.3	C4	P2	PR2	
19302302	2.9	C2	P2	PR3	F1
19302401	1.5	C4	P4	PR1	
19302402	.3	C4	P3	PR1	
19302403	6.0	C3	P3	PR4	
19302901	.3	C4	P4	PR1	
19310501	4.9	C3	P2	PR3	F3
19310502	.4	C2	P2	PR3	
19310503	.4	C2	P2	PR3	
19310601	.3	C1	P1	PR1	F1
19310602	11.0	C3	P3	PR4	F3
19310603	2.3	C4	P4	PR2	
19310604	3.1	C3	P2	PR2	F3
19310605	8.8	C2	P2	PR2	F2
19310606	.7	C2	P2	PR3	
19310607	.6	C2	P2	PR3	
19310701	4.2	C4	P4	PR3	
19310702	2.7	C4	P4	PR2	
19310703	4.4	C3	P2	PR4	F3
19310704	1.1	C3	P2	PR2	F3
19310705	.3	C4	P4	PR2	
19310801	1.1	C1	P1	PR2	F1
19311801	4.4	C3	P2	PR4	F3
19311802	4.2	C2	P2	PR4	F2
19311803	1.5	C4	P4	PR2	
19311804	1.5	C4	P4	PR1	
19311901	4.2	C3	P4	PR3	
19311902	.8	C2	P2	PR3	
19311903	.8	C4	P4	PR2	
19312801	3.2	C3	P4	PR4	
19312802	2.6	C4	P4	PR4	
20300101	.5	-	-	-	
20311701	4.0	C4	P4	PR3	
20311702	.6	C4	P3	PR2	

Biological Evaluation/Assessment for PETS Species
that may occur in or would be affected by the

SILVIES CANYON WATERSHED RESTORATION PROJECT

Malheur National Forest
Emigrant Creek Ranger District

Table 1. Summary of Conclusion of Effects
(Rationale for conclusion of effects is contained in the body of this document).

Species	**No Action** (Alternative 1)	Proposed Action (Alternative 2)	Alternative 3	Preferred Alternative and Alternatives 4 and 7a	Alternative 5	Alternative 6
gray wolf (**T**)	NE	NE	NE	NE	NE	NE
bald eagle (**T**) - Nesting	NE	NLAA	NLAA	NLAA	NLAA	NLAA
bald eagle (**T**) – potential roosting	NE	NE	NE/BE	NE/BE (NE-7a)	NE/BE	NE/BE
lynx (**T**)	NE	NE	NE	NE	NE	NE
wolverine (**S**)	NI	NI	NI	NI	NI	NI
pygmy rabbit (**S**)	NI	NI	NI	NI	NI	NI
peregrine falcon (**S**)	NI	NI	NI	NI	NI	NI
western sage grouse (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
gray flycatcher (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
bufflehead (**S**)	NI	NI	NI	NI	NI	NI
redband trout (**S**)	NI (MIIH)	MIIH (BI)	MIIH (BI)	MIIH (BI)	MIIH (BI)	MIIH (BI)
Malheur mottled sculpin (**S**)	NI (MIIH)	MIIH (BI)	MIIH (BI)	MIIH (BI)	MIIH (BI)	MIIH (BI)
Columbia spotted frog (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
crenulate moonwort (**S**)	NI	NI	NI	NI	NI	NI
Deschutes milkvetch (**S**)	NI	MIIH	MIIH	MIIH	MIIH	MIIH
Raven's lomatium (**S**)	NI	NI	NI	NI	NI	NI

P = Proposed, E = Endangered, T = Threatened, S = Sensitive
NE =No Effect, NLAA =May Effect, Not Likely to Adversely Affect, LAA =May Effect, Likely to Adversely Affect, BE =Beneficial Effect, NI =No Impact, MIIH =May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species, (Effects in parentheses are longt term effects; definitions of effects determinations provided in Appendix A)

Fish Section Prepared By: Rick Vetter (signature) — Rick Vetter, Fisheries Biologist — 8/1/03 Date

Plant Section Prepared By: Lori Bailey (signature) — Lori Bailey, Botanist — 8/1/03 Date

Wildlife Section Prepared By: Michelle K Putz (signature) — Michelle Putz, Writer/Editor/Wildlife Biol. — 7/28/03 Date

Wildlife Section Reviewed By: Karen Haines (signature) — Karen Haines, Forest Wildlife Biologist — 7/29/03 Date

Reviewed By: Margaret David Bailey (signature) — Margaret David Bailey, District Ranger — 8/1/03 Date

I. Introduction

This combined BE (Biological Evaluation)/BA (Biological Assessment) analyzes the potential effects of the proposed action and alternatives developed for the Silvies Canyon Watershed Restoration Project, which are fully described in the FEIS Chapter 2. Effects on PET (Proposed, Endangered, or Threatened) species listed under ESA (Endangered Species Act, as amended) and those species identified as sensitive by the FS (United States Department of Agriculture-Forest Service) that do or may occur in the project area would be considered (Appendix B) as required by FSM (Forest Service Manual) 2672.42.

PET species considered include:

those that are known to occur within the planning area,
those that are likely to occur within the planning area, based on the distribution of the species, the habitat conditions required or used by the species, and the current habitat conditions of the planning area,

- those that could be affected by management actions, due to known species occurrence adjacent to, or immediately downstream from the planning area.

The BE includes documentation of how PETS (proposed, endangered, threatened, or sensitive) species were identified for, or excluded from, the effects analysis.

The following sources were reviewed during a prefield data base review to gather evidence of or potential for PETS and/or their habitats to occur within the area of the proposed project or action:

Current Regional Forester's (R6) Sensitive Plant and Animal Lists
Malheur National Forest and Burns Ranger District PETS Species Database

- Burns District WildObs Database
- Oregon Department of Fish and Wildlife
- Oregon State University, Department of Fish and Wildlife
- ORNHP (Oregon National Heritage Program) Database records
- District Stream Surveys

Current and historical species distribution maps
Site-specific habitat present within the analysis area that is suitable or may be potential habitat
Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests

In addition, field reconnaissance was conducted to:

- Assess the project area to identify potential PETS habitat
- Search suitable habitat for PETS species occurrence (if present)
- Confirm known habitat is suitable (if present)
- Refine knowledge of how habitat exists on the landscape and how species use their habitat

Field reconnaissance to determine the presence of PETS was conducted from 1992-2002.

This combined BE/BA is prepared to satisfy the requirements of FSM 2672.42. This requires the Forest Service to review all its planned, funded, executed, or permitted programs and activities for possible effects (beneficial, adverse, or lack of effects) on PETS species.

The BE/BA process is intended to review proposed Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect PETS species and to ensure that proposed management actions would not:

jeopardize the continued existence, or cause adverse modification of habitat, for species listed or proposed to be listed as endangered or threatened by the FWS (United States Department of the Interior-Fish and Wildlife Service) (FSM 2672.41) or; contribute to the loss of viability for species listed as sensitive by FS-Region 6, or any native or desired non-native species; nor cause any species to move toward federal listing (FSM 2672.41).

This process is conducted to provide a standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process.

II. Summary of Alternatives

The project area is located on the west side of the Emigrant Creek Ranger District and is comprised of Boulder Creek/ Fawn Creek, Burnt Mountain, Myrtle Creek, Myrtle Park, Red Hill, Sage Hen Creek, and Stancliff Creek subwatersheds (6th level HUC) which make up the Silvies Canyon Watershed (5th level HUC). All the drainages flow off the forest and into the Harney Malheur Lakes subbasin. Table 2. provides the legal description of the project area.

Table 2. Project Area Location by Township/Range/Section.

Township	Range	Section
18 S	29 E	1, 12-13, 24-26, 36
18 S	30 E	6-7, 13-36
18 S	31 E	30-32
19 S	30 E	1-36
19 S	31 E	5-24, 26-35
20 S	30 E	1-5, 9-15
20 S	31 E	2-11, 15-18, 20-22

The project area contains about 65,000 acres of National Forest lands. Some private land occurs within project area boundary.

All acres listed herein are approximate. In most cases, units or stands have been delineated using the most up to date information available and acreages have been determined through computer analysis. Acreages are considered approximate until actually verified on the ground.

The alternatives described in the Silvies Canyon Watershed FEIS (Final Environmental Impact Statement) were developed by the interdisciplinary team in response to the issues that were brought up during project scoping. Eight alternatives are considered in detail: the No Action (Alternative 1), the Proposed Action (Alternative 2), the Preferred Alternative (Alternative 7) and five other alternatives.

See Chapter 2 of the FEIS for a complete description of alternatives. Project area maps, and foldout maps of all alternatives considered in detail are provided in the FEIS. Large-scale maps are also available in the project planning record. Appropriate mitigation measures have been developed as needed for the action alternatives.

III. Species Considered

Table 3. Federally listed species (documented or suspected to occur in the project area, or otherwise impacted by actions taken) considered.

Species	Effects Determination	Informal Consultation	Biological Assessment	USFWS Concurrence Biological Opinion
gray wolf (**T**)	**No Effect**	**NO**	**NO**	**N/A**
bald eagle (**T**)	**May Effect**	**YES**	**YES**	**YES, 9/26/01**
lynx (**T**)	**No Effect**	**NO**	**NO**	**N/A**

Table 4. Federally listed and proposed endangered and threatened species that may occur within the Malheur National Forest but are NOT present in the project area

Species	DPS/ESU (fish)
bull trout (**T**)	Columbia River DPS
summer steelhead (**T**)/critical habitat	mid-Columbia ESU

Table 5. Sensitive species (documented or suspected to occur in the project area, or otherwise impacted by actions taken) considered.

Animals	Fish	Invertebrates	Plants
wolverine pygmy rabbit peregrine falcon western sage grouse gray flycatcher bufflehead Columbia spotted frog	redband trout Malheur mottled sculpin	Blue Mountain crypotochian caddisfly	crenulate moonwort Deschutes milkvetch Raven's lomatium

Table 6. Sensitive species that may occur within the Malheur National Forest but are NOT present in the project area.

Species
tri-colored blackbird
upland sandpiper
bobolink

See Appendix B for full list of PETS found or suspected to occur on the Emigrant Creek Ranger District.

IV. Potential Effects on Listed and Proposed Species and Critical Habitat

Gray wolf

(*Canis lupus*) Linnaeus 1758

Status

Federal Status: Threatened (Fed. Reg. Vol. 68, #62, pp. 15804-15875). The northern Rocky Mountain gray wolf was listed as endangered on June 4, 1973, and a recovery plan was released in 1987. The USDI Fish and Wildlife Service published a final rule changing the status of northern Rocky Mountain gray wolf to threatened on April 1, 2003.
USDA-Forest Service (Region 6) Status: Threatened
State Status: Endangered (last revised 12/1998)
Oregon Natural Heritage Program Status: List 2-extirpated (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank= G4 (November 15, 1996)
National Rank=N4 (September 05, 1996)
Oregon State Rank=SX (presumed extirpated)

(Status definitions included in Appendix C)

Major Threats

Human-caused mortality is the major factor limiting the recovery of wolves with the majority of losses due to shooting, trapping and vehicle accidents. In addition, wolves, particularly juveniles, are susceptible to canine parvovirus and distemper.

This species is negatively affected by roads. Roads increase human presence in wolf habitat and increase the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. These mortalities are mostly legal and illegal shooting resulting from human access provided by roads. Vehicle collisions account for additional mortalities.

"Thurber and others (1994) cite three studies (Jensen and others 1986, Mech and others 1988, Thiel 1985) indicating wolf packs would not persist where road densities exceeded about 1.0 mi/mi^2." (Wisdom et al. 2000).

Population Status and Trend

Currently there are experimental populations of gray wolves established in Idaho and Montana. There are no known wolf packs in Oregon but dispersing wolves could become established in remote areas within the state. There are no known populations on the Malheur National Forest.

Source Habitat Trend

Source habitats span a broad elevational range and include all terrestrial community groups except exotic herblands and agriculture (Wisdom et al. 2000).

Source habitats for gray wolf likely occurred throughout the basin historically. The current extent of habitat, albeit largely unoccupied, is similar to the historical distribution except for the Columbia Plateau, Lower Clark Fork, and Upper Clark Forks ERUs, where habitat is more patchily distributed than it was historically.

The overall trend in source habitats across the basin was neutral.

Existing Condition

Historically, wolves occupied all habitats on this Forest (Wisdom et al. 2000), but are currently considered extirpated.

In 1999, a collared wolf (B-45-F) from the experimental, non-essential Idaho population traveled to the Malheur, Wallowa-Whitman, and Umatilla National Forests and stayed until it was captured and returned to Idaho. In 2000, at least two wolves were killed in Oregon, one wolf was found dead near Baker City and one was shot illegally near Ukiah, Oregon.

This indicates that the Malheur, Wallowa-Whitman, and Umatilla Forests are probably suitable habitat for wolves. Over time, wolves dispersing from the growing experimental, non-essential central Idaho wolf population could return to the Blue Mountains and establish packs.

Big game (ungulates) are an important source of year-round prey for wolves. Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage ungulate populations to prevent large changes in the populations. Habitat and disturbance effects are of concern in denning and rendezvous areas. No habitat is currently occupied in Oregon.

Effects and Determination

Direct and Indirect Effects

Alternative 1, No Action, maintains existing big-game habitat and open road densities. Existing big-game populations provide an adequate prey base for individual wolves or packs should they occupy the area in the future. Wolf/human interactions usually increase with increased road density. Road densities in the Silvies Canyon Watershed range from over 5 miles per square mile in the Myrtle Creek subwatershed to just under 3 miles per square mile in the Boulder/Fawn subwatershed. Because unroaded areas provide the best habitat for wolves, densities in this watershed result in degraded wolf habitat. Road densities and big-game habitat would not change with this alternative.

Cumulative Effects

Ongoing activities, such as livestock grazing, would continue in the project area. While grazing can reduce ground vegetation and shrubs and has the potential to impact riparian habitat, grazing would not be expected to contribute to cumulative effects on wolves. Alternative 1 would maintain adequate wolf prey species in the short-term; however, elk habitat quality could be reduced in the foreseeable future when stand-replacing events (such as a fire or insect outbreak) remove available cover. The likelihood of such events is higher in Alternative 1 than in the action alternatives.

Determination

Due to the nature of the no action alternative, and the fact that there are no wolf populations currently occupying the Malheur National Forest and no denning or rendezvous sites on the Malheur National Forest, there would be **No Effect (NE)**. There are potential indirect, long-term effects from potential large-scale insect and disease outbreaks infestation and catastrophic wildfire that could occur because of not addressing current forest heath issues. The magnitude and timing of these potential impacts are unknown, but they could drastically modify potential wolf and big game habitat conditions for many years to come.

Alternatives 2, 4, 7, and 7a reduce big-game cover on summer range in all subwatersheds and reduces cover on winter range in all subwatersheds except Red Hill and Stancliffe Creek. Alternative 5 reduces big-game cover on summer range in all except the Boulder/Fawn and Red Hill subwatersheds and reduces cover on winter range in all subwatersheds except Stancliffe Creek. Although cover is being reduced, habitat effectiveness improves in these alternatives on both summer and winter range due to road closures. Big-game animals might move from an area during treatments, but they are expected to return upon completion. Although cover is being reduced, the effect on big-game populations is not expected to be measurable; therefore, adequate prey should remain in the watershed to provide forage for wolves. Under Alternatives 3 and 6 thermal cover would remain at existing levels and overall habitat effectiveness would increase for elk; adequate prey would remain available under these alternatives.

Road closures will increase seclusion habitat and reduce the potential for wolf/human interactions in all action alternatives. Other proposed activities (such as old-growth reconfiguration, spring restoration, juniper reduction, weed treatment, and aspen restoration) would have no measurable effect on wolves or their habitat.

Cumulative Effects

All alternatives would be expected to maintain adequate wolf prey species, despite the potential for cumulative effects to elk. Proposed activities should not contribute to cumulative effects on wolves.

The determination for all action alternatives is **No Effect (NE)** for the following reasons:

There is an abundance of prey on the forest and timber, fuel management, and other proposed actions (juniper reduction, aspen restoration) are not expected to affect big game populations measurably; therefore prey availability is not a limiting factor.

No wolf populations currently occupy the Malheur National Forest.

No denning or rendezvous sites have been identified on the Malheur National Forest.

Road closures will increase seclusion habitat and reduce the potential for wolf/human interactions.

Most management activities for non-breeding populations are compatible with wolf protection and recovery.

bald eagle

(Haliaeetus leucocephaslus)
Linneaus 1766

Effects of proposed actions on bald eagles and their nesting and roosting habitat are discussed in the Biological Assessment (BA) for the Silvies Canyon Watershed Restoration Project (Wildlife Project Record).

The BA and associated Biological Opinion (9/26/01) analyzed and concurred on the effects of commercially thinning 29 acres and precommercially thinning 144 acres as well as prescribed burning these acres within the Bald Eagle Management Area (BEMA). The BA and BO also considered and concurred on the effects of precommercial thinning and burning of slash on 729 acres of potential winter roost habitat and effects of thinning, burning, roads, and other treatments as described in Alternative 7 in areas outside of bald eagle habitat.
Alternatives 2 and 5 treat bald eagle nesting habitat in the manner described in the BA/consultation. Therefore, the effects from the BA/consultation of Alternatives 2 and 5 on nesting bald eagles and nesting habitat are repeated below and used as a comparison for other alternative effects. Alternatives 3, 4, 5, 6, and 7 treat potential roosting stands the same as described in the BA/consultation. Those effects from the BA are summarized below. The effects of no action (Alternative 1) and of varied treatment within nesting habitat (Alternatives 3, 4, 6, 7, and 7a), and no action or limited action on potential roosting habitat (Alternatives 1, 2, and 7a) have been added here.

Status

Federal Status: Threatened (list 1-7-00-SP-588)
Federal status is categorized by state/region, rather than by subspecies.
USDA-Forest Service (Region 6) Status: Threatened
State Status: Listed as a Threatened Species (last revised 12/1998)
Oregon Natural Heritage Program Status: List 1- contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range. (ORNHP 2000)

Conservation Status Ranking

(NatureServe 2000)
Global Rank = Apparently Secure-Uncommon but not rare, and usually widespread. Possibly, cause for long-term concern. Typically more than 1000 occurrences and more than 10,000 individuals. (November 22, 1966)
National Rank = Apparently Secure-Uncommon but not rare, and usually widespread (January 05, 1997)
Oregon State Rank = Vulnerable in Oregon either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 1000 occurrences. (ORNHP 2000)

Degree of Fragility

Fairly resistant. enerally susceptible to human intrusion, but "show a high degree of adaptability and tolerance if the human activity is not directed toward them". Chronic disturbance results in disuse of areas by eagles. (NatureServe 2000)

Species Abundance and Distribution

The bald eagle is the only North American representative of the fish and sea eagles (Grossman and Hamlet 1964, Brown and Amadon 1968), and is endemic to North America.

1. Pacific Population

a. Condition and Trend of the Pacific Population

In Oregon and Washington, breeding populations are still widely distributed, but historical information suggests significant declines and changes in distribution (USDI 1986). Oregon has the second highest population of nesting bald eagles in the Pacific Northwest recovery area. By 1999, breeding pairs occupied 376 of 391 surveyed traditional nesting territories (Isaacs and Anthony 1999). Isaacs and Anthony (1999) report recovery population goals were met or exceeded in 8 (Recovery Zone 9,10,11,12,13,21,22, and 23) of 10 (80%) Recovery Zones in Oregon.

b. Habitat

Summer/Nesting

Bald eagle nests in the Pacific recovery area are usually in large trees located in uneven-aged (multi-storied) stands with old-growth components (Anthony et al. 1982) and are near water bodies, which support an adequate food supply. Most nests in Oregon, Washington and California are located in predominantly coniferous stands.

Winter

This species preferentially roosts in conifers or other sheltered sites in winter and typically selects larger, accessible trees in second growth stands with large trees or old growth. At preferred communal roost sites, bald eagle use occurs in successive years. Winter roost sites vary in their proximity to food resources (up to 20 miles) but are typically located near an abundant food source (Isaacs et al. 1993).

Existing Condition

Currently, there is one known active bald eagle nest (Silvies River Nest Site #807-009) in the project area. The nest tree is situated in a mature ponderosa pine stand along the Silvies River as it enters the Malheur National Forest, southwest of the Silvies Valley.

There are two potential winter roost sites in the project area, the 482-acre Silvies River and the 277-acre Myrtle Creek potential winter roost sites. These roosts are located in the Silvies River Watershed approximately seven air miles southwest of the nest/ Bald Eagle Management Area (BEMA).

By the 1900s, a variety of activities including grazing, commercial trapping, logging, irrigation, road construction, recreation, predator control, introduced fish and wildlife species and fire suppression have influenced the ecology and biological processes functioning in the area. Stands immediately adjacent to the nest site exhibit only limited impacts from anthropogenic use.

Effects and Determination

Alternative 1 (No Action)
Under the No Action Alternative, there would be no management activities; therefore, there should be no direct effects to bald eagles or bald eagle habitat. Bald eagle potential roosts have no known use reported and important nesting and roosting structural characteristics would be retained at current levels.

However, an indirect effect of no action on nest habitat and potential roosts is an expected decline in habitat suitability, as reflected by shifts in species composition, loss of large tree structure and increased fire risk.

The forested stands in bald eagle habitat are identified as moderate to high risk for stocking induced mortality, related infestation of pests or disease, and loss of stand characteristics through stand-replacing events such as wildfire. Without silvicultural treatment or the controlled re-introduction of fire into the project area, current stand conditions would progress from dense understories to even denser understories with continued tree species conversion and increased competition for water. The expected result is forest with decreasing vigor, increasing mortality, and a higher probability of stand-replacing events.

Cumulative Effects

Livestock grazing is the principal activity that occurs on federally administered and private lands in the BEMA (Bald Eagle Management Area). Historically, commercial timber harvest has occurred in the BEMA and would occur in the future to manage for healthy, resilient forest stands. Road construction has occurred in relation to timber harvest. One seasonally closed (closed January 1 through August 31) road exists adjacent to the stand containing the nest site. A Categorical Exclusion signed in 1998 permitted the 44-acre stand around the bald eagle nest to be precommercially thinned, hand-piled, and burned in an effort to protect and enhance bald eagle habitat. This stand was thinned and piled between 1999 and 2001. Most piles still need to be burned. These activities have likely improved forest health and slightly reduced the risk to stand-replacing events in this stand. These activities provide a small amount of improved habitat for eagles. Overall cumulative effects on bald eagle are minimal.

Determination

Due the nature of the No-action Alternative, there would be **No Effect (NE)** to nesting bald eagles, bald eagle nest habitat, or potential roosting habitat. However, there are potential indirect, long-term effects to habitat from probable high intensity wildfire that could occur because of not creating resilient forest ecosystems. The magnitude and timing of this potential impact is unknown, but it could drastically modify nest and roost stands and could remove nest and roost trees.

Effects on Nesting and Nesting Habitat

Alternatives 2 and 5

To improve stand vigor, manage stand structure, and improve or maintain overall long-term stand cover, commercial (29 ac. near the nesting stand) and precommercial thinning (144 acres near the nesting stand) and prescribed burning (1,100 acres-most outside the Bald Eagle Management Area) would focus mainly on the removal of excess trees from mid-story and lower tree canopies. After treatment, the residual stand structure should become more vigorous as competition from the understory is reduced. This would make these stands more stable over time as the remaining trees become increasingly resilient to the effects of pathogens, drought and fire. The risk of stand loss due to these factors may be reduced.

No management activities (including harvest and prescribed burning) would occur within 1 mile of the nest when the nest site is in use. Mitigation measures for treatments would be the same as in the other action alternatives.

Based on the above mitigation, there would be no direct effect to bald eagles or habitat used for breeding. The following may indirectly affect bald eagles by affecting forest habitat adjacent to the nest stand.

Reduction in Canopy Closure:
There would be a slight reduction in canopy closure following precommercial thinning due to the removal of suppressed understory trees and intermediate trees. The canopy closure should be reduced by an estimated 5-10%.

Canopy reduction in the commercially thinned stands would be greater (reduced by 10%-20%) because more trees would be removed from the lower canopy layer.

This change in canopy closure may also result in a slight increase in ambient and ground temperature as more light is allowed through the canopy.

The slight reduction in canopy closure following thinning would not alter the overall appearance or function of these stands or effect the overstory trees in stands adjacent to the bald eagle nest stand.

Increased Stand Vigor:
The residual stand should become more vigorous as competition from the understory is reduced. This would make these adjacent stands more resilient to the effects of pathogens, drought and fire. The risk of stand loss due to these factors may be reduced. This in turn, would reduce the likelihood of stand replacement fires or insect outbreaks originating in these stands and spreading to the nest stands.

Fuel treatments would result in an overall reduction of fuel levels (approximately 80% consumed during multiple burns with an objective of 50% consumed during the first stage) throughout forested stands adjacent to the nest site. This would reduce the risk of a stand-replacing fire originating from these stands and spreading to the nest stand.

As some suppressed understory trees are consumed by fire, small openings in the canopy should develop. These small openings in existing stand canopies should create optimal growing conditions for natural regeneration of tree seedlings and forage species. This should promote the development of sustainable stand structure over time.

Through the removal of smaller diameter dead and dying trees from the understory, ladder fuels that are capable of carrying a ground fire into the canopy would be reduced. Hand piled activity generated slash would be burned. Some fire creep is expected between piles depending on concentration of natural fuels and fall/winter burning conditions. This treatment would result in an overall reduction of fuel levels throughout the stand and would reduce the risk of a stand-replacing fire.

No snags or down wood would be actively treated as part of the fuels reduction prescription. Regional direction for retention of snags and down wood would be applied to retain this habitat for primary cavity excavators, secondary cavity users and other wildlife that uses this habitat.

Pile burning and ground creep would potentially pose a risk to the stand if the fire burned out of prescription. Some tree mortality could occur to shade tolerant trees if fire intensity increased above a low intensity ground fire. Stands to be treated in this project are from 1/10 to ½ mile away from the nest

While there are risks of fire damage to overstory trees during prescribed fires, such risks would be minimized by prior thinning of ladder fuels

Low to moderate intensity ground fires would likely prune conifers to 4 to 6 feet above the ground. This would contribute to the effects on canopy cover and understory structure.

Cumulative Effects

Cumulative effects would be similar to those described in Alternative 1. Prescribed treatments combined with past thinning of 44 acres around the nest will cumulatively improve habitat conditions and improve resiliency of the BEMA. Cumulative effects would be simialr for the remaining action alternatives.

Determination

The effects on stand structure resulting from commercial and pre-commercial thinning, piling and burning are fairly predictable, but how this may effect bald eagles use of the area is more difficult to predict.

Recently completed vegetation management activities within the Silvies River nest stand appear to have had no adverse effect on the eagles that use the area. In 1999 and 2000, the Silvies River eagle pair successfully reared one young each year. This indicates that this pair was not adversely affected by stand level precommercial thinning in the nest stand. Similar treatments in stands adjacent to the nest stand should have no greater affect on nesting bald eagles as long as mitigation measures are properly applied.

There are inherent risks whenever forest structure is altered and when fire is used in an uncontrolled setting. Timing of entry and careful use of fire would limit the risk to a very low level. How the eagles may respond to altered habitat adjacent to the nest stand still remains an uncertain. Because of the uncertainty of management activities in an uncontrolled setting, there still remains some short-term risk; therefore, these actions **May Effect-Not Likely to Adversely Affect (NLAA)** bald eagles or their nesting habitat.

Alternatives 3 and 6

These alternatives would do only precommercial thinning inside and outside the BEMA. Precommercial treatment would somewhat reduce canopy closure and stand structure as described in Alternatives 2 and 5. Compared to no-action, stand vigor would increase and the probability of stand-replacing events would decrease, but the degree of improvement would be smaller than with Alternatives 2 and 5. Compared to Alternative 2 and 5, these alternatives would have less potential to impact bald eagles but would also provide less protection from fire and insects for a shorter period of time.

Determination

The overall effect to nest habitat would likely be similar to Alternatives 2 and 5, though the benefits of treatment would last for a shorter time. Implementation of these action alternatives **May Effect-Not Likely to Adversely Affect (NLAA)** nesting bald eagles or occupied nesting habitat.

Alternatives 4, 7, and 7a

These alternatives would commercially thin all acres (173 acres) proposed inside the BEMA. Canopy closure and stand structure would be reduced as described in Alternatives 2 and 5, though the extent of reduction would be greater than in those alternatives. Stand vigor would increase and the probability of stand-replacing events would decrease over a larger area than with Alternatives 2 and 5, but the potential to have negative impacts on nesting habitat could also increase. Since impacts in the BEMA would be greater in these alternatives than the actions consulted on, further consultation would be needed to implement the treatments in these alternatives in BEMA habitat.

Determination

The overall effect to nest habitat would likely be similar to Alternatives 2 and 5, though more commercial harvest occurs in Alternatives 4, 7, and 7a. Implementation of these action alternatives **May Effect-Not Likely To Adversely Affect (NLAA)** nesting bald eagles or occupied nesting habitat.

Effects on Roosting Habitat

Alternatives 3, 4, 5, 6, and 7

Use by eagles of potential roosts would be determined prior to implementation of silvicultural treatments or prescribed burning. If sites were active, any disturbing activities would be seasonally restricted from about November 15 to April 15 within and adjacent to roost sites.

Based on the above mitigation, there would be no direct effect to bald eagles or critical habitat. Bald eagles may be indirectly affected by affecting forest habitat within potential roosts.

The general effect of vegetation treatment on stand structure and composition within potential roost sites would be similar to that discussed in the above section. The method of treatment would be limited to precommercial hand felling of understory trees. To maximize the benefit of understory thinning while retaining key structural elements and maintain overall stand integrity, understory thinning would remove conifers up to 7 inch dbh.

The general effect of fuels management treatment on stand structure and composition within potential roost sites would be similar to that discussed in the above section. Prescribed burning would be limited to burning of hand piles of activity-generated slash piled after thinning operations. This treatment would limit fuels reductions of “new” slash only. Limited ground creep from burning piles would remove some accumulations of natural fuels but would not significantly reduce fuel loading in the potential roost stands. Fuel loading would remain relatively high but removal of much of the ladder fuels from the stands would reduce the risk of a ground fire moving up into the canopy.

Determination

These alternatives would have **No Effect (NE)** on bald eagles or their habitat in the short-term. This is because the Silvies River and Myrtle Creek roosts are not currently used by bald eagles and are considered unoccupied.

DellaSala et al. (1998) strongly recommend aggressively treating declining roosting habitat to preserve and improve stand characteristics important to roosting eagles. The proposed action attempts to do this in potential roosting sites with the hope that limited stand restoration treatments would increase the suitability and sustainability of these areas for future roosting. The result of this treatment should have a long-term **Beneficial Effect (BE)** on potential bald eagle winter roosting habitat.

Alternatives 2 and 7a

Mitigation measures for treatments would be the same as in the other action alternatives.

Thinning treatments would not occur in these alternatives, but burning would occur in the both potential roost sites in Alternative 2 and in the 277 acre Myrtle Creek potential roost in Alternative 7a. The effect would be a minor, short-term reduction in fuels with a subsequent reduction in the risk of a stand-replacing event. The overall effect to roost habitat would likely be similar to the No-action Alternative.

Determination

The effect to potential roost habitat is the same as the Alternative 1 (no action) – **No Effect (NE)** on bald eagles.

lynx

(Lynx canadensis) Kerr 1792

Status

Federal Status: Threatened (list 1-7-00-SP-588). On March 24, 2000, the USDI Fish and Wildlife Service published a final rule (50 CFR Part 17, RIN 1018-AF03) to list the contiguous U.S. distinct population segment of the Canada lynx, as threatened, pursuant to the Endangered Species Act of 1973, as amended. The listing became effective 30 days after publication of the final rule in the Federal Register (USDI-Fish and Wildlife Service 2000a).
USDA-Forest Service (Region 6) Status: Threatened
State Status: N/A
Oregon Natural Heritage Program Status: List 2

Conservation Status Ranking

(The Association for Biodiversity Information 2000)
Global Rank= G5 (Nov 19, 1996)
National Rank=N4 (Jan. 15, 1997)
Oregon State Rank=S1

Major Threats

Habitat loss, fragmentation and susceptibility to overharvest (trapping) are major concerns across its range (TNC 1999). Factors thought to be of concern include; forest management activities that drastically alter habitat, fire suppression, landscape level stand-replacing wildfire, roads, developments that destroy habitat, grazing, predator control and trapping, competition with other predators, and human disturbances (winter recreation off-highway travel and highways) that displace lynx from their habitat (Wisdom et al. 2000, TNC 1999, and Witmer et al. 1998). Stand-replacing wildfire has a short-term negative effect that is likely due to a reduction in snowshoe hare populations (Ruediger et al. 2000). Hare populations generally peak 15-30 years after a stand-replacing event in their habitat. Lynx habitat in the Rocky Mountains was dominated by stand-replacing fires or mixed severity first historically. These fires maintained lynx habitat by providing high quality habitat for snowshoe hare.

Population Status and Trend

Empirical data for distribution of lynx within the basin are scarce, and data on abundance of lynx populations are not available. McKelvey and others (1999) recently summarized all known lynx locations in the United States, which provides a framework for designing and conducting future surveys and demographic studies of lynx populations.

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 47 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+26.93%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid and late-seral montane forests and mid-seral subalpine forests (Wisdom et al. 2000).

Distribution and Habitat

The lynx is found in the taiga zone of North America, from British Columbia east to Atlantic Coast of Canada. It ranges from Alaska south, except for the coastal areas, to isolated parts of Washington, Idaho, and Montana. The lynx is also found in central Utah and in a fraction of Colorado. Small populations might still exist in northern Minnesota, Wisconsin, and New Hampshire (U. S. Dept. Interior. Fish and Wildlife Service 1994). Its distribution probably has changed little from the historical except at the southern extent of its range (Koehler and Aubry 1994). The occurrence of the lynx in most of the contiguous United States is likely the result of transient dispersal during declines in population density of their primary prey, snowshoe hares (Quinn and Parks 1987).

The lynx has always been rare in Oregon (Koehler and Aubry 1994). The few specimen records that exist are from the higher elevations of the Cascade Mountains and the Wallowa Mountains in northeastern Oregon. A lynx shot in Oregon in 1964 was the first record since 1935. One lynx was trapped near Drewsey, Oregon, in 1994.

General Description

Lynx are typically associated with large tracts of higher elevation boreal and coniferous forests that are often interspersed with rock outcrops, bogs and thickets. Key components of lynx habitat include denning, foraging, and travel corridors provided by a mosaic of forest habitats.

Home range size varies considerably and is usually dependent upon prey availability. Typical home range territories are 45-155 mi^2. Lynx habitat landtypes typically occur where low topographic relief creates continuous forest communities of varying ages (Ruggiero 1994). This species requires early successional forests that contain high numbers of prey for foraging, and late-successional forest that contain cover for kittens (especially deadfalls) and for denning. Intermediate successional stages may serve as travel cover, but function primarily to provide connectivity within a forested landscape. Lynx avoid large openings (> 330 feet from cover) that have the potential to disrupt movement between isolated populations (Ruggiero 1994).

Snowshoe hare (*Lepus americanus*) is a primary prey species (Quinn and Parker 1987). Other prey items used include small rodents, red squirrels (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus* and *Dendrogapus* spp.) and ptarmigan (*Lagopus* spp.) (Hatler 1989, McCord and Cordoza 1982).

Lynx prefer early to mid-successional, densely stocked, mixed conifer forests created by natural or human-caused disturbances that support plentiful populations of hare for hunting (Ruggiero 1994). In general, these conditions are often preferred by snowshoe hare for cover. In Washington, hares were 4-5 times more abundant in 20-25 year old lodgepole pine (*Pinus contorta*) stands than older stands. In Montana, dense stand of early to mid-successional Douglas-fir (*Pseudotsuga mesziesii*) were most commonly used and in Colorado and Utah, dense stands of early to mid-successional subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*) were preferentially selected.

Snowshoe hares also need large numbers of downed logs within these habitats for hiding cover and warren sites.

Lynx denning habitat is characterized as having large woody debris that provides security and thermal cover and mature overstory canopies. These combine to provide both vertical and horizontal structural diversity (Ruggiero 1994). Habitat quality, as measured by the availability of alternate den sites, appears to be an important factor in kitten survival when disturbance occurs. Den sites occur primarily on north to northeast aspect slopes (Ruggiero 1994). Primary denning sites are often in large hollow logs, beneath windfall or upturned roots, or in brush piles in dense thickets (Brittell et al. 1989).

Deep snow and cold temperatures are often associated with lynx habitat. Other predators, such as the wolverine, may need to migrate to lower elevations under these conditions in order to follow their food source. Lynx, however, remain and thrive under these conditions due to their physical adaptations to low temperatures, deep snow and ability to successfully hunt the snowshoe hare.

The third key component of lynx habitat is travel corridors that provide security during movement from denning areas to foraging areas and during dispersal. Travel corridors are characterized as having minimum stem density of at least 180 stems per acre that are over eight feet tall.

Local Description
(central Idaho, eastern Oregon and western Utah)

The Blue Mountains of Oregon, Idaho Batholith of central Idaho, Bitterroot Mountains of Montana and eastern Idaho, and mountains of Wyoming are included in this ecoprovince.

In central Idaho, lodgepole pine community types and habitat types are not widespread but do commonly appear on more gentle terrain, toe-slopes and valley bottoms wherever the species can dominate the site. Such stands usually grade into subalpine fir or Douglas-fir habitat types on adjacent steeper or higher slopes. After disturbances such as fire, these lodgepole pine communities often provide good quality lynx foraging habitat for several decades.

The subalpine fir series occurs at upper elevations throughout most of central Idaho. Large stands of fire-induced lodgepole pine commonly dominate much of this series and, especially when interspersed with unburned islands of subalpine fir, often provide very good quality lynx habitat. Under growth is variable and ranges from tall shrub layers of blue huckleberry and menziesia to low, depauperate layers of grouse whortleberry or heartleaf arnica. Thus, the quality of lynx foraging habitat (i.e., snowshoe hare habitat) often varies greatly by habitat type. Engelmann spruce stands commonly occur along streams and valley bottoms where cool air drainage allows them to extend into the adjacent, lower elevation Douglas-fir communities. Habitat types within the series often occur on very wet sites and on steep northerly aspects where snow accumulates. Though a minor series, Engelmann spruce habitat types commonly provide good lynx travel corridors and denning habitat.

Douglas-fir habitat types occur over the broadest range of environmental conditions of any conifer in central Idaho. Douglas-fir communities often extend from lower to upper timberline, especially in the drier mountain ranges. The types of most importance to lynx include those where lodgepole pine is a seral species and those, which abut shrub-steppe communities. Within central Idaho, many habitat types within the Douglas-fir series are too dry and/or depauperate to provide good lynx foraging habitat.

Atypical lynx habitats in central and southern Idaho, Wyoming, southeast Montana, and eastern Oregon occur in the shrub-steppe communities where populations of alternate prey such as whitetail jackrabbits are found. These atypical habitats often provide connectivity between adjacent mountains ranges. Along the Continental Divide, they may also provide an important north/south link between large areas of typical habitats.

Existing Condition

In Oregon, there are 12 verified records of lynx documented between 1897-1993 (Ruggiero et al 1999, Verts and Carraway 1998). Locations for these specimens include:

- One from the Willamette Valley (taken in atypical habitat-suburban residential area, near Corvallis, Oregon)
- Two from the Cascade Range
- One from Steens Mountain
- One from the Stinkingwater Mountains
- Five from the northern and central Blue Mountains
- One from the Wallowa Mountains (taken in atypical habitat-bunchgrass-rimrock habitat, near Imnaha, Oregon)
- One in 1993 from the southern Blue Mountains in anomalous (non-typical) habitat (near Drewsey, Oregon - occurrence was positively identified from physical remains (portion of skull and pelt)

Of these 12 known specimens, one each was collected in 1897, 1964, 1974, and 1993; 2 in 1920; and 3 each in 1916 and 1927.

Peaks in density of lynx populations in Alaska reportedly occurred in 1916-1918, 1926-1928, 1963-1966, and 1974-1975 (Quinn and Parks 1987). Collection dates in populations farther north; even the collection of lynx in Oregon in 1920 may be related to an exceptionally high peak in 1914-1916 (Quinn and Parks 1987). The 1993 specimen was also collected within several years of a lynx population peak in western Canada (Ruggiero et al. 1999). Verts and Carraway (1998) concludes from this that lynx occurrence in Oregon likely are of dispersers from within currently occupied areas farther north that immigrate into the area and persist for a short time Thus, self-maintaining populations of lynx likely have not existed in historical times in Oregon.

The Fish and Wildlife Service (2000) states, "…many of the lynx records in the contiguous United States, including Oregon, are of transient animals that disperse during cyclic population increases". Animals that are considered "dispersing" and found in unsuitable habitat are considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USF&WS 2000).

In addition to verified records, there are 72 spatially referenced occurrences in Oregon (Ruggiero et al. 1999). This includes 20 records of physical evidence (15-reliable, 5-unknown reliability), 1 report of tracks (unknown reliability), 36 visual reports (9-reliable, 27-unknown reliability), and 15 unknowns.

In Harney and Grant Counties, there are nine "spatially referenced" unconfirmed occurrences (Table 7.). Reliability varies for unreliable to very good but are not considered confirmed/verified.

The Emigrant Creek Ranger District defines an "**unconfirmed**" sighting as:

- An uncollaborated sighting of an animal by an observer lacking the necessary skills to properly identify and differentiate the animal in question from similar species (i.e., bobcat).
- A sighting of an animal by a trained observer that lacks any physical evidence.

For sightings to be considered as "confirmed":

- Observation must be independently collaborated by additional trained observers or
- An observer must be clearly familiar with the species in question, and physical evidence such as photos of the animal or its tracks, physical remains, track castings, hair samples should be collected to positively confirm the sighting.

Because of the uncertainty of unconfirmed sightings, it would be dubious to infer that lynx are present in a given area.

Table 7. "Unconfirmed" Occurrences of Lynx in Harney and Grant County

County	Location	Date
Grant	Umatilla National Forest	1980
Grant	Wallowa-Whitman NF	1990
Grant	Malheur National Forest	1991
Grant	Malheur National Forest	1996
***Harney**	Ochoco National Forest	1997
Grant	Umatilla National Forest	1997
Grant	Malheur National Forest	2000
Grant	Malheur National Forest	2000

*1997-occurrence on the Snow Mountain Ranger District. Occurrence was a visual observation considered to have very good reliability. Observation lacked independent collaboration by additional trained observers or physical evidence to verify occurrence.

Current Pacific Northwest Distribution Assessment

In Washington, lynx occurred historically along the Cascade Range down to Mount Adams (Dalquest 1948) and lynx occurred historically as far south as the southern end of the Cascade Range (Ruggiero et al. 1999, Weaver and Amato 1999).

A national interagency survey was initiated in 1999. Surveys conducted in 2001 were the third, and in many cases, the final year of surveys in a three-year effort. The surveys were conducted in the Pacific Northwest, the Rocky Mountains, Great Lakes and Northeastern parts of the country to assess lynx distribution. Surveys conducted in the Pacific Northwest also met Northwest Forest Plan (NWFP) survey requirements.

The Forest Service is using the National Lynx Detection Protocol developed as part of the Interagency Lynx Conservation Assessment Strategy and Agreement. Forests surveyed in the Pacific Northwest include the Mt. Baker-Snoqualmie, Okanogan, Wenatchee and Gifford Pinchot National Forests (NF) in Washington, and the Mt. Hood, Willamette, Deschutes, Umpqua, Winema, Rogue River, Wallowa-Whitman, Ochoco, Malheur, and Umatilla NFs in Oregon.

The survey method capitalizes on a common felid (cat) behavior of scent-marking territories by rubbing. Rubbing stations were placed in potential lynx habitat and scented with a lure to induce lynx to rub and leave hair at the sampling station. Since several wildlife species may be attracted to the stations and leave hair, a DNA analysis method to distinguish species, using only hair, was developed.

In Oregon and Washington, the FS set up approximately 450 transects, each with five rubbing stations. Surveyors visited each rubbing station twice, resulting in a total of about 4,520 sample sites. All hair samples were cataloged and referenced to allow biologists to identify exactly where the hair samples were collected. There were several lynx hair samples sent to the DNA laboratory that were not collected as part of the field surveys, but these were identified and isolated from the rest of the field collected hair samples. They are not included in the results table that follows.

DNA analysis of collected hair determined that lynx are present in Washington (Okanogan National Forest) but was unable to document presence in Oregon and other forests in Washington.

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historical or current presence of a resident lynx population in Oregon (USF&WS 2000). Based on records and available collections, Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon. Additional surveys and research are warranted before lynx are considered as having self-maintaining populations in Oregon.

Local Surveys

Camera set results: Multiple baited camera stations were set up in the watershed in 1992-1994 (Gold Hill, Flat Creek, Gilbert Ridge, Myrtle Creek, Lost Creek, and Silvies River) and 1996 (Myrtle Park) to survey for marten, lynx, and wolverine presence. Methodology closely followed that suggested by Zielinski and Kucera (1995).

No lynx were documented by camera sets.

Snowmobile snow tracking survey results: Snow track intercept surveys (Myrtle Park Route) were conducted in the watershed during the winters of 1992-93, 1993-94, and 1994-95.

No lynx tracks were found during these track surveys.

Hair-Snag Pad Surveys 1999 to 2001, the Forest Service and Fish and Wildlife Service (1999 only) conducted hair capture surveys in the Snow Mountain, Blue Mountain and Prairie City Ranger Districts. Survey protocol followed that developed as a part of the Interagency Lynx Conservation Assessment Strategy and Agreement and by Dr. John Weaver. This was part of a region-wide survey to be conducted in Oregon and Washington.

No lynx hair was captured during these surveys. DNA analysis of hair captured from survey sites confirmed bobcat presence.

There were no surveys conducted on the Emigrant Creek Ranger District during this time as no primary habitat is present in sufficient quantity on the district.

Habitat Model

Lynx habitat was modeled for the Emigrant Creek Ranger District and Snow Mountain District using plant associations considered as primary and secondary vegetation (Appendix D).

The Western boreal forests within the range of the lynx are dominated by three tree species: lodgepole pine, Engelmann spruce, and subalpine fir (Ruggiero et al 1999). Subalpine fir, Engelmann spruce, cedar, and lodgepole pine are considered primary lynx habitat. There are no subalpine fir, cedar or Engelmann spruce plant associations in the project area or on these two districts. The closest stands occur in the Strawberry Mountains. There are small, scattered lodgepole primary vegetation blocks present on the districts, mostly in the northern portions. There are also small, scattered, non-continuous secondary vegetation blocks in portions of the District. This includes, some grand fir, aspen and alder plant associations.

Additional reviews of grand fir plant associations indicate that most these dry grand fir (ABGR/VASC) sites do not qualify as secondary lynx habitat.

Within the Silvies watershed/project area there are about 294 acres of primary vegetation (lodgepole pine (ABGR)/grouse huckleberry/pinegrass (CLG211)). There are an additional 1,011 acres of fragmented secondary vegetation (99 acres of Douglas-fir/ocean spray (CDS611), and 912 acres of Grand fir/birchleaf spirea (CWG113), aspen not included) present.

Conclusion on Status and Distribution in Oregon

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historical or current presence of a resident lynx population in Oregon (USF&WS 2000). The Fish and Wildlife Service (USF&WS 2000) goes on to states that "…many of the lynx records in the contiguous United States, including Oregon, are of transient animals that disperse during cyclic population increases".

Based on records and available collections, Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon.

Effects and Determination

Common to All Alternatives

From a review of currently available research, lynx habitat was always found in association with spruce and subalpine fir habitats (Ruggiero et al. 2000). This watershed lacks any association with spruce or subalpine fir, is too dry and the site potential too limited to provide anything more than poor lynx foraging habitat or marginal connectivity/dispersal habitat. The closest significant area of possible lynx habitat is located over 22 miles to the north.

Research indicates that lynx need at least 15 square miles (9,600) of low-hare-density habitat to support a functional home range (Ruediger et al. 2000, pg. 1-5). Reudiger et al. (2000, pgs. 7-3 through 7-4) go on to recommend that Lynx Analysis Units (LAUs) should be 16,000-25,000 acres in contiguous habitat; at least 10 mi^2 (6,400 ac.) of primary vegetation should be present in the LAU to support survival and reproduction. With less than 1,400 acres of habitat available in the entire 65,000-acre watershed (294 acres of primary habitat and 1,011 of secondary habitat), the Silvies watershed/project area does not provide enough habitat to sustain a lynx home range. Throughout all versions of lynx habitat analysis, the Silvies Canyon project area was never in an LAU and was never considered to be lynx habitat because of the lack of adequate habitat. In addition, this project area is not within or adjacent to a Malheur LAU or any other LAUs because the Ochoco National Forest does not have LAUs.

Many of the lynx records in the contiguous United States, including Oregon, are of transient animals that dispersed during cyclic population increases. Animals that are considered “dispersing” and found in unsuitable habitat are considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USF&WS 2000). Should dispersing lynx move through the area, they could use the connectivity corridors left to connect late and old stands, as required by the Forest Plan.

Although there is one confirmed sighting and other unconfirmed sightings in Grant and Harney Counties, there is no indication that lynx regularly occur in or use the project area. The likelihood of lynx using or frequenting the area is expected to be very low due to the lack of lynx habitat.

Cumulative Effects

There would be no cumulative effects to lynx from any of the alternatives.

Determination

Since there is not sufficient habitat in this watershed to consider this area as contributing to lynx habitat and since no lynx are expected to inhabit the project area, all alternatives would have **No Effect (NE)** on lynx.

V. Potential Effects of the Proposed Action on Sensitive Species

The two criteria for evaluating potential effects to sensitive species are:

Would implementation of any of the alternatives contribute to the loss of viability for species listed as sensitive (**S**) by USDA-Forest Service Region 6, or any native or desired non-native species, or

Would implementation of any of the alternatives cause any species to move toward federal listing (FSM 2672.4) under the Endangered Species Act?

Sensitive Animals

California wolverine

(Gulo gulo luteus) Elliot 1904

Status

Federal Status: Species of Concern (list 1-7-00-SP-588). On April 19, 1995, the USDI Fish and Wildlife Service published a 90-day finding for a petition to add the contiguous United States population of the

North American wolverine (*Gulo gulo luscus*) to the List of Threatened and Endangered Species. The Service found the petition did not present substantial information indicating that listing the wolverine in the contiguous United States may be warranted.
USDA-Forest Service (Region 6) Status: Sensitive
State Status: Threatened (ODFW 2000)
Oregon Natural Heritage Program Status: List 2 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G4T3 (Nov 18, 1996)
National=N3 (Jan 15, 1997)
Oregon State Rank=S2

Major Threats

Status is not well known in many portions of the range and wolverine are extirpated from most of its historical range in the contiguous 48 states. Wolverines are showing promising signs of semi-recovery in selected western states (TNC 1999).

Wolverine populations are suspected to be small, especially sensitive to disturbance, and vulnerable to local extinction (USDA 1994). Past decline in population may have been due primarily from fur trapping, but habitat alteration (e.g. agriculture, oil exploration, cattle grazing, rural settlement, timber harvest, road construction, and ski area development) and general human disturbance are contributing factors (TNC 1999, Witmer et al. 1998).

Population Status and Trend

Hash (1987) describes a contraction in the North American range of the wolverine beginning around 1840 with the onset of extensive exploration, fur trade, and settlement. State records suggest very low wolverine numbers in Montana, Idaho, Oregon, and Washington from the 1920s through 1950s, with increases in wolverine sightings since the 1960s (Banci 1994).

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 56 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+27.46%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane community types (Wisdom et al. 2000).

Habitat

The wolverine occurs in a broad range of wilderness habitats (Verts and Carraway 1998). Source habitats for wolverines include alpine tundra and all subalpine and montane forests. Within the forest type, all structural stages except the closed stem exclusion stage provide source habitat (Wisdom et al. 2000). The impression that wolverines require high elevation habitat may be a result of remaining wolverine populations retreating to inaccessible, undeveloped areas, which are often at high elevations (Witmer et al. 1998).

They are solitary predators that range over vast and remote territories; consequently, they are difficult to study and to survey (Rausch and Pearson 1972). Most available research indicated that wolverines were strictly associated with secluded wilderness areas and that distribution is probably limited to upper montane and sub-alpine forest types. Some recent work suggests that although wolverines may frequent upper montane and sub-alpine habitat during most of the year, they may follow migrating big game herds to lower elevation winter range and scavenge on winterkills, which is considered a primary winter food source (Wisdom et al. 2000, Ruggiero 1994).

In summer, wolverines use a variety of foods including small mammals, birds, carrion, and berries (Wisdom et al. 2000). Copeland (1996) found that carrion-related food supplied 46 percent of wolverine diets in Idaho during both summer and winter. Banci (1994) suggests that diversity of habitats and foods is important to wolverines.

Several special habitat features have been identified for wolverines. Natal dens in the western United States are generally located in subalpine basins in isolated talus fields surrounded by trees (Copeland 1996). There is also evidence that wolverine use down logs and hollow trees for denning and cavities in live trees may be used (Wisdom et al. 2000). Both talus and areas associated with large, fallen trees were used as maternal dens sites in Idaho (Copeland 1996).

Regardless of habitat type used, the critical component to suitable source habitat seems to be the absence of human activity or development (Hash 1987). High elevation wilderness and undisturbed backcountry refugia are still considered critical to the current welfare and viability of existing wolverine populations (Hornocker and Hash 1981).

Denning Habitat

A denning habitat model developed primarily by Jeff Copeland, Idaho Department of Fish and Game, was used to identify potential wolverine denning habitat on the Malheur National Forest. Utilizing satellite imagery and GIS data, key habitat components were queried to produce a forest level coverage of potential denning habitat. Key elements included topographic relief with flat to concave curvature, slopes with north to northeast aspects, areas above 5,000-foot elevation, and rock or snow covertypes.

Results: Large areas of potential denning habitat were identified in the Strawberry Wilderness, Monument Rock Wilderness, and in some northern portions of the Malheur National Forest. Isolated potential denning habitat points were identified on the Emigrant Creek Ranger District. Most of these data points identified by the model are a result of "data noise" or are not likely suitable denning habitat because of size or position on the landscape in relationship to developments, roads or natural landscape conditions.

Distribution

Wolverines once occupied the boreal zone across the northern part of the continent and southward into the mountains of Colorado and California. Bailey (1936) states that wolverine were thought to be rare in the United States, but probably were not yet extinct in the Cascades and Sierra Nevada’s.

Since Bailey's report, numerous animals have been collected or sighted around the northwest. A query of the Oregon Natural Heritage database reveals that there are about 150 observations of wolverines in Oregon, with most occurring in the mountainous northeast (Baker, Grant, Umatilla, Union and Wallowa Counties) region (Edelmann and Copeland 1997).

Confirmed observations on Malheur National Forest and adjacent areas include:

- Collection of an animal from Steens Mountain, Harney County, (1973)
- Hair and track collection on Snow Mountain Ranger District, Ochoco National Forest (1992)
- A partial skeleton and tufts of fir found near Canyon Mountain, Grant County (1992)
- Tracks and a probable denning site found in the Strawberry Mountains (1997)
- Tracks in Monument Rock Wilderness (1997)

There are 7 "unconfirmed" sightings of wolverines on the Emigrant Creek Ranger District; Hall Creek (1983), Gilbert Ridge (1990), Crooked Creek (1991), Paine Creek (1991), Gold Hill (1993), Silvies River (1994), and along Burnt Cabin Creek (1987).

Because of the uncertainty of unconfirmed sightings, it would be dubious to infer that wolverine movement corridor or even a territory is present in the area.

Local Surveys

Camera set results: Multiple baited camera stations were set up in the watershed in 1992-1994 (Gold Hill, Flat Creek, Gilbert Ridge, Myrtle Creek, Lost Creek, and Silvies River) and 1996 (Myrtle Park) to survey for marten, lynx, and wolverine presence. Methodology closely followed that suggested by Zielinski and Kucera (1995).

No wolverines were documented by camera sets.

Snowmobile snow tracking survey results: Snow track intercept surveys (Myrtle Park Route) were conducted in the watershed during the winters of 1992-93, 1993-94, and 1994-95.

No wolverine tracks were found during these track surveys.

Aerial snow tracking survey results: On 02/24/1997 Oregon Department of Fish and Wildlife personnel conducted an aerial survey of potential wolverine habitat on the Malheur National Forest.

Observers located probable wolverine tracks leading to and from a potential wolverine natal or maternal den in the northwest corner (T.14S., R.32E.) of the Strawberry Wilderness. Additional aerial reconnaissance of the area on 02/25 located additional tracks leading to and from the potential denning site.

A second set of tracks was observed in the Monument Rock Wilderness (T.14S., R.36E.) near the crest of Table Rock. No obvious denning or feeding locations were found associated with these tracks.

A third set of probable wolverine tracks were found in the Pine Creek drainage near the Lost Fork of Pine Creek. No obvious denning or feeding locations were found associated with these tracks.

Tracks observed showed the correct gate patterns for wolverine and were the correct size but physical evidence (track casts or detailed photos) could not be collected. Reliability of observation is high.

Existing Condition

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. Verts and Carraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the state, most animals seen or collected are likely dispersers from Washington and Idaho populations. The most recent “unconfirmed” sighting of a wolverine was reported in 1994, in the Silvies River Canyon, which is within the planning area.

Source habitat is very limited in this watershed. There are no subalpine forest types with or without talus surrounded by trees in or adjacent to this area. The nearest area that approximates this habitat type is located in the Strawberry and Aldrich Mountains, over 35 miles to the north.

Because wolverines are sensitive to disturbance, the high levels of human disturbance (recreational use, firewood cutting, and management activities) reduce the suitability of the area for wolverine. The area provides an adequate prey base, which is often carrion frequently associate with big-game range. Four of the seven subwatersheds in the project area are below Forest Plan cover standards on summer range and two of seven are below standards on winter range. The habitat effectiveness index (HEI) is slightly above standards in summer range in all except one subwatershed, and it is slightly below standards in winter range in all but two subwatersheds. Despite being below standards, elk are at management objectives established by Oregon Department of Fish and Wildlife within the Silvies Wildlife Management Unit.

The likelihood of wolverine using or frequenting the area is expected to be very low.

Effects and Determination

Alternative 1 (No Action Alternative)

Direct and Indirect Effect:

Under the No Action Alternative, there would be no management activities; therefore, there should be no direct or indirect effects to wolverine or potential habitat.

Alternative 1 maintains existing big-game habitat and open road densities. Existing big-game populations provide an adequate prey base for wolverine should they occupy or disperse through the area in the future. Predator/human interactions usually increase with increased road density. Road densities in the Silvies Canyon Watershed range from over 5 miles per square mile in the Myrtle Creek subwatershed to just under 3 miles per square mile in the Boulder/Fawn subwatershed. Because unroaded areas provide the best habitat for wolverine, densities in this watershed result in degraded habitat. Road densities and big-game habitat would not change with this alternative.

Cumulative Effects

Ongoing activities, such as livestock grazing, would continue in the project area. Grazing would not contribute to cumulative effects on wolverine. Alternative 1 would maintain adequate wolverine prey species in the short-term; however, elk habitat quality could be reduced in the foreseeable future when stand-replacing events (such as a fire or insect outbreak) remove available cover. The likelihood of such events is higher in Alternative 1 than in the action alternatives.

Determination

Due to the nature of the no action alternative, and that wolverine are not known to inhabit the area, Alternative 1 would have **No Impact (NI)** on wolverine or wolverine habitat. There are potential indirect, long-term effects from large-scale insect and disease outbreaks infestation and catastrophic wildfire that could occur because of not addressing current forest heath issues. The magnitude and timing of these potential impacts are unknown, but they could drastically modify potential wolverine prey and dispersal habitat conditions for many years to come.

Alternative 2, 4, 5, 7, and 7a

Direct Effect

There are no confirmed records of this species occurring in the project area; therefore, there would be no direct effect to individuals.
Indirect Effects

Minor indirect effects to travel/dispersing habitat are anticipated.

Alternatives 2, 4, 7, and 7a reduce big-game cover on summer range in all subwatersheds and reduces cover on winter range in all subwatersheds except Red Hill and Stancliffe Creek. Alternative 5 reduces big-game cover on summer range in all except the Boulder/Fawn and Red Hill subwatersheds and reduces cover on winter range in all subwatersheds except Stancliffe Creek. Although cover is being reduced, habitat effectiveness improves in these alternatives on both summer and winter range due to road closures. Big-game animals might move from an area during treatments, but they are expected to return upon completion. Although cover is being reduced, the effect on big-game populations is not expected to be measurable; there fore adequate prey should remain in the watershed to provide forage for wolverine. Elk and deer numbers are expected to stay stable, thereby maintaining the potential forage base for wolverine.

There are no effects anticipated for wolverine or their habitat with implementation of weed control documented sites or new sites within the watershed.

Wisdom et al. (2000) suggests several management practices that could be used to reverse broad-scale declines or accelerate improvements in source habitat within the Interior Columbia Basin. While developed primarily for the northern portion of the basin they can be used in the southern portion with beneficial results. They include:

Maintain current wilderness areas and other reserves as refugia for wolverines.
Minimize new construction of secondary roads and close unneeded roads after timber harvest.
Retain existing old forests and identify mid successional forests where attainment of old-forest conditions can be accelerated.
Actively recruit snags and logs in mid-seral and old forests where these old-forest structures are uncommon or absent.

Refugia

The Myrtle-Silvies Semiprimitive Area covers much of the center of the project area and provides a sizable refugia area. This area does not contain sufficient habitat to support long-term occupation by wolverine but could be used by transient animals.

Under these alternatives, this area would not be entered or modified in a manner that could affect wolverine.

Road Densities

Under these alternatives, road densities would be substantially reduced in all subwatersheds. This reduction in road densities should result in a reduction in potential wolverine human conflicts and increased areas with no or minor road effects if a transient animal passed through the watershed. Security areas (areas ½ mile or more from an open road) would increase in all action alternatives. In Alternative 1, about 5% of the project area (3,150 acres) is security area; the amount of security rises to 6% in Alt. 5, 7% in Alts. 2, 6, 7, and 7a, and 10% in Alt. 4.

Harvest

Ruggiero et al. (1994) indicates that the impacts of logging and associated activities on wolverine and wolverine habitat can only be surmised. Some research indicate that while wolverine in some ecoprovinces prefer to occupy mature to intermediate forest habitat, other studies find that there is no difference in movements, habitat use or behavior between wolverine occupying logged and unlogged areas (Hornocker and Hash 1981).

Under these alternatives, there are no proposals to drastically modify existing stand structure or reduce connective habitat to a point of excluding possible wolverine use. However, human disturbance related to proposed activities (sale layout, road reconstruction, harvest, post-harvest treatments) might displace transient dispersing wolverine from potential foraging habitat during the duration of the project.

Under these alternatives, about one third of existing old forest multiple strata and old forest single strata habitat would be entered with the goal of restoring environmental processes associated with healthy, structurally complex that matches site potential and is sustainable over time. Structural elements would be retained to achieve the management objective of providing structural habitat elements in harvested stands while removing wood products.

Hayes et al. (1997) indicate that thinning can likely enhance habitat, particularly if critical structural components, such as dead wood, are provided and if stands are managed to provide vertical and horizontal heterogeneity. Kohm and Franklin (1997) concludes that many species and processes can tolerate conditions in a harvested area if key structural elements are still present and there is at least some level of climatic protection.

In later stages of stand development, thinning may lead to stands that resembled historical stand conditions that were once found across much of the watershed. Treated stands would have a well developed understory beneath a open overstory made up of a few large trees per acre. After treatment the resulting stand structure should more resemble a multistoried, uneven-aged stand (Hayes et al 1997).

Under these alternatives, a substantial amount of thinning would occur in mid-seral stands, especially in stem exclusion stage stands. Thinning young mid-successional stands may provide growing conditions that more closely approximate those historically found in developing old-growth stands, thereby accelerating development of structure found in late seral forests (Hayes et al. 1997). Although thinning can reduce the total volume of wood in a stand, it promotes rapid growth of individual trees by reducing competition for light and water (Arno and Stephen 1999, Tappeiner and Latham 1999, Hayes et al. 1997, Edminster and Olsen 1996, Hatz 1991).

Snag and Down Wood Recruitment

Snags or down wood would not be actively treated as part of the vegetation management or fuels reduction prescriptions, though some could be felled as hazard trees or burned during prescribed burning. Regional direction for retention of down wood would be applied to retain this habitat for wildlife, including wolverines, which are associated with this habitat. If standards were not met upon completion of fuels treatments, additional snags would be created in old growth stands (replacement) to provide snags at a historical level.

Other proposed activities (such as old-growth reconfiguration, spring restoration, juniper reduction, weed treatment, and aspen restoration) may provide enhanced habitat diversity, but would have no measurable effect on wolverine or their habitat.

Cumulative Effects on Potential Habitat:

All alternatives would be expected to maintain adequate wolverine prey species, despite the potential for cumulative effects to elk.
Permitted livestock grazing would continue during and after timber harvest, precommercial thinning, and prescribed fire in the area. Despite the potential effects of grazing, grazing is not expected to contribute to cumulative effects on wolverine.

Proposed road decommissioning activities associated with this project would have synergistic beneficial effects with past road closures. The combined road closures and decommissioning would result in a reduction of road densities throughout the watershed.

It is likely that proposed and future treatments would restore environmental processes associated with healthy, structurally complex ponderosa pine and mixed confer forests which could slightly improve potential dispersal habitat in the area.

Determination

Wolverine dispersal habitat and prey species would be maintained. The potential benefit of reduced road densities or negative impact of disturbance is extremely small and would not be measurable. Because wolverine are not known to inhabit the area, because the project area is not remote, provides no denning habitat, and provides only travel/dispersal habitat, and because activities will not affect dispersal habitat, these alternatives would have **No Impact (NI)** on wolverine or wolverine habitat.

Alternative 3 and 6

Direct Effect

There are no confirmed records of this species occurring in the project area; therefore, there would be no direct effect to this species.

Indirect Effects on Potential Foraging Habitat

Under these alternatives, treatment focuses on the reduction of ladder fuels with precommercial thinning and prescribed fire.

While the treatments proposed under this alternative do not aggressively treat high priority stands in the project area, they do begin to move stand structure in the area toward HRV, and contributes to restoring ecological balance to forest habitat in the project area. Stands that were experiencing reduced vigor and stand health because of overstocking, fire exclusion, and insect and disease-related mortality would continue to be influenced by these forces, but the level of influence would be reduced.

Using precommercial thinning, as a pretreatment for prescribed burning would reduce the potential for fires burning out of prescription and causing significant modification of old forest structure, although, the remaining high stand densities would likely contribute to higher understory and overstory tree mortality even if prescribed burning was successfully implemented.

These alternatives maintain or improve big game habitat effectiveness (over existing conditions) in all subwatersheds. While habitat quality may improve, elk numbers would not change drastically since area elk are at management objectives and the Oregon Dept. of Fish and Wildlife is currently managing elk to maintain elk numbers at the management objective.

Under these alternatives, a substantial amount of road closures would also occur. The results would be similar to that discussed above.

Other proposed activities (such as old-growth reconfiguration, spring restoration, juniper reduction, weed treatment, and aspen restoration) may provide enhanced habitat diversity, but would have no measurable effect on wolverine or their habitat.

Cumulative Effects

The cumulative effects of these alternatives would be the same as those described for the other action alternatives.

Determination

Wolverine dispersal habitat and prey species would be maintained. The potential benefit of reduced road densities or negative impact of disturbance is extremely small and would not be measurable. Because wolverine are not known to inhabit the area, because the project area is not remote, provides no denning habitat, and provides only travel/dispersal habitat, and because activities will not affect dispersal habitat, these alternatives would have **No Impact (NI)** on wolverine or wolverine habitat.

pygmy rabbit

(Brachylagus idahoensis) Merriam 1891

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).
USDA-Forest Service (Region 6) Status: Sensitive (USDA 2000)
State Status: Vulnerable (ORNHP 2000)
Oregon Natural Heritage Program Status: List 2 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G4 (November 2, 1998)
National=N4 (December 05, 1996)
Oregon State Rank=S2

The U. S. Fish and Wildlife Service added the Columbia Basin population of the pygmy rabbit to the Federal list of endangered species March 5, 2003, after determining that the population meets the Service's criteria to be listed as a distinct population segment (DPS) under the Endangered Species Act. Historically, the Columbia Basin pygmy rabbit was found in appropriate shrub-steppe habitats in portions of Douglas, Grant, Lincoln, Adams, and Benton Counties, Washington. Oregon populations were not included in this listing.

Major Threats

Threats include range wildfire, sagebrush eradication to improve range conditions for livestock grazing, invasion of exotic annuals, conversion of shrub-steppe to cropland, and fragmentation of remaining suitable and occupied habitat (WDFW 1995).

Population Status and Trend

Moderately threatened range-wide, habitat or community lends itself to alternate use.

Washington Department of Wildlife reports that pygmy rabbit had declined greatly in eastern Washington. Washington Department of Fish and Wildlife (1995) estimated that the state's population is less than 250 rabbits in five areas.

Little information is available on population trend in other states.

Source Habitat Trend

The trend for Great Basin shrubsteppe habitats is generally downward due to fire, grazing, invasion of exotic annuals, and agricultural conversion, which likely correlate with downward trends for sagebrush obligate species such as the pygmy rabbit (Whisenant 1990; Knick and Rotenberry 1995, 1997).

Degree of Fragility

Fairly resistant and tolerant of nondestructive intrusion.

Habitat

Pygmy rabbits are closely tied to habitats dominated by big sagebrush (*Artemisia tridentata*) growing on deep, loose, friable soil types (Verts and Carraway 1998, WDFW 1995). Sagebrush is a key habitat element for this species because is provides both forage and cover. When 10 habitat variables were submitted to discriminant analysis, shrub cover was the most important variable distinguishing site occupancy by pygmy rabbits from adjacent sites. Soil depth was the second most important variable of importance (WDWF 1995).

The principal food of this species is big sagebrush, even where other tall shrubs such as bitterbrush (*Purshia tridentate*) are common. On an annual basis, sagebrush composes 67% of the diet, grasses 26% and forbs only 6% (Verts and Carraway 1998).

Sagebrush present on occupied sites characteristically forms tall and very dense stands. Occupied sites have an average shrub height of 33 ± 2 inches and an average overall shrub cover of 28.8 ± 1.4%, with sagebrush making up almost 24% of the total (Verts and Carraway 1998).

In southwestern Wyoming, pygmy rabbits selectively used dense and structurally diverse stands of sagebrush that accumulated a relatively large amount of snow; the subnivean environment provided access to a relatively constant supply of food and provided protection from predators and thermal extremes (Katzner and Parker 1997).

Soil type is also a major factor in habitat suitability. Soils need to be of the proper depth and texture to excavate for burrows. Burrows are most commonly found in loose coarse-silty and fine-loamy soil types derived from loess or glacial parent material. Burrows usually extend to no more than 3 feet in depth (WDFW 1995).

Occupancy of potential habitats is likely related to a combination of availability of forage, security from predators, and ease of burrow construction.

Distribution

This species can be found in the southeastern third of Oregon to east-central California, east to western Utah and southwestern Montana. Isolated populations occur in east-central Washington (WDFW 1995). Within its range the distribution is not continuous but patchy, primarily in areas of Great Basin big sagebrush dominated plains and alluvial fans where plants occur in tall and dense clumps, and the soil relatively deep and friable (NatureServe 2000)

In Oregon, pygmy rabbits have been documented at 37 sites east and south of a line connecting Klamath Falls, Klamath County; Fremont, Lake County; Redmond, Deschutes County; and Baker City, Baker County (Verts and Carraway 1998). Sightings within Harney County indicate that this species occurs mainly in the sagebrush basin south of Burns Oregon. An isolated locality record documents a historical occurrence in Silvies Valley (near Seneca, Oregon).

Existing Condition

Confirmation of the presence of pygmy rabbits has not been done but an analysis of potential habitat was conducted using current data. GIS analysis indicates that there is about 10,691 acres of shrublands in Silvies Canyon Project area. The bulk of the acres were classified as generic dry shrublands (8,770 acres). Mountain Mahogany (936 acres) and wet grasslands/shrub-meadows (664 acres) makes up the remaining large classes of the acreage classified.

Several additional shrubland associations are present but are minimally represented. This includes 4 small shrubland stands of mountain big sagebrush plant association (ARTRV/FEID-AGSP) habitat totaling 120 acres (mean=30, range 8 to 53 acres) widely scattered across the southern end of the watershed.

This association represents habitat most likely to be suitable for pygmy rabbit use in the Silvies Canyon

Watershed. This association is described as rough to rolling, or undulating terrain with mountain big sagebrush and bunchgrasses growing in deep, stony soils (Johnson and Clausnitzer 1992).

Effects and Determination

Alternative 1 (No Action Alternative)

Direct and Indirect Effect

Based on the scattered distribution of mountain big sagebrush habitat, its small size and lack of suitable linkage corridors, the likelihood of pygmy rabbit occupying these habitat blocks is very low.

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct or indirect effects to limited potential pygmy rabbit habitat present in the watershed.

Pygmy rabbits have evolved in the presence of native ungulate grazing. Historical heavy livestock grazing has apparently lowered the resilience of sagebrush plant communities across much of this species range.

The influence of ongoing cattle grazing on pygmy rabbit habitat is not well understood. In general, grazing is known to affect the characteristics of sagebrush communities. The effects depend on a variety of factors including timing and intensity of grazing, stocking densities, location of water sources and salting areas, and other factors that would concentrate cattle use in suitable habitat (WDFW 1995).

It is speculated that livestock grazing may result in forage competition during the spring and summer when pygmy rabbits preferentially select grasses, and heavy grazing can cause breakage of sagebrush plants because of trampling. On the other hand, grazing can increase sagebrush densities and vigor when grazing animals selectively graze on perennial forbs and grasses and reduce competition for limited resources.

Determination

Because of low habitat potential and the low likelihood of pygmy rabbit occurrence in these areas there would be **No Impact (NI)** from implementation of any alternative.

Direct and Indirect Effects Common to All Action Alternatives

Based on the scattered distribution of mountain big sagebrush habitat, its small size and lack of suitable linkage corridors, the likelihood of pygmy rabbit occupying these habitat blocks is very low.

Most management activities (such as road closures, old-growth reconfiguration, and spring and aspen restoration) would not impact sagebrush habitats since treatment would not occur within them. However, sagebrush habitats would be affected by fire and by juniper reduction.

Sagebrush habitats, particularly those in the southern part of the project area-see mitigation measures), would not be actively treated (ignited) with prescribed fire though a small amount of light intensity burning may occur on the fringes of these habitats. 15% or less of these shrublands within burn blocks are expected to burn (G. Mackey, pers. com.); this would further reduce habitat potential until vegetation recovered (15 years).

Juniper reduction may provide for limited expansion of sagebrush in areas formerly dominated by encroaching juniper, but these areas would be limited, scattered, and may not provide the deep soils used by pygmy rabbits. Juniper reduction would have no measurable effect on pygmy rabbits or their habitat.

Cumulative Effects

Ongoing grazing in the watershed is not likely adversely impacting limited potential habitat that exists in the watershed, though the potential for effects from grazing (as described in Alternative 1) would continue.

Determination

Because these sites are already considered “very low in potential”, any activities that alter vegetation structure or availability would not likely further reduce its very limited potential. Because of this low habitat potential and the low likelihood of pygmy rabbit occurrence in these areas there would be **No Impact (NI)** from implementation of any action alternatives.

Sensitive Amphibians

Columbia Spotted Frog
Population 3-Great Basin
(*Rana luteiventris*) Thompson, 1913

Status

Federal Status: N/A The Great Basin population (Idaho, Nevada) is a candidate for listing under the U.S. Endangered Species Act (Federal Register, 7 May 1993, 2 April 1998).

USDA-Forest Service (Region 6) Status: Sensitive (USFS 2000)
Oregon State Status: Undetermined Status (ORNHP 2000)
Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking
(NatureServe 2000)

- **Global Rank= G4T?Q**
- **Oregon State Rank=S2?**

Major Threats

Great Basin population has been adversely affected by habitat degradation resulting from mining, livestock grazing, road construction, agriculture, and direct predation by bullfrogs and non-native fishes (NatureServe 2000).

Degree of Threat

Moderately threatened range-wide, habitat or community lends itself to alternate use

Population Status and Trend

Recent intensive surveys indicate severe declines in the Great Basin populations.

Fragility

Fairly resistant and tolerant of nondestructive intrusion.

Habitat

Spotted frogs are highly aquatic; and are rarely found far from permanent water. They are usually found along the grassy margins of streams, lakes, ponds, springs, and marshes. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding

Distribution

Green et al. (1997) determined that frogs from the vicinity of the type locality of *Rana pretiosa* (Oregon spotted frog) are conspecific with the species residing in south-central Washington and the Cascade Mountains of Oregon. They concluded that populations from southwestern British Columbia, western Washington, western and central Oregon, and northeastern California are Oregon spotted frog whereas spotted frogs from the remainder of the range are Columbia spotted frogs (NatureServe 2000).

This species occurs in extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming. Disjunct populations occur on isolated mountains and in arid-land springs.

In Oregon, the Columbia spotted frog appears to be widely distributed east of the Cascade Mountains.

This frog is present in all subbasins on the Malheur National Forest. It is assumed widely distributed in the project area. Confirmed sightings occur in Myrtle Creek and North Fork Myrtle Creek.

Existing Condition

No habitat surveys have been conducted specifically for spotted frogs. However, habitat for spotted frogs probably has been degraded due to past management activities such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes

Effects and Determination

Alternative 1
(No Action Alternative)

Direct and Indirect Effects:

Alternative 1 would have no short-term adverse effects to Columbia spotted frog. Current watershed conditions in upland areas are probably not having adverse affects to spotted frogs.

This alternative may have minor long-term adverse effects to spotted frogs. Current watershed conditions favor the likelihood of a severe wildfire. As fuels continue to build up due to the current stand conditions the potential for a severe wildfire would increase.

A severe wildfire could adversely affect spotted frogs though effects are expected to be minimal. Fire-caused injury to amphibians appears to be minimal (Smith 2000). Riparian habitat quality could be temporarily reduced by fire, though burns in permanent riparian habitats tend to leave patches of habitat that can be used as refuge by amphibians (Smith 2000).

Determination

Due to the nature of a no action alternative, there would be **NO IMPACT (NI)**, but there are potential minor indirect, long-term potential effects from insects, disease, and stand-replacement wildfire because of not addressing current forest heath issues. The timing and extent of these effects is unknown.

Alternatives 2, 4, 5, 7, and 7a

Vegetation Management Activities

Direct and Indirect Effects

Commercial Harvest

Commercial harvest activities would not have adverse effects to Columbia spotted frogs or their habitat. Streams would be protected with INFISH RHCA buffers. Forest Plan buffers would protect springs and ponds.

PCT, Post & Pole, Juniper Removal, Aspen Restoration (Outside of RHCAs)

These activities would not have adverse effects to Columbia spotted frogs or their habitat. Streams would be protected with INFISH RHCA buffers. Forest Plan buffers would protect springs.

Aspen Restoration (Inside of RHCAs)

This activity may result in adverse and beneficial effects to spotted frogs. Felling of trees in RHCAs may result in direct mortality to spotted frogs though this is unlikely. Beneficial effects to frogs are possible from this activity because reducing coniferous tree density could increase surface water availability, making more habitat available to frogs. No disturbance to habitat is likely to occur.

Spring and Cottonwood Restoration

This activity may result in adverse and beneficial effects to spotted frogs and their habitat. Felling of trees in RHCAs may result in direct mortality to spotted frogs though this is unlikely.

Spring development can dewater portions of the ground surrounding springs. Since frogs may be using this wet dirt as hibernation habitat, dewatering (drying up) the habitat could reduce the amount of hibernation habitat that is available (J. Wood, USFWS, pers. com. 2003). Water developments for livestock (on 3 springs [Alt 7a] or 4 springs [remaining alternatives]) would be designed so they do not dewater spring sites and therefore would not affect frog hibernation habitat.

Thinned trees left jack-strawed and fencing will reduce livestock and possibly big game impacts at spring and cottonwood sites which would protect potential frog habitat. Reducing coniferous tree density around springs could increase surface water flows, which may result in greater water availability through the summer months, which in turn could provide more habitat for frogs.

Fuels Treatment

This activity has a low potential for causing adverse effects to spotted frogs and their habitat. Prescribed burns normally occur when fuel moistures are high. Riparian areas are not likely to burn extensively under these conditions. Riparian areas with permanent water are also not planned for active treatment with prescribed fire, so little effect to riparian habitat is expected.

Roads

This activity has a low potential for causing adverse effects to spotted frog habitat. The main adverse effects from road closing and decommissioning to aquatic habitat is an increase in fine sediment. Increases in fine sediment do not appear to adversely affect frog habitat. Road activities may cause short-term adverse effects, but decommissioning may provide mid and long term benefits by restoring habitat.

Mitigation

As described above, water developments at springs will not dewater spring areas.

Alternatives 3 and 6

Direct and Indirect Effects

Similar to the other action alternatives, PCT and juniper reduction would not have adverse effects to Columbia spotted frogs or their habitat. The affects of aspen, spring, and cottonwood restoration and fuel and road treatments would be the same as in the other action alternatives.

Cumulative Effects

The proposed vegetation management activities would begin moving vegetation back towards historical conditions and reduce the high fuel loads that have resulted from past vegetation management practices in the watershed.

Spring habitat has been altered across the forest landscape as springs were developed for livestock watering. Ongoing grazing may continue to impact habitat for this species. Munger and Engle (2000) suggest that livestock negatively impacts this species through trampling of riparian vegetation and possibly frogs. On the other hand, Hatch, Blomquist and Tracy (2000) suggest negative grazing impacts are anecodotal and grazing may benefit this species by clearing choking vegetation from stream banks. Treatments, as proposed, that enhance and protect springs and wet aspen sites should reduce any cumulative effects contributed by on-going grazing by providing enhanced habitat for spotted frog.

Determination

Timber harvest activities are not planned in wet habitats used by spotted frog. Little or no effect to frogs or frog habitat is expected from these treatments. Prescribed burn treatments and road activities have the potential to affect frogs or their habitat, though the effect is expected to be minimal. Spring and cottonwood restoration should improve water quality and may improve habitat, but the effects to frogs are not expected to be measurable. Spring developments will not dewater springs, so no effect to frog hibernation habitat is expected. Due to the potential for impacts, the action alternatives **may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species**.

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American peregrine falcon
(Falco peregrinus anatum)
Tunstall 1771

Status

Federal Status: N/A
On August 25, 1999 the Department of Interior, Fish and Wildlife Service determined that the American peregrine falcon is no longer an endangered or threatened species pursuant to the Endangered Species Act of 1973, as amended (50 CFR Part 17, RIN 1018-AF04). This action removes the American peregrine falcon throughout its range as an endangered species from the Federal List of Endangered and Threatened Wildlife, thereby removing all protections provided by the Act. It also removed the designation of “endangered due to similarity of appearance” or any free-flying peregrine falcons within the 48 conterminous United States.

This designation does not affect protection provided to this species by the Migratory Bird Treaty Act, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, or state laws and regulations, nor does it affect the endangered listing status of the Eurasian peregrine falcon (*Falco peregrinus peregrinus*) under the Act. (USDI-Fish and Wildlife Service 1999)
USDA-Forest Service (Region 6) Status: Sensitive (USDA 2000)
State Status: Endangered (last revised 12/1998)
Oregon Natural Heritage Program Status: List 1 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank= G4T3 (July 04, 1997)
National Rank=N3B, N3N (July 04, 1997)
Oregon State Rank=S1B

Major Threats

In the 1970's, peregrine falcon populations were greatly impacted by organochlorine pesticide accumulation that caused eggshell thinning. Peregrine falcons in Oregon and Washington are still adversely affected by organochlorine contaminants, which contribute to nesting failure due to eggshell thinning. During the 1998 nesting season, 24 of 51 active nest sites found in Oregon failed due to eggshell thinning and subsequent breakage and/or embryo mortality (pers. comm., J. Pagel).

Data suggest that the DDE may be residual and could continue to affect Pacific Northwest peregrine falcons for decades. Additional monitoring is needed to investigate this hypothesis and identify possible sources of contamination.

Illegal collecting of nestlings for use in falconry and incidental shooting are other major threats to recovery efforts (The Nature Conservancy 1999).

Habitat

Peregrine falcon habitat consists of nesting, perching, roosting and foraging areas. The most critical habitat component for peregrine falcons appears to be suitable nesting sites (Csuti et al 1997). Nesting occurs almost exclusively on sheer cliffs with small caves or overhangs large enough to contain three to four full-grown nestlings and is usually near water. Nesting on substitute human-made sites include ledges on tall buildings, bridges, rock quarries, and raised platforms occurs. Tree nesting is virtually unknown.

The peregrine falcon nests along the seacoast, near marshes and even in cities, but are not well suited to life in forest interiors (Csuti et al 1997).

Associated with the nest territory is a foraging area. This generally includes wooded areas, marshes, open grasslands and bodies of water within a short flying distance from the nesting area (Marshall 1992). Peregrine falcon prey consists almost entirely of birds (USDI Fish and Wildlife Service 1982).

When not breeding, peregrine falcons can occur in areas where prey concentrates. This includes farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities and airports (The Nature Conservancy 1999).

Peregrine falcons (*Falco mexicanus*) may compete with other species, particularly prairie falcon, for cliff nesting sites (USDI Fish and Wildlife Service 1982).

Distribution

This subspecies breeds across interior Alaska, south of the Brooks Range, eastward across Canada, south-central United States and the Atlantic coast. Its southern range extend includes Baja, California and Mexico. Now absent from large areas of its historical range, particularly in the eastern United States. Successful introduction of non-native peregrine falcons have occurred in much of this subspecies historical eastern United States range (The Nature Conservancy 1999). The Pacific Coast population has increase since its near extirpation in the early 1970's (Pagel 1992).

Henny and Nelson (1981) reported that there are at least 42 historical peregrine nest sites in Oregon. Other sources indicate that there were as many as 70 historical nest sites within the state. Of these reports, one referred to a location in the Strawberry Mountain Wilderness (unverified).

Sighting of peregrine falcons are uncommon. They are often noted in the fall and spring when migrating through the forest (Pagel 1992).

Existing Condition

In 1992, surveys to identify probable nest sites were conducted on the Malheur National Forest (Pagel 1992). The potential for nests at various locations were identified and rated from no to high potential of use according to specific habitat criteria. The closest potential nest site is located within Silvies Canyon. Pagel (1992) classified this site as having a "medium" potential.

Medium potential is defined as: cliffs with an acceptable level of potential occupancy, or were otherwise low potential cliffs with a possibility of a nesting ledge that was not visible or may be suspected. Certain rock types (conglomerate, granite, sandstone, limestone) have distinct possibilities of having ledges that are not normally visible, and were usually categorized as medium, if they had the "proper" or acceptable height (Pagel 1992).

To date, there have been no recorded observations of peregrine falcon use in this area. In July, 2000 a pair of peregrine falcons with an immature were sighted near Yellowjacket Lake. The presence of an apparently successful breeding pair suggest that peregrine falcons are breeding somewhere on the Malheur National Forest.

In response to the observation of peregrine falcons in the adjacent watershed, potential nesting habitat within the Silvies Canyon Watershed was monitored twice in 2003 (once during the courtship/egg laying period and once during the hatching period). Peregrine falcons were not observed in the watershed and were not found nesting.

From a further review of available records, it was determined that there is no known occupied nesting, perching or roosting peregrine falcon habitat within the planning area. Potential nesting habitat identified in the watershed is apparently being used by a breeding pair of prairie falcons.

Effects and Determination

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Because no peregrine falcons are known to be currently using the area, activities would have no effect on this species. Under the No Action Alternative, there would be no new management activities; therefore, there would be no direct or indirect effects on peregrine falcon habitat. Ongoing grazing, prescribed burning and Forest level weed control (through manual removal) will continue

There are potential indirect, long-term effects to prey species from probable stand-replacing events, such as high intensity wildfire, that could occur because of not creating resilient forest ecosystems, but little chance of effects to cliff habitat from fire. The magnitude and timing of this potential impact is unknown, but it could drastically modify large areas of low elevation ponderosa pine habitat.

Cumulative Effects

Ongoing activities, such as livestock grazing, would continue in the project area. Grazing can reduce ground vegetation and shrubs and impact riparian habitat, which in turn can affect falcon prey species. However, managed grazing is not expected to contribute to cumulative effects on falcon prey species. Alternative 1 would maintain adequate habitat for falcon prey species in the short-term; however, habitat for falcon prey species could be substantially changed in the foreseeable future when stand-replacing events (such as a fire or insect outbreak) occur. The likelihood of such events is higher in Alternative 1 than in the action alternatives.

Determination

Because there are no peregrine falcons present in the project area and because proposed actions would not occur in the no action alternative, there would be **No Impact (NI)** to peregrine falcons or their habitat.

Effects Common to All Action Alternatives

Because no peregrine falcons are known to be currently using the area, activities would have no effect on this species. While no peregrines are known to be present, the highest potential for effects to peregrines would come from disturbance during treatments (including precommercial thinning, commercial harvest, and prescribed fire; other treatments such as aspen and spring restoration, and road decommissioning would not occur near the nest cliff). Peregrine falcon are sensitive to disturbance near the nest cliff during the breeding season (February 1 – August 15), but are most sensitive prior to egg laying (USDI Fish and Wildlife Service 1982).

The prairie falcon nest that is in the vicinity "medium potential" peregrine falcon cliff will be monitored prior to treatments if treatments are proposed within ½ mile of the nest between March 1 and July 31. If prairie falcons or peregrine falcons are found, effects from disturbance would be reduced through disturbance restrictions (prairie falcon – no treatments within ½ mile 3/1-7/31, peregrine falcon – no treatment within 1 mile 2/1-8/1) (Pagel 1990).

There are no records of peregrines foraging in or migrating through the area. While a transient peregrine falcon could fly over or migrate through the project area, the potential of the activity having a measurable effect on this species is very low. Proposed treatments will have a limited affect on falcon prey species since treatments do not occur close to the nest cliff, and treatments farther away from the nest cliff may shift the type of prey species toward dry forest species and away from moist/interior forest species, but would likely not change the amount of prey available.

Cumulative Effects

Ongoing activities, such as livestock grazing, would continue in the project area. Grazing can reduce ground vegetation and shrubs and impact riparian habitat, which in turn can affect falcon prey species. However, managed grazing is not expected to contribute to cumulative effects on falcons or their prey species. No cumulative effects are expected

Determination

Because there are no peregrine falcons present in the project area and falcon habitat would not be altered there would be **No Impact (NI)** to peregrine falcons or peregrine falcon habitat by the implementation of any alternative.

western sage grouse

southeast populations
(Centrocercus urophasianus phaios)
Bonaparte 1827

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).
USDA-Forest Service (Region 6) Status: Sensitive (USFS 2000)
Malheur National Forest Status: N/A
State Status: N/A
Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G5T3Q (Nov 25, 1996)
National Rank=N3 (Jan 05, 1997)
Oregon State Rank=S3

Major Threats

Conversion of sagebrush cover types to agricultural lands and conversion of shrubsteppe vegetation to exotic forbs and annual grasses (Wisdom et al. 2000) have drastically reduced or altered the availability of this species habitat. In southeastern Oregon over 2,760 square miles of federally administered lands have been modified to the detriment of sage grouse (Willis et al. 1993).

Predation and livestock grazing contribute to the decline of sage grouse numbers.

Population Status and Trend

Prior to the 1950s, estimates of abundance were anecdotal, and historical population levels are unknown (Braun 1998). Early accounts, however, suggest that this species was once widespread and abundant in many areas of the West. There are reports of sage grouse at times blackening the sky and being shot by the wagon-load (Braun 1999b). Declines began with livestock overgrazing of western rangelands aggravated by over harvesting and periods of drought. By the 1920s and 1930s sage grouse were thought to be declining throughout their range (Braun 1998). Population declines have continued to present day with accumulating loss and degradation of sagebrush habitats.

Distribution has contracted by approximately 50 percent since European settlement, and these species has been extirpated from five states and one province (Kansas, Nebraska, Oklahoma, Arizona, New Mexico, and British Columbia) (Braun 1998).

Wisdom et al. (2000) reports that sage grouse populations have shown significant, steep declines since the 1940s in Idaho, Oregon and Washington. The rates of decline in Idaho, Oregon, and Washington are not significantly different, suggesting common, widespread factors affecting these populations. In Oregon, long-term population declines have averaged 30 percent since 1950. (Interagency Interdisciplinary Sage Grouse Planning Team 2000 “draft”)

Braun (1998) estimates a current total of fewer than 142,000 grouse rangewide, and population levels for each state and province as follows:

Estimated 500 in Alberta and Saskatchewan.
Fewer than 2,000 in North Dakota, South Dakota, and Washington.
Fewer than 5,000 in California.
Fewer than 15,000 in Colorado and Utah.
Fewer than 20,000 in Idaho and Nevada.
Fewer than 20,000 in Montana, Oregon and Wyoming.

A complicating factor is that sage grouse in this geographic area may exhibit population cycles with a periodicity of around 10 years. Apparent trends over short periods should be regarded with caution. Nonetheless, trends for populations in Colorado, for example, reveal that each population peak has been lower than the last (Braun 1999b). There have been no sustained population increases in any part of the range (Braun 1998).

Source Habitat Trend

The current extent of habitat is similar to the historical distribution, although the abundance of habitat has changed in some areas. Basin-wide, nearly 48 percent of the watersheds showed a moderate or strongly declining trend in habitat, and declines exceeded increases in every ERU. The Blue Mountains ERU has undergone a negative absolute (-11.73% and -12.70%) and relative (-30.14% and -32.78%) change in winter and summer source habitat availability (Wisdom et al. 2000).

Habitat

Sage grouse are obligate residents of sagebrush habitat, usually inhabiting sagebrush-grassland or juniper-sagebrush-grassland communities. Throughout their range habitats used includes a wide variety of sagebrush mosaic habitats, including: (Schroeder et al. 1999)

tall sagebrush types such as big sagebrush, three-tip sagebrush (*A. tripartita*), and silver sagebrush (*A. cana*);
low sagebrush types, such as low sagebrush (*Artemesia arbuscula*) and black sagebrush (*A. nova*);
mixes of low and tall sagebrush with abundant forbs;
riparian and wet meadows;
steppe dominated by native forbs and bunchgrasses;
scrub-willow (*Salix* spp.)
sagebrush/woodland mixes with juniper (*Juniperus* spp.), ponderosa pine (*Pinus ponderosa*),or quaking aspen (*Populus tremuloides*).

In southeastern Oregon, the most widely used vegetation type throughout the year is forb-rich sagebrush types with low stature sagebrush, and mosaics of low and high stature sagebrush (Willis et al. 1993). Vegetation types of low stature primarily include low sagebrush (*A. longiloba*), although black sagebrush, stiff sagebrush (*A. rigida*), and three-tipped sagebrush may be used. Wyoming big sagebrush (*A. t.* var *wyomingensis*) and mountain big sagebrush (*A. t.* var *vaseyana*) are the primary species of high stature used in mosaic form with low sagebrush in Oregon. Neither expansive dense sagebrush nor expansive open areas constitute optimal sage grouse habitat.

Sage grouse use sagebrush of different age classes and stand structures for lek (courtship display), nesting, brood rearing, and wintering.

During the mating season (February-May), leks may be on bare areas, such as swales, irrigated fields, meadows, burns, and roadsides (Call and Maser 1985), or areas of low cover and stature of sagebrush and are more often within vegetation types of low sagebrush or low/big sagebrush mosaics. When not on the lek, sage grouse disperse to the surrounding areas (Wallestad 1975).

After mating, hens usually nest near lek grounds (usually within 2 miles), but some fly as far as 12 to 20 miles (19-32 km) to favorable nesting sites (Call and Maser 1985). They prefer sagebrush 14 to 25 inches (36-63.5 cm) tall with an open canopy, 10-50%, for nesting (Klebenow 1973). During the nesting season, cocks and hens without nests use relatively open areas for feeding, and roost in dense sagebrush patches (Klebenow 1969).

Early brood rearing occurs near the nest site depending on the availability of forbs and insects, which are the main food source for the chicks. Young broods use areas of low plant height (9 to 15 inches) and density, while older broods and adults use areas with taller plants (7 to 25 inches) (Martin 1970). Sage grouse apparently do not require open water for day-to-day survival if succulent vegetation is available, but they utilize free water if it is available.

Habitat used by summering groups generally takes three forms: mid-elevation playas and waterholes, high mountain areas, and alfalfa developments. After early brood rearing, hens with broods leave early brooding areas when forbs have dried and move to areas that still have green vegetation. There they spend the mid- and late summer period with other hens and brood groups. Hens without broods group up with other unsuccessful hens in meadow habitats. By August, most birds cluster near permanent watering sites (Klebenow 1969).

In Oregon, sage grouse movements in mid-elevational summering areas are more random.

The Interagency Sage Grouse Planning Team (2000) identify important late brood rearing habitats as sagebrush, meadows and riparian areas, dry lake beds, and agricultural lands. The optimum habitat contains a mosaic of these lands types that include at least;

40 percent of the area in sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 to 20 percnet (less than 25 percent total shrub cover) and an herbaceous understory of 15 percent grass canopy cover and 10 percent forb canopy cover

Habitat loss, predation, drought, and poor weather conditions during hatching and brooding have been cited as factors leading to poor recruitment (Mattise 1995). Sage grouse hunting is closely regulated in states where it is allowed, and is not generally cited as a factor in sage grouse decline (Autenrieth et al. 1982, Blaisdell, et al. 1982, Johnsgard 1973, Johnsgard 1983).

Sagebrush is used for hiding cover year-round and provides thermal cover during summer and winter. Vegetation types used for wintering include primarily low sagebrush, big sagebrush, and mosaics of low and big sagebrush, where the often prefer wind swept areas free of snow.

Sagebrush, used year-round, is the most important component in the diet of adult sage grouse (Beck 1975, Call 1979, Call and Maser 1985, Klebenow 1973, Patterson 1952, Schneegas 1967, Sime 1991, Wallestad 1975, Wallestad et al. 1975). Sagebrush constituted less than 60 percent of the diet only between June and September (Wallestad 1975). Other forage consists largely of herbaceous leaves of dandelion *(Taraxacum* spp.), legumes (*Fabaceae*), yarrow (*Achillea* spp.) and wild lettuce (*Lactuca* spp.), which is used primarily in late spring and summer (Edminster 1947, Autenrieth et al. 1982, Sime 1991). Insects are a minor diet item for adult sage grouse. Chicks consume primarily insects, especially ants and beetles, in their first week of life (Patterson 1952). Their diet then switches to forbs, with sagebrush gradually assuming primary importance.

Existing Conditions

There are no known leks in the Silvies Canyon Watershed. A potential transitional lek site (a site used only in years with little snow) was recently reported just south of the analysis area. This site has not been confirmed as a lek and in most years would be covered in snow during the courtship/mating season (R. Vetter pers. com. 2003). Active grouse leks have been found further south of the watershed than the potential lek site. Additional leks may occur in the Silvies Valley but have yet to be located.

Sage grouse may nest inside the project area in patches of sagebrush, most likely, within two miles of the reported lek (Call and Maser 1985). 938 acres of dry shrub habitat occur within 2 miles of the reported lek, though all acres are not necessarily sagebrush or nesting habitat. Potential “marginal quality” late season brood rearing habitat/summer sagebrush-steppe habitat exists in the south end of the watershed. Hens with broods or hen groups may use these sagebrush-steppe/meadow/ephemeral wet riparian areas as lower elevation sagebrush types dry up and herbaceous plants mature. No information is currently available on use of the project area for nesting.

There is one documented occurrence of sage grouse in the watershed. It is likely that adult sage grouse with young occasionally use the non-forested portions of the watershed. There is no key late brood-rearing habitat identified in the watershed. Use appears to be occasional and random within suitable habitat.

Effects and Determination

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the No Action Alternative, there would be no new management activities; therefore, there would be no direct or indirect effects to sage grouse or their habitat. Ongoing grazing, prescribed burning and Forest level mechanical and manual weed control will continue

Current levels of noxious weeds in the watershed are probably below threshold levels that can cause measurable changes in terrestrial habitat. Over the long-term, degradation of foraging habitat may be impacted by encroaching noxious weeds.

Cumulative Effects

More suitable nesting habitat is available in abundance outside the project area south of the reported lek. This habitat should continue to provide additional sage grouse habitats since there are no reasonably foreseeable treatments known in this habitat. Grazing would continue to occur in areas that may occasionally be used as late brood-rearing habitat. Grazing could affect sage grouse foraging success by reducing ground vegetation and shrubs. At moderate grazing levels, livestock grazing can be compatible with sage grouse management.

If sage grouse are verified at the reported lek and determined to be using the project area for nesting, sage grouse habitat could be analyzed and managed through another project aimed specifically at managing habitat for this species.

Determination

Due to the nature of a no action alternative, there would be **No Impact (NI)**.

Direct and Indirect Effects Common to All Action Alternatives

Vegetation Management

Most vegetation management proposed would not affect this species. Known and reported leks would not be treated, and therefore not be affected, since leks are outside the project area. Juniper reduction in lower elevation dry ponderosa pine/shrub steppe areas may increase the availability of late brood-rearing habitat by removing encroaching conifers from historically non-forested areas. After burning and conifer removal, existing perennial grasses and forbs should increase in vigor and expand in restored non-forested areas.

Fuels Management

Burning would not impact grouse in or near potential or known lek sites because lek sites would not be treated and would be actively protected from treatment. Since the potential lek is ¼ to ½ mile outside of the project area (and therefore ¼ to ½ mile from proposed burning), effects to the lek are not expected. However, during burning operations, firefighters would actively suppress any prescribed fire spread along the southern border of project area (using methods such as an ATV-mounted sprayer) to assure that prescribed fire does not spread into the sagebrush/lek habitat that is south of the project area.

Although nesting birds have not been observed in the project area, 938 acres of possible nesting habitat do occur within 2 miles of a reported lek. If nesting is determined to be occurring in the project area, the Malheur Forest would conduct prescribed burning in Burn Block #6 and in any areas with known nesting sage grouse during the fall to eliminate the potential to affect nesting sage grouse. Fall burning could flush birds, but would not negatively impact nests or nesting success since grouse would be fledged by the time burning occurs.

In addition to timing restrictions, within two miles of the reported lek (that occurs south of the southern border of the project area) and in any areas with known nesting sage grouse, no hand lighting would occur in sagebrush habitats 1/4 acre or larger. In aerial ignition, sagebrush stands of 2 acres and larger would be identified and attempts would be made to not put any direct ignition into them. Fire would be allowed to back or creep into up to 15% (in area) of these stands (Kilpatrick no date). These measures would avoid affects on nesting sage grouse and would have a minor benefit on nesting habitat by creating a mosaic of sagebrush and grassland habitat in treated areas (Kilpatrick no date, Call and Maser 1985).

Early spring and fall burning would not affect potential sage grouse use of late brood rearing habitat since burning would not occur when sage grouse could be using this habitat. Similar to nesting habitat, burning could provide a slight improvement in brood rearing habitat.

Noxious Weed

The Interagency Sage Grouse Planning Team (2000) recommends aggressive treatment of noxious weeds and other invasive plants to protect or restore habitat. Proposed selective treatment of noxious weeds may benefit this species on a very limited basis.

Direct disturbance from weed control activity may occur in nesting and foraging habitat. This disturbance is expected to be of low level and short duration. With the majority of documented weed sites adjacent to roadsides, disturbance from weed treatment would be similar to disturbance from road use and is expected to affect few, if any, individuals. There would be no effects at the population level. All treatment would be manual so no effect from chemicals would occur.

There are no indirect effects because of weed control. There is low potential for any habitat changes in this watershed large enough to affect sage grouse habitat or prey base.

Road closures would reduce the road-associated effects on sage grouse and their habitat. Other proposed activities (such as old-growth reconfiguration, spring restoration, and aspen restoration) may provide enhanced habitat diversity, but would have no measurable effect on sage grouse or their habitat.

Cumulative Effects

Cumulative effects would be similar to those discussed in the no action alternative.

Determination

Activities proposed under these alternatives are expected to provide minor benefits to potential late brood-rearing habitat and to potential nesting habitat. Activities proposed would have no effect on lek or potential lek habitat. Although no sage grouse are currently known to inhabit the project area, prescribed burning would be done outside of the nesting season to avoid affecting potential nests or nesting birds. Prescribed burning could cause sage grouse to be disturbed, but sage grouse are expected to escape the fire.

Due to the potential for impacts, the action alternatives may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species. Potential impacts are minor and would be an overall benefit to this species. The level of proposed treatment represents only a small percent of sagebrush habitat available in the watershed. At this level, restoration would be slightly increased at the local level, but not at the landscape level.

gray flycatcher

(Empidonax wrightii) Baird 1858

Status

Federal Status: N/A
USDA-Forest Service (Region 6) Status: Sensitive (USDA 2000)
State Status: N/A
Oregon Natural Heritage Program Status: N/A

Conservation Status Ranking

(NatureServe 2000)

Global Rank= G5 (December 2, 1996)
National Rank=N5B, NZN (March 19, 1997)
Oregon State Rank=S4

Major Threats

This species would be vulnerable to land clearing, but generally found in very arid environments that are not usually converted to agriculture (USDA Forest Service 1994). Clearing of pinyon-juniper in favor of grassland for livestock grazing or widespread harvesting of pinyon-juniper could be detrimental.

Population Status and Trend

North American BBS (Breeding Bird Survey) shows a survey-wide significantly increasing trend of 10.2 percent average per year (n = 89) during the 1966-1996 sample period; a nonsignificant decline of -1.0 percent average per year (n = 22) during 1966-1979; and a significant increase from 1980 to 1996 of 10.0 percent average per year (n = 84) (Sauer et al. 1997).

Data for Oregon reflects a strong long-term increase of 7.9 percent average per year (n = 29) during the 1966-1996 period (Sauer et al. 1997).

Habitat

The gray flycatcher prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities, but is also associated with pinyon-juniper woodland with understory sagebrush, open ponderosa pine forests (Csuti et al. 1997). This species in most abundant in extensive tracts of big sagebrush, often selecting areas along washes where the sagebrush is especially tall. In the western Great Basin, this species nests in tall big sagebrush shrublands (Ryser 1985).

During the nonbreeding season, this species commonly winters in arid scrub, riparian woodland, and mesquite (NatureServe 2000).

Distribution

Breeding range covers extreme southern British Columbia and south-central Idaho south to southern California, southern Nevada, central Arizona, south-central New Mexico, and locally western Texas (NatureServe 2000).

In Oregon, this species is typically found east of the Cascade Mountains (Csuti et al. 1997).

Birds winter in southern California, central Arizona, south to Baja California and south-central mainland of Mexico (NatureServe 2000).

Existing Condition

Confirmation of the presence and general abundance (0.01 birds/route-very low abundance) (USGS 2000) of gray flycatchers was done for the Silvies Valley during roadside abundance surveys on BBS route **Ore-248: Silvies**. Presence and density information is not available for the Silvies Canyon Watershed.

An analysis of potential habitat was conducted using current data to determine the potential for presence. GIS analysis indicates that there are about 10,691 acres of shrublands in Silvies Canyon Project area. Most of this acreage occurs in the south end of the watershed.

The bulk of the acres were classified as generic dry shrublands (8,770 acres). Mountain Mahogany (936 acres) and wet grasslands/shrub-meadows (664 acres) make up the remaining large classes of the acreage classified. Several additional shrubland associations are present but are minimally represented.

While not all of the shrubland/nonforested areas found in the watershed provide habitat for this species, much of the shrubland habitat is potential habitat. Gray flycatchers can be considered fairly widespread in the south end of the watershed.

The Malheur National Forest considers this species as a rare (not seen every year) summer resident. Marshall et al. (2003) shows confirmed breeding of gray flycatchers in the general area of the Silvies Canyon project.

Effects and Determination

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the No Action Alternative, there would be no new management activities; therefore, there should be no direct or indirect effects on gray flycatchers or their habitat. Ongoing grazing, prescribed burning and Forest level weed control (through manual and mechanical removal) will continue.

Noxious weeds are not known to occur in these habitats. Current levels of noxious weeds in the watershed are probably below threshold levels that can cause measurable changes to shrubland habitats. Over the long-term, degradation of habitat may be impacted by encroaching noxious weeds.

Determination

Due to the nature of a no action alternative, there would be **No Impact (NI)**. Juniper woodlands would remain in their current “status quo” condition. Open juniper woodlands have the greatest potential for maximum structural diversity and habitat potential when all layers are present (Miller 1999). Over the long-term, maintaining juniper dominated sites fails to restore resilient and healthy arid shrubland habitat that favors the gray flycatcher and other open-grassland and shrub-steppe adapted species.

There are potential indirect, long-term effects from probable high intensity wildfire that could occur because of not creating resilient forest and shrubland ecosystems. The magnitude and timing of this potential impact is unknown, but it could drastically modify large areas of arid woodland shrublands and low elevation ponderosa pine habitat.

Due to the loss of sagebrush and other shrubs from stand-replacing fire, this could adversely impact gray flycatchers in the short term. As the shrub and understory layer recovers from the effects of a fire, this species would greatly benefit from the creation of relatively treeless grassland/shrub-steppe areas.

Alternatives 2, 3, 4, 5, 7, and 7a

Direct and Indirect Effects

Silvicultural Practices

Preliminary analysis by Miller et al. (1999) shows avian diversity among different communities types is greatest in mid-successional shrub-steppe woodland communities and open old growth juniper. These alternatives were developed to convert 515 to 715 acres (Table 8.) of closed canopy juniper stands to an open mid-successional stage with remnant old juniper structure.

Table 8. Juniper Treatment by Alternative.

Alt	acres treated	method
2	537	commercial (where viable) and non-commercial
3	515	non-commercial
4, 7, and 7a	715	commercial (where viable) and non-commercial
5	535	commercial (where viable) and non-commercial

Direct and Indirect Effects

Silvicultural Practices

Gray flycatcher may nest 2-5 feet up in shrubs, trees, or in juniper trees that are to be thinned. They would be vulnerable to loss of nest productivity from juniper removal if the activities occur during the nesting season. Nests, eggs and nestlings could be destroyed and brooding adults could be killed during felling operations (OR-WA PIF 2001). In most cases, adult birds can escape. Juniper stands would be treated outside the nesting season or will be monitored for gray flycatcher nests, and nest trees would be protected to reduce the potential for direct effects. Proposed treatment should improve habitat for open-grassland and shrub-steppe adapted species including gray flycatchers. Thinning of juniper would likely reduce below-ground competition and increased availability of soil water and nutrients to shrubs and grasses (Bates et al. 1999). This would improve foraging habitat by increasing spacing between trees, encouraging development of sagebrush, bluegrass, perennial bunchgrasses, and, annual forbs in the understory increasing total ground cover, and increasing total biomass.

Fuel Treatment

Under these alternatives, prescribed fire would be used as a follow-up treatment to remove “old” slash, kill additional young juniper in the understory, remove the buildup of dead vegetation, and release stored nitrogen back into the system.

Because of limited continuity of fuels, low to moderate burning should have little effect on remaining mature and old growth junipers, grasses, or forbs. Burning under these site conditions should result in a mosaic burn that would enhance habitat conditions for the gray flycatcher.

Road closures would reduce the road-associated effects on flycatchers and their habitat. Other proposed activities (such as old-growth reconfiguration, spring restoration, and aspen restoration) would occur outside of gray flycatcher habitat, so would have no measurable effect on gray flycatchers or their habitat.

Alternative 6

Direct and Indirect Effects

Burning to reduce created “green” fuels and kill junipers would require fire intensities that may cause substantial mortality of native perennial grasses, such as Idaho fescue and bluebunch wheatgrass, reduce seed production, and damage dormant seed reserves. This may leave the site open for colonization by cheatgrass and noxious weeds depending on preburn conditions and availability of seed (Belsky 1996). Because of negative environmental impacts, burning would be done at low to moderate intensity, not at the intensity that would kill junipers.

Because of limited continuity of fuels, low to moderate intensity burning should have little effect on most of the juniper present in the units. While burning may reduce a small number of young juniper and would positively influence some understory vegetation, burning is not expected to reduce larger juniper and the positive influence of burning would be relatively short term. Without a substantial reduction in the density of junipers, these areas would not show significant change in habitat over the long-term. Effects would be similar to Alternative 1.

Cumulative Effect

Currently, so little is known about the effects of juniper control on complex environmental attributes that it is difficult to predict how a given site would respond to treatment. Response of arid and semi-arid northwest communities to juniper control are typically site specific. A preponderance of current research indicates that juniper removal would increase the productivity of understory shrubs and herbaceous plants on most sites.

In some cases, juniper management can encourage undesirable weedy annuals and shrubs. This usually occurs if a weed source is already present or if ground disturbing activities or prescribed burning damages desired native understory vegetation. Weed sources are not known to occur in these habitats and the goal of these alternatives is to improve arid shrubland habitat conditions without creating negative environmental impacts. Prescription perameters and noxious weed mitigation measures were designed to restore desired native vegetation without excessive damage or loss and to reduce the risk of spreading weeds, thereby avoiding or limiting establishment of undesired vegetation.

Determination

Due to the potential for impacts, the action alternatives may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species. Potential impacts are minor and would be an overall benefit to this species. The level of proposed treatment represents only a small percent of juniper habitat available in the watershed. At this level, restoration would be slightly increased at the local level, but not at the landscape level

bufflehead

(*Bucephala albeola*) Linnaeus, 1758

Status

Federal Status: N/A
Forest Service (Region 6) Status: Sensitive (USDA 2000)
State Status: N/A
Oregon Natural Heritage Program Status: N/A

Conservation Status Ranking

(NatureServe 2000)

Global Rank= G5 (November 21,1996)
National Rank=N5B, N5N (January 05, 1997)
Oregon State Rank=S2B, S5N

Major Threats

Loss of nesting trees near mountain lakes and hunting pressure are major threats. This duck is currently a game species in Oregon.

Population Status and Trend

Only several hundred pair are thought to breed in Oregon (Csuti et al. 1997).

Habitat

Breeding habitat for bufflehead includes lakes, ponds, rivers and seacoasts (NatureServe 2000). In Oregon, this duck nests near mountain lakes surrounded by open woodlands containing snags. In many areas, the preferred nest trees are aspen, but it will also nest in ponderosa pine and Douglas-fir snags (Csuti et al. 1997).

During the non-breeding/wintering season, bufflehead can be found in sheltered bays and estuaries along the Oregon Coast as well as open freshwater lakes, reservoirs and major rivers.

Distribution

This northern species breeds from Alaska across Canada and south to Oregon, northern California, and Wisconsin.

In Oregon, breeding season distribution is limited to the Cascade Mountains from the northern boundary to the Klamath Basin (Csuti et al. 1997).

During the non-breeding season, bufflehead can be found in the Aleutians, Alaska Peninsula, Great Lakes, New Brunswick and Newfoundland, south to Baja California, mainland Mexico, the Gulf Coast, Florida; and occasionally in Hawaii. The most abundant wintering populations include those around Vancouver Island, along the Atlantic coast from the Bay of Fundy to Chesapeake Bay, and in northern California-southern Oregon, Mississippi, eastern New Mexico (NatureServe 2000).

Existing Condition

This species does not occur on the Malheur National Forest during the breeding season (USGS 2000, Csuti et al. 1997), but migrating/overwintering birds can be found on Yellowjacket Reservoir, Delintment Lake, and the Silvies River.

Effects and Determination

Common to all Alternatives

This species does not breed in the Silvies Canyon Watershed and there is no breeding habitat present therefore there would be **No Impact (NI)** to breeding birds or breeding habitat regardless of the alternative selected.

This duck can be found in the watershed during the fall and possible spring migration and some birds may overwinter depending on the availability of open water. All activities proposed in the action alternatives occur outside RHCAs. Proposed alternatives would no alter overwintering habitat used by the bufflehead. There would be **No Impact (NI)** to non-breeding birds regardless of alternative selected.

Sensitive Fish

Surveys were conducted in the Silvies Canyon watershed during 1998 and 1999. PFC (proper functioning condition) surveys were conducted in the fall of 1998 (BLM 1998). Presence/absence surveys were conducted in the summer of 1999 to refine the distribution of fish in the watershed.

Great Basin redband trout

Population 18
(Oncorhynchus mykiss spp.) Walbaum 1792

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).
Forest Service (Region 6) Status: Sensitive (USFS 2003)
Malheur National Forest Status: management indicator species
State Status: Vulnerable-Listing of Species is not believed to be imminent and can be avoided (ODFW 1997).
Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

The Association for Biodiversity Information 2000)

Global Rank=G5T2Q (Sept. 02, 1998)
National Rank=N
Oregon State Rank=S3

Major Threats

In the Great Basin, agricultural development has resulted in extensive diking, channeling, draining, and loss of marshlands. Irrigation diversions have been constructed on most streams, causing habitat dewatering and physical blockage for both upstream and downstream migration trout. Because of these developments, lake and marsh trout rearing habitat has been lost and population productivity has been compromised. Timber harvest, livestock grazing, and road building have adversely affected aquatic habitats in forested areas and rangelands throughout the range of Great Basin redband trout (USFWS 2000).

The introduction of nonnative fish species such as brook trout and smallmouth bass, and the stocking of hatchery rainbow trout have also negatively impacted this species (USFWS 2000).

Habitat

There are four different populations of redband trout in the Blue Mountains. These are: 1) sympatric populations with steelhead, 2) isolated allopatric populations in anadromous watersheds, 3) allopatric populations in the Great Basin portion of the Blue Mountains, and 4) allopatric populations in watersheds that formally supported anadromous populations (N.F. Malheur and Upper Malheur Rivers). There is little data on current population trends of the redband trout, however, the four population types do not face the same level of threats from management activities. Subpopulations of the Great Basin redband trout are probably at the greatest threat of being listed as threatened under the ESA. Redband trout in the project area are of the Great Basin population. Overall, the Interior redband trout have the most extensive area of all game fishes in the Blue Mountains. They are in the smallest headwater areas as well as in the largest rivers of the Blue Mountains.

Native trout found in the internal basins of Oregon are redband trout derived from the Columbia River system. Malheur Lake Basin is the largest of the Oregon desert basins and contains the greatest amount of trout habitat associated with the Great Basin population. The Silvies River is one of six sub-basins feeding into the lake. Basin fish fauna show little difference from the Columbia River fauna, suggesting a rather broad and geologically recent connection between Malheur Lake and Malheur River; which flows east into the Snake River system. Berg (1987) found a relatively high frequency in genetic likeness between the Silvies River and the Columbia River sub-groups. J.O. Snyder was the first researcher to sample Malheur redband trout in 1904, taking them from the Silvies River and Silver Creek.

It is not known if pure native trout populations exist in the Malheur basin (Behnke 1992). The last specimen collected that was thought to be pure native came from Smyth Creek in 1968. Hatchery introduction has occurred across the basin in years past and native redband trout face constant hazards in the high desert environment. The Silvies Canyon Project Area's climatic extremes of high summer temperatures and low flow conditions frequently produce oxygen depletion in the water. Malheur redband trout are a genotypic sub-species adapted to these unstable, harsh, environments and because they are more adapted to variable water conditions, they probably have resisted hybridization with hatchery fish or native cutthroat. Observations in the Silvies watershed have verified this adaptive nature by finding redband trout in some very marginal waters late in the summer. They tend to be small in size and are better suited for the microhabitats being maintained by base flows of less the 0.3 cfs. Hatchery rainbows would not be able to tolerate the harsh water conditions.

Interior redband trout (sensitive) are assumed to be the resident form of the anadromous steelhead. Most redband trout spawning and rearing occurs in the second to fourth order streams in the forested environment. Even when small streams are not accessible to migrating fish because of barriers or steep gradients, they are vitally important to the quality of downstream habitats.

Redband trout of the interior Oregon basins inhabit isolated desert watersheds that vary widely in size. Populations residing in small isolated streams are vulnerable to climatic fluctuations and habitat disturbance due to their isolation from neighboring streams. During wet years, marshes and lakes can provide connections between populations of adjacent streams.

Redband trout are sensitive to changes in water quality and habitat. Redband trout of interior Oregon basins are believed to be best adapted to cold (<21° C), clean water, but possess a hereditary basis to function at high temperatures (Behnke 1992). Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat is important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and intersticial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD (large woody debris).

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailouts of pools. Water temperatures influence emergence of fry, which is typically from June through July.

Distribution

Interior redband trout are widely distributed across Oregon east of the Cascade Mountains and in the Klamath Basin (Behnke 1992). The U.S. Fish and Wildlife Service has classified the populations of redband trout inhabiting the Great Basin as a single distinct population segment (DPS) (USFWS 2000). This DPS is referred to as the “Great Basin redband trout DPS”. The range of Great Basin redband trout in Oregon includes the Warner, Catlow, Goose Lake, Fort Rock, Chewaucan, and Harney basins.

Great Basin redband trout are widely distributed in the Silvies and Harney-Malheur Lakes subbasins on the Emigrant Creek and Blue Mountain Ranger Districts of the Malheur National Forest.

This species is widely distributed in the project area, occupying the majority of perennial streams found within the watershed. They also move seasonally in the spring into many of the intermittent streams.

Existing Conditions

Stream surveys have been completed in 8 of 14 fish bearing streams in the project area. The majority of surveyed reaches are not meeting Forest Plan riparian management objectives (RMOs) for pool habitat, LWD, and fine sediment (Miller, Fisheries Specialist Report; and Goodman, Hydrologist Specialist Report). Myrtle Creek and tributaries upstream of Forest Service Road 31 have high amounts of fine sediment. Sagehen Creek also has high amounts of fine sediment. No current data on stream shading is available, although high stream temperatures indicate stream shade is lacking. Myrtle Creek does not meet Oregon water temperature standards and is on the State's 303(d) list. High water temperatures are also present in the Silvies River.

Malheur mottled sculpin

(Cottus bendireii) Girard 1850

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).
Forest Service (Region 6) Status: Sensitive (USFS 2000)
Malheur National Forest Status: management indicator species
State Status: Critical (ODFW 1998).
Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G5T3Q (Aug. 28, 1996)
National Rank=N3 (Dec 05, 1996)
Oregon State Rank=S3

Major Threats

Major threats to the Malheur mottled sculpin include destruction, modification and contraction of habitat from livestock grazing, timber harvest, and water withdrawals.

Habitat

The Malheur mottled sculpin requires cool-water streams with large gravel or rubble substrates for cover and spawning. It requires water temperatures below 26°C with high dissolved oxygen and low turbidity. Malheur mottled sculpin are sensitive to changes in water quality including increases in water temperature and sediment. Spawning occurs in the spring generally from February through May. Sculpin attach their eggs in clumps to the underside of stones. Eggs hatch in about 4 weeks.

Distribution

The taxonomy of mottled sculpin (*Cottus bairdi* complex) in Harney County, Oregon was recently reviewed by Markle and Hill (2000). Based on available literature and current data, Markle and Hill support recognition of two species, Malheur mottled sculpin (*C. bendirei*) and Columbia mottled sculpin (*C. hubbsi*). The regional foresters sensitive species list recognizes the Malheur mottled sculpin as *Cottus bairdi* but recent literature recognizes the species as *Cottus bendirei,* which will be used in this report. Both species occur in northern Harney Basin and hybrids were found at contact zones in the Silver and Silvies Rivers. The Columbia mottled sculpin appears dominant in the mainstem of the Silvies River with the Malheur mottled sculpin found upstream and in isolated creeks. The Malheur mottled sculpin was the only species found in southern Harney Basin. Recent fish surveys found sculpin species form this complex in one stream in the project area, the lower reach of Myrtle Creek. Previous surveys found this species in the Silvies River, within the project area.

Both species also occur outside Harney Basin in the Malheur and Snake Rivers, lower Columbia Basin, and probably the upper Columbia Basin.

The Malheur mottled sculpin was first reported in Rattlesnake Creek near Camp Harney but, apparently disappeared from that locality about 1960 (Bond 1983). Malheur mottled sculpin populations are currently reported to be present in Smyth Creek, Riddell Creek, Poison Creek, Devine Creek, upper

Silver Creek, Donner und Blitzen River, Silvies River, and in the Malheur River system. The composition of fish from the Silvies River has changed dramatically from predominantly *hubbsi* forms in 1955-68 to predominantly *bendirei* and intergrades more recently.

There is a possibility that these sculpin represent a single polymorphic species or ecotype. Markle and Hill (2000) reject this hypothesis because the congruence of morphology and distribution was consistent with two species meeting in a narrow hybrid zone. A better understanding of reproduction, development and the dynamics of sculpin hybrid contact zones is needed o resolve this question.

Existing Conditions

Mottled sculpin require water temperatures below 26°C with high dissolved oxygen and low turbidity. They are found in streams with moderate to rapid current and are associated with rubble, gravel, or rocky bottoms. They seldom are found in silted areas. Malheur mottled sculpins are sensitive to changes in water quality including increases in water temperature and sediment. Spawning occurs in the spring generally from February through May. Females deposit adhesive eggs in a crevice or under rocks in clusters of 20 to 150. The male guides her to the nest area and guards the nest after she leaves the area. The female produces from about 50 to 300 eggs, depending on her size. Eggs hatch in about 4 weeks. They feed on a variety of aquatic invertebrates, mostly insects, but also shrimp, snails, fish eggs and fish fry. They were thought to be serious predators of trout eggs and fry, but results of studies on their food habits have revealed that few trout eggs or fry are actually eaten. Mottled sculpins are much more important as forage for trout.

Sculpin are a bottom dwelling fish that generally favor streams dominated by riffles or glides with cool water and clean, silt free, gravels, although the "bairdi" complex can tolerate temperatures up to 70 degrees F. Many of the streams within the project area do not meet the preferred habitat conditions; therefore, water temperature is more likely a key factor in structuring and controlling seasonal distribution patterns.

Stream surveys have been completed in 8 of 14 fish bearing streams in the project area. The majority of surveyed reaches are not meeting Forest Plan riparian management objectives (RMOs) for pool habitat, LWD, and fine sediment (Miller, Fisheries Specialist Report; and Goodman, Hydrologist Specialist Report). Myrtle Creek and tributaries upstream of Forest Service Road 31 have high amounts of fine sediment. Sagehen Creek also has high amounts of fine sediment. No current data on stream shading is available,although high stream temperatures indicate that stream shade is lacking. Myrtle Creek does not meet Oregon water temperature standards and is on the State’s 303(d) list. High water temperatures are also present in the Silvies River.

Combined Effects and Determination for Redband Trout and Malheur Mottled Sculpin

Alternative 1 (No Action Alternative)

Direct and Indirect Effects

Under the No Action Alternative, there would be no management activities; therefore, there would be no direct effects to redband trout and Malheur Mottled Sculpin habitat. However there would be indirect effects as described below.

Most of the forested stands in the project area are identified as moderate to high risk for stocking induced mortality and related infestation of pests or disease. Without silvicultural treatment and/or the controlled re-introduction of fire into the project area, current stand conditions would worsen and increase the chance of a stand replacement fire. A stand replacement wildfire would result in the loss of shading along stream channels, loss of instream wood structures, and short-term (3-5 years) loss of streamside vegetation. This could adversely affect redband trout and Malheur mottled sculpin habitat. In addition, localized extirpation of these fish could occur as the result of severe wildfires (Rinne 1996).

Roads would not be treated in this alternative, which would allow about twelve specific roads (R.Vetter and A. Miller, Silvies Existing Condition Report) to continue input of sediment into stream channels and alter fish habitat.

Current levels of noxious weeds adjacent to streams are probably below threshold levels that can cause measurable changes in aquatic habitat. Under this action, there would be no direct or indirect adverse impacts to aquatic species or habitats during the 5-year Malheur National Forest Noxious Weed Control implementation period, which would include hand pulling as the only control method. Without active control, it is likely that the spread of noxious weeds would increase during the next 10 years and begin to adversely impact redband trout and Malheur mottled sculpin habitat.

Cumulative Effects

During the past 100 years livestock grazing, weed infestations, timber harvesting activities across the landscape and stream systems, stream dewatering, fire suppression, road construction, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes in overland flows, and riparian and fish habitat. These changes are having negative affects on water quality, and aquatic habitat that could result in negative effects on redband trout and Malheur mottled sculpin habitat. During the past 30 years successful efforts have been made to limit resource degradation and conduct restoration projects that have stabilized and improved water quality and aquatic habitat. However, this process may require decades to restore natural drainage systems and meet INFISH/FOREST RMOs, including pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width depth ratios.

Potential effects from the no action alternative would be cumulative with effects from non-federal activities within the project area and all activities outside the project area on federal, state and private lands but within the Silvies River drainage. Aside from this project, other activities that may contribute to cumulative effects include; timber harvest activities, wildfires, livestock grazing, road use, flood irrigation, and vegetation alteration. These activities occur on an annual basis with the exception of timber harvest and wildfire and are known contributors of stream dewatering and sediment affecting water quality and aquatic species to an unknown degree.

Other large-scale timber harvest activities and wildfires within the sub-basin (35 river miles upstream of the Silvies project area) include the 8000 acre Flagtail wildfire in 2002. Between 3800 and 5000 acres would be harvested on National Forest System Lands in 2004, with no harvesting activities in RHCAs. Associated restoration projects occurring in 2003 include adding LWD to 27 miles of streams, riparian planting of hardwoods on 200 acres, coarse wood placement on 3-5 acres of sensitive soils, and decommissioning/closure of 24 miles of road. Additionally there are state permits for timber harvesting on 8540 acres of private land occurring 35 miles upstream of the Silvies Canyon watershed.

Both positive and negative fisheries effects from these upstream activities are likely to be immeasurable at the Silvies Canyon project area due to distance between project areas, numerous beaver dams, that filter out sediment and water diversions for flood irrigation that affect stream flows. over 35 miles of stream channel.

Livestock grazing and its effect on water quality (temperature and sediment) and aquatic species would continue into the foreseeable future with negative affects on fish. Several reaches on the Silvies River and Myrtle Creek systems are in a recent downward trend due to excessive forage utilization and associated bank failures. Recent grazing management has allowed some reaches to improve and develop an upward trend, however, more than half of the reaches are still classified as functioning-at-risk (see Silvies Canyon WA 2000) and contribute to higher stream temperatures and sediment, due to lack of shade and bank failure, respectively. Shading of streams has been documented as a key component in maintaining proper stream temperatures (Beschta et al., 2003).

This cumulative component and future recovery of riparian areas depends on the level of livestock use and achievement of grazing standards within the RHCAs. The outcome would influence and may offset some of the positive benefits for fisheries gained from this project. This analysis will assume that Forest Service grazing standards would be achieved in the future. Under these conditions riparian vegetation would stabilize stream banks in about 3-5 years, and produce stream shade in 5-10 years. Narrowing of stream channels requires the longest recovery period, between 10 to 50 years, but due to the high number of stream reaches currently functioning at risk, the stream channel recovery period could be longer.

The combined negative effects from a possible stand replacement fire, weed infestations and lack of road treatments resulting in shade reductions and increased sediment could alter fisheries habitat. The magnitude and timing of these potential impacts are unknown, but they would have short term (1-3 years) negative effects on fisheries habitat in this watershed. The magnitude and timing of these potential impacts are unknown, but they would have negative effects on redband trout and Malheur mottled sculpin habitat in this watershed. Left untreated these conditions in combination with similar conditions on private land within the project area and all lands outside the project area create negative affects that could be a detriment to redband trout and Malheur mottled sculpins. However it is unlikely that these potential impacts would reduce the viability of this species in the subbasin.

Determination

As a result of the direct, indirect and cumulative long-term effects of doing nothing to actively restore and manage a healthy watershed, this alternative would have no impact in the short term (NI) but in the long term **May Impact Individuals or their Habitat but would Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH).**

Effects Common to all Action Alternatives

Road Activities

Direct and Indirect Effects

Sediment from roads is one of the main contributing factors degrading aquatic habitat and water quality that could affect redband trout and Malheur mottled sculpin habitat. Road closures, reconstruction or decommissioning activities are the most effective means of reducing sediment input from these roads into streams. Direct beneficial effects from road closures and decommissioning would be a decrease in chronic sediment input to streams and improved spawning and rearing habitat for redband trout and other aquatic species. Indirect beneficial effects would be an increase in large woody material recruitment and an increase canopy closure (shade) along streams as closed and decommissioned road segments re-vegetate with native conifers and hardwoods. Chapter 2 of the FEIS describes the differences in road treatments between alternatives.

Road decommissioning would remove the road from the Forest Road Transportation System and close the road at the entrances with earthen berms and/or boulders. Road surfaces would be sub-soiled to a depth of about 18" and scattered with slash to restore natural infiltration processes, allowing the reestablishment of vegetation and reducing sediment runoff. All culverts would be removed and the natural drainage channel restored. Removing culverts may result in short-term (< 1 year) sediment increases to stream channels; however, design features and BMPs would minimize these impacts. Long-term effects would include improvements to water quality, reestablishment drainage-ways and natural vegetation, and improvements to fisheries habitat and populations of aquatic species.

Permanent and seasonal road closures would close the road to motorized traffic, but it would remain on the Forest Road Transportation System. Surface erosion from these roads can be a major source of sediment to streams (Furniss et al. 1991). Sediment from unpaved roads is correlated to traffic volume; higher traffic levels result in higher amounts of sediment reaching streams (Reid and Dunne 1984). Road closures would decrease the amount of road-related sediment into streams and improve water quality and aquatic habitat. Under the action alternatives, all permanently closed roads would be treated to correct drainage problems and may require periodic maintenance to ensure they remain hydrologically stable.

Road reconstruction (Alternatives Six, Seven, and Seven-A) would improve roads through blading, realignment, new surfacing, cleaning ditches and culvert replacement to restore drainage and reduce sediment input into streams.

Maintenance activities (Alternatives Two, Four, Five, Six, Seven, and Seven-A) would occur, using BMPs, on approximately 8-200 miles of road, which would further reduce sediment input into streams throughout the project area. Alternatives Four, Seven, and Seven-A would have the greatest benefit to water quality and aquatic species from road maintenance, treating over 192 miles of road. Alternatives Two and Five would treat about 163 miles, whereas Alternative Six would treat the least amount, only 8 miles.

About fourteen temporary roads, totaling between 2.8 and 3.5 miles, would be constructed outside of RHCAs following BMPs in Alternatives Two, Four, Five, Seven, and Seven-A. No long term negative effects are expected from these roads due to the small number, and short lengths. They would also be constructed and decommissioned (at the completion of harvesting activities) following BMPs, which would minimize the ground disturbing activities and potential water runoff.

Twelve roads were identified in the project area as contributing sediment directly into streams and contributing to the degraded stream habitat conditions in the Silvies Canyon watershed (See FEIS Chapter 3).

Varying combinations of these twelve roads would be decommissioned, closed, maintained or reconstructed at various times during the implementation phase of the project, depending on the alternative selected and the timing of the timber harvest, prescribed burning and post and pole activities in those areas. The location of the road and possible connected use for other project activities will determine the timing for treatment. Treating roads early as possible in the project timeframe would allow for maximum benefits to water quality and fisheries habitat. Roads used for harvest activities and identified for reconstruction or maintenance would be treated just before the start of harvest activities. Roads identified for decommissioning and used for timber harvest or prescribed fire activities would be treated at the completion of those activities. Roads identified for treatment that are not associated with project activities would be treated within the first 3 years of implementation, 2004-2007. The 3700117, 3700167 and 3700275 roads would be treated in the year 2007, after they are used for post and pole harvest. Chapter 4 of the FEIS displays specific road treatments, and implementation dates by alternative. Roads identified for closure would be closed at each end (following BMPs) with drainage structures along the length of the road to reduce water movement and sediment input to streams.

Treating any amount of roads would improve habitat for redband trout and the Malheur mottled sculpin. Increases in fine sediment from the existing road system could diminish interstitial habitat quality and have negative affects on fisheries habitat. BMPs and design features would minimize possible negative effects during the road treatment process.

The following discussion describes varying effects, by alternative, of road treatments on water quality and aquatic species This includes a discussion on the twelve specific roads identified as sediment sources as well as the reduction of roads within the S.F. Myrtle Creek and Heifer Creek drainages that are also contributing significant amounts of sediment into streams.

Alternative Two would correct five of the twelve specific roads identified as sediment sources, and would have less beneficial effect than the other Action Alternatives. This alternative would reduce the miles of open roads in the vicinity of S.F. Myrtle Creek to 39% of current conditions and Heifer Creek to 24% of current conditions. Additionally, this Alternative treats the least number and miles of roads in the Silvies Canyon Watershed.

Although Alternatives Three and Four would have the second greatest benefit by correcting eleven of the twelve specific roads identified as sediment sources, they would have the greatest reduction of open roads in the S.F. Myrtle Creek and Heifer Creek drainages by reducing the miles of open road to 68% and 100%, respectively. Additionally, these Alternatives treat the greatest number and miles of roads in the Silvies Canyon Watershed.

Alternative Five would be the second least effective of the action alternatives by correcting eight of the twelve specific roads identified as sediment sources. This Alternative would also reduce the miles of open roads in the S.F. Myrtle Creek and Heifer Creek drainages to 59% and 55% of current conditions, respectively.

Alternatives Six, Seven, and Seven-A would have the greatest benefit by correcting all twelve of the specific roads identified as sediment sources. However, these Alternatives would be less effective than Alternatives Three and Four in terms of reducing the miles of open roads in the S.F. Myrtle Creek and Heifer Creek drainages -- 17% and 55% of current conditions, respectively. Alternative Seven would decommission an additional 4.3 miles of FS road 035 in the Silvies-Myrtle Roadless Area.

During analysis it was documented that there are 63 miles of road identified for closure under previous Environmental Assessments that are currently open. These roads would be closed after the completion of commercial timber harvest activities in order to maintain drainage features and reduce sedimentation, as identified under previous decisions.

Upland and Riparian Vegetation

Several types of riparian habitat restoration are proposed at 46 springs under all action alternatives. Removal of encroaching conifers and junipers would have a beneficial impact by increasing the abundance and diversity of understory riparian species (grasses, forbs and shrubs) and possibly increasing water flows at springs and streams. Anecdotal reports have suggested that removal of conifers and junipers (Eddleman 1992 and Miller 2003) adjacent to springs can increase spring flows; however, little quantifiable scientific information exists to substantiate these claims (Belsky 1996). Five of these springs would be fenced to restrict livestock and protect riparian habitat for Columbia spotted frogs and other aquatic species. Four of the fenced springs would be developed and would transfer water to livestock troughs. These developments would include float valves or return lines to prevent dewatering of the riparian habitat and potential altering of the riparian vegetation. Fencing spring sites would reduce compaction, improve water quality, and limit sediment transport into the stream network.

Cottonwood restoration is proposed under all action alternatives and would reduce conifer encroachment at the remnant cottonwood stand on upper Sagehen Creek. Conifers would be converted to standing snags or downed LWD. Effects from these activities would benefit the stream channel and fish by adding LWD to a stream reach that is deficient in LWD. Cottonwood plantings with protective cages on Sagehen Creek, Stancliff Creek and reaches on the Silvies River below the 31 road would restore a unique riparian species and benefit aquatic species and their habitat. Benefits include lower stream temperatures, improved fisheries habitat, increased deposition of organic material (leaves), and increased bank stability.

Seventy-seven noxious weed sites have been identified in the watershed and are proposed for manual treatment (hand pulling) under all action alternatives. Less than five sites are located near streams. Due to the control method, distance from streams, and relatively small size (< 25 sq. ft.), there would be no negative effects to water quality and aquatic species during the control effort. Noxious weed treatments would result in increaases in native vegetation species, stabilization of stream banks and improved stream shade, which would benefit aquatic habitat, water quality and fish.

Precommercial thinning and slash treatment, post and pole removal, juniper removal, and conifer thinning in aspen stands would reduce dense stands of timber and ladder fuels, reducing the likelihood of stand replacement fires within the project area and potential negative effects on soils and water quality (Beschta et al. 1987, and McNabb and Swanson 1990). This would also increase the amount of water available for stream flows and for remaining plants. Between 10,920 and 17,577 acres would be treated depending on the alternative selected. There would be no effects on stream shade, LWD, water quality or aquatic species. All of these activities would be conducted by hand except slash treatment of thinning material, which would be accomplished by grapple piling. These activities would be limited to areas outside INFISH RHCA buffers and result in minimal impacts to soils, surface water flows, water quality and aquatic species.

Aspen restoration within RHCAs would include converting encroaching conifers and junipers to standing snags or LWD, with hand tools. This would occur on 147 acres within RHCAs associated with category 1, 2, and 4 streams, in all action alternatives. Most of this activity is proposed on category 4 streams which are intermittent and do not affect downstream summer water temperatures. Ground disturbance would be limited to the felling of conifer trees, which would add to the LWD component, benefiting soil stabilization and reducing sediment input into streams. Due to the small size of aspen stands, the small amount of potential loss of stream shade from felled conifer trees would be minimal and short-term with no negative effects. Releasing these aspens from conifer competition and protecting them from livestock would allow the reestablishment of stream shade within 7-10 years that would benefit fish.

Prescribed Burning

Alternatives Two, Three, Four and Seven would prescribe burn 12 fuel blocks for a total of 39,277 acres in each alternative. These alternatives propose the highest amount of burning and have the greatest potential for effects from prescribed burning. Alternative Seven-A would prescribed burn 11 fuel blocks for 33,751 acres, Alternative Six, 10 burn blocks for 33,374 acres, and Alternative Five, 7 burn blocks for 25,311 acres, with corresponding levels of potential effects in each alternative. Prescribed burning activities (by aerial and ground ignition) are planned over a 10-year period to allow different combinations of spring and fall burning and allow for varying stages of vegetation growth across the landscape. There would be no aerial ignition within 300 feet of category 1 riparian areas except for incidental ignitions due to steep slopes or wind gusts. All ignitions would be allowed to back burn into the RHCAs.

Few adverse direct and indirect effects from prescribed burning are expected from these alternatives due to the gently sloping terrain of the project area, which reduces the potential for soil erosion and sedimentation. The potential for sediment transport to stream channels may occur during the first year. There is little risk of mortality to fish and other aquatic species since these burns would be initiated outside RHCAs and would only be allowed to creep into small portions of RHCAs. In the short-term (1-3 years), the prescribed fires may produce small amounts of sediment into the project area tributaries. Groundcover may be consumed in small areas of moderate to high intensity burns on upslope and riparian areas during the prescribed burn. If this occurs, groundcover usually returns to or exceeds pre-burn levels 3-5 years in the Blue Mountains (Johnson 1998). Sediment yields, however, are expected to be insignificant for the following reasons: (1) low intensity burns, (2) timing (3) mosaic burn patterns, (4) moist/wet riparian conditions.

Commercial Harvest

Alternatives Two, Four, Five, Seven, and Seven-A propose varying levels of commercial harvest activities. Alternatives Four, Seven, and Seven-A propose the most timber harvesting activities (15,580 acres) and therefore would have the highest potential for impact. Alternative Two (15,149 acres) would have a slightly lower potential for causing adverse effects than Alternatives Four, Seven, or Seven-A. Alternative Five (11,066 acres) proposes the least amount of timber harvesting activities and therefore would have the least impact of the three harvest alternatives. No harvest or harvest related activities are proposed in the RHCAs.

Alternatives Three and Six would cause the least amount of ground disturbance in the watershed (no commercial timber harvest) and still allow varying degrees of other restoration activities to occur, including road decommissioning, precommercial thinning, juniper reduction, and aspen, cottonwood and spring restoration. However, without commercial thinning of forest stands across the watershed, dense stand conditions and high fuel levels will remain an issue, increasing the risk of stand replacement fires.

Timber harvesting and associated activities can increase peak and channel modifying flows, and can increase sediment supply from erosion and bank destabilization resulting in channel degradation (Chamberlin et al., 1991). Tree felling by itself is not usually a significant cause of increased sediment production. Timber yarding, on the other hand, can cause measurable increases in erosion through alteration of soil structure, gouging of slopes, disturbance to stream channels and modification of soil infiltration capacities. Road systems, skid trails, and landings can accelerate hillslope runoff by concentrating flow and altering the natural drainage system.

Significant increases in sediment yields to stream channels may exceed the stream's natural ability to carry the sediment load. This would result in sediment deposition as point and mid-channel bars, especially in lower gradient reaches of a stream, that would lead to wider, shallower, and less stable channels. This can result in bank erosion and bed-scour, which further increase the sediment load in the stream. These effects can be activated by initial direct introduction of sediment from outside the channel and/or increases in water yields that result in channel erosion. Increases in fine sediment can result in decreased reproductive success of fish. However, significant increases in sediment yields are not expected with any of the Action Alternatives due to the gentle terrain, design features, mitigation, and riparian protection measures (INFISH buffers).

Aquatic habitat would be buffered from effects related to commercial harvest activities by using INFISH RHCA buffers, R6 BMPs, Malheur N.F. Forest Plan standards, and INFISH standards and guides. RHCAs help maintain the integrity of aquatic habitats by buffering stream channels from non-channelized sediment delivery, and providing for other riparian functions such as LWD inputs, shading, and bank stability (USDA Forest Service, USDI Fish and Wildlife Service, INFISH, 1995). INFISH RHCA buffers are: 300 ft each side of fish-bearing streams, 150 ft each side of non fish-bearing perennial streams, and 50 feet each side of non fish-bearing intermittent streams. Springs would be protected with 100-foot buffers as required by the Forest Plan.

R6 BMPs, Forest Plan standards, and INFISH standards and guides would reduce effects from timber harvest and associated road reconstruction and use. These measures are designed to protect stream channels and banks, reduce soil disturbance and compaction, and reduce channelized sediment delivery to streams, which would result in minimal impacts to water quality and aquatic species.

Of the five commercial harvest alternatives, Alternatives Four, Seven, and Seven-A have the highest potential for causing negative effects to water quality and fish from vegetation management activities because they propose the highest combination of acres of commercial harvest, miles of temporary road construction, and miles of road activities related to timber harvest (i.e. truck traffic, road reconstruction, and road maintenance). Alternative Two would have a slightly lower potential for causing adverse effects based on fewer acres of timber harvest related activities. Alternative Five has the least potential for negative effects to water quality and aquatic habitat based on the fact that this alternative has the least amount of acres with timber harvest related activities. Alternatives 3 and 6 do not include timber harvest activities which would allow the fuel levels to increase resulting in a greater chance of a stand replacement fire and negative effects to redband trout and the Malheur mottled sculpin.

Cumulative Effects

Past Effects

During the past 100 years timber harvesting, livestock grazing, noxious weeds, stream dewatering, fire suppression, road construction on erosive soils, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes in overland and stream flows affecting riparian and aquatic habitat. These changes are having negative affects on water quality, and aquatic species. Fire exclusion in the 20th century resulted in dense understories that may be detrimentally affecting late season flow in streams. Extensive road construction and timber harvest activities often occurred in stream channels resulting in unstable streambanks and high amounts of sediment. The cumulative affects of riparian grazing and timber harvest contributed to a reduction of LWD, wider stream channels, and loss of stream shade, resulting in higher stream temperatures and a reduction of high quality pools. Map 30 (stream reaches) Map 31 (Sediment from roads) Map 32 (Past Harvest Activities) Map 29 (temp), Map 33 (wood) and Map 34 (pools) in the map section at the end of Chapter 2 display site specific areas within the project area where these activities and subsequent habitat alteration occur. Table 9 describes past commercial harvest and fire activity by subwatershed (since1982) within the project area.

Table 9 Historical Commercial Harvest and Fire Activity within the Silvies Canyon Watershed

Subwatershed/ Watershed	Year/Acres Commercial Harvest	Years/Acres of prescribed Burn	Years/Acres of Wildfires (>5ac.)
Boulder Creek/Fawn Creek	1983-1996 / 1149	0	0
Burnt Mountain	1984-1981 / 610	1996-1999/5298	0
Myrtle Creek	1984-1995 / 1684	1996/16	0
Myrtle Park	1984-2003 / 6677	NA/52	0
Red Hill	1984-1993 / 642	1997/132	0
Sage Hen Creek	1983-2003 / 2508	1996-1999/698	0
Stancliffe Creek	1982-1994 / 1682	1995-1999/853	0
Silvies Canyon			118
Total Acres	1982-2003 / 14,952	1995-1999 / 7049	118

As streams became channelized riparian floodplains lost their ability to retain ground water and floodplain vegetation changed from grasses, sedges and forbs to sagebrush and rabbitbrush. During the past 20 years efforts have been made to limit resource degradation withinthe watershed by conducting small scale restoration projects. These projects included; meadow restoration, headcut stabilization, streambank stabilization, aspen restoration, livestock exclosures and drift fences. INFISH guidelines established riparian stream buffers and now exclude activities from these areas that may have negative affects on aquatic ecosystem. However, this process will require decades to restore natural drainage systems and meet INFISH/FOREST RMOs, including pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width depth ratios.

Cumulative Effects at the Silvies Canyon Project Level

Management activities and natural processes over space and time create cumulative watershed effects. These include but are not limited to: changes in timing and magnitude of flows, sediment supply to channels, sediment storage, structure in channels, and water temperature, snowmelt and freezing. Cumulative watershed effects can affect fish directly by increasing sedimentation of spawning/rearing habitat, or indirectly by changes in habitat, water quality, or impacts to macroinvertebrates/aquatic organisms.

Prescribed burning combined with juniper treatments, precommercial and commercial thinning, aspen restoration, road closures, reconstruction and decommissioning, spring restoration and noxious weed control would improve watershed conditions and aquatic habitat. The result would be improved channel stability with the addition of LWD from aspen restoration sites, enhanced riparian areas and riparian vegetation through thinning of conifers in aspen stands and reduction in sediment erosion-prone roads. As individual roads are closed and decommissioned in the upper part of the watershed, sediment input would be reduced and eventually the entire watershed and downstream areas would receive less sediment, resulting in long term positive cumulative effects for water quality and aquatic species.

The cumulative effects of precommercial thinning, commercial thinning and prescribed burning would reduce the chance of stand replacement fires and the potential negative effects to soils and water quality (Beschta et al. 1987, McNabb and Swanson 1990, and Effects of Fire on Soil 1979). The higher number of acres thinned and prescribed burned, the greater the reduction in fuel levels across the landscape. This reduces fire danger and decreases the intensity of wildfires. Alternatives 4 and 7 would reduce fuel levels on the most acres, followed by alternatives 7a, 2, 5, 3, 6. In addition, alternatives 4 and 7 would reduce evapotranspiration on the most acres allowing more water for remaining vegetation, recharge of springs and stream flows, followed by alternatives 7a, 2, 5, 3, 6,

Based on the analysis of proposed activities, the action alternatives are not likely to exacerbate cumulative watershed effects; few adverse impacts from harvesting activities are expected due to design features, mitigation, and monitoring. Insignificant sediment increases are expected from soil disturbances, as RHCA buffers would filter any sediment from upslope activities.

Reasonable Foreseeable Activities

Potential effects from the action alternatives would be cumulative with effects from non-federal activities within the project area and all activities outside the project area on federal, state and private lands but within the Silvies River drainage. Aside from this project, other activities that may contribute to cumulative effects include; timber harvest activities, wildfires, livestock grazing, road use, flood irrigation, and vegetation alteration. These activities occur on an annual basis with the exception of timber harvest and wildfire and are known contributors of stream dewatering and sediment, affecting water quality and aquatic species to an unknown degree.

Water diversions for flood irrigation occur in Myrtle Creek just above the 31 road on USFS/private lands, and in the Silvies River in Silvies and Bear valleys, on private lands. In both cases small weir dams block the stream flow and divert it into the floodplain for livestock grazing or hay production. These diversions may restrict seasonal fish movement during the spring and summer and temporarily trap fish. Sediment is released downstream when the structures are opened at the end of the irrigation season, affecting fish habitat and reproductive success. These diversions also affect natural seasonal water flows.
Other large-scale timber harvest activities and wildfires within the sub-basin (35 river miles upstream of the Silvies project area) include the 8000 acre Flagtail wildfire in 2002. Between 3800 and 5000 acres would be harvested on National Forest System Lands in 2004, with no harvesting activities in RHCAs. Associated restoration projects occurring in 2003 include adding LWD to 27 miles of streams, riparian planting of hardwoods on 200 acres, coarse wood placement on 3-5 acres of sensitive soils, and decommissioning/closure of 24 miles of road. Additionally there are state permits for timber harvesting on 8540 acres of private land occurring 35 miles upstream of the Silvies Canyon watershed.

Both positive and negative effects from these activities are likely to be immeasurable at the Silvies Canyon project area due to distance between project areas, numerous beaver dams, and diversions for flood irrigation that filter out sediment over 35 miles of stream channel.

Livestock grazing and its effects on water quality (temperature and sediment) and aquatic species would continue into the foreseeable future until addressed in allotment management plans. Allotment management plans for Silvies, Big Sagehen, Crooked Creek, and Scotty allotments are scheduled for completion in 2005. The West Myrtle and Scatfield allotment management plans were completed in 1996. The Myrtle allotment management plan completed in 1996 addressed negative effects of livestock grazing on several reaches of the Silvies River and Myrtle Creek systems that are in a current downward trend due to excessive riparian forage utilization and associated bank failures. Currently more than half of the reaches within the Silvies Canyon watershed are classified as functioning-at-risk (see Silvies Canyon WA 2000) and contribute to higher stream temperatures and sediment, due to lack of shade and bank failure, respectively. Shading of streams has been documented as a key component in maintaining proper stream temperatures (Beschta et al., 2003).

This cumulative component and future recovery of riparian areas depends on the level of livestock use and achievement of grazing standards within the RHCAs. The outcome would influence and may offset some of the positive benefits for water quality and aquatic species gained from this project. This analysis will assume that Forest Service grazing standards would be achieved in the future. Under these conditions riparian vegetation would stabilize stream banks in about 3-5 years, and produce stream shade in 10-20 years. Narrowing of stream channels requires the longest recovery period, between 10 to 50 years, but due to the high number of stream reaches currently functioning at risk, the stream channel recovery period could be longer.

Summary of Effects

Of the action alternatives, Alternatives Four and then Seven, allow for the most improvement within the project area with the least potential for negative impacts to soils and water quality. Alternative Four treats (closures, decommissions and reconstruction) about 345 roads and 164 miles while alternative Seven treats about 248 roads and 93 miles. These alternatives would prevent further decline in watershed health, reduce risks affecting ecosystem sustainability, begin vegetation and watershed restoration activities, lower the risk of stand-replacement fires, protect and improve riparian, aquatic and terrestrial habitat, and address road management concerns. Environmental changes resulting from these actions include the enhancement of riparian areas and improved watershed health and ecosystem sustainability that would be consistent with the Clean Water Act, INFISH and Forest standards. Minimal watershed and aquatic impacts from harvesting activities are likely to occur due to the implementation of design features, BMPs, INFISH RHCA buffers and monitoring strategies associated with these action alternatives. Negligible direct, indirect, and cumulative effects on water quality (sediment and temperature) and quantity (magnitude, timing, and duration) are anticipated if these alternatives are implemented. Erosion control structures and stream buffers would limit sediment input into streams. Canopy reductions would allow more snow accumulation and less evapotranspiration, which would allow more water to be available for stream flows. A reduction in stream sediment would improve aquatic habitat, especially pool quality, and allow redband trout and other aquatic species to increase in size. Activities associated with the action alternatives would maintain or improve water quality (temperature and sediment) in the long term on Myrtle Creek, a 303D listed stream for temperature and on other streams with documented high water temperatures.

Considering the use of INFISH RHCA stream buffers and the level of beneficial activities that would affect redband trout, the Malheur mottled sculpin and their associated habitat, the proposed activities from the action alternatives activities **May Impact Individuals or their Habitat but would Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)** in the short term (1-3 years). After the completion of road treatments aspen restoration and prescribed burning, there would be long term **Beneficial Impacts (BI)** to both species and their habitats, as sediment input decreases, stream shade increases and the risk of stand replacement fire decreases.

Sensitive Plants

Sensitive plants suspected to occur on the district are derived from the 1999 Region 6 Sensitive Plant List. The affected environment is identified by reviewing historical records of Region 6 sensitive plant occurrences in the planning area, and by surveying areas of potential habitat for new populations of sensitive plants. Habitats suspected of harboring new populations are identified based on aspect, elevation, and ecoclasses (plant association). Brooks et al. (1991) describes specific habitat features for Malheur National Forest sensitive species. Species known or suspected to occur in the planning area are listed in Table 10.

Table 10. Sensitive plant species suspected to occur within the Silvies Canyon Watershed Planning Area.

Species Name	Common Name
Astragalus tegetarioides	Deschutes milkvetch
Botrychium spp.	moonworts
Carex interior	Inland sedge
Carex parryana	Parry’s sedge
Achnatherum hendersonii and A. wallowensis	Henderson's ricegrass
Lomatium ravenii	Raven’s lomatium

Sensitive plant surveys were conducted in the planning area in 1994, 1996, 1999, 2000 and 2002. Habitats suspected to harbor the plants listed in Table 10 were examined by means of a floristic walk-through survey (Nelson 1985) during specific times of the year for peak plant identification periods.

One new population of crenulate moonwort was found in 2000. The documented sensitive plant sites from previous surveys include one population of Raven's lomatium and eighteen populations of Deschutes milkvetch within the planning area.

Mitigation For All Action Alternatives

A 50-foot ATP (area to protect) would be established around the outer extent of all documented/mapped sensitive plant sites. Vehicles, equipment, and operations that would displace soils or damage plants, would not be permitted in the ATP. All trees would be directionally felled away from the ATP. Activity created slash would not be piled in ATPs. Seeding of decommissioned road segments within documented ATP sites would not occur. Before any road reconstruction occurs, the reconstruction plan would be review by the botanist to ensure that sensitive plant populations are not inadvertently impacted or impacts are minimized. During prescribed burning, fire line construction and fire suppression equipment use would not occur within documented ATP sites. Any exceptions would have to be evaluated for compatibility by a botanist prior to implementation.

Crenulate moonwort

(Botrychium crenulatum) Wagner

Status

Federal Status: Species of Concern
Forest Service (Region 6) Status: Sensitive (USFS 1999)
Oregon State Status: Candidate for listing by Oregon Dept. of Agriculture under the Oregon Endangered Species Act of 1987
Oregon Natural Heritage Program Status: List 1 (ORNHP 2000)

Conservation Status Ranking

(ORNHP 2000)

Global Rank=G3
Oregon State Rank=S2

Major Threats

Alteration of the area water regime is a threat. Trampling by domestic livestock and public use could pose a threat.

Degree of Fragility

Very fragile

Habitat

Crenulate moonworts (hereafter referred to as BOCR) are found in wet seep or spring areas in lodgepole or mixed conifer forest habitat, in moist meadows with varying amounts of graminoids and forbs. It can sometimes be found in full sun and sometimes at the edge or under the shade of tree seedlings and in boggy, stream or riverbanks. Moonworts are relatives of ferns and produce spores for sexual reproduction. Moonwort spores require a medium of soil or humus in which to germinate, which implies some ground disturbance (Wagner & Wagner 1993). Zika (1992) noted that the nature of disturbance was important in providing a medium suitable for moonwort recruitment-modest flooding along headwater creek floodplains, frost heaving, and soil creep. The author found many moonworts colonizing small patches of ground less than 10 cm square, so small mammal mounds (gophers and other small, burrowing animals) may create colonization sites. Moonworts have been observed colonizing areas such as these, but also have been observed on more severely disturbed soil in riparian areas and floodplains. These disturbances appear to be solitary events occurring about twenty or more years ago; hence, larger disturbances permitting moonwort colonization have probably not been ongoing or otherwise chronic.

Intermittent wetness, characteristic of its habitats, provides moisture for the survival and growth of the fungus that provides the critical mycorrhizal connection to the moonworts. These intermittent wet habitats also presumably prevent competition from species better adapted to perennially dryer or wetter conditions. Sites should be protected from severe disturbances that eliminate shade or alter the water regime such as forest canopy thinning and water diversion for livestock.

Moonworts have an essential symbiotic relationship with fungi, in which the fungus receives secondary compounds and the moonworts receive food, water and nutrients. Moonworts cannot survive without this fungal relationship, and it is believed that they may not need to photosynthesize because of the sustenance they receive from the fungus (Farrar and Johnson 1997). For this reason, they grow underground for years, producing many leaves before they ever emerge above ground. When they do emerge, they often are found on old, down trees that are overgrown with mosses and liverworts or on convex humps or toe slopes that afford the moonwort ground with less competition, above the more thickly vegetated, seepy substrate.

Moonwort species are usually less than 10 centimeters tall, display only two leaves each season, and turn yellow in late summer-autumn. It is most commonly found growing with strawberry plants (*Fragaria* spp.). No other plant associates have been identified.

Distribution

Various moonwort species are found throughout North America yet appear to be very rare on the Malheur National Forest and even more rare on the Burns Ranger District. There are only three documented sites on the district.

This plant usually occurs above 4,500 feet elevation on the Malheur National Forest, but in a variety of habitats. The distribution of individual species of moonworts, including BOCR, is unknown because data on these rare plants has been collected only recently and their full range has not been determined.

Existing Conditions

One population of BOCR has been found in the planning area, in the Myrtle Park subwatershed (T.18 S., R. 30 E., Sec. 19). It was found in two locations along a moist meadow, one location with nine plants, the other with two plants.

Effects and Determination

Alternative 1–No Action

Under this alternative, there would be no management activities; therefore, there would be **No Impact (NI)** to this BOCR population.

Ongoing activities (grazing, fire management, road use) would continue to influence conditions at this site. The effects of these activities on this species are not fully understood at this time.

Common to All Action Alternatives

Noxious Weeds

Manual treatment of noxious weed sites would not impact the BOCR population because there are no noxious weed sites within the BOCR site.

Fuels Management

No fuels management activities for the area containing the BOCR site are proposed under any alternative; therefore, no impact would occur. This site is a wet or moist meadow and even in the driest year would not burn during prescribed burning periods (spring and fall).

Riparian Habitat (Spring) Restoration

Proposed riparian (spring) restoration of Gribble spring includes fencing the entire wet/moist meadow of approximately 7 acres. The proposed fence would have no direct effect to Botrychium crenulatum because the fence line would not be constructed where the plants are growing. Indirect effects would be beneficial because detrimental disturbance by livestock grazing to moonworts would not occur. If the viability of Botrychium crenulatum is determined to depend on the level or timing of grazing, fencing the entire wet meadow allows for regulating this type of disturbance. Monitoring the BOCR populations will help determine how the site should be managed in the future.

Alternative 2 - Proposed Action

Vegetation Management

Direct and Indirect Effects

The mixed conifer stands surrounding the BOCR site would be treated with an intermediate thinning (Stands 30.02 and 30.03). The BOCR site is located within the 150-foot RHCA buffer (class 3 stream). With application of RHCA restrictions there would be no direct effect on population of BOCR as a result of upland treatment.

The indirect effects of intermediate thinning could include changes in relative humidity and tree canopy of the surrounding mixed conifer forest, in hydrologic relationships and in soil structure. These changes could alter the habitat conditions for BOCR plants, leading to insufficient moisture levels due to decreased shading and/or greater competition by other plant species due to increased light availability.

Road Closure

Direct and indirect effects

There would be no direct effects to BOCR populations under Alternative 2- Proposed Action, which permanently closes Forest Service road 3700379. While this treatment does not return the road prism to natural conditions, it could reduce its potential as a sediment source by restricting use, thereby indirectly improving BOCR habitat.

Cumulative effects

Past domestic grazing, timber harvesting and fire suppression have contributed to great changes in riparian habitats and the plant communities they support. The distribution and vitality of BOCR and all other moonwort species before these management activities began are unknown. Disturbance by livestock grazing could be detrimental to moonworts or could provide for their viability depending on the level or timing of grazing. Trampling and grazing could create soil openings in which moonwort spores (the reproductive cells essential to the reproductive cycle of moonworts to produce new plants) may germinate. However, excessive, late-season grazing, which leads to heavy trampling in riparian areas and grazing of the very short (less than 6 inches) moonwort, would be deleterious to mature plants.

Historic grazing levels have resulted in loss of potential moonwort habitat through stream downcutting and accelerated erosion processes that significantly alter local surface hydrology. Past timber harvesting has also increased erosion and altered hydrologic relationships. Historic logging practices included skidding logs through riparian areas which could have destroyed existing plants but could have also provided soil openings for new plants to establish.

Fire suppression may have caused a decline in moonwort populations through increased competition for soil moisture and nutrients by shade-tolerant plant species. In addition, the repression of the natural fire regime likely reduced the amount of disturbance in riparian areas where new moonworts could have established.

Proposed activities of fencing the entire wet/moist meadow and closing or decommissioning forest road 3700379 would be beneficial to moonworts. In the future, this fence could regulate the level or timing of grazing, or eliminate grazing altogether within the entire wet/moist meadow. Cumulatively, these actions would have a beneficial effect on moonworts.

Cumulatively, these factors have resulted in habitat alteration through stream downcutting, hydrologic changes, soil compaction, changes in tree canopy density, intense competition from exotic and native plant species, and direct crushing/uprooting of plants.

Determination

Through compliance with RHCA regulations, there would be **No Impact (NI)** under Alternative 2–Proposed Action.

Alternative 3

Vegetation Management

Direct and Indirect Effects

Precommercial thinning is proposed for the mixed conifer forest surrounding the BOCR site. The site is located within an RHCA buffer therefore piling of slash would not occur. Through avoidance, there would be no direct impacts to this site.

Indirectly, reducing the canopy cover through precommercial thinning would decrease shade and could change the relative humidity and hydrology of the mixed conifer stand that provides the cool, moist habitat where BOCR grows.

Road Decommission

Direct and Indirect effects

There would be no direct effects to BOCR populations because of decommissioning Forest Service road 3700379. Decommissioning the road may require erosion control through direct seeding of the roadbed. Preferably, local, native grasses would be seeded; however, the source for these grasses has not yet been fully developed. To reduce the risk of creating competitive stress on BOCR, only annual, non-persistent grasses should be used because they pose less threat of long-term competitive stress.

Indirect effects of decommissioning this road would be reduced damage to the riparian area supporting the BOCR habitat because motorized access to this area would be eliminated.

Cumulative effects

Cumulative effects are the same as for Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be **No Impact (NI)** under Alternative 3.

Alternative 4

Vegetation Management

Direct and Indirect Effects

Under Alternative 4, the mixed conifer stand surrounding the BOCR site would be managed by an intermediate thinning treatment, the same activity and effects as discussed under Alternative 2-Proposed Action.

Road Decommission

Direct and Indirect Effects

Under Alternative 4, road 3700379 would be decommissioned. This is the same activity and effect as discussed under Alternative 3.

Cumulative effects

Cumulative effects are the same those discussed under Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be **No Impact (NI)** under Alternative 4.

Alternative 5

Vegetation Management

Direct and Indirect Effects

Under Alternative 5, the mixed conifer stand surrounding the BOCR site would be managed by an intermediate thinning treatment, the same activity and effects as discussed under Alternative 2-Proposed Action.

Road Closures

Direct and Indirect Effects

There would be no effects to the BOCR population under Alternative 5 because Forest Service road 3700379 would be left open.

Cumulative effects

Cumulative effects are the same those discussed under Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be **No Impact (NI)** under Alternative 5.

Alternative 6

Vegetation Management

Direct and Indirect Effects

Under Alternative 6, precommercial thinning is proposed for the mixed conifer forest surrounding the BOCR site, which is the same activity proposed under Alternative 3. Refer to effects for vegetation management under Alternative 3.

Cumulative effects

Cumulative effects are the same those discussed under Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be NO IMPACT (NI) under Alternative 6.

Alternative 7 – Preferred Alternative

Vegetation Management

Direct and Indirect Effects

Under Alternative 7, the mixed conifer stand surrounding the BOCR site would be managed by an intermediate thinning treatment, the same activity and effects as discussed under Alternative 2-Proposed Action.

Road Decommission

Direct and Indirect Effects

Under Alternative 7, road 3700379 would be closed. This is the same activity and effect as discussed under Alternative 2-Proposed Action.

Cumulative effects

Cumulative effects are the same those discussed under Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be **No Impact (NI)** under Alternative 7.

Alternative 7a

Vegetation Management

Direct and Indirect Effects

Under Alternative 7a, the mixed conifer stand surrounding the BOCR site would be managed by an intermediate thinning treatment, the same activity and effects as discussed under Alternative 2-Proposed Action.

Road Decommission

Direct and Indirect Effects

Under Alternative 7a, road 3700379 would be closed. This is the same activity and effect as discussed under Alternative 2-Proposed Action.

Cumulative effects

Cumulative effects are the same those discussed under Alternative 2–Proposed Action.

Determination

Through compliance with RHCA regulation and the recommended mitigation, there would be **No Impact (NI)** under Alternative 7a.

Deschutes milkvetch

(Astragalus tegetarioides) Jones

Status

Federal Status: Species of Concern
Forest Service (Region 6) Status: Sensitive (USFS 1999)
Oregon State Status: Candidate for listing by Oregon Dept. of Agriculture under the Oregon Endangered Species Act of 1987
Oregon Natural Heritage Program Status: List 1 (ORNHP 2000)

Conservation Status Ranking

(ORNHP 2000)

Global Rank=G3
Oregon State Rank=S3

Major Threats

This species in not very threatened range-wide. It is self-protecting by unsuitability of habitat for other uses. Forest management practices, which discouraged natural wildfires, may be suppressing this taxon (TNC 1999). Suppression of wildfires has reduced the number of open, disturbed sites on which this species depends.

Degree of Fragility

Fairly resistant (NatureServe 2000).

Habitat

Deschutes milkvetch (hereafter referred to as ASTE) occurs in open stands of big sagebrush, or low sagebrush (*Artemisia arbuscula*), and in openings, swales and canyon bottoms in ponderosa pine forests. It is found on soils that are shallow to moderately deep and varying in texture from clay-loams to gravelly or somewhat rocky. It has not been found in stands of sagebrush or ponderosa pine where canopy closure is greater the 75 percent, or where needle duff is greater then one inch deep. The majority of the plants found occur in the following:

Swales dominated by big or low sagebrush, often with adjacent higher ground supporting ponderosa

pine.
Minor tributary draws which experience seasonal water flows, again associated with big sagebrush.
in openings within forest stands where the soil seems thin or rocky
dirt roads, where plants are found in the road margins or between wheel tracks

Other common associates of ASTE include western juniper (*Juniperus occidentalis*), bitterbrush, green rabbit-brush (*Chrysothamnus viscidiflorus*), Idaho fescue (*Festuca idahoensis*), Sandberg's bluegrass (*Poa sandbergii*), Ross's sedge (*Carex rossii*), *Eriogonum umbellatum, E. ovalifolium, Lupinus lepidus, Epilobium paniculatum, Phacelia hastata, Eriophyllum lanatum*, and *Antennaria microphylla*.

Flowering occurs in late June to early August, and occasionally into October.

Distribution

This plant is known only from northern California (Ash Valley, Lassen County) and central and eastern Oregon at moderate elevations of 4,800 to 5,300 feet (Brooks et al. 1991). Plants have been found near Juniper Mountain on Lakeview District, BLM, on the Snow Mountain Ranger District, Ochoco National Forest, and on the Burns Ranger District, Malheur National Forest. The full range of this plant has not yet been determined.

Existing Conditions

Eighteen populations of ASTE have been found in the proposed planning area. Fifteen populations exist in the Stancliffe Creek subwatershed (T. 19 S., R. 31 E., Sec. 33, 34, & 35 and T. 20 S., R. 31 E., Sec. 3, 5, 9, 15 & 16) and three populations are in the adjacent subwatershed of Burnt Mountain (T. 20 S., R. 31 E., Sec. 7 and T. 20 S., R. 30 E., Sec. 3 & 14). The population sizes range from four individual plants to more than 500 plants. The heaviest concentration of plants is found in the open stands of big sagebrush, with fewer plants in the open ponderosa pine stands.

Effects and Determination

Alternative 1–No Action

Under this alternative, there would be no management activities; therefore, there would be **No Impact (NI)** to local ASTE populations.

Common to All Action Alternatives

Noxious Weeds

Manual treatment of noxious weeds from ASTE sites is expected to beneficially impact identified populations. This is a result of reducing competition for growing space and resources (Malheur National Forest Noxious Weed Control EA).

Alternative 2- Proposed Action

Vegetation Management

Direct and Indirect Effects

There would be direct and indirect effects to the populations of ASTE from silvicultural activities proposed under this alternative. Various proposed activities would potentially affect 15 of the 18 ASTE populations found in the watershed (Table 11.).

Skidding trees through documented ASTE sites could uproot or crush individual or groups of plants. Piling slash or stems may smother plants. Mechanical piling could be particularly severe on this small plant. It could be easily uprooted, and it could be crushed by machinery as well as buried by displaced soil.

Indirectly, ASTE can be positively influenced by soil disturbance, removal of heavy pine litter and created openings in the canopy. These activities could increase light penetration to the ground, decrease pine needle litter and duff, and provide scarified soil that likely improve site conditions for ASTE establishment or expansion.

Table 11. ASTE sites that may be impacted by vegetation management activities proposed under the Alternative 2-Modified Proposed Action.

ASTE site number	PCT	CT	JR
020003		X	
020005	X	X	X
020008		X	
020009		X	
020010	X		
020013		X	
020014		X	
020015	X		X
020024		X	
020025	X		
020026		X	
020029		X	
020030	X	X	
020031	X	X	
020032	X		

PCT – Precommercial thinning
CT – Commercial thinning
JR – Juniper reduction

Fuels Management

Prescribed burning activities in proposed burn blocks could potentially affect known ASTE populations found in the watershed (Table 12.). During prescribed burning, active lighting would be concentrated in forested areas, although fire would be allowed to creep into nonforested areas. Prescribed fire is not expected to burn intensively or extensively in nonforested areas. ASTE is presumably adapted to a fire regime of frequent, low intensity fires in mid to late summer, and it is assumed it is also adaptable to early spring burning.

Table 12. ASTE Sites That May be Impacted by Prescribed Burning.

ASTE site number	Fuel Block						
	5	6	7	7b	8	9	9a
020003			X				
020005			X			X	
020008			X				
020009			X				
020010					X	X	X
020011							
102002						X	
020013							X
020014			X				
102005						X	
202004						X	
020025						X	
020026			X				
020029	X						
020030			X	X			
020031		X	X				
020032						X	
020033					X		

ASTE are not generally found where needle duff is greater than one inch deep. This indicates that the plants would naturally occur in openings with low fuel loading. Prescribed fire burning in typical ASTE habitat would likely pass by without burning much of the groundcover in these sites.

Road Closures

Direct and Indirect Effects

There would be direct and indirect effects to four ASTE sites because of road closures.

Population 020013 may be affected by closure of roads 3130057, 3130074, and 3130077.

Population 020030 may be affected by closure of road 3120161.

Population 020032 may be affected by closure of road 3130616.

Population 020033 may be affected by closure of road 3130988.

Direct effects of uprooting, crushing or smothering plants would result from road closures (earth berm) if ASTE occur at or near the closure site. An earth berm could obliterate an entire ASTE population if the population consists of only a few plants.

The use of pole gates, steel gates or closure signs would be less impactive on populations because individual plants could be avoided in the small area needed to install the gate or sign. These structures would be substituted for earth berms if impacting large clusters of ASTE were unavoidable.

Direct effects of road decommissioning would destroy plants that grow on the road shoulders or in the center of the wheel tracks, where they are commonly found. Road surface scarification should be avoided where possible conflicts with ASTE occur.

Waterbars would cause minor disturbance to the existing plants because of the small area they employ. Slash piling as sediment barriers at waterbar outlets could smother plants and destroy habitat for this plant, which needs bare ground to establish and flourish.

By limiting the motorized vehicle traffic, the road closures would have indirect effects on ASTE. The populations may increase their concentration in the roads by colonizing abandoned wheel tracks. This colonization could help stabilize the road against surface erosion.

Cumulative effects

The ecological niche of this plant is not fully understood. This species behaves as an early seral species of the pine forest, appearing in openings made by fire or other disturbances. Field observations from this forest and the Ochoco National Forest indicate that the species can tolerate some disturbance from fuels treatment, grazing, timber harvest activities, and road construction.

Plants have been found growing in low use dirt roads, in gravel fill on road shoulders, and in sagebrush flats treated with a low intensity fuel reduction/range improvement burn (unnumbered population growing in Crow Flat, burned in the spring of 1994). Past road closures have also encouraged the spread of this species in the roadbed, thus stabilizing the road soil from probable erosion. The cumulative effects are not expected to be harmful and may even have a beneficial impact.

The ecological factor(s) responsible for the limiting the distribution of this plant have not yet been identified. Rarity in other members of this genus have been variously attributed to habitat alteration, herbicides, inbreeding depression, pre-dispersal seed predation, competition for pollinators, and destruction of pollinator habitat by livestock (USFS, Biological Evaluation for Sensitive Plants in the Silver Creek Analysis Area, 1991). Observations on the Malheur National Forest indicate that this plant does not respond well in disturbed areas that have been seeded with non-native grasses or in areas that experience sheet erosion.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Alternative 3

Vegetation Management

Direct and Indirect Effects

There may be indirect effects to the populations of ASTE from silvicultural activities proposed under this alternative. Various proposed activities would potentially affect 14 of the 18 ASTE populations found in the watershed (Table 13).

Precommercial thinning and juniper reduction should create openings in the canopy. This would increase light penetration to the ground, decrease future build up pine needle litter and duff, and this in combination with prescribed burning provide a limited amount of scarified soil that likely improve site growing conditions to promote ASTE establishment or expansion.

Table 13. ASTE sites that may be impacted by vegetation management activities proposed under Alternative 3.

ASTE site number	PCT	JR
020003	X	
020005	X	X
020009	X	
020010	X	
020011	X	
020014	X	
020015	X	X
020024	X	
020025	X	
020026	X	
020029	X	X
020030	X	
020031	X	
020032	X	

PCT – Precommercial thinning
JR – Juniper reduction

Road Closures

There could be direct and indirect effects to four ASTE sites because of road closures.

Population 020013 may be affected by closure of roads 3130057, 3130074, and 3130077.

Population 020026 may be affected by decommissioning of road 3130095.

Population 020032 may be affected by closure of road 3130616.

Potential effects of road closure and decommissioning would be similar to that discussed under Alternative 2- Proposed Action.

Fuels Management

The direct and indirect effects of fuels treatment on ASTE under this alternative are the same as the, Alternative 2- Proposed Action.

Cumulative effects

Cumulative effects of this alternative are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Alternative 4

Vegetation Management

Direct and Indirect Effects

There would be direct and indirect effects to the populations of ASTE from silvicultural activities proposed under this alternative. Various proposed activities would potentially affect 16 of the 18 ASTE populations found in the watershed (Table 14).

Table 14. ASTE sites that may be impacted by vegetation management activities proposed under Alternative 4.

ASTE site number	CT	IT	PCT	JR
020003	X			
020005			X	X
020008	X			
020009	X			
020010		X		
020011	X			
020013	X			
020014	X			X
020015	X		X	X
020024	X			
020025	X			
020026	X			
020029	X			
020030			X	X
020031	X		X	
020032	X			

CT=Commercial thin IT=Intermediate thin
PCT – Precommercial thinning JR – Juniper reduction

The effects of this alternative would be similar to that discussed under Alternative 2- Proposed Action.

Fuels Management

The direct and indirect effects of fuels treatment on ASTE under this alternative are the same as the Alternative 2- Proposed Action.

Road Closures

There could be direct and indirect effects to four ASTE sites because of road closures.

Population 020005 would be affected directly by the decommissioning of road 3100759.

Population 020013 may be affected by closure of road 3130077.

Population 020026 would be directly affected by the decommissioning of road 3100095.

Population 020032 may be affected by closure of road 3130616.

Refer to Alternative 2-Proposed Action for direct and indirect effects of road closures and road decommissioning on ASTE.

Cumulative effects

Cumulative effects of this alternative are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Alternative 5

Vegetation Management

Direct and Indirect Effects

There would be direct and indirect effects to the populations of ASTE from activities proposed under this alternative. Various proposed activities would potentially affect 15 of the 18 ASTE populations found in the watershed (Table 15).

The effects of these activities are the same as those discusses under Alternative 2- Proposed Action.

Table 15. ASTE sites that may be impacted by vegetation management activities proposed under Alternative 5.

ASTE site number	CT	PCT	JR
020003	X	X	X
020005	X	X	X
020008		X	
020009		X	
020010	X		
020013	X		
020014		X	
020015	X	X	X
020024		X	
020025	X		
020026		X	
020029		X	
020030	X	X	
020031	X	X	
020032	X		

CT=Commercial thin
PCT – Precommercial thinning
JR – Juniper reduction

Road Closures

Road closures would not occur in documented ASTE sites; therefore, there would be no impacts.

Fuels Management

The effects of fuels treatment on ASTE under this alternative are the same as the Modified Proposed Action; however, fuel block 8 has been omitted under this alternative.

Prescribed burning activities in proposed burn blocks would potentially affect 15 of the 18 known ASTE populations found in the watershed (Table 10.). ASTE population 020010 and 020033 fall within the omitted fuel block 8

Cumulative effects

Cumulative effects are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Alternative 6

Vegetation Management

Direct and Indirect Effects

The effects of vegetation treatment on ASTE under this alternative are the same as that discussed under Alternative 3.

Fuels Management

Direct and Indirect Effects

Prescribed burning activities in proposed burn blocks would potentially affect 17 of the 18 known ASTE populations found in the watershed (Table 16.).

Table 16. ASTE sites that may be impacted by prescribed burning activities.

	Fuel Block					
ASTE site number	**5**	**6**	**7**	**8**	**9**	**13**
020003			X			
020005			X		X	
020008		X	X			
020009			X			
020010				X	X	
020011						X
020012					X	
020014			X			
020015					X	
020024					X	
020025					X	
020026			X			
020029	X					
020030			X			
020031		X	X			
020032					X	
020033				X		X

ASTE is presumably adapted to a fire regime characterized by frequent, low intensity fires in mid to late summer. The effects of spring and/or late fall burning are not understood but such a fire probably would have occurred naturally, but at a much lower frequency than summer/fall burns.

The effects of fuels treatment on ASTE under this alternative are the same as that discussed under Alternative 2- Proposed Action.

Road Closures

Direct and Indirect Effects

There could be direct and indirect effects to four ASTE sites because of road closures.

Population 020013 may be affected by closure of roads 3130074 and 3130077.

Population 020026 may be affected by closure of road 3130095.

Population 020032 may be affected by closure of road 3130616.

Population 020010 and 020033 may be affected by reconstruction of road 3130129.

Potential effects of road closure would be similar to that discussed under Alternative 2- Proposed Action.

Under this alternative, road reconstruction may impact two documented populations of ASTE located on and adjacent to Forest Service road 3130129. Reconstruction activities are focused on repairing parts of the road affecting stream quality and/or causing resource damage. ASTE does not occur near wet habitats and most likely would not occur where major reconstruction would occur, thereby avoiding impacting ASTE.

Recommended Mitigation

Before any reconstruction occurs, the botanist would review the reconstruction plan to ensure these populations are not inadvertently impacted or impacts are minimized.

Cumulative effects

Cumulative effects are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH)

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures.

Alternative 7-Preferred Alternative

Vegetation Management

Direct and Indirect Effects

There would be direct and indirect effects to the populations of ASTE from silvicultural activities proposed under this alternative. Various proposed activities would potentially affect 16 of the 18 ASTE populations found in the watershed (Table 17.).

Table 17. ASTE sites that may be impacted by vegetation management activities proposed under Alternative 7.

ASTE site number	CT	IT	PCT	JR
020003	X			
020005			X	X
020008	X			
020009	X			
020010		X		
020011	X			
020013	X			
020014	X			X
020015	X		X	X
020024	X			
020025	X			
020026	X			
020029	X			
020030			X	X
020031	X		X	
020032	X			

CT=Commercial thin
IT=Intermediate thin
PCT – Precommercial thinning
JR – Juniper reduction

The effects of this alternative would be similar to that discussed under Alternative 2- Proposed Action.

Fuels Management

The direct and indirect effects of fuels treatment on ASTE under this alternative are the same as the Alternative 2- Proposed Action.

Road Closures

There could be direct and indirect effects to four ASTE sites because of road closures.

Population 020013 may be affected by closure of roads 3130074 and 3130077.

Population 020026 may be affected by closure of road 3130095.

Population 020032 may be affected by closure of road 3130616.

Population 020010 and 020033 may be affected by reconstruction of road 3130129.

Potential effects of road closure would be similar to that discussed under Alternative 2- Proposed Action.

Under this alternative, road reconstruction may impact two documented populations of ASTE located on and adjacent to Forest Service road 3130129. Reconstruction activities are focused on repairing parts of the road affecting stream quality and/or causing resource damage. ASTE does not occur near wet habitats and most likely would not occur where major reconstruction would occur, thereby avoiding impacting ASTE.

Recommended Mitigation

Before any reconstruction occurs, the botanist would review the reconstruction plan to ensure these populations are not inadvertently impacted or impacts are minimized.

Cumulative effects

Cumulative effects are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Alternative 7a

Vegetation Management

Direct and Indirect Effects

There would be direct and indirect effects to the populations of ASTE from silvicultural activities proposed under this alternative. Various proposed activities would potentially affect 16 of the 18 ASTE populations found in the watershed (Table 18).

Table 18. ASTE sites that may be impacted by vegetation management activities proposed under Alternative 7a.

ASTE site number	CT	IT	PCT	JR
020003	X			
020005			X	X
020008	X			
020009	X			
020010		X		
020011	X			
020013	X			
020014	X			X
020015	X		X	X
020024	X			
020025	X			
020026	X			
020029	X			
020030			X	X
020031	X		X	
020032	X			

CT=Commercial thin
IT=Intermediate thin
PCT – Precommercial thinning
JR – Juniper reduction

The effects of this alternative would be similar to that discussed under Alternative 2- Proposed Action.

Fuels Management

The direct and indirect effects of fuels treatment on ASTE under this alternative are the same as the Alternative 2- Proposed Action except Fuel Block 6 has been omitted from this alternative.

Road Closures

There could be direct and indirect effects to four ASTE sites because of road closures.

Population 020013 may be affected by closure of roads 3130074 and 3130077.

Population 020026 may be affected by closure of road 3130095.

Population 020032 may be affected by closure of road 3130616.

Population 020010 and 020033 may be affected by reconstruction of road 3130129.

Potential effects of road closure would be similar to that discussed under Alternative 2- Proposed Action.

Under this alternative, road reconstruction may impact two documented populations of ASTE located on and adjacent to Forest Service road 3130129. Reconstruction activities are focused on repairing parts of the road affecting stream quality and/or causing resource damage. ASTE does not occur near wet habitats and most likely would not occur where major reconstruction would occur, thereby avoiding impacting ASTE.

Recommended Mitigation

Before any reconstruction occurs, the botanist would review the reconstruction plan to ensure these populations are not inadvertently impacted or impacts are minimized.

Cumulative effects

Cumulative effects are the same as for Alternative 2–Proposed Action.

Determination

Due to the potential for impacts, this alternative may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species (MIIH).

Potential impacts are minor and would be avoided altogether with implementation of recommended mitigation measures. This would result in a determination of **No Impact** to ASTE.

Raven's lomatium

(*Lomatium ravenii*) Mathias and Constance

Status

Federal Status: N/A
Forest Service (Region 6) Status: Sensitive (USFS 1999)
Oregon State Status: N/A
Oregon Natural Heritage Program Status: List 2 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G4
National Rank=N4 (Dec. 17, 1994)
Oregon State Rank=S1

Major Threats

Not specified at this time

Degree of Fragility

Unknown

Habitat

Raven's lomatium (hereafter referred to as LORA) is found growing on lithosols in scab openings in mixed or ponderosa pine forest. It grows on flats, slopes, or ridges in association with low sagebrush, stiff sagebrush (*Artemisia rigida*) and western juniper. There is little information about this plant's mode of reproduction. It is presumed that the species depends upon individuals surviving disturbance events and then bearing seed to be scattered and restore the population.

Distribution

LORA is a rare plant once found in the Basin and Range of southeast Oregon. Herbarium records reveal a few early collections from Steens Mountain in Harney County, however repeated attempts to relocate these populations in the early 1980's failed. Because of this apparent rarity, the Oregon Natural Heritage Program, declared the species "extirpated" from the state. Outside of Oregon, LORA has been documented in one county of northeast California, in Nevada, and in Utah (Plants Database, USDA website).

In 1992, LORA was discovered in two locations on the Prairie City Ranger District. Since then, a few additional populations have been found on both Prairie City and Burns Districts. At this time there are 12 populations documented on the Forest. With one other population recently found in the Steens Mountain area, documented reports of this plant is still quite rare.

Existing Conditions

One population of Raven's lomatium (hereafter referred to as LORA) has been found within the planning area. It is located in the Burnt Mountain subwatershed on the southern rim of the Silvies River (T. 20 S., R. 30 E., Sec. 14). There are approximately 500 plants in the population in a scattered distribution over five acres. The area is a plateau with shallow, rocky soil. The site is interspersed with mountain mahogany (*Cercocarpus ledifolius*) and western juniper and surrounded by a mixed conifer forest of ponderosa pine and Douglas-fir. Other species on site are low sagebrush, Hood's phlox (*Phlox hoodii*), meadow pussytoes (*Antennaria corymbosa*), gray rabbitbrush (*Chrysothamnus nauseosus*) and woollypod milkvetch (*Astragalus purshii*).

Effects and determination

Alternative 1 (No Action Alternative)

Under this alternative, there would no activities, therefore, there would be **No Impact** to this species.

Ongoing activities (grazing, fire management, road use) would continue to influence conditions at this site. The effects of these activities on this species in not fully understood at this time.

Common to All Action Alternatives

Noxious Weeds

Manual treatment of noxious weed sites occurring in the watershed would not impact the LORA population because there are no noxious weed sites within the site. This sensitive plant is typically found growing in very shallow, rocky soils, while most weed species prefer deeper, wetter soils. There is little overlap of habitats so the potential for noxious weed encroachment on LORA sites is expected to be very low (Malheur National Forest Noxious Weed Control EA).

Fuels Management

The LORA population is located within fuel blocks 6 and 7. Landscape scale prescribed burning proposed in the watershed would not impact the Lomatium ravenii (LORA) population. This sensitive plant grows in a habitat almost devoid of fuel and, therefore, serves as a natural fuel break and would be unaffected by normal prescribed burning activities. In addition, as a designated ATP, vehicles and machinery used to implement prescribed burning would be prohibited on the site.

Alternative 2 (Proposed Action)

Vegetation Management

Under this alternative, there are precommercial and commercial thinning activities planned for the mixed conifer forest surrounding the scab flat that contains the only documented population of this species in the planning area. Thinning of conifer trees would not impact the LORA population as long as conifer trees are directionally felled away from the surrounding scab flat. In addition, as a designated ATP, vehicles and machinery used to implement thinning would be prohibited on the scab flat.

Road treatment activities

Forest road 3120279 passes through the scab flat where the population of LORA exists. In fact, many LORA plants are actually growing on the road.

There could be direct and indirect effects on the LORA population because of the road closure. The road would be closed with either a post and pole barrier or closure sign. A standard closure structure (earth berm) would be virtually ineffective at the beginning termini of this road because no other natural barriers exist to block vehicles from driving around the structure. A signed closure would be as effective at closing the road as other standard structures and least harmful to the population of LORA. The use of either a post and pole barrier or closure sign would have minimal impact on this population because individual plants could be avoided in the small area needed to install the structure. Prior to installation, a botanist would check the selected closure site to ensure that existing plants are avoided.

By reducing or eliminating motorized vehicle traffic on this road, there may be beneficial indirect effects on LORA. The populations may increase their concentration in the road by colonizing the abandoned wheel tracks. This revegetation could contribute to stabilizing the road against erosion.

Occasional violation of the road closure CFR is likely, especially if a sign is used. This occasional use may be sufficient to prevent significant colonization of the abandoned wheel tracks. Monitoring by a botanist would determine the effectiveness of the closure and if any future management activities would be needed to protect the site.

Cumulative effects

Because this rare plant was discovered recently on the Malheur National Forest, very little is known about the growth habit of LORA and much less is known about the effects of fire, natural disturbance, grazing, and timber management activities on its survival. However, the habitat in which this plant grows influences what kinds of disturbances can occur.

The plant grows on lithosolic soils defined as “a great soil group of azonal soils characterized by an incomplete solum or no clearly expressed soil morphology and consisting of freshly or imperfectly weathered rock or rock fragments” (Brady 1974). This type of soil provides a very low-nutrient, shallow substrate that cannot support many plants; therefore, this habitat is very sparsely vegetated with little fuel to carry a fire, little to no forage to attract grazers, and only scattered western juniper in the overstory.

LORA grows in an environment naturally unaffected by fire because of limited fuels, and appears unaffected by heavy grazing because of sparse grasses. Because of these environmental influences, LORA may not be well adapted to grazing disturbance or fire impacts.

A proposed road closure would discontinue further motorized disturbance of its habitat, and may even encourage LORA to spread into the roadbed and aid in controlling soil erosion.

Determination

With application of recommended mitigation, there would be **No Impact (NI)** on this population of LORA.

Alternative 3

Direct and Indirect Effects

Under this alternative, there are precommercial thinning activities planned for the mixed conifer forest surrounding the scab flat that contains the only documented population of this species in the planning area. Through the application of an ATP, precommercial thinning activities proposed under this alternative would not likely impact this population.

Cumulative effects

Cumulative effects are the same as for the Proposed Action.

Determination

With application of recommended mitigation, there would be **No Impact (NI)** on this population of LORA.

Alternative 4

Direct and Indirect Effects

The effects for all activities under this alternative are the same as under the Proposed Action. Alternative 4 proposes only commercial thinning for the unit adjacent to the LORA site.

Determination

With application of recommended mitigation of a designated 50-foot ATP for the sensitive site is followed, there would be **No Impact (NI)** on the population of LORA because of activities proposed under this alternative.

Alternative 5

Direct and Indirect Effects

This alternative proposes precommercial and commercial thinning in the unit adjacent to the LORA site. The effects are the same as those described under Alternative 2- Proposed Action.

Under this alternative, FS road 3120279 would be left open. The road would likely be used by forest users. This use would likely prevent recolonization of the wheel tracks.

Cumulative effects

Cumulative effects are the same as for the Proposed Action.
Determination

With application of recommended mitigation, there would be **NO IMPACT (NI)** on this population of LORA.

Alternative 6

Direct and Indirect Effects

The effects of all activities, except for silvicultural activities, would be the same under this alternative as under Alternative 2- Proposed Action. No silvicultural activities would occur in or near the documented LORA site under this alternative.

Cumulative effects

Cumulative effects are the same as for the Proposed Action.

Determination

With application of recommended mitigation measures, there would be **No Impact (NI)** on the population of LORA because of activities proposed under this alternative.

Alternative 7-Preferred Alternative

Direct and Indirect Effects

The effects for all activities under this alternative are the same as under the Proposed Action. Alternative 7 proposes only commercial thinning for the unit adjacent to the LORA site.

Determination

With application of recommended mitigation of a designated 50-foot ATP for the sensitive site is followed, there would be **No Impact (NI)** on the population of LORA because of activities proposed under this alternative.

Alternative 7a

Direct and Indirect Effects

The effects for all activities under this alternative are the same as under the Proposed Action. Alternative 7a proposes only commercial thinning for the unit adjacent to the LORA site.

Determination

With application of recommended mitigation of a designated 50-foot ATP for the sensitive site is followed, there would be **No Impact (NI)** on the population of LORA because of activities proposed under this alternative.

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Appendix C

Status Definitions

Federal Status Definitions

Endangered Species, which are in danger of becoming extinct within the near future throughout all or a significant portion of their range

Threatened Species those likely to become endangered within the foreseeable future.

Species of Concern Former USFWS C2 candidate that have sufficient information to support a proposal to list under the ESA or by ODFW under the OEAS.

Oregon's Threatened and Endangered Species Program Definitions
(under the authority of ORS 496.172, the Oregon Endangered Species Act, 1987)

Sensitive species are broken into four categories defined as follows:

Critical Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species that are at risk throughout their range, and some disjunct populations.

Vulnerable Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

Peripheral or Naturally Rare Peripheral species refer to those whose Oregon populations that are on the edge of their range, Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting factors. Maintaining the status quo for the habitat and population of these species is a minimum requirement. Disjunct populations of several species that occur in Oregon should not be confused with peripheral.

Undetermined Status Animals in this category are species for which status is unclear. They may b susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study will be required before a classification can be made.

Conservation Status Ranking

5 Secure-Common, demonstrably widespread and abundant. Typically with considerably more than 1000 occurrences and more than 10,000 individuals.

Secure in Oregon, and essentially ineradicable under present conditions.

4 Apparently Secure-Uncommon but not rare, and usually widespread. Possibly, cause for long-term concern. Typically more than 1000 occurrences and more than 10,000 individuals.

Not rare, and usually widespread in Oregon. Usually more than 100 occurrences.

3 Vulnerable-Vulnerable globally because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

Vulnerable in Oregon either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 1000 occurrences.

2 Imperiled-Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).

Imperiled in Oregon because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 21 to 100 occurrences.

1 Critically Imperiled-Critically imperiled globally because of extreme rarity or because of some factor(s) making is especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).

Critically Imperiled in Oregon because of extreme rarity or because or some factor(s) making it especially vulnerable to extirpation for the state. Typically 5 or fewer occurrences or very few remaining individuals or acres.

Oregon Natural Heritage Program List (ONHP 2000)

List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2 contains taxa that are threatened with extirpation or presumed extirpated from the state of Oregon. These often peripheral or disjunct species are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHP regards extreme rarity as a significant threat and has included species that are very rare in Oregon on this list.

List 3 contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4 contains taxa that are of conservation concern but are not currently threatened or endangered. This includes taxa that are very rare but are currently secure, as well as taxa that are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these taxa currently may not need the same active management attention as threatened or endangered taxa, they do require continued monitoring.

Appendix A

Determination of Conclusion Definitions for Biological Assessments and Biological Evaluations.

Listed Species

No Effect (NE)

Applied when a project or activity will not have any "effect" on a listed species, or critical habitat.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required.

May Effect-Likely to Adversely Affect (LAA)

If all Forest Plan standards and guidelines, interim direction and Recovery Plan conservation recommendations to protect threatened or endangered species cannot be implemented, a "May Effect-Likely to Adversely Affect" situation likely exists. Informal consultation should be begun to determine if this determination can be avoided.

If this determination is made, formal consultation must be initiated (50 CFR 402.12). Formal consultation must be requested in writing through the forest supervisor (FSM 2670.44) to the appropriate US Fish and Wildlife Service state or field supervisor, or National Marine Fisheries Service office.

May Effect-Not Likely to Adversely Affect (NLAA)

A situation where a "May Effect-Not Likely to Adversely Affect" conclusion could be made if there are possible effects such as displacement or habitat modification, but those effects are insignificant or discountable.

If this determination is made, then written concurrence by the US Fish and Wildlife Service or National Marine Fisheries Service is required (50 CFR 402.13). Requests for concurrence must be initiated in writing from the forest supervisor to the state or field supervisor.

Beneficial Effect (BE)

A situation where an activity or project is determined to substantially improve the habitat or status of a threatened or endangered species, or its habitat.

Written concurrence from the US Fish and Wildlife Service or National Marine Fisheries Service is required. Requests for concurrence must be initiated in writing from the forest supervisor to the state or field supervisor.

Proposed Species

No Effect (NE)

Applied when a project or activity will not have any "effect" on a proposed species, or proposed critical habitat.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required.

Not Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat (NLJR)

This determination is used when there are effects or cumulative effects, but where such effects would not have the consequence of losing key populations (stocks), would not adversely modify proposed critical habitat, or would not irreversible or irretrievable commit resources that might foreclose options to recovery, should the species be listed.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required but may be initiated.

Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat (LJR)

This determination is used when there are significant effects that could jeopardize the continued existence of the species, result in adverse modification or destruction of proposed critical habitat, and/or result in irreversible or irretrievable commitments of resources that could foreclose options to avoid jeopardy, should the species be listed.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is required if this determination is made.

Sensitive Species

No Impact (NI)

Applied when an activity would have no effect on habitat, individuals, a population or a species.

May Impact Individuals or Habitat, But will Not Likely Contribute to a Trend Toward Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)

Activities or actions that have effects that are immeasurable or minor, or that are consistent with Conservation Strategies or conservation of the species would receive this conclusion.

For populations that are very small, or vulnerable, each individual may be important for the short and long term viability.

Because sensitive species have been designated based on concerns for their viability, impacts on either individuals or populations are best managed under the umbrella of a Conservation Strategy. Without a Conservation Strategy, the best hierarchical level to base effects of management activities or activities is usually the population, metapopulation or fish stock level.

Will Impact Individuals or Habitat with a Consequence that the Action Will Contribute to a Trend Toward Federal Listing or Cause a Loss of Viability to the Population or Species (WIFV)

Loss of individuals or habitat can be considered significant when the potential effect may be:

1. contributing to a trend towards federal listing,

2. results in a significantly increased risk of loss of viability to a species,

3. or results in a significantly increased loss of viability to a population (stock).

Activities that adversely affect many individuals, or even a few individuals in vulnerable populations, should probably receive this determination unless there is a Conservation Strategy. Activities that are in conflict with the Conservation Strategy or Conservation Agreement would receive this determination.

Significant adverse impacts to sensitive species must not occur until a Conservation Strategy, or similar plan for species conservation, is prepared (FSH 2672.1) The purpose of a Conservation Strategy is to ensure cumulative effects do not result in reduced viability or conditions that result in the need for federal listing.

Beneficial Impact (BI) - Applied when an activity would benefit a sensitive species.

Appendix B

PETS Species List for the Emigrant Creek Ranger District and Occurrence in the Silvies Canyon Watershed Restoration Project Area (Revised 12-2000)

common name	scientific name	status	occurrence in project area
gray wolf	Canis lupus	Endangered	historical
northern bald eagle	Haliaeetus leucocephalus	Threatened	documented
Columbia River bull trou (Columbia River DPS)	Salvelinus confluentus	Threatened	N/A
Mid Columbia River steelhead (mid-Columbia River ESU)	Oncorhynchus (=Salmo) mykiss	Threatened/Designated Critical Habitat	N/A
lynx	lynx canadensis	Threatened	suspected
American peregrine falcon	Falco peregrinus anatum	R-6 Sensitive	suspected
western sage grouse	Centrocercus urophasianus phaios	R-6 Sensitive	documented
gray flycatcher	Empidonas wrightii	R-6 Sensitive	documented
bobolink	Dolichonyx oryzivorus	R-6 Sensitive	N/A
Tri-colored blackbird	Agelaius tricolor	R-6 Sensitive	N/A
Upland sandpiper	Bartramia longicaude	R-6 Sensitive	N/A
bufflehead	*Bucephala albeola*	R-6 Sensitive	documented
wolverine	Gulo gulo luseus	R-6 Sensitive	suspected
pygmy rabbit	Brachylagus idahoensis	R-6 Sensitive	suspected
Pacific fisher	Martes pennanti	R-6 Sensitive	unknown/historical
redband trout	Oncorhynchus mykiss spp	R-6 Sensitive	documented
Malheur mottled sculpin	Cottus bairdi complex	R-6 Sensitive	documented
Columbia spotted frog	Rana luteiventris	R-6 Sensitive	documented
Henderson's ricegrass	*Achnatherum hendersonii and A. wallowensis (Oryzopsis hendersonii)*	R-6 Sensitive	suspected
Deschutes milkvetch	Astragalus tegetarioides	R-6 Sensitive	documented
upward-lobed moonwort	Botrychium ascendens	R-6 Sensitive	suspected
crenulate moonwort	B. crenulatum	R-6 Sensitive	documented
lance-leaved moonwort	B. lanceolatum	R-6 Sensitive	suspected
Mingan moonwort	B. minganense	R-6 Sensitive	suspected
pinnate moonwort	B. pinnatum	R-6 Sensitive	suspected
Peck's long-bearded mariposa-lily	Calochortus longebarbatus var. peckii	R-6 Sensitive	suspected
Back's sedge	Carex backii	R-6 Sensitive	suspected
inland sedge	C. interior	R-6 Sensitive	suspected
Parry's sedge	C. parryana	R-6 Sensitive	suspected
clustered lady's-slipper	Cypripedium fasciculatum	R-6 Sensitive	suspected
Raven's lomatium	Lomatium ravenii	R-6 Sensitive	documented
monkeyflower	Mimulus evanescens	R-6 Sensitive	suspected
least phacelia	Phacelia minutissima	R-6 Sensitive	suspected
Oregon semaphore grass	Pleuropogon oregonus	R-6 Sensitive	suspected
arrowleaf thelypody	Thelypodium eucosmum	R-6 Sensitive	suspected

Documented=in project area, or adjoining lands **Suspected**=potential habitat present **N/A=Not Applicable**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish & Wildlife Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

File 2670

Reply To: 8330.10414 (01)
X-ref:
File Name: Silvies Canyon Watershed Restoration Project
OALS Number: 01-4899

September 26, 2001

Bonnie J. Wood
Forest Supervisor
Malheur National Forest
P.O. Box 909
John Day, OR 97845

Subject: Silvies Canyon Watershed Restoration Project

Dear Ms. Wood:

This letter responds to your request for informal consultation received on May 31, 2001, regarding potential effects to the threatened bald eagle (*Haliaeetus leucocephalus*), resulting from implementation of the Silvies Canyon Watershed Restoration Project. The project was analyzed by Emigrant Creek Ranger District staff, and a determination was made that the action may affect, but is not likely to adversely affect bald eagles.

<u>Project Description:</u>

The proposed action is described in the Biological Assessment (May 2001) and involves a combination of activities including: management of timber stand density and composition; fuels reduction through prescribed burning or mechanical treatments; aspen stand enhancement and protection; and road management projects including closure, decommissioning and reconstruction. The preferred alternative includes extensive treatment areas: 77 miles of year round road closure or decommissioning and 10 miles of seasonal road closure; 202 miles of road reconstruction and 15 miles of temporary road construction, with post treatment closure; 16,186 acres of precommercial thinning and associated fuels treatment; 15,701 acres of thinning and associated fuels treatment (including 121 acres of aspen restoration); 715 acres of juniper thinning; 452 acres of lodgepole pine thinning; and establishment of 47,726 acres within landscape scale fuel treatment blocks with a combination of mechanical and fire treatments prescribed to be implemented over a period of 20 years (including 42,000 acres of prescribed burning).

Within the Bald Eagle Management Area (BEMA), 29 acres of commercial thinning, 144 acres of small diameter tree thinning, and 174 acres of prescribed burning are proposed. Within potential winter roosts, small diameter tree thinning treatments, and subsequent hand piling and burning of slash would occur on 729 acres. Immediately outside the BEMA an additional 926 acres within the same fuel block would be treated with prescribed fire at the same time as that area within the BEMA. Where the precommercial thin overlaps with the prescribed fire area, pretreatment of slash will occur by pile burning after the thinning is accomplished, but before the broadcast burn. Precommercial thinning and prescribed burning treatments are proposed within 1/4 mile of the nest site, and commercial, precommercial and burning treatments are proposed within ½ mile and within line of sight of the nest site.

Species Account:

One bald eagle nest is known in proximity to areas proposed for treatment by this project. This nest has been occupied annually since it was located ten years ago, and has produced young at least seven years within that period. Several treatment units are within the boundary of the Silvies River BEMA.

Two potential winter roost areas (Silvies River Roost and Myrtle Creek Roost) have been identified approximately seven miles southwest of the BEMA. The majority of the area within these potential roost areas are also proposed for treatment.

This proposed action should not affect the amount of habitat suitable for foraging, nesting or roosting by bald eagles. The project will, however, alter the composition and structure of timber stands in proximity to the Silvies River nest site and within two potential winter roost sites in the Silvies Canyon watershed. There is also potential for effects from disturbance during the nesting season or at winter roosts, or due to unplanned effects such as wind throw or loss of containment on prescribed fires.

The nest area contains an overstory of ponderosa pine that became established in small clumps or unevenly spaced single trees 150 to 400 years ago. High frequency and low intensity fires maintained the light stocking level in the understory and resulted in light and patchy mortality in the overstory. With grazing from livestock beginning in the late 1800s and fire suppression beginning in the early 1900's, thick understory conifers became established. This trend in combination with selective logging beginning in the 1940's resulted in stand conditions that are outside of the historic range of variability for the site. The changes in stocking levels, forest mortality, fuel type and abundance promote fire conditions that would likely result in high intensity stand replacing fire events.

Concurrence:

The U.S. Fish and Wildlife Service (Service) has reviewed The Biological Assessment (BA) and supporting documents, along with information provided at a Level 1 Team meeting on October 11, 2000, for the Silvies Canyon Restoration Project. The BA determined that the proposed action, as described in these documents, may affect but is not likely to adversely affect bald eagles.

Commercial thinning and small tree thinning are prescribed to redistribute growth potential to overstory and mid-story trees, and to increase vigor and longevity of overstory trees currently under stress from competition with understory conifers. These treatments should reduce the susceptibility of the remaining stand to insects and disease. Understory density treatments combined with prescribed fire are intended to reduce ladder fuels and lower fuel loading. These treatments may contribute to a reduction in future fire intensities.

Seasonal operating restrictions are prescribed to be implemented for treatment areas within one mile of the nest site between January 1 and August 31 of each nesting season. In addition, if the winter roosts become active, seasonal operating restrictions are to be implemented from November 15 through April 15.

For the reasons stated above, the Service concurs with the "may affect, but not likely to adversely affect" determination. This review completes informal consultation on effects to bald eagles for activities described within the Silvies Canyon Restoration Project BA, pursuant to section 7(a)(2) of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*) as amended, and the Interagency Consultation Regulations (50CFR 402).

If other listed or proposed species are determined to be potentially affected by this action, consultation for those species should be completed. Should additional information become available on the use of the affected area by bald eagles, or if the effects are determined to be greater than described, re-initiation of consultation may be required. The Forest is encouraged to continue to explore opportunities to manage pro-actively to benefit native species, and to promote the conservation of proposed and listed species as directed by section 7(a)(1) of the Endangered Species Act.

Thank you for your continued cooperation in the effort to conserve and restore native species and the ecosystems they inhabit. If you have questions regarding this response, please contact Dede Steele at our Bend Field Office (541) 383-7146.

Sincerely,

Nancy K. Lee

for Kemper M. McMaster
State Supervisor

Burns Paiute Tribe
NATURAL RESOURCE PROGRAMS
HC-71 100 PASIGO STREET
BURNS, OREGON 97720
PHONE (541) 573-2421
FAX (541) 573-2422

3/21/01

Joan Suther & Lori Bailey
IDT Co-Leaders
Burns Ranger District
HC 74, Box 12870
Hines, Oregon 97738

Ms. Suther & Ms. Bailey:

I have reviewed the Silvies Canyon Watershed Restoration Project Draft EIS and have a number of comments regarding the document. The Silvies Watershed is in the boundaries of the former Malheur Reservation and is not just an area "traditionally" used by the Burns Paiute. I am concerned that the tribe's occupation and use of this area is minimized. This region is of significant interest and importance to tribal members. Burns Paiute tribal members have lived in this region for 1000's of years. The Burns Paiute Tribe has interest in the Silvies River system. Oral histories and visits to the region have produced a great deal of knowledge related to current and past use by tribal members. Documentation of tribal history through oral documentation is part of a larger BPT cultural research focus of documenting, preserving and maintaining tribal culture. It is important for the Forest Service to recognize the Burns Paiute use of the area – they are the primary Indian users of the Silvies watershed.

The Tribe has used this region since their occupation of the northern Great Basin. Tribal members have and still use this area for hunting, fishing, gathering, and religious purposes. Many activities that were thought to no longer occur are still practiced by tribal families, such as traditional religious ceremonies. Gathering of plants for food, medicine and art is flourishing. Hunting for a variety of mammals is an important subsistence activity for tribal members. Fishing, with a current focus on trout, is conducted spring through fall of every year. 1-1

There is a rich history alive in this region. People tell stories related to a variety of topics, including friendly contact with other Tribes, battles with the US Army and other Tribes, travel throughout their aboriginal area, and trade relations.

The Malheur Reservation boundaries are documented as

> Beginning at the mouth of the North Fork of the Malheur River; thence up said North Fork, including the waters thereof, to Castle Rock; thence in a northwesterly direct to Strawberry Butte; thence to Soda Spring, on the Canyon City and Camp Harney Road; thence down Silvies River to Malheur Lake; thence east to the South Fork of the Malheur River; thence down said South Fork, including the waters thereof, to the place of beginning (to be known as Malheur Reservation), including all lands within said boundaries, excepting so much thereof as may have been granted for military or wagon-road purposes (Indian Claims Commission 1950).

The Burns Paiute received reparation for the loss of the Malheur Reservation after the Indian Claims Commission upheld the boundaries of the reservation and recognized tribal losses.

Tribal members indicate that their people have always been in this region. They learned to survive in the High Desert by moving from resource to resource as needed. Families or small groups would travel – occasionally meeting other families. Large winter camps developed in protected areas close to water, such as lakes, hot springs or rivers. The activities people did in the past continue to be reflected in historic and current actions. Tribal members still hunt, fish and gather as their ancestors did. This is an important part of the culture of the Silvies watershed and more description of tribal use needs to be included in the document. 1-1-2

One of the earliest descriptions of Indians in southeastern Oregon is in the journal of Peter Ogden (Ogden 1909-1910). Ogden described "Snake" Indians living in the area of Malheur Lake. The "Snake" Indians are now considered to have been Northern Paiute people – the ancestors of the people living on the Burns Paiute Reservation.

As settlers started moving into the area, the Indians were forced to approach the newcomers. Settlers arrived with farm and ranch animals that would eat foods normally gathered by the Indians, such as native grasses. The settlers did not recognize the native grasses as a human food source. The situation became serious for the Indians when important food sources were no longer available to them. Also, settlers often did not allow the Indians access to traditional food sources on lands they had homesteaded – a practice that continues today (BPT Elder, Age 65). The lack of food led the Indians to fight with the settlers. The settlers complained to Washington, DC about the "Indian problem". The US Army was sent to intervene on behalf of the settlers. Fort Harney was developed to control the Indians in this region. The Indians continued fighting with the settlers.

In 1868 J. W. Huntington, Superintendent of Indian Affairs in Oregon, held a meeting with representatives of the different "Snake" Indians at Fort Harney. A treaty was developed and signed by seven tribal representatives (We-You-We-Wa, Gsha-Nee, E-He-Gant, Po-Nee, Chow-Wat-Na-Nee, Ow-Its, and Tash-E-Go) (Indian Claims Commission 1950). The treaty indicated that a reservation would be developed and set aside to provide for the "Snake" Indians. This treaty was not ratified by Congress. The primary purpose for developing this treaty was to end the continued attacks between settlers and Indians in southeastern Oregon.

> "On September 4, 1872 the Commissioner of Indian Affairs wrote the following letter to the Secretary of the Interior:
>
> Sir: I have the honor to inclose herewith a report, dated the 22nd ultimo (and accompanying map), received from T. B. Odeneal, Esq., superintendent Indian affairs for Oregon, reciting the action taken by him relative to the establishment of a proposed reservation on the headwaters of Malheur River, in that State, for the Snake or Piute Indians, under instructions contained in letter to him from this office, dated the 6th of July last....
>
> Beginning at the mouth of the North Fork of the Malheur River; thence up said North Fork, including the waters thereof, to Castle Rock; thence in a northwesterly direction to Strawberry Butte; thence to Soda Spring, on the Canyon City and Camp Harney Road; thence down Silvies River to Malheur Lake; thence east to the South Fork of the Malheur River; thence down said South Fork, including the waters thereof, to the place of beginning (to be known as Malheur Reservation), including all lands within said boundaries, excepting so much thereof as may have been granted for military or wagon-road purposes.
>
> I respectfully recommend that the tract of country embraced within the foregoing limits be set apart and reserved as an Indian reservation, and that the President be requested to issue an Executive order accordingly...."(Indian Claims Commission 1950).

The Executive Order was signed by the President on September 12, 1872. By February 1878, 846 Indians were living on the Malheur Reservation including 759 Paiute and 87 Shoshone Indians (Indian Claims Commission 1950).

Tribal ancestors were encouraged to abandon traditional practices and to become farmers and ranchers (BPT Members, Age 52, 65, and 85). Many of the Indians made an effort to accommodate the US Army and started farming. Many cooperated with the federal government's plans and made friends with the first Indian Agent assigned to the Malheur Reservation. Buildings at the site were constructed including a saw mill, mess house, commissary, and Agency office or headquarters. The saw mill produced the lumber for the agency buildings.

When a new agent, Rinehart, came and replaced Parrish, the relationship with the Indians soured rapidly. Rinehart had promised to pay the Indians cash for the work they did, but instead gave them second hand goods, which Egan, a tribal leader, and others took it as an insult. Egan had a number of meetings with Rinehart who refused to submit to the demands. Settlers began encroaching on reservation lands (Burns Paiute Elders Age 81, 79, 56 and Duck Valley Tribal Members, oral communication, 1999). The cattle ranches

P ir and farms mentioned in the EIS (p.3-57) as encroaching on traditional land of the Wadatika were people setting up homes and ranches on the tribal reservation.

The Indians on the reservation became increasingly dissatisfied with their situation. The Bannocks arrived in the area of Agency Valley and were on the verge of starvation which inspired people from the Malheur Reservation to protest their situation (BPT Elder, Age 81). Many of the Paiutes left the Malheur Reservation to live off the land as they had always done. The Bannocks found willing allies in their decision to fight the settlement of their land, which started the Bannock War. Many of the young people on the reservation felt that they should support the Bannock people. Older Paiute people tried to convince them not to go to war (BPT Elder, Age 65). In June 1878 the Bannock War began and a majority of the Indians living on the Malheur Reservation left to join the war. Some tribal families chose not to fight and stayed behind.

The Malheur Reservation was used by the US Army during the Bannock War which includes the Silvies watershed. The Indians associated with the Malheur Reservation were taken by the US Army to the Yakima Reservation (BPT Common Knowledge and Soucie 1972). Executive Orders in 1882, 1883, and 1889 opened the Malheur Reservation to public domain (Indian Claims Commission 1950). The reservation was opened to public domain because Indians no longer lived on the land.

Some tribal members managed to escape from the Yakima Reservation by swimming or hanging onto horses to cross the Columbia River. The ones that survived made their way back to the city of Burns. They were afraid to return to the Malheur Reservation due to anti-Indian sentiments.

Representatives from the descendants of the Malheur Reservation sued the US Government for the wrongful taking of the reservation in 1950 for $3,500,000. Their first case in front of the Claims Commission was turned down, but later overturned by a federal court. The next time the Claims Commission reviewed the case they found in favor of the Tribe. A 1959 Claims Commission report indicates that the acreage under consideration for value and payment to the Tribe is 1,449,304.77 after land was taken away for wagon road grants and Indian allotments (7 Ind.Cl.Com 526:p.527). "The subject tract is located largely in what is now Harney County in southeastern Oregon. The tract also extends on its eastern border some twelve miles into Malheur County and on its northern boundary an area in the shape of a triangle extends about nineteen miles north into Grant County with its northernmost tip at Strawberry Butte in the Blue Mountains. Approximately 75 percent of the tract lies within Harney County and the balance is about equally divided between Grant and Malheur Counties. The tract extends in its greatest dimensions east and west about 60 miles, and north and south approximately 65 miles" (7 Ind. Cl. Com. 526:p.527). The Tribe was reimbursed for the wrongful taking of the Malheur Reservation at 1880 prices. The land was valued low because timber had not yet become the valuable commodity it is today.

1-3 Plants are actively gathered in the Silvies system by women, men and children. The list includes, but is not limited to: dogbane, sagebrush, rabbit brush, red osier dogwood, juniper, bitterroot, biscuit root, quaking aspen, chokecherry, grey willow, coyote willow, camas, mountain Mahogany and cattail.

One of the primary uses of plant materials is for food. The best known plants are the roots, such as bitterroot and biscuitroot. These root crops are gathered in the spring and summer for use throughout the year using a digging stick. They primarily grow in scabby rocky areas. The roots are eaten fresh or dried for storage. Root gathering is labor intensive. After digging up roots the people take them home to prepare or work on them at their campsite. The outer part of the root is stripped off. Then, the roots are hung up in muslin or laid out to dry, or they are frozen. Traditionally, tribal members would either grind them for flour or boil them. Today, people generally boil the roots for consumption. Almost every tribal family gathers roots. People are willing to travel an hour or two to get to a good gathering spot. Roots are used for daily and ceremonial use. Examples of use include the monthly Elders Meeting, funeral dinners, Reservation Day, and Annual Elders Gathering. Roots are an important part of any traditional menu.

The Burns Paiute Tribal members are actively gathering chokecherries throughout the area. Chokecherries are an important traditional food that is served at a variety of occasions. They are served at large gatherings/meetings, such as the Burns Paiute Reservation Day celebration. Tribal members of all ages consume chokecherry pudding, which is made out of chokecherries. There is also a bedrock mortar nearby the chokecherry site, which indicates that tribal members have been processing plant products in this area for a long time.

The last major category of plants is for art and utility. People use a variety of plants to construct dreamcatchers, cradleboards, dolls, baskets, mats, twine, and duck decoys. These items are used both for personal and commercial purposes. The master artists with the Tribe are the older members. They have been actively teaching their art to younger tribal members, so there is a resurgence in traditional arts.

Cradleboards, made of willow, have always been made by tribal members for carrying and protecting babies. In the past, all babies would have at least one cradleboard. Today, the majority of babies still have a cradleboard. Sometimes the cradleboards are handed down in families and used again. Larger cradleboards may be made for babies to accommodate their growth. Willow, along with red osier dogwood, are collected along riparian areas.

Fishing is actively done by tribal members of both sexes and all ages. Fish have always been an important resource for tribal members. On a number of times during fieldtrips and interviews tribal staff ended up taking people fishing. This proved valuable because it got some of the tribal men involved in the recording of tribal history. Today, the only available native fish is redband trout. As stated before, people fish spring through fall. 1-4

Many tribal families actively hunt in Harney and Grant counties, Oregon. They hunt for elk, deer, antelope, groundhog (yellow bellied marmot), rabbit, ducks and geese. These are all traditional food sources for the Tribe and are eaten throughout the year. Many tribal members still tan hides by brain tanning. The hides are used in the construction of clothing, saddles and jewelry. 1-4

1-5 The point of this discussion is that this area is important to the Burns Paiute Tribe. In the Affected Geographic Area (3-24) the Burns Paiute Reservation and land in Logan Valley needs to be discussed. Plant gathering, hunting and fishing by tribal members are important uses of the Silvies Watershed (3-5). Every tribal family uses this region for cultural purposes. Careful consideration needs to occur if roads are closed in the Silvies Watershed. Many tribal members gather plants in this area and I am concerned that their traditional cultural practices may be limited. Many of the people on the reservation that are the master artists are elders and have limited mobility. These individuals need to be able to get to cultural plant and other sites in this region. 1-6 Spraying of noxious weeds need to be carefully coordinated with the Tribe to avoid important cultural plant sites being impacted and/or destroyed. Little research has occurred that shows the impact of weed spraying on cultural plants. 1-7 Also, the "Native American burning" in the Silvies Watershed was by Northern Paiute people and ancestors of the Burns Paiute Tribe. 1-8 I have turned over the EIS to the tribal Fisheries and Wildlife Department, so you may receive comments from another staff person.

Sincerely,

L. Jerofke

Linda Jerofke
Cultural Resource Manager
541-573-2088 ext.244

cc: Tribal Council

D-6

1-1. Gathering of food and non-food items is recognized as very important to the Burns Paiute Tribe. The supplemental DEIS discusses this and attempts to analyze potential effects on and relative benefits to: road access, forest restoration and sustainability of resources, fuelwood availability, and potential for employment. See SDEIS, pages 2-3 through 2-5, 2-11, 2-14, 2-16, 3-4 through 3-7, 3-14 and 3-15. See also the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

1-2. This has been addressed in the SDEIS and the FEIS. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

1-3. This was not identified as an issue during scoping, so the effects on these species were not analyzed in the DEIS. The FEIS chapter 4 describes the effects to many of these species. Most root crops like bitterroot, biscuit root and camas occupy areas that are generally unaffected by the activities we are proposing. Proposed activities were also designed to move vegetation towards its historic range of variability.

Since these are all species that developed in a fire environment, prescribed fire should have limited effects on them. The most common effect would be to kill the older growth in the perennial plants and regenerate younger plants. Also, since prescribed fire would occur in a mosaic pattern, there should be limited effects on species. Since the majority of the prescribed burning is to be done in the spring, there should be little effect on riparian vegetation; riparian areas are usually too wet to burn in the spring.

Cutting juniper should reduce the amount of juniper in the project area, but compared to the total amount of juniper in the watershed, there would be little effect. There are still numerous stands of juniper throughout the watershed that are not being treated.

Manual vegetation management activities would occur in all seasons, over several years, and throughout the watershed. There would be no effects on riparian vegetation since INFISH buffers would be adhered to.

1-4. Proposed management activities, including reintroduction of fire, should increase big game habitat (big game populations are managed by Oregon Department of Fish and Wildlife). Forage for big game would be enhanced while thermal and hiding cover may be reduced. Prescribed fire should also increase forage for rabbits and marmots. There should be a benefit to aquatic species (redband trout, ducks and geese) from proposed management in the long term, which is explained in BE/BA, pages 31-39, Appendix C.

1-5. The Silvies Canyon SDEIS pages 2-3, 2-5, 2-8, and 2-14 disclosed the importance of the area to the Burns Paiute Tribe, and the current and historic uses of the area by the Tribe. Chapter 3 disclosed the effects by alternative to the Tribe. This discussion has been updated in the FEIS. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

1-6. Although Alternative Four is preferred for vegetation treatment, the access management (road closures) portion was not preferred, primarily because it could have a significant impact on the Burns Paiute Tribe, the elderly, and the mobility impaired.

Under the Preferred Alternative, motorized access into areas still exists. Approximately 227 miles of roads would remain open in this watershed. Closures predominantly would address those spurs that serve no purpose other than to access old logging units, and those roads that are causing environmental damage. Road closures and decommissioning were designed to benefit fish and wildlife. Motorized access was identified as a significant issue in the FEIS chapter 1. Permits are available to access closed roads when justified.

1-7. No spraying of noxious weeds was proposed as part of the Silvies Canyon Watershed Restoration Project. In the DEIS, the treatment of 6 sites by “hand pulling and grubbing” was considered (DEIS, page 2-27). In the FEIS, the analysis of 12 sites by “hand pulling and grubbing” is considered (FEIS chapter 2).

For cumulative effects analysis and tiering, the DEIS referenced the Malheur National Forest Noxious Weed Environmental Analysis (April 2000) and Decision Notice and FONSI (June 26, 2000) under which 63 sites in the Silvies Canyon project area were proposed to be treated with herbicides and two sites with hand pulling. This EA is not open for review or appeal in this EIS. However, since the 2000 decision, an appeal has resulted in treatment of the 63 sites to be changed to manual treatment. The FEIS has been updated to include this information.

1-8. In the DEIS, the term “Native American” was used so as not to exclude the probable use and claims of use of the project area by other American Indians. This has been updated in the FEIS. Refer to the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

4.18.01

Dear Ms. Bailey,

I strongly urge: the highest # of
21 roads permanently closed & de-
commissioned, restoration (full)
with NO commercial harvest,
NO management activities within 2-2
the Myrtle-Silvies Roadless area,
meeting big game cover standards & 2-3
NO logging old growth! Do 2-4
your job! Protect the forest & 2-5
the endangered, threatened &
sensitive species!

Your attention to this most
urgent matter would be
much appreciated!

Thank you,

[signature]

Ms. Lydia Garvey
P.O. Box 487
Rosebud, SD 57570

D-9

2-1. Your preference most closely matches Alternative Three, with the exception that you would prefer no management activity within the Myrtle-Silvies Roadless Area. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

2-2. The No Action Alternative (Alternative One) and Alternative 7a propose no management activities in the Myrtle-Silvies Roadless Area. See FEIS chapter 2 for more information.

2-3. The cover table in Chapter 3 of the FEIS shows that, prior to proposed actions, some subwatersheds met the Forest Plan standard for deer and elk winter range cover while other subwatersheds did not meet Forest Plan standards.

After treatment some big game cover values, both in winter range and in summer range, will be reduced below current values or below Forest Plan standards (see cover table in Chapter 4 of the FEIS) in Alternatives 2, 4, 5, 7, and 7a. As described in Chapter 2 of the FEIS, a Forest plan amendment would be necessary to reduce cover below the Forest Plan standards or below existing conditions that do not meet standards. As recommended in the Malheur Forest Plan (IV-28), hiding cover would be retained in unthinned patches to mitigate a shortage in satisfactory cover (Chapter 2). Analysis of effects of going below standards is included in the FEIS, Chapter 4.

2-4. Commercial harvesting in LOS (Late and Old Structure) is designed to maintain and enhance large tree structure. No trees 21 inches dbh (diameter at breast height) or greater would be harvested except in aspen stands under Alternative 4. No harvest is proposed in Dedicated Old Growth. Refer to FEIS chapter 4 for the effects to LOS and Old Growth.

2-5. The purpose and need for this project is described in the FEIS chapter 1. Generally the purpose of the proposed project is to protect the National Forest and increase forest health and long-term sustainability (DEIS 1-10). Chapter 4 of the FEIS and the project BE/BA (Appendix C) describe the potential effects to TES (threatened, endangered, and sensitive) species. Even though there may be short-term effects to some TES species, the long-term benefits of healthy riparian areas and forests would improve habitat for these species.

Malheur Wildlife Associates

Malhuer National Forest, Emigrant Creek Ranger District April 14 2001
HC-74, Box 12870
Hines, Oregon 97738

Dear ~~Sir~~: Attn: Lori Bailey

Malhuer Wildlife Associates(MWA) is an organization of over 100 members with interest in maintaining and improving water quality, fish and wildlife and their habitat in the Malhuer Lake Basin. Our comments on the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement(DEIS) are both general and specific.

General Comments

The assumption that current livestock use is not adversely impacting riparian areas, wildlife habitat, fish habitat and water quality is inaccurate. Your own data shows many of these adverse impacts from grazing as do MWAs observations. Forest Service studies have cost tens of thousands of dollars to obtain data that is being ignored in this assumption. Livestock grazing is a major factor in degraded riparian habitat along significant portions of stream. Portions of Little Sagehen Creek, Silvies River, Myrtle Creek and its tributaries (DEIS p3-10 , 1" stubble height) are annually heavily grazed. If you are going to do restoration of the watershed you must include changes in the current grazing use in order to meet your objectives. You need to acknowledge grazing impacts and address them in the EIS. 3·1

The description of the 8' tall fencing is inadequate. How many miles of fence would be needed? One mile, ten miles or what? How long would the fencing be in place? What MWA has seen of FS maintenance of fences they are likely to be a tangle of downed wire due to snow damage plus trees tipping over and knocking the fences down. 3·2

Reference to INFISH (p. 2-32, 4,104) is of interest. If FS is going to refer to this document in regard to buffer strips you also need to take a look at the stubble height recommendations. Grazing lower Little Sagehen Creek riparian area to the roots annually could hardly meet INFISH guidelines nor any others for responsible land management. 3·3

The Proposed Action is inaccurate in the discussion of the impacts of prescribed burning on sage grouse and other sagebrush obligates. DEIS 4-78 states there is no impact and Appendix C gives only a cursory analysis of the impacts on this species. As you state in the DEIS this species has had its habitat drastically altered over much of its range and large scale burning may effect its habitat. Has the USFS inventoried for leks and species presence? The fact that you have only one record of it indicates the short tenure of your biologists or your failure to inventory for the species. Before any burning of sagebrush USFS should do inventory of its habitat in order to not jeopardize this species. Similarly the treatment in the text of sagebrush obligates indicates you haven't 3·4 given much thought to the impacts on these species.

The range of alternatives is too narrow. There isn't one alternative that considers livestock grazing changes. As MWA has indicated livestock grazing is having a large negative impact on water quality and fish habitat in the project area. Add a Proposed Action that includes changes in livestock use. 3-5

The literature cited section is weak. Numerous statements in the text need to be referenced including assumptions in the Purpose and Need. 3-6

Specific Comments

Page 1-10

Objective 2. Improve riparian habitat

As an objective this is necessary to support your title of watershed restoration. Your supporting references in the text (3-8 to 3-10) and our observations indicate that merely closing roads and prescribed burning, etc. are not going to accomplish the objective as livestock grazing would not be changed. The limiting factor on significant portions of riparian habitat is livestock grazing. Roads and culverts are also a problem and MWA supports the need for changes in these structures. Changes in structures are easy. Changes in livestock use are more difficult. 3-

Page 1-14,p.3-18

Fire frequency ranges need supporting references. Fire frequencies of 3 years need to be substantiated. .Is this a typo? If it is 5 years it should be referenced. Generally fire frequencies vary with vegetation types. Include a reference for fire frequencies on aspen, riparian areas, meadows, etc. 3-8

Chapter 3

Where is the figure for the miles of stream in the watershed area? This is fundamental in your discussion of how many miles of stream(perennial and ephemeral)that will be improved and where is this improvement going to occur.How many miles of fish habitat? How many miles of various PFC condition classes? Similarly , there is no listing that breaks out woodland from sagebrush/steppe. You need this in your analysis of impacts. 3-9 3-10

Page 2-37

Measures to Protect Range Resources

Reference this paragraph. Why would you burn extensive areas that are less than 50 percent of a pasture and graze it the first year after burning and call it watershed restoration ? One of the alternative should have been to change the grazing use. 3-11

Page 3-5 and 3-34

This section is confusing pages 3-5 give livestock use in AUMS. Pages 3-34 and 35,36 give the use in head months(HMs). Use a standard unit of measure. Does 3-12

USFS assume that the 11366 AUMs of cattle use does not have an effect on riparian habitat? When you grazed Myrtle Creek Meadows twice during the summer of 2000 there were very significant impacts. There are scores of scientific articles that suggest there just might be adverse impacts and your own data show that. 3-

Page 4-62,63,64

Changes in thermal cover for deer and elk are to be ameliorated by reducing road densities thereby improving habitat effectiveness. The problem with that assumption is that changes in canopy cover may be long term but changes in road densities may be short term due to a change in USFS policy, internal local in-house management decisions, and politics. Planning Documents can be amended or ignored and the habitat effectiveness may be compromised. 3-1

Malhuer Wildlife Associates appreciates the opportunity to comment on the DEIS and looks forward to significant changes in the document in the Final EIS.

Prepared by Board Members of Malheur Wildlife Associates,

Alice Elshoff, pres.

3-1. Livestock grazing is considered outside the scope of this project. Cattle grazing is a permitted use on the Malheur National Forest, as documented in the Forest Plan. Changes to the permit, in the numbers, type, distribution, timing, or duration of livestock grazed, is considered outside the scope of this project (40 CFR 1508.25). The effects of these activities are considered as part of the NEPA analysis for the reissuance of grazing permits, which is tentatively scheduled for Silvies, Big Sagehen, Crooked Creek and Scotty Allotments in 2003 – 2005. Myrtle, West Myrtle and Scatfield Allotments have current grazing EAs completed in 1996; Rainbow Allotment has a current grazing EA completed in 1991. These actions were not considered in this analysis pursuant to 40 CFR 1502.4(c)(2) (FEIS chapter 1, DEIS pg 1-23). More discussion on cumulative effects of grazing is found in the final EIS.

3-2. The 8' tall fence (DEIS, page 2-16) is an option for fence around aspen stands. The fences are usually in place for ten years or until young aspen have reached 8' in height. See also the FEIS chapter 2.

3-3. Livestock grazing was considered outside the scope of this project. INFISH covers a broad area and therefore doesn't try to dictate specific stubble height standards. The Forest has used INFISH as well as other references and an interdisciplinary process in developing stubble heights. See also response to 3-1.

3-4. The presence of sage grouse leks in the project area would be unlikely due to the early nesting period of this species. In most years, the project area would have snow on the ground during the nesting season. However, the effects on sage grouse were reanalyzed in the BE/BA (Appendix C) and the FEIS (Chapter 4) after a potential transitional lek (a site used only in years with little snow) was reported just south of the project area. A determination of "may impact individuals and their habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population of this species" was made because of the potential for effects. Oregon Department of Fish and Wildlife conducts sage grouse lek surveys, and none were found in the project area. Surveys would be done for nesting sage grouse prior to any treatments in spring in sagebrush habitats (see Monitoring in Chapter 2 of the FEIS). If nesting sage grouse were found, design features (FEIS, Chapter 2) would be used to protect nesting grouse. The effects of this project on several sagebrush associated species including sage grouse, pygmy rabbit, pronghorn antelope and Brewer's and sage sparrow were analyzed., and a more thorough discussion of the effects was included in Chapter 4 of the FEIS.

3-5. Livestock grazing is considered outside the scope of this project. See also response to 3-1.

3-6. Thank you for your comment. The Literature Cited section in the FEIS has been updated.

3-7. Thank you for your comment; it has been incorporated into the EIS and is now part of the administrative record for this project. See also response to 3-1.

3-8. Thank you for pointing out this confusion. You are correct; fire frequencies generally vary with vegetation type. Different frequencies are listed in Chapter 3 under the Vegetation Section (DEIS pages 3-17 through 3-18).

Maruoka and Agee (1994) provide this information:

- Ponderosa pine fire regimes (DEIS Low-Dry, page 3-17; FEIS Hot Dry, chapter 3): fire intervals of 3-30 years;
- Douglas-fir and grand fir fire regimes (DEIS Up-Dry, page 3-17; FEIS Warm Dry, chapter 3): fire intervals may vary from a low range of 10-25 years to a high range of 25-100 years.

These differences are based upon the predominance of different species, and variations in slope, elevation, and moisture.

Maruoka and Agee (1994) further reference fire history data collected in the Myrtle Creek area (within the Silvies Canyon Watershed Restoration project area). Their data indicate that between 1752 and 1890, there was a mean fire-return interval of 15.3 years, and an interval range of 5-23 years. This interval was used in the FEIS.

3-9. They were omitted in the DEIS and are now included in Chapter 3 of the FEIS. Total stream miles within the project area include 59 miles of Category 1, 2 miles of Category 2, and 91 miles of Category 4, for a total of 156 stream miles. Category 3 areas were not surveyed. PFC miles are described in the range analysis and Map 18 in the Silvies Canyon Watershed Analysis pages 22-24.

3-10. There are many different ways to classify vegetation, based on various factors, such as vegetation structure, site moisture conditions, site fertility, heat, climax vegetation, overstory, understory, current vegetation, and projected use. The reason that forest vegetation is broken out by Plant Association Groups (PAGs) is that Regional Forester's Amendment # 2 requires us to compare present forest structure to historical forest structure in an analysis called Historical Range of Variability. This type of analysis is not required and often impossible for other Plant Association Group (PAG) or Potential Vegetation Group (PVG). The juniper woodlands are often an ecotone between the shrub/steppe and the forested vegetation.

Treatments proposed in woodlands and shrub/steepe are either prescribed burning to closely mimic historic mosaic-type burns, or cutting juniper that has encroached into historically non-juniper sites in the last 100-150 years (trees generally less than 12" DBH but maybe up to18" DBH). Both of these treatments are designed to move the area toward historical landscape conditions.

3-11. These are general mitigation measures. Site-specific decisions on use after burning would be made based on fire severity, extent of areas burned, slopes, location, etc.

3-12. In the FEIS, HMs will not be used.

Stocking levels vary depending on the size of the area grazed and amount of forage produced. The important consideration is the utilization levels, which are set in the annual operating plan. Discussion of the cumulative effects of grazing is in the FEIS chapter 4.

3-13. The expectation is that proposed road closures and road obliterations would benefit elk and improve habitat effectiveness in the long-term (FEIS, Chapter 4). Road densities would move toward Forest Plan standards, or would be reduced to Forest standards or below and should remain at those levels. There could be change in policies in the future with a new Forest Plan, but any changes in road density would require further NEPA analysis.

Dear Ms.Bailey, April 19, 2001

I am concerned about logging of old growth trees in the Silvies Canyon Watershed. My class is studying endangered species this year. I am studying the Bald Eagle. If this logging takes place Eagle habitat will be destroyed.

Sincerely,
Evan Randall
5th Grade Student
High Lakes Elementary School

Tyler Clifton
Kyle B.
Krystal Carr
Matt F
Alex Bankston
Ryann
Mrs. Riley
Mrs. Schlaich 5 Class
Jamie Hoty
Roxee J. Baker
Nathan Rasmussen
KYLE linehan
Mason Hoty
Gustavo velin
Gannon Hall
Dillon Ross
C.J. Miller
Jessica Schafer
Emily
Austin
~~Tom Smith~~
Madison Welch
Michelle
Dylan W
Becky Creswell (save the animals too!)
Marco Mazariegos
Andrew Schlaich
Nicholas Scott
James. H
Garrett
Christin
Johnny Phillips
lets Save Sands
amy
Heinz

D-16

4-1. There would not be logging of old growth trees unless the trees were a hazard to people. Bald eagles require old growth trees for nesting and roosting. We plan on preserving old growth trees by thinning the smaller trees around potential eagle nesting areas. Thinning the smaller trees would protect the large trees from wildfires and diseases. Timber harvest in the Bald Eagle Management Area on the eastern boundary of the project area would be limited and would not destroy eagle habitat. As discussed in Chapter 4 of the FEIS and in the Biological Assessment Appendix C (FEIS), proposed treatments would not adversely affect bald eagles or their habitat. Section 7 consultation was completed for bald eagles, and the Letter of Concurrence for consultation dated 9/26/01 is in the Project Record.

4-17-01

Dear Ms.Bailey,

I am concerned about logging of old growth trees in the Silvies Canyon Watershed. My class is studying endangered species this year. I am studying the Bald Eagle. If this logging takes place Eagle habitat will be destroyed. 5-1

Sincerely,
Evan Randall
5^{th} Grade Student
High Lakes Elementary School

27 N.W. Mueller
Bend O.R 97701

D-18

5-1. See response 4-1.

April 16, 2001

Malheur Forest
Atten: Lori Bailey
Emigrant Creek Ranger District
HC-74, Box 12870
Hines, Oregon 97738

Dear Lori Bailey,

We have recently received an alert regarding the DEIS for restoration in the Silvies Canyon Watershed. Our group has spent many years reviewing Forest Service proposals of various sorts and have little trust that much of the proposed "restoration" will accomplish much of anything.

We support the Blue Mountain Biodiversity Projects recommendation that Alternative 10 (Minimum Restoration without Commercial Harvest) be chosen with the exception that it not occur in the Myrtle-Silvies Roadless Area. Much public support was generated for the President's Roadless Area protection plan (now on hold) and it was precisely because these areas are the last ones showing ecological integrity. I.e. clean water, old growth, intact ecosystems, habitat complexity, etc. 6-1

6-5 Large trees of any species (juniper), living or dead or dying, should never be cut for any reason. Biodiversity in the Pacific Northwest now depends upon reclaiming the old growth matrix that most species developed with. Complexity should now be the name of the game and not forest simplification under the misguided belief that we can and should control natural processes. 6-2

Restoration, which will close roads, however has our undying support and admiration. This rebuilds connectivity for wide ranging species and should help stop the many acknowledged problems caused by roads. 6-3

Reducing the stocking levels of domestic livestock could also help genuinely restore the watershed. 6-4

Sincerely,

Linda Driskill

Linda Driskill

D-20

6-1. Thank you for your comment. Alternative 10 in the DEIS has been renumbered to Alternative Six in the FEIS. In the FEIS, the No Action Alternative and Alternative Seven-a propose no activities within the Myrtle-Silvies Roadless area.

6-2. The greatest biodiversity exists when you have a variety of stand structures. A variety of structures provides habitat for a diversity of species. When biodiversity of conifer tree species is increased often this results in a decrease in biodiversity of other vegetation species (such as grasses, forbs and shrubs). See also response to 6-5.

6-3. The effects of road closures on wildlife and other resources are discussed in Chapter 4 of the FEIS.

6-4. Livestock grazing was considered outside the scope of this project. See also response to 3-1.

6-5. One objective of the Silvies Canyon Watershed Restoration Project is to reduce stocking levels of smaller diameter trees to protect existing large trees and to enhance the growth of the smaller trees. The only circumstances in which larger diameter or old growth trees would be cut or killed are: 1. Hazard trees – trees posing a hazard to workers or the general public; 2. Large trees that are inhibiting or shading aspen stands in excess of historic levels; 3. In aspen stands outside of riparian buffers where wildlife needs such as snags and large woody material are met (DEIS page 2-8).

Laurie Solomon
10935 NW 2nd St
Portland, OR 97231

Attn: Lori Bailey
Malheur National Forest
Emigrant Creek Ranger District
HC-74, Boc 12870
Hines OR 97738

April 20, 2001

Dear Ms. Bailey,

Please consider this to be my comment on the "Silvies Canyon Watershed Restoration Project" proposal. I object to this proposal, and most especially the preferred alternative for many reasons. The one that is the most egregious is the proposal to severely impact one of the last remaining roadless areas, the Myrtle-Sylvies Roadless Area. This alone makes this proposal unacceptable. Unless your agency is sure that the protections Clinton and now the new forest service chief seem to want to extend to what precious few unroaded wild places still exist will NEVER be granted by the Bush regime, it would be prudent to wait for the final decision about roadless protection before putting this one up for sale. Please honor the intent of the roadless directive, and uphold the law for now, instead of slipping this sale in while the jury is still out on roadless protection. Burning & thinning and riparian disturbance in the Myrtle-Sylvies old growth Roadless Area is not likely to result in restoration; only destruction can result. Leave the roadless area as it is, wild and flowing in ecological balance. 7-1 7-2

As for the roaded part of the proposed restoration area, closing and decommissioning roads seems to be what the gov't funding is expected to cover. With this in mind, and the fact that this project is considered to be for the purposes of "restoration", Alternatives 3 & 4 are most likely to receive federal funds for implementation. These 2 alternatives are also in keeping with the stated intent of this project. Alternative 10 has good road closure plan, and should be incorporated into the final decision. However, Alternative 10 allows for the aforementioned disturbance of the Myrtle-Sylvies Roadless Area. This aspect of alternative 10 is unacceptable. The focus should be to close, permanently close, and decommission the roads based on their contribution to environmental impacts 7-3

Another problem I have with this proposed restoration project involves the proposed amendments to the Forest Plan. Big Game cover standards MUST be adhered to. Logging of trees greater than 21" dbh in aspen stands has no purpose with regards to the stated intent of "restoration". It should not be allowed to target a small area for an amendment that is this vague, and allowing the logging of "excess", "dying" live old growth trees allows too much discretion on the part of the logging personnel to adequately provide protection for wildlife habitat and forest diversity. In fact, the preferred alternative, quoting the Draft EIS, p. S-24 specifically says: "Of the action alternatives, The Preferred Alternative has the highest potential for causing negative effects from vegetation management activities to aquatic habitat because it proposes the highest combination of acres of commercial harvest, miles of temporary road construction, and miles of road activities related to timber harvest (ie. truck traffic, road reconstruction and road maintenance)." 7-4

The analysis of potential impacts to listed Endangered, Threatened and Sensitive species is insufficient to determine the extent to which forest dwelling species would be impacted by this sale. However your agency has determined in the EIS that there will be adverse effects on the following TES species: Deschutes milkvetch, Blue Mountain Caddisfly, Wolverine, Preble's shrew, Redband trout, Malheur Mottle Sculpin, and Bald Eagle. Under the Preferred Alternative, winter range cover for deer and elk would fall further below the cover standards set by the forest plan, and the summer cover standards would be substandard as well. Burning and logging could, by your agency's own admission, threaten nesting and reproductive success for Neotropical migratory bird species using this area. In every way this preferred alternative breaks the very guidelines set up in the NW Forest Plan that your agency is required to adhere to. Amendments to cover standards for this sale are not appropriate and would not further any restoration cause, and would in fact set this area back and make it even more in need of restoration after the sale than it is right now. 7-6 7-5

D-22

As a regular user of the National Forest and as a taxpaying citizen of the United States, I object to the unnecessary impact this sale will have on the animal and plant species in this area, given the Forest Service's admissions of full knowledge of these impacts, and I also object to the degradation of yet another roadless area, which blatantly goes against the recent directive to protect roadless areas now and in the future. Please comply with the law, and with the intent of the Roadless Protection policy which still stands, despite lack of enforcement. 7-7

I support an alternative similar to Alternative 10, without the burning , thinning, and riparian disruption of the Myrtle-Sylvies Roadless area, and also incorporating the number of road closures and decommissioning described in alternative 4, basing the reasons for closure on each road's environmental impact at this time. This would be a true "restoration" project. The Roadless area should be left untouched. 7-8

Thank you for considering my comment. I look forward to your timely reply.

Sincerely,

Laurie Solomon

Laurie Solomon

D-23

7-1. All action alternatives in the DEIS were developed not to preclude implementation of National Forest System Land Resource Management Planning regulations at 36 CFR 219 (65 FR 67514, November 9, 2000), Administration of the Forest Development Transportation System regulations at 36 CFR 212, Forest Service Transportation Administrative Policy (66 FR 3206, January 12, 2001), and Roadless Area Conservation regulations at 36 CFR 294 (66 FR 3244, January 12, 2001). Since the DEIS, interim direction for Roadless Area protection was published in the *Federal Register* on August 22, 2001 (66 FR 44111) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). This direction was used for alternative development and management of roadless areas in the FEIS. Inventories to consider areas that might be eligible for wilderness designation are done as part of Forest Plan revision. The Malheur Forest Plan revision process is due to start in fiscal year 2004. The current criteria used for these areas are found in Forest Service Handbook 1909.12 – Land and Resource Management Planning Handbook, Chapter 7.

7-2. The effects of proposed precommercial thinning and prescribed fire in the Myrtle-Silvies Roadless Area for each alternative are found in Chapter 4 of the DEIS. This discussion has been updated in the FEIS. The No Action Alternative and Alternative 7a propose no activities in the Myrtle-Silvies Roadless Area.

7-3. The Purpose and Need for Action statement in the FEIS (page 1-10) has been updated.

In the FEIS, Alternatives Three and Six rely wholly on appropriated funds from Congress to successfully implement the restoration activities. Based on recent funding levels, only a portion of the work would be accomplished (DEIS pages 2-14 and 2-25).

The Preferred Alternative, Alternatives Two, Four, Five, and Seven-a would rely on funding generated from harvesting timber as well as appropriated funding to accomplish needed restoration activities. Additionally, these alternatives would utilize the purchaser to implement road closures on roads used during timber sales. Effects are displayed by Alternative in the FEIS chapter 4.

7-4. To restore aspen a range of treatments were developed. Alternative Four is the only alternative that allows logging (felling and removal of the log) of trees greater than 21” dbh in aspen stands. The other alternatives allow a variety of treatments from no action to such activities as snag creation and felling for large woody debris.

Regarding the old growth issue, there are at least two scenarios in this watershed. The conifer forests have fewer large old trees but a higher stocking of younger trees than historically. The aspen forests may or may not be above historical levels in old trees, but have few young trees. In comparison of rarity, aspen trees are much more rare on the landscape than conifers greater than 21 inches.

Aspen communities along with other riparian vegetation support a wide variety of life forms. Within the Blue Mountains, 1% of the land area is within stream zones, while 60% of bird species rely on riparian habitat for feeding or reproduction. The specific value of aspen communities to wildlife varies according to the species composition of the understory and the relative age of the aspen. The number of life forms that use aspen communities for both reproduction and feeding is almost the same for all aspen successional stages.

7-5. The project BE/BA (Appendix C) thoroughly discusses the potential impacts to forest dwelling species and other species that occur, are suspected to occur, or have potential habitat in the project area: with references to scientific documents. The adverse effects to TES species would be minor, short in duration, and with specific mitigations designed to avoid impacts. Section 7 consultation has been completed for Federally listed threatened and endangered species, and the Letter of Concurrence for consultation dated 9/26/01 has been added to Appendix C.

The effects to neotropical migratory birds are discussed and analyzed in Chapter 4 of this FEIS. As described in Chapter 4 of the FEIS, some bird species would be reduced by this dry forest restoration while many other species native to dry forest would benefit (Altman 2000, OR-WA PIF 2001, Tiedemann et al. 2000). Design elements described in Chapter 2 of this FEIS would help to protect migratory birds. The Northwest Forest Plan applies to Federal lands within the range of the northern spotted owl, and does not apply on the Malheur National Forest.

7-6. See response to comment 2-3.

7-7. See response to comment 7-1.

7-8. See response to comment 6-1.

April 21, 2001

Lori Bailey
Malheur National Forest
Emigrant Creek Ranger District
HC-74, Box 12870
Hines, OR 97738

Dear Ms. Bailey,

I am writing to submit public comment for the Silvies Canyon Watershed Restoration Project. As a former resident of Oregon, and a citizen concerned about the state of our national forests, I wish to express my disappointment that your district has selected as its preferred alternative for this project the alternative with the maximum amount of commercial logging under the guise of "restoration". It is especially disappointing that you are proposing to combine this maximum amount of logging with a lower number of miles of road closure than originally included in this alternative.

I am also alarmed to see your plans to conduct burning and thinning projects within the Myrtle-Silvies Roadless Area. The native forests contained within National Forest roadless areas are invaluable repositories of natural forest processes, and must not be disturbed, even by well-intentioned human efforts. 8-1

I hope that you will change your preferred alternative to alternative 10, "Minimum Restoration without Harvest", with the following exceptions: Incorporate the maximum number of miles of road closures, as proposed in the original alternative 4, and refrain from any management activities within the Myrtle-Silvies Roadless Area. Such a plan would retain the integrity of the roadless area ecosystem, improve the ecological value of areas currently degraded by excessive roads, and provide for honest, science-based restoration efforts in areas previously disturbed by commercial logging activity. 8-2

Sincerely,

Karen Wood-Campbell

Karen Wood-Campbell

9460 SARATOGA DR.
PITTSBURGH, PA 15237

D-26

8-1. The Myrtle-Silvies Roadless Area developed under a fire regime of frequent (5-23) low intensity fires. Within the last 100 years effective fire suppression has drastically changed the fire frequency in this area. The proposed activities were designed to re-introduce fire into the ecosystem.

8-2. See response 6-1.

4·17·01

9

Lori Bailey
Emigrant Ck. RD

I am commenting on the Silvies Canyon Watershed Restoration Project.

There should be no burning, thinning or riparian restoration in the Myrtle-Silvies roadless 9-1
area. I suggest choosing Alternative #1 the No Action Alternative but amending it with
the restoration proposal from Alternative #10 and the road closure and decommissioning 9.2
from Alt. #3 to close 160 miles of roads. This area needs far fewer roads, much more
correct restoration and no commercial harvests. It is time to face the future and begin
landscape level forest wide restoration in areas of past mismanagement.
There is currently a timber glut on the market and your proposed act has the highest 9.3
potential for negative impacts of all the alternatives as well as affecting the Elk and Deer
summer range standards, illegally reducing them below the Forest Plan standards.
Do the right thing by restoring and closing roads, no commercial harvest and leave the
roadless areas alone.

Please send me the FEIS and the DN etc.... and any related documents concerning this
project.

Mark Day
PO Box 4946
Portland, OR. 97208

Mark Day

D-28

9-1. Alternative One – The No Action alternative and Alternative Seven-a propose no management activities in the Myrtle-Silvies Roadless Area. The effects on the Myrtle-Silvies Roadless Area are described by alternative in the FEIS chapter 4.

9-2. You prefer the lighter restoration of Alternative Ten with the maximum road closure and decommissioning of Alternative Three, and no other activity. Thank you for your comment; it has been incorporated into the EIS and is now part of the administrative record for this project.

9-3. The Purpose and Need for Action statement in the FEIS (page 1-10) has been updated. Neither the “timber glut” nor the “timber market” is the driver for treating forest vegetation. See response 2-3, and the effects of reducing big game cover in the FEIS chapter 4.

Malheur Lumber Company
P.O. Box 160 • John Day, Oregon 97845
(541) 575-2054 FAX 575-2057

April 16, 2001

Malheur National Forest
Emigrant Creek Ranger Dist.
Attn. Lori Bailey
HC-74 Box 12870
Hines, Oregon 97738

RE: Silvies Canyon DEIS

Dear Lori Bailey,

Thank you for the opportunity to comment on the Silvies Canyon Watershed Restoration Draft EIS. We appreciate your efforts in trying to restore the area and produce some timber volume. The following comments are offered as ways to help improve your project. Many of the comments address the concern that timber sales may not receive bids.

Upon reviewing the area, it appears that much of the volume produced will be small and of low value. Some will have no value at all. To help pay for your restoration, large trees in excess of Forest Plan Standards need to be salvaged as discussed on page 1-25. A few of these trees go a long way fiscally toward reducing the stocking of smaller stems. Such items could be very important on a project that may not be economically feasible as a timber sale.

From an operations standpoint, there are several things listed in the DEIS that add costs to a timber sale, but have little benefit to resources. One such item is ripping skid trails and landings. This practice can increase sediment more than roads or skidding, but it is prescribed regularly. In this project it should be used only when compacted areas are observed. This should be very rare since skidding is only to occur during dry, frozen or snow covered conditions. 10-1

Designating skid trails at 120 feet spacing will also increase costs and possibly compaction. Felled trees will need to be packed to the skid trails. This will increase the amount of trips a machine makes over the land, which increases compaction and costs. The sale administrator should look at the terrain and timber type to judge the layout of skid trails and then approve them. A requirement of 120 feet spacing will only lead to problems for the people and the resources involved. 10-2

D-30

Requiring borax on all ponderosa pine stumps over twelve inches is also very costly with little or no benefit. Research indicates that stumps less than eighteen inches in diameter rarely act as infection foci. It also states that special measures to prevent damage are needed only in stands within one mile of severely affected stands. Spreading borax based on these criteria, as opposed to the shotgun approach being taken, would save the Forest Service a tremendous amount of money on this project. 10-3

Burning is an issue that is quite contentious for the Forest Service. However it is a tool that can be utilized if done properly. We would recommend that burning only be done in the fall to reduce threats to nesting wildlife and the possibility of escape through the summer. 10-4

In addition, fire should not be used to thin trees. Thinning manually produces better results with less risk. The role of fire should be limited to reducing fuel loads on the ground and burning slash piles. Using it in that manner will reduce much of the negative impacts associated with using fire. 10-5

With the Forest Service touting recreation as a major part of the economy, it does not make sense to reduce the amount of dispersed recreation sites through road closures. These areas are often traditional places for families to camp, and eliminating them will reduce the appeal of the outdoors to those people. In areas where dispersed recreation exists it should be enhanced, not eliminated. 10-6

Please use these comments as you move through the process toward a decision. There is a very real possibility that the Forest Service may have to use part of their budget to fully implement this project because the value of the timber will not cover it. It is unfortunate that this is the case since the timber value is there, it's just not being harvested. That said, we hope you are successful in your restoration efforts. If we can be of any help or if you have any question please contact us at the address above. 10-7

Sincerely,

Steven J. Courtney, CF
Operations Forester

10-1. Subsoiling of skid trails and compacted areas to restore infiltrative capacity and reduce potential for surface flow, as well as scattering woody material over disturbed sites to provide enhanced surface cover, dissipate velocities, and trap sediment on the slope, would be implemented on a site specific basis as needed as determined by hydrologist or soil scientist. When subsoiling is determined necessary, it would occur when soil moisture conditions are less than 20 percent at depths of 4-16 inches. Subsoiling volcanic ash soils may occur at soil moisture levels up to 30 percent with recommendation by a hydrologist or soil scientist. Subsoiling within 66 feet of springs and seeps, and within 33 feet of the bottoms of draws would be avoided. Subsoil landings where compaction and potentially hydrophobic soil exist, if soil depth and rock content permit subsoiling. Landings would be seeded with local native seed or non-persistent non-native species, or planted with conifers where appropriate (FEIS chapter 2).

10-2. Approved designated skid trails would be required on all harvest units to reduce soil compaction and displacement. Existing skid trails would be used whenever possible, however, no skid trails would be used within RHCAs. Skidding equipment would be restricted to skid trails. Tractor trails would not exceed approximately 14 feet in total width over 90 percent of the length except where otherwise authorized. Skid trail and trail spacing would not generally be closer than 120 feet center to center, where parallel trails are used and 90 feet, center to center at midpoint when radial trails are used. Exceptions would exist where skid trails converge at landings. Water-barring and/or slash placement on skid trails would be required where the potential for erosion exists. Forest Service Manual direction and the Forest Plan recommend that skid trails over 20% gradient and areas of disturbed soil within 200 feet of streams be erosion control seeded and that these skid trails be water barred (FEIS chapter 2).

10-3. "The recommended minimum stump treatment size is 12 inches diameter for pine and true firs felled using chainsaws. Where mechanical shearers are used, the minimum diameter should be reduced to 8 inches. High elevation true fir stumps should be treated down to 8 inches regardless of type of felling. Stump size recommendations have varied in the past, especially between different USDA Forest Service Regions and states." *Craig L. Schmitt, John R. Parmeter, and John T. Kliejunas. Annosus Root Disease of Western Conifers. USDA Forest Service. Forest Insect & Disease Leaflet 172. Revised February 2000.*

Annosus root disease is common in ponderosa pine stands on the Emigrant Cr. RD. Presence of annosus root disease in ponderosa pine stands greatly decreases the potential for managing ponderosa pine. These sites are usually too dry to effectively grow alternative tree species, so preventing the introduction and subsequent increase of annosus root disease is crucial for managing ponderosa pine. Annosus root disease is also widespread at low elevations where Douglas fir and true firs are in association with ponderosa pine.

10-4. Due to excessive fuel loading in the project area, fall burning would have to be preceded by at least one spring burn in several locations. Spring burning would reduce the potential of an escaped prescribed fire and the loss of valuable wildlife habitat. As described in Chapter 4 of the FEIS, most spring burning would occur prior to June 1. This would reduce the impact to birds by generally avoiding nesting activities early in the year. The effects of burning on nesting birds are discussed in Chapter 4 of the FEIS.

10-5. The NEPA process requires response to comments received during scoping. Some responders wanted us to analyze alternatives where stocking was reduced using only precommercial thinning and prescribed burning.

We agree that most often manual thinning produces better results because the residual trees are individually selected. Once the trees are thinned, though, the slash needs to be treated. Due to the amount of area that needs to be treated, the economics of treating some areas, and the size of the trees, prescribed burning may reduce stocking and reduce the percentage of fire sensitive species.

10-6. Recreational opportunities were considered. Roads with resource concerns would be closed, decommissioned, or repaired and left open. Dispersed campsites were identified and all attempts would be made to provide access. In some cases, the type of access to identified dispersed campsites would be changed from motorized to non-motorized access. The effects to dispersed campsites by alternative are described in FEIS chapter 4.

10-7. This is recognized as a necessary investment in restoring the ecosystem. Similar investments have been made both in the past and currently.

MALHEUR
Timber Operators, Inc.
P.O. Box 928 • John Day, OR 97845 • (541) 575-2711 • FAX (541) 575-2

APR 25 2001

April 23, 2001

Malheur National Forest
Emigrant Creek Ranger District
Attn: Lori Bailey
HC-74 Box 12870
Hines, OR 97738

RE: 1950, 2/27/01 Silvies Canyon DEIS

Dear Mr. Keniston:

Malheur Timber Operators, Inc. and KLE Enterprises, Inc. submit the following comments regarding the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement. These joint comments are submitted to insure that both organizations are recognized as active participants in the NEPA process and included on the information distribution list. Both organizations have submitted scoping information.

- Chapter 1 Purpose and Need is complex and confusing which makes it impossible to identify the underlying purpose and need to which the proposed alternatives, including the proposed action, are designed to respond to and implement. The underlying purpose and need is not briefly stated. 11-1

- It is misleading and improper to present and use in the analysis RHCA's as a Forest Plan Management Area. Regional Forester's Amendment 2 did not establish new "Management Areas". This is most misleading when MA 3A is made a part of the RHCAs. 11-2

- The project area contains 30,500 acres of MA 1 designed to emphasize timber production on a sustained yield bases while providing for other resource values. The Modified Proposed Action is designed to accomplish a suggested purpose and need on 29,000 acres that changes the definition and use of MA 1 to one that moves the stand composition towards historic ecosystem conditions. This change in MA 1 requires a Forest Plan amendment and an analysis that supports the amendment. 11-3

- The discussion on page 1-25 concerning the commercial harvest of trees greater than 21 inches DBH needs to properly disclose the direction in Regional Forester's Amendment 2 and his policy letter dated October 2, 1997. 11-4

- Alternative 3 is in direct violation of the Forest Plan because it is designed to cut and not harvest trees up to 9" DBH and not recognizing that the Forest Plan and current commercial timber sales recognize trees 7" DBH and greater as commercial timber. 11-5

- The DEIS discusses in considerable detail and references Forest Plan standards concerning big game hiding and thermal cover. While discussing hiding cover the discussion includes security from hunters which is not included in the Forest Plan and the objective has not been developed. 11-6 Also no discussion has been included that discloses the effect of Stand Structural Stages (Historic Range of Variability) objectives and implementation and the effect on Forest Plan cover standards. The inability to reasonably manage land under this concept as it is disclosed and presented under Effects on Vegetation Condition (Issue 4) page 4-27. 11-7

- The review of Appendix A discloses a serious question about the justification and cost-effectiveness of road closures that are not discusses under effects. A large number of roads scheduled for closure range from 0.05 mile to most being well under 0.5. For example, the effects section of the DEIS does not disclose how wildlife habitat is benefited by closing these short roads and if the cost is justified. Logic and wildlife habitat science does not support these actions. 11-8

- The implementation direction to girdle trees (especially over 21 inches DBH) based on broad standards without site specific analysis and justification that discloses different options that include cost effective possibilities is a major concern and needs to be addressed. 11-9

- Page 9 and 11 of the combined BE/BA needs to reference the Regional Office 270 letter dated 3/12/01 concerning no lynx in Oregon. 11-10

- Page 16 of the combined BE/BA under the discussion concerning wolverine is the only reference we could find concerning the effect of LOS Management on PETS species. This appears to be an omission. 11-11

In general we can only express disappointment in this DEIS. Major points are:

- The DEIS as scheduled in the NOI has been delayed of one year. 11-12

- The decision that an EIS was necessary without first doing an EA was flawed and most likely resulted from the decision to attempt to use the NEPA process to analysis a series of action in one document that are not "connected actions". 11-13

- The attempt to be "politically correct" by attempting to avoid recognizing timber harvest based on sound silviculture and resource management as directed by the Forest Plan has resulted in delays and unreasonable expenses. To analyze 7 subwatersheds consisting of 65,000 acres and develop the no action and two alternatives that do not include timber harvest is unrealistic and is not in keeping Item 3 of the purpose and need on page 1-10 and the Forest Plan. Violations of the Forest Plan are well documented under Effects on Vegetation Condition (Issue 4) page 4-27. 11-14
  The DEIS Public Notices of availability draws attention to the DEIS being 466 pages as if this was a measure of success. 11-15

Please include us in all mailings and communication opportunities concerning the development of this EIS.

Sincerely,

Malheur Timber Operators, Inc.

Ken Evans

Ken Evans CF
Forester

cc:
mnf

11-1. Thank you for your comment, the Purpose and Need for Action statement has been updated in the FEIS (page 1-10).

11-2. The FEIS chapter 1 states, "The Forest Plan (1990) divided National Forest System Lands into Management Areas (MA), each with different management goals, resource potential, and limitations. Forest Plan Amendment #29 (1994) amended MA 3A and 3B (Riparian Areas) and provided desired future conditions for each of these MAs. Additionally, this amendment provided more specific numeric standards for these MAs. Standards are now based on the same scientific information used in PACFISH (March 25, 1994). Riparian Habitat Conservation Areas (RHCA) were created with PACFISH. In this manner, RHCAs are not management areas; however, they amend the Forest Plan and incorporate new goals, objectives, standards, guidelines, and management direction. These new standards take the place of direction described in the Forest Plan. The Forest Plan also identified Roadless Areas.

11-3. In the Multiple-Use Sustained-Yield Act (MUSYA) of 1960 sustained yield is defined as *"Sustained yield of several products and services'*, which means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land. The Forest Plan was developed to comply with the National Forest Management Act of 1976 which references MUSYA numerous times (Sec. 2. (3); Sec. 6. (e)(1) and (2); Sec. 6. (g); and Sec. 14 (a)).

Historical (as defined in the FEIS chapter 3) vegetation conditions are the only vegetation conditions that we can be fairly certain were sustainable over a fairly long time period (several thousand years). There is little doubt by professionals that we currently do not have sustainable vegetation conditions on the Malheur NF.

Regional Foresters Amendments 1 and 2 analyzed and amended the Forest Plan and developed HRV guidelines. Although these were interim guidelines they are still applicable today. The Proposed Action is in accordance with these Forest Plan Amendments and thus does not require a Forest Plan amendment or analysis.

11-4. It is not necessary to discuss all direction received in the past in the DEIS or the Final EIS. According to 40 CFR:

1) Part 1500.4, "Agencies shall reduce excessive paperwork by" … "(b) Preparing analytic rather than encyclopedic environmental impact statements".
2) Part 1502.2 (a) "Environmental impact statements shall be analytic rather than encyclopedic."
3) Part 1502.2 (c) "Environmental impact statements shall be kept concise and shall be no longer than absolutely necessary to comply with NEPA and with these regulations."

Regarding the direction in the two documents, we can only guess that you are referring to the following:

1) "What is a "large tree" or "common occurrence of large trees" on the Fremont National Forest in Oregon in not necessarily the same on the Okanogan National Forest in Washington and the revised classification allows this appropriate distinction. Forest Supervisors retain the option to amend their individual forest plans when site-specific conditions warrant a deviation from these revised interim standards" (*Regional Foresters Amendment 2*). The Malheur NF has not chosen to change the 21" DBH definition of late or old growth trees.

2) The Policy letter dated October 2, 1997 established: "1. A clear and compelling case can be made for the biological or ecological urgency to cut large trees in the short term (i.e., next 5 years). 2. The amendment is unique or uncommon and is not being commonly applied across landscapes (watersheds and larger)."

This section in the FEIS has been updated in regard to dead, dying and downed trees.

11-5. If Alternatives Three or Six were selected, the ROD would include a Forest Plan Amendment to allow cutting and leaving trees 7-9" dbh, if required.

11-6. There is no Forest Plan standard for hiding cover. However, the Malheur Forest Plan (IV-28) recommends retaining hiding cover to mitigate shortages in satisfactory cover; since shortages of satisfactory cover exist in the project area, the discussion of hiding cover was included to provide information to the public. At least one of our publics brought up hiding cover during scoping and wanted us to analyze it.

11-7. None of the Alternatives propose to move to HRV; each alternative moves vegetation towards HRV, some more than others. Cover standards are not directly related to stand structural stages. Therefore, we did not attempt to analyze by HRV. The effects of each alternative as it relates to HRV are described in chapter 4 of the FEIS.

11-8. Road closures, however small, promote wildlife habitat by allowing native vegetation to return, provide cover, and eliminate some fragmentation of habitat. Closures on these smaller spur roads are designed to be cost effective. Also, some roads are proposed for closure for reasons other than wildlife habitat and some roads would be closed by the closure of adjacent roads. Chapter 4 of the DEIS (pages 4-68 to 4-71) displays by alternative the effects road densities have on wildlife and wildlife habitat. This discussion has been updated in Chapter 4 of the FEIS.

11-9. The methods for creating snags (including the method for choosing snag size) was modified between DEIS and FEIS (see FEIS Chapter 2 Mitigation Measures). Snags may be created using a variety of methods in designated aspen stands, springs, and Replacement Old Growth areas.

11-10. Appendix D of the BE/BA (included in the DEIS Appendix C) describes lynx habitat. Lynx are considered extirpated from the state of Oregon. The BE/BA (Appendix C of the FEIS) thoroughly describes the status and distribution of lynx in Oregon and the rationale for the determination of "NO EFFECT" from the proposed projects.

11-11. Wolverine is the primary PETS species in the project area to which LOS management would apply. LOS management affects several Management Indicator Species (MIS) as well as goshawk (not an MIS, but a species of concern). Effects on these species can be found in Chapter 4 of the FEIS.

11-12. Thank you for your comment. It has been incorporated into the EIS and is now part of the administrative record for this project.

11-13. Significant effects were likely therefore an EIS was warranted. A combination of factors necessitated completion of an EIS. These factors included:

- Size of the area involved (65,000 acres in 7 subwatersheds);
- Acreage (approximately 45,000 acres) under consideration for vegetation management;
- Presence of a known bald eagle nest area;
- Fisheries and water quality issues associated with roads, which had the potential to become a serious issue with the public; and
- At the initiation of this project, there had not been a watershed analysis (WA) completed for the watershed (a WA was completed in November 2000).

11-14. In the DEIS, three alternatives were developed that utilize timber harvest for resource management, including the preferred alternative. The No Action alternative is required by law (40 CFR Section 1502.14). The two "action" alternatives that did not propose commercial timber harvest were part of a reasonable range of alternatives addressing the Purpose and Need and issues brought up during scoping. Alternative Three was developed in response to an agreement made during the appeal resolution for the Crater Vegetation and Watershed Management Project EA.

With all the action alternatives, treatments are planned that would reduce stocking from below and move tree species composition toward early seral species (DEIS 4-29). Likewise, all action alternatives address the Purpose and Need for Action described on page 1-10 of the DEIS. The Purpose and Need for Action statement in the FEIS (page 1-10) has been updated.

11-15. The public notices drew attention to the size of the DEIS not as a measure of success, but to inform the public of the costs associated with printing and distributing a large document. This was meant as a way to encourage the public to view the DEIS on the Forest web site.

Malheur National Forest
Emigrant Creek Ranger District
Attn: Lori Bailey
HC-74, Box 12870
Hines, Oregon 97738

Karen Coulter
Blue Mountains Biodiversity Project
HCR-82, Fossil, OR 97830
League of Wilderness Defenders

April 20, 2001

Comments re: the Silvies Canyon Watershed Restoration Project DEIS

Based on our review of the Silvies Canyon Watershed Restoration Project Draft Environmental Impact Statement and its Summary, we propose adoption of Alternative 10, Minimum Restoration Without Harvest, modified to include Alternative 3's Access and Travel Management Plan instead of Alternative 10's Access and Travel Management provisions and definite prohibition against cutting any 21" or greater dbh tree except to meet OSHA requirements (closing the loopholes of cutting larger trees in aspen areas and "dying" larger trees "excess" to wildlife and fishery needs. Instead we favor no commercial logging to meet the purpose and need of restoration (reducing road-related impacts, improving riparian conditions, and improving the health, vigor and resiliency of vegetation in order to promote long term forest sustainability--EIS, p. 1-10.) This means we are advocating only precommercial diameter thinning of conifers from aspen areas (after all, old growth diameter trees are usually at least 150-200 years old and thus represent pre-fire suppression growth) and no logging of "dying" trees over precommercial diameters. 12-

Commercial logging is not necessary to achieve the restoration project's purpose and need objectives; in fact commercial scale and diameter logging is acknowledged to have caused many of the impacts to wildlife and natural resources this project is seeking to heal. Commercial logging is also well known to cause and exacerbate many of the problems evident in the project area in general (eg. sedimentation of streams, removal of stream shading, compaction of soils, depletion of beneficial soil mycorrhizae, removal of needed large structure and old growth habitat for old growth-dependent species, removal of thermal and hiding cover for big game and other species, removal of biomass needed for nutrient recycling, increased homogenization of the landscape with consequent reduction of biodiversity and incremental, cumulative extirpation and extinction of interior and large, intact forest-dependent species, etc.) Commercial scale and diameter logging is especially inappropriate in areas needing to recover from prior logging impacts (already over-logged areas) and in last intact, relatively pristine areas preserving natural state baseline conditions, such as the Myrtle-Silvies Roadless Area. As for the potential occurrence of large-scale wildfire (which can never be completely prevented and which may be caused or increased in severity by commercial logging according to recent credible scientific studies and statements), the EIS admits that alternatives 3 and 10 (with no commercial logging) would treat vegetative conditions in the watershed that have left the watershed vulnerable to large-scale wildfires: "Alternatives 3 and 10 would accomplish this without the ground disturbing activities associated with commercial harvest, related road reconstruction and temporary road construction, and road traffic which are part of Alternatives 2, 4 and 5. Commercial harvest activities, related road reconstruction and temporary road construction, and road traffic all are potential sources of fine sediment that may adversely affect aquatic habitat. The use of BMPs and RHCA buffers would lessen the potential effects but would not totally eliminate them." (EA, p. 4-16) The Forest Service's "Preferred Alternative" of Alternative 4 (the greatest amount of commercial logging) with the road closure plan of Alternative 10 (which offers less restoration of road impacts than any of the action alternatives except Alternative 5) strangely seeks maximum logging impacts combined with one of the least restorative access and travel management plans for a "Restoration" project intended to reduce road-related impacts.

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improve riparian conditions, and improve the health, vigor and resiliency of vegetation to promote long term forest sustainability. Our proposed combination of Alternative 10 with the access and travel plan of alt. 3 and an overall dbh limit to precommercial size thinning better meets these restoration objectives by protecting existing native species, allowing over-logged lands to naturally recover, allowing for needed road closures and decommissioning, allowing for needed precommercial thinning for gradual re-instatement of a natural fire regime, and allowing for prescribed burning on a conservative level to reduce fuel-loading and allow for re-instatement of natural fire and preserving existing larger tree and down or snag structure, needed canopy closure, more cover (than with commercial logging) and protection of the natural character of the Myrtle-Silvies Roadless Area while protecting it better against stand-replacement scale fire with prescribed burn fuel breaks around it. (See below for more site-specific concerns for fine-tuning burning plans, habitat provisions for Management Indicator species, protection of riparian areas, etc.) We have not been able to field-check the project area yet and though we have received some preliminary sale maps and you included some small scale maps in the DEIS, we would appreciate your sending us your sale unit maps (larger, with sale unit #s, topographic lines, smaller road access #s identified, prescription for each unit identified) for your "preferred" alt. 4 (or whichever one you decide to adopt) and alt. 10 as soon as possible so we can ground-truth conditions. 12-

Alternative 4 would decrease cover below Forest Plan standards in summer range and in about half of the subwatersheds in winter range; Alternative 10 would avoid this violation of Forest Plan standards. 12-8

In regard to your arguments for commercial logging (though small diameter thinning and prescribed burning could meet your concerns): The EIS admits there is no mandate to move vegetation towards historical conditions in either law or policy but that you are mandated by law to manage vegetation on a sustainable basis--more over-logging on a commercial level (in an already over-logged forest), including logging of the next largest size class of trees (15-21" is the next largest to the largely logged-out old growth of 21" dbh and greater) is <u>not</u> sustainable as the Malheur National Forest (like other National Forests in the region) is already greatly over-logged with consequent damage to natural resources, biodiversity and ecological integrity. There are admissions throughout the EIS that large structure was selectively removed, leading to current problems and discrepancies from (theoretical) Historical Range of Variability (HRV). At some point (and the time is long past due), you need to stop allowing commercial logging (commercial re: profit motive imperatives driving damaging results, amount of timber taken and elimination of larger size classes of trees) so as to allow vital ecological functions to recover, sensitive and listed species to regain numbers and viability and more trees to reach maturity and old growth status so that there will be a real sustainable and natural forest again. 12-

The EIS fails to prove that defoliating insects and diseases are higher than endemic levels or are causing or accelerating "excessive" mortality. 12-10 The EIS also doesn't recognize and discuss the ecological niche of these native insects and diseases and how they are normal and integral parts of a functioning ecosystem. 12-11 National Forests were originally set aside not to be tree farms for maximum timber yields but to protect native, natural forests (the public's common heritage) from further corporate exploitation (the timber corporations had already snatched up the most productive forest lands for private profit.) So maximum tree growth should not be the primary concern, nor revenues from logging, and natural processes should be allowed to take place in most cases. Alot of your "historical condition" claims are unsubstantiated or not credible. How do you know that current conditions 12-1 "have developed to a degree never before experienced in the natural system of plant succession in the Blue Mountains..."?(EIS,p. 3-27, our emphasis) What is your scientific evidence that "(m)any stands are now highly susceptible to some of these pests and are contributing to widespread mortality or constitute a continuing threat to widespread mortality"? (EIS,P. 3-27) The Forest Service's use of words with deragatory and frightening connotatio such as"pest" and "threat" and undefined terms such as "highly" and "widespread" seems purposeful and to serve the timber industry's agenda rather than more objectively describing ecological conditions. What is your scientific citation(s) to substantiate your claim that Western Pine Beetle "historically were known for attacking and killing old, slow-growing ponderosa pine that were overstocked and susceptible to beetles due to drou drought and damage by fire"? (EIS, p. 3-28)

Anecdotal evidence of pre-settlement conditions is insufficient to determine HRV.(re: Figures 3-2 and 3-3, p. 3-23 EIS) Pioneer writings (and "early recordings") were likely to emphasize what was different from the eastern part of the country (i.e. open forest stands) rather than what was similar (denser stands) and only discuss areas they'd passed through (pioneers logically sought out the easist, low land routes whenever possible) and were not systematic, consistent or reliable field surveys. Current observations of the lack of large trees and large stumps in an area (to justify low old growth tree per acre estimations for HRV) may also be unreliable, especially in mid- to high elevations with more moisture, where large stumps and down wood may rot and disappear more quickly. For instance, the Tupper Butte Roadless Area on the Umatilla National Forest has little large structure and no interior roads but was apparently horse-logged to a mill which no longer exists and the stumps have since disintegrated.) Historically, according to your own estimates, multistratum old forest was far more common than single stratum--both are now greatly depleted, so you shouldn't now be trying to convert last multi-stratum with large structure into single stratum with large. (See Figures 3-4, 3-5, 3-6, 3-7, p. 3 24.) Figure 3-8 is based on what year, what data sources for historic conditions? (p. 3-25) What is the scientific basis for your belief that there were only 2-3 greater than 21" trees (dbh) per acre in aspen areas historically? In general, we find your HRV estimates quite speculative and leaning in the direction that would accommodate a bias toward cutting more and bigger trees (using HRV as justification for more over-logging.)

In regard to prescribed burning, fire records on the District only date back to 1959 (EIS p. 3-29) and the first documented Euro-American entry into Central Oregon was in 1826-7 for fur trapping and trading (not timber or land surveying) (EIS p.3-57), so how did Maruoka and Agee (1994), Heyerdahl and Agee (1996) and Agee (1993) determine the historic (pre-European settlement and fire suppression) fire intervals--specifically for the Silvies Canyon watershed? Please respond to our HRV questions. We would like to request several restrictions for prescribed burning to lessen environmental impacts from the burning and to help prevent an accidental uncontrolled fire being started with the burning program: Please prohib aerial ignition for prescribed burns as aerial ignition coulf start a crown fire and is less discriminating with regard to avoiding sensitive areas that should not be burned (eg. Goshawk nests, areas with fuel loadings too high to control, etc.) We would appreciate your taking care to avoid killing larger trees with prescribed burning. Don't allow prescribed fire to back down into RHCAs, as there are too many risks to already degraded aquatic habitat (Table 4-2, pp.4-18 & 19, EIS) and already streams and the Silvies River are water quality-listed, which means that further impacts must be avoided. No burning should be allowed near Cottonwood stands due to their vulnerability to fire. Prescribed burning should only take place in the fall (under appropriate

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conditions) to protect young mammals in burrows, bird fledglings in nests, nesting reproductive success, sensitive flowering plants, fine pine roots and soil moisture reserves for summer. Prescribed burning should also not take place in Dedicated Old Growth areas, Replacement Old Growth areas, (DOGs, ROGs) and Pileated woodpecker feeding areas because down wood is needed in abundance by species these areas are supposed to protect--Pileated woodpecker, other woodpeckers, Pine Martens, etc. 12-2 12-22

With regard to the access and travel management plan, we have the following concerns and recomendations: We appreciate the value of road closures and decommissioning of unnecessary roads to benefit water quality and wildlife. However, many forms of closure are inadequate to stop off-road vehicle trespass and/or are reversed, with roads re-opened for the next resource exploitation project. So we request that you permanently close, and decommission with slope recontouring wherever ecologically beneficial, the maximum number of little used, unnecessary and damaging roads possible. There should be no new or temporary road construction and no re-opening/reconstruction of roads already closed to protect wildlife or water quality or simply because they are unnecessary. The purpose is to reduce road impacts overall, so reconstruction should only be done on high use roads which are to be kept open but have something (eg. a culvert or bridge) that needs reconstruction to prevent or stop ecological impacts. We request that all the roads known to be causing sedimentation and other riparian impacts, including all those listed on EIS p. 3-12 and in Table 3-3 p.3-13 be closed permanently, and wherever possible, decommissioned properly and re-contoured. 12-25

Our remaining riparian concerns include the following: There should be no burning or thinning along creeks and the Silvies River, as most streams and the Silvies River are water quality-listed, so we need to protect bird nesting habitat, stream temperatures and existing riparian shrubs and trees to prement further exceedances of water quality standards and protect aquatic habitat. Limitations on riparian thinning and burning to ensure stream shading and buffers to sedimentation would better protect the Columbia Spotted frog, listed fish species (eg. Redband trout, Malheur mottled sculpin and Blue Mountain Cryptochian caddisfly. 12-26

We request complete avoidance of sensitive plant sites and cultural resource sites with thinning and burning and careful decommissioning and berm closures of roads to avoid sensitive plant individuals and populations. 12-27

The Forest Service needs to do population surveys for PETS, MIS, Neotropical migratory songbirds and other rare species to determine population status, population trends and viability thresholds to form a sound basis for their protection and prevention of their uplisting. 12-28 Pileated woodpecker feeding areas as well as Replacement Old Growth areas should be identified and designated for Dedicated Old Growth areas <u>prior</u> to any management activities such as thinning and burning. 120 acres (DOG minimum size by 1992 definitions) is now known not to be large enough to support a home range for a pair of Pileated woodpeckers or Pine (American) Martens. You need to protect larger areas to expand existing DOGs to sufficient size by <u>letting them grow</u> and not cutting more than precommercial diameter thinning. These areas should be designated and protected from commercial logging. 12-29 Ecological boundaries of existing old growth habitat should be followed and not have chunks of good habitat cut off to follow convenient road boundaries since there is insufficient acreage of true old growth habitat. Where following a road or other geographically identifiable boundary would <u>extend</u> the size of the DOG or ROG, that would be acceptable. 12-30 There should be no commercial thinning of ROGs as that would remove needed large structure and canopy closure and no commercial thinning in Goshawk post-fledgling areas, as Goshawk 12-31

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are adapted to denser, more closed canopy conditions and depend on interior forest prey. They prefer canopy closure of 60% or more. 12-31

Livestock grazing is continuously mentioned throughout the EIS as a major source of current conditions and ongoing impacts for which the project was designed to correct, yet livestock grazing control or elimination from the project area is not addressed in the DIS. Livestock grazing is as much within the scope of the project as impacts from roads and impacts from fire suppression are, and controls or cancellation of AUMs should be part of the analysis and included in project alternatives. 12-32 Livestock grazing should be completely eliminated in the Myrtle-Silvies Roadless Area as incompatible with the natural character of a roadless area, with recreation there, with preservation of water quality and native riparian shrubs and as in conflict with wild ungulates for forage. The feeling of solitude, semi-primitive recreation and aesthetics are all degraded by the presence of cattle, including their disturbance of vegetation, their destruction of riparian areas, their sounds, their smell, etc. 12-33

The project area obviously has high recreational value and consistent, varied recreational use and should be maintained in a natural appearance with no commercial scale logging and a mosaic of fuel reduction. 12-34 There is a need to move the dispersed campsites that are located in RHCAs, using natural barriers and signs if necessary. 12-35 "Considerable" use for big game hunting in the fall suggests the need to preserve marginal and suitable game cover to Forest Plan standards or above. 12-36 Alt. 3 better meets Forest Plan standards for road density than Alt. 10 for less disturbance to wildlife (thus our Alt. 10 combination with Alt. 3's road closure plan.) 12-37

What exactly is "intermediate" treatment/thinning? 12-38 We would like to request the following studies: Maruoka and Agee, 1994 (How could they know what the fire interval for this area was from 1752-1890??) 12-39
Studies that show more logging (removal) of trees somehow improves growth productivity rather than degrades it (with heavy equipment soil compaction, destruction of mycorrhizal fungi, etc., all of which would tend to decrease the health, resiliency and growth of remaining trees), studies showing positive effects to eagle occupancy of precommercial thinning and fuels reduction in winter roost areas (we think it's better to leave the eagles undisturbed.) And please send us a copy of Hayes et al., 1997. Thank you for your cooperation and consideration of our comments. We anticipate your response and would like to receive copies of others' comments on this EIS.

12-1. Thank you for your comment. Your comment has been incorporated into the EIS and is now part of the administrative record for this project.

12-2. In the FEIS Chapter 2, Alternatives Three and Six considered and analyzed the effects of restoration alternatives without the use of commercial harvest. The Preferred Alternative, Proposed Action, Alternatives Four and Five, and Alternative Seven-a considered and analyzed the effects of restoration activities with commercial harvest. Chapters 3 and 4 of the FEIS display the effects by alternative.

12-3. See response 12-2.

12-4. See response 7-7 and response 12-2.

12-5. The potential for a large fire cannot be eliminated. The goal of reducing ladder and surface fuel is to lessen the effects of a fire when it does happen. Logging can increase fire intensity if the slash is not treated. The risk of large-scale fire occurrence would be lessened with Alternatives Three and Six, but would still be much higher than the other action alternatives due to higher fuel loads and greater continuity of fuels. The risk of a prescribed fire getting out of control and doing resource damage is much greater with Alternatives Three and Six than with the other action alternatives.

12-6. No harvest or harvest related activities would occur in RHCAs. This includes the use of landings and skidding logs across streams. Therefore potential sediment from these sources would not impact streams. Aspen restoration and road treatments activities within the RHCAs are designed to minimize effects to a point where they would not degrade the aquatic resources, as described in the BMPs and design features. A long-term effect of these activities would be enhancement of the RHCA by eliminating or reducing chronic sources of stream sediment and providing more stream shade. See FEIS chapter 4.

12-7. Regulations specify an agency to “identify the agency’s preferred alternative or alternatives, if one or more exists, in a draft statement and identify such alternative in the final statement” (40 CFR 1502.14(e)) (DEIS page 2-30).

The Preferred Alternative responds to the purpose and need for action and the range of issues (DEIS pg. 2-30). Effective fire suppression for the past 100 years has contributed to a dramatic increase in fuel loading, the arrangement of fuels (fuel ladders), and changes in vegetation composition, structure and density. Current composition and densities of forested areas are unhealthy and outside the historic range of variability (HRV). The Preferred Alternative would move the most forested stands in the project area toward historical ecosystem conditions (DEIS pg 2-15). Road densities in most subwatersheds of the Silvies Canyon Watershed are exceeding Forest Plan standards in both winter and summer range for elk. The Burns Paiute tribe has expressed concern regarding roaded access to resources within the area, especially for elders who may be mobility-impaired. Public roaded access would be maintained while closing and decommissioning:

- roads identified as contributing sediment to the area’s streams, and
- short spur roads needed to meet Forest Plan standards.

As per 40 CFR 1502.14(a) an agency shall rigorously explore and objectively evaluate all reasonable alternatives. Chapter 4 of the FEIS displays the effects by alternative.

12-8. Forest Plan standards for cover for either summer range or winter range are at the watershed level, not subwatershed. The Preferred Alternative, Proposed Action, Alternatives Four, Five and Seven-a would take cover below standards, which would require a Forest Plan amendment.

The effects of reducing big game cover are discussed in DEIS pages 4-62 through 4-67 (also, see response 2-3) and the FEIS chapter 4.

The Forest Plan was designed with amendments in mind. The Forest Plan (V-1 and V-9) states “National Forest planning is a dynamic process, and the products, Forest Plans, are similarly dynamic. This Forest Plan 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."

12-9. See response to comment 11-3 and 12-2.

12-10. Defoliators and secondary disturbers were discussed in the DEIS on page 3-27. From 1991 through 1995 an outbreak of Douglas-fir tussock moth occurred in the "Gold Hill area" which includes a large part of Silvies Canyon. The effects of this outbreak and subsequent secondary disturbers are documented in several site visit reports (*Douglas-fir Tussock Moth on the Burns Ranger District*, September 11, 1992; *Douglas-fir Tussock Moth Populations on the Burns Ranger District, Malheur National Forest in 1993*, September 21, 1993;*Technical Assistance Insect and Disease Management Evaluation Curry Springs Planning Area, Gold Hill, Burns RD, Malheur NF*, February 18, 1994; *Biological Evaluation of Douglas-fir Tussock Moth on the Burns Ranger District*, February 2, 1995; *Technical Assistance: Myrtle-Silvies-Primitive Area*, Feb 16, 1999) from the Zone Entomologist and Pathologist. The publication *Recurrent Outbreak of the Douglas-Fir Tussock Moth in the Malheur National Forest: A Case History by RR Mason, DW Scott, MD Loewen, and HG Paul,* December 1998, was also published on this outbreak. Also, refer to the FEIS chapters 3 and 4.

12-11. Ecology of native insects and diseases was discussed in detail in the numerous site visit reports. This was not discussed in detail in the DEIS because it was not raised as an issue. Refer to the FEIS chapters 3 and 4.

12-12. The need for action is based on the current conditions of resources within the watershed. The Purpose and Need for Action statement in the FEIS (pg 1-10) has been updated.

12-13. You are correct that we should not say, "Current conditions have developed to a degree never before experienced." This is too broad a statement because we do not know the conditions that have existed here throughout time. This will be changed in the FEIS. There has been substantial research done throughout the Blue Mountains. The one consistent general conclusion is that current forest conditions do not match historical conditions.

12-14. For at least the last 10 years this district has had an annual aerial survey that mapped tree mortality. From 1991-1995 there was an outbreak of Douglas-fir tussock moth in this area and we are continuing to see mortality based upon secondary pests. There is ongoing research on the Emigrant Creek (Burns) RD into black stain root rot. We have at least 13 reviews of this area or the adjacent areas by either a pathologist(s) and/or entomologist(s) over the last 10 years. Finally we are seeing mortality or bark beetle attacks that have been occurring in the area over the last three years to Douglas-fir and increased attacks last year by mountain pine beetle. More information on local research can be found in Mason et al, 1998, and Thies et al, 1999.

12-15. Western Forest Insects, by R.L. Furniss and V.M Carolin, USDA Forest Service, Misc Publ 1339, 1977. In 1936, F.P. Keen developed a rating system for susceptibility of ponderosa pine to bark beetle attack (Relative Susceptibility of Ponderosa Pines to Bark Beetle Attack. J. For. 34(10):919-927). This grading system was updated in 1943 (Relative Susceptibility of Ponderosa Pines to Bark Beetle Attack. J. For. 41(4):249-253). This grading system was and is still used throughout the range of ponderosa pine.

12-16. Figure 3.2 shows historical conditions while Figure 3.3 shows current conditions.

HRV analysis required by *Regional Foresters Amendment 1 & 2* states that HRV is to be an "estimated percentage." It also states, "For this exercise, the HRV should be based on conditions in the pre-settlement era; however, early 1900 photography may be acceptable."

In the DEIS page 3-23 the method used to determine acres was based upon the ICBEMP 1936 map and the corresponding data base from which the map was produced, as well as our assumptions that "Pine Mix Small," "Ponderosa Pine Seedling-Sapling-Pole," and "Ponderosa Pine Small" were historically non-forested. The same methodology was used in the FEIS.

12-17. Figures 3-4, 3-5, 3-6 and 3-7 (DEIS) do not depict effects of any proposed treatment. Figure 3-4 and 3-7 depict our estimate of historic conditions from 1850 to 1900 (DEIS 3-23). Figures 3-5 and 3-6 depict current conditions.

Effects on stand structural stages were evaluated in Chapter 4 on pages 4-29 and 4-30. Briefly this states that prescribed treatments would not change the present structure of Old Forest Multi-Stratum (OFMS) to Old Forest Single Stratum (OFSS). Treatment would only change the structure of stands classified as Stem Exclusion Closed Canopy to Stem Exclusion Open Canopy. The treatments prescribed would reduce stand stocking and move species composition towards historical composition (DEIS 4-29). In the long term treatments would move the stands in earlier stages toward older structure faster than if not treated (DEIS 4-30). Where OFMS is to be treated, it is to maintain the old growth characteristics (DEIS 4-30). See also the FEIS Chapter 4.

Data sources for these tables are:
1) Silvies Canyon Vegetation Map generated from Historic data in ICBEMP from 1936 and corresponding data queries;
2) Aerial photos from 1949;
3) On the ground review of this area;
4) Herrick-Hines Story, Pacific Northwest Quarterly 84, no. 1, pp. 19-29;
5) Report of the Proposed Blue Mountains Forest Reserve by H.D. Langille 1906;
6) Report on blue Mountains (West) Reserve Oregon by M.L. Erickson, assistant Forest Inspector, December 1906; 7) USDA Bulletin No 418, Western Yellow Pine in Oregon by Thornton T. Munger, February 1917.

12-18. This will be amended in the FEIS. In some stands there were historically, more than two or three large conifer trees per acre. In other stands there were fewer large trees. It was the consensus of the ID team that historically there was an average of around two or three large conifers per acre. In discussing restoring these aspen stands the IDT felt that we needed to reduce these large conifers to approximately two or three per acre. By retaining this large tree density, we would retain sources for large snags and woody debris. Also birds and animals that use conifers would continue to have these available. By reducing these conifers to two or three per acre, we would have the best chance of regenerating aspen without destroying the existing aspen. Options to regenerate aspen were analyzed in a paper titled “Aspen” written by Mark Loewen and modified by Roy Schwenke on 11/1/2000. This was not cited in the Literature section of the DEIS and will be added to the FEIS.

12-19. Thank you for your comment. Your comment has been incorporated into the EIS and is now part of the administrative record for this project.

12-20. The authors’ methods are described in their articles. Basically they studied and cross-dated fire scars using master tree-ring width chronologies.

Heyerdahl examined fire scars from stumps, logs, snags, and live trees 20 miles east-northeast of the Silvies Canyon in 1995 (Dugout Creek). A total of 215 samples were studied. They were taken from 82 dry site forest plots. By cross-dating the ages and counting the interval between fire scars she determined that the historic fire interval range for the dry site forest there ranges from 5 to 20 years.

Among the many samples Maruoka and Agee studied were samples of 50 trees taken from Myrtle Creek, which is part of this analysis area. For the Myrtle Creek area the fire interval range was 5 to 23 years with a mean of 15.3 years.

12-21. Aerial ignition using a sphere dispenser is a time-delayed mechanism where sphere ignition is delayed for 20-30 seconds. This gives the sphere’s adequate time to reach the forest floor before ignition.

Crown fires can occur from any type of ignition. The main drivers of a crown fire are wind, fuel continuity and loading, and ladder fuels. Occasional torching of individual or small groups of trees can occur with prescribed burning regardless of the type of ignition and is acceptable. Prescribed burning would not be initiated when conditions are conducive to crown fires.

Sensitive areas would be identified and avoided whenever possible. Design criteria have been established to protect sensitive areas (goshawks, eagles, PETS, aspen, and cottonwood) and are described in the FEIS Chapter 2.

12-22. We do not plan on nor want large trees to be killed. It is not intended to allow fire to back into an entire RHCA. The intent is to create a mosaic effect.

Cottonwood is to be protected in all action alternatives (DEIS pages 4-36 and 4-38).

12-23. A combination of spring and fall burning would occur. Spring burning would be initiated in timbered areas with fuel bed depths greater than 1". This is because moisture of large fuels is generally higher in the spring. The higher fuel moisture results in better control of fire intensity in areas with heavy fuels. Spring burning is a natural occurrence (Heyerdahl and Agee (1996). Wildland fires caused by lightning have occurred in Harney County in May (Bulger Fire 2001, 97 acres). The possibility of a prescribed fire escaping occurs both in the spring (late) and fall (early). The amount of spring and fall burning would depend upon weather conditions and the window of opportunities that exist each year. Design criteria and mitigation measures in Chapter 2 of the FEIS also describes areas where spring or fall burning would occur due to other concerns. The effects of proposed burning are described in Chapter 4 of the FEIS.

12-24. According to the Forest Plan we are to "Manage residue to maintain or enhance old-growth habitat" and "Protect old-growth habitat from catastrophic wildfire," (Chapter IV-107). These Dedicated Old Growth areas developed in a disturbance regime, which primarily involved periodic fire. For approximately 100 years fires have been suppressed. Burning in old growth would put fire back into the ecosystem to restore the natural disturbance while protecting down wood and snags (see Chapters 2 of the FEIS). The Forest Plan also states we are to "Utilize interdisciplinary teams to develop prescriptions and long-term management strategies for each replacement area," (Chapter IV-107). It is the intent of the Forest Plan to manage Replacement Old Growth so it can be developed into old growth. The effects of prescribed burning on Dedicated Old Growth, Replacement Old Growth, pileated woodpeckers, and snags and down logs are described in Chapter 4 of the FEIS.

12-25. Roads causing sediment have been identified. Most closure devices rely upon individuals honoring them. Not all forest users are conscientious, but many are. Each alternative treats roads differently; refer to the FEIS Appendix A.

No new construction of permanent roads is proposed for any activities within the Silvies Canyon project area. Temporary roads are short term and built specifically for project use. Temporary roads would be water barred and closed, and scarified and seeded with weed free seed as needed to meet NFMA requirements at the end of the project. The intent is to close temporary roads to motorized travel after harvest activities are completed (FEIS Chapter 2). They are not added to the forest road inventory, but are tracked by temporary identification numbers.

In the DEIS chapter 2, the term reconstruction was used to describe hazard tree removal, brushing for site distance, minor reconstruction of existing drainage structures etc. This definition has been changed in the FEIS.

In the FEIS chapter 2, road maintenance activities would be dependent upon severity of road damage, erosion and sediment production, and designed maintenance level. Most commonly, maintenance would consist of hazard tree removal and brushing for sight distance, although some ground-disturbing activity would be necessary. Maintenance of existing drainage structures may be necessary to assure the integrity of their design function. Stricter measures (placement of rock, site specific drainage structures, and sediment fences) would be taken on specific roads with chronic sediment or erosion concerns to minimize water concentrations and related effects on surroundings.

Road reconstruction activities would apply when the road would require realignment (FEIS chapter 2).

12-26. Activities proposed within RHCAs include:

- Aspen and Cottonwood Restoration
- Riparian Habitat (spring) Restoration
- Road Closures and Decommissioning
- Prescribed Burning

Burning is part of the natural process that creates disturbance and allows certain ecosystems to be maintained, like aspen stands. Due to the lack of natural low intensity fires, thinning is now necessary to reduce the chance of high intensity fires and allow the use of prescribed burning to obtain natural conditions. The mosaic nature of the prescribed burns would protect the majority of bird nesting habitat. Prescribed burning would also occur outside the core time period of nesting birds. Prescribed burning in RHCAs would be of low intensity and in a mosaic pattern. Given the wet conditions often experienced during the spring, burning is not expected to creep into or back down into large portions of RHCAs and burning is not expected to be of high intensities. There are limitations on thinning and prescribed burning in sensitive areas to protect water quality and aquatic species. See also the FEIS chapters 2 and 4.

12-27. As stated in the BE/BA Appendix C. Activities around sensitive plant sites would be mitigated. Precautions would be taken during road closure to protect sensitive plant sites. All measures to protect cultural resources would be followed as described in FEIS Chapter 2.

12-28. There are no Forest Service established procedures for sampling wildlife populations, trends, or viability, but biologists and others do record species presence formally during wildlife surveys, and through informal wildlife sightings and other means. Where available, regional and state status and trend data, as well as other available data, is used to supplement local knowledge (for example see Neotropical Migratory Birds, FEIS Chapter 3). Determinations of effects are based on maintaining habitat or some level of habitat. The best available science, such as DecAID (Mellen et al. 2003) is used to assist in making determinations of effects.

Effects to PETS species are discussed in the BE/BA (Appendix C) and Chapter 4. Effects to MIS are analyzed and discussed in Chapter 4 of the FEIS. The neotropical migratory bird (NTMB) analysis was expanded in the FEIS and is discussed in Chapters 3 and 4 of the FEIS.

12-29. See also response to comment 12-24. The thinning and burning in ROG and feeding areas are for maintenance and to reduce overstocking. These fuel reduction activities would reduce the risk of a stand replacement fire, which would be detrimental to old growth species. ROG and effects are discussed in the FEIS in Chapter 4 and in the DEIS on pages 2-27 to 29, 4-85, and 4-86. Old growth characteristics such as snags and downed logs would be retained at current levels; snags and down logs may be created in ROGs to provide habitat for snag-dependent species at historical levels (Chapter 2 and Chapter 4, FEIS).

DOGs in the Silvies Canton project area were designated for pileated woodpeckers, not for marten. In the existing conditions in Chapter 3 of the FEIS, we acknowledge that pileated woodpeckers may need home ranges larger than some of the DOGs, but project area DOGS are also known to “meet some of the pileated woodpecker management recommendations developed by Bull and Holthausen (1992) particularly in terms of vegetation types, size of core old growth, and canopy closures. As described in Chapter 4 of the FEIS, adjusted DOGs would be between 289 to 715 acres; all DOGs would either remain larger than Bull and Holthausen’s (1992) recommendations or be moved closer to those recommendations.

12-30. Please refer to Preliminary Alternative 9 (DEIS page 2-3). The decision maker decided not to pursue this alternative any further. See also FEIS Chapter 2, Preliminary Alternative D. As discussed in Chapter 4 of the FEIS “, The goal of adjusting DOG lines was to better define DOG boundaries, not to increase or decrease the size of DOGs. However, adjusting DOG lines would slightly increase the size of DOG 02039, moving it toward the Forest Plan standard, and would somewhat compensate for DOG acres lost to reallocating acres of DOG to ROG” and “…the final effect of adjusting DOG boundaries is a 38-acre decrease in DOG but a slight net increase (37 acres) in high quality old-growth habitat within DOGs with a negligible effect on pileated woodpecker and other old-growth associated species.”

12-31. The Forest Plan and its accompanying EIS (1990) states “*In replacement old growth units, allow scheduled timber harvest which maintain or enhance the capability of timber stands to provide suitable old growth habitat in the future* (Forest Plan, IV-106 #13). ROGs are to be identified and managed to replace the Designated Old Growth areas.

Goshawks are a species of interest. Goshawk habitat requirements and effects of proposed activities on goshawk and their habitat are described in Chapter 4 of the FEIS.

12-32. Refer to response to comment 3-5.

12-33. Grazing is a permitted activity within Management Area 10, Semi-Primitive Non-Motorized Recreation Area (Forest Plan IV-97 #6). Also refer to response to comment 3-5.

12-34. Commercial harvest is permitted on about 75 percent of the project area as stated in the Forest Plan description of management areas and FEIS chapter 1. The DEIS (pg 4-92) states: Under all alternatives the project area would continue to provide a wide range of recreation opportunities, activities, settings, and experiences; however, the roaded settings clearly dominate. All action alternatives generally result in no change, or a small decrease in roaded settings and a small increase in semi-primitive non-motorized settings. Also refer to the recreation section in the FEIS chapter 4.

12-35. Thank you for your comment; the effects to dispersed campsites are displayed in Chapter 4 of the FEIS.

12-36. The effect of cover removal on big game is described in Chapter 4 of the FEIS. The Oregon Department of Fish and Wildlife (ODFW) was consulted and concurred on expected effects of proposed actions on elk (consultation notes are in the Wildlife Project Record). While hunting was considered an action that contributes cumulative effects to big game populations (see Chapter 4 of the FEIS), hunter numbers as an effect on big game animals is outside the scope of this analysis; legal responsibility for hunter numbers rests with the State of Oregon.

12-37. Roaded access was identified during scoping to be a significant issue with the public. The Burns Paiute tribe also expressed concern regarding roaded access to resources within the area, especially for elders who may be mobility-impaired.

All action alternatives move road densities toward Forest Plan standards (FEIS chapter 4). Chapter 4 of the FEIS discusses the effects of different road densities on wildlife.

12-38. The definitions will be added to the FEIS glossary and are as follows:

- Commercial thinning – a type of commercial harvesting which removes commercial size (7-21 inches dbh) trees from a stand for the purpose of increasing the spacing between the residual trees. Trees of undesirable species, form or condition would be removed by cutting from below.
- Intermediate thinning - a type of commercial harvesting which removes commercial size (7-21 inches dbh) trees from a stand for the purpose of increasing the spacing between the residual trees and moving the composition of the residual tress towards historical species composition. Trees with undesirable form or condition would be removed by cutting from below.

12-39. Copies of public comments are provided in the FEIS, Appendix D. Copies of the two specific publications will be sent. Non-specific requests cannot be filled.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: ECO-088

MAY 11 2001

Ref: 99-090-AFS

Malheur National Forest
Emigrant Creek Ranger District
Attn: Lori Bailey
HC-74 Box 12870
Hines, OR 97738

Dear Ms. Bailey:

We have reviewed the Draft Environmental Impact Statement (DEIS) for the proposed **Silvies Canyon Watershed Restoration Project** pursuant to the Environmental Review Process (ERP), under section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act as amended. Section 309, independent of NEPA, directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions. The Silvies Canyon watershed is located within Malheur National Forest (MNF) of the Burns and Bear Valley District.

Specifically, the DEIS proposes an action plan to implement ecosystem restoration on more than 80% of the watershed area lying within the Burns and Bear Valley District. The Forest Service proposes to implement a variety of management activities, including silvicultural prescriptions, prescribed burning, implement wildlife enhancement projects, road decommissioning, and new road construction and reconstruction.

EPA's main concerns are that the Forest Service needs to bring the project area's road densities more on line with Forest Plan management objectives, manage access issues posed by all terrain vehicles (ATVs), manage the quality of aquatic and upland resources in light of on-going livestock grazing activities, consider a Clean Water Act Section 303(d) Protocol for listed waters, and design a smoke management program for prescribe fires. Based on our review, we have assigned the Draft Supplement EIS a rating of EC-2 (Environmental Concerns - Insufficient Information). This rating and a summary of our comments will be published in the *Federal Register*. A summary of the rating system we used in our evaluation of this DSEIS is enclosed for your reference.

Enclosed please find our detailed comments, which elaborate further on these issues. We are interested in working with MNF in the resolution of these issues. I encourage you to contact Tom Connor at (206) 553-4423 at your earliest convenience to discuss our comments and how they might best be addressed.

Thank you for the opportunity to review this Draft EIS on the Mill Creek Timber Sales and Related Activities in Rogue River National Forest.

Sincerely,

Judith Leckrone Lee

Judith Leckrone Lee, Manager
Geographic Implementation Unit

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Enclosure

EPA COMMENTS ON THE SILVIES CANYON WATERSHED RESTORATION PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

Issue #1 – FOREST ROADS

1) How will the Malheur National Forest, in its watershed restoration proposals for the Silvies Canyon Watershed project area, match current Forest Plan standards for road densities? The FEIS (Final Environmental Impact Statement) needs to disclose and describe how proposed road closures or decommissions will meet existing Forest Plan standards for road densities within the Silvies Canyon Watershed project area. 13-1

Forest roads have a strong influence on a watershed (Kohm and Franklin, 1997). Surface erosion from logging roads is a significant source of deliverable sediments in watersheds (DEIS, page 4-13). Areas with high road density can be expected to have a relatively high mass wasting hazard and surface erosion hazard both now and into the future. A recognized study (Cederholm, 1981) in the northwest has determined that basin integrity is impaired when road density is above sustainable levels.

According to the DEIS, the project area has an average road density of 2.4 mi/m^2 in big game winter range and 3.9 mi/m^2 in summer range (page 1-10). These current densities are above Forest Plan standards for road densities in big game winter ranges of 2.2 mi/m^2 and 3.2 mi/m^2 in summer ranges respectively. At this time, high fine sediment loads are impacting portions of the Myrtle Creek system in the Malheur Nation Forest (MNF) as evident by the high levels of streambed embeddedness (DEIS, page 3-4). The EIS's enclosed Biological Evaluation/Assessment on Great Basin redband trout, identified as a species of concern, is sensitive to changes in habitat quality, especially degradation of stream substrate configurations that might impede water flow through dynamics in spawning areas. The DEIS identified 33 miles of forest roads are located within the sensitive and erodible Riparian Habitat Conservation Areas (page 4-4). These identified logging and access roads continue "to be chronic sediment sources and would continue to degrade the water quality and fish habitat within the watershed" (page 4-4).

While the DEIS does present information on levels of permanent closures and decommissioning activities for each alternative, this information is not translated in a more understandable format for the reviewer to see if or how each alternative strategy will restore the project area to Forest Plan standards. 13-2

2) After successful decommissioning activities, how will road closures and decommissioned roads remain at current standards throughout the life span of the closure? Furthermore, how will MNF manage and restrict breachs of road closures by off highway vehicle (OHV)? 13-3

As identified on page 1-10, a portion of forest of forest road number 3100035, which was previously closed, was breached. This unregulated and intentional breach allowed all

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terrain vehicles (ATVs) to cross the Silvies River and have unrestrained access into Myrtle-Silvies Roadless Area. As stated on page 3-6, unauthorized "off highway vehicle (OHV) use is becoming a concern" since this vehicle disturbance is inconsistent with MNF's Forest Plan. In addition, unregulated and unsanctioned motorized vehicle use on public lands is one of the "most intrusive activities" (DEIS, page 3-6) within MNF since it is incompatible with soil and aquatic resource management, including the project area.

Therefore, how will the Forest Service prevent both short and long-term access through permanent road closures by unauthorized motorized traffic, especially by 4-wheel drive vehicles (or ATVs), and prevent unrestrained access through streams and sensitive areas? 13-3

3) The DEIS reports that Oregon Department of Environmental Quality (DEQ) states that more data is needed before the streams in the project area are listed for sediment (page 1-21). It appears that DEQ is only waiting for more collaborative data to confirm §303(d) of the Clean Water Act (CWA) listing for streams in the project area, like Myrtle Creek. Due to on-going high sediment loads and elevated status of stream bed embeddedness, EPA recommends that any restoration projects should include a monitoring program to supply enough ambient sediment data to aid in resolving DEQ's determination. 13-4

Issue #2 – IMPACTS FROM CATTLE GRAZING

1) The FEIS needs to disclose more fully the environmental impacts, including direct, indirect, and cumulative impacts (40 CFR § 1508.7) from cattle grazing within the project area. 13-5

At a national level, domestic livestock presently graze approximately 91% on all federal lands in the 11 contiguous western states (Armour et al., 1991; and U.S. General Accounting Office, 1998). Within the MNF, cattle grazing has been an on-going, permitted activity as documented within the Forest Plan. At present, there are eight grazing allotments within the project area, grazing an average of 8,853 head months (DEIS, page 3-34).

Livestock grazing, as is unrestrained access by ATVs, is an environmentally intrusive activity (DEIS, page 3-6). The thin ribbon of stream and riparian habitats that threads through arid western areas composed but 0.5 - 1.0% of the landscape (Belsky et al., 1999). The DEIS acknowledges that the effects of livestock grazing are more concentrated along stream corridors (page 3-6) than on upland sites. Livestock will concentrate where is forage more readily available. One study found that 81% of the forage consumed by cattle was growing within the riparian zone (Roath and Krueger, 1982). The extensive disruption to riparian areas caused by cattle is more disproportionately damaging than their often small numbers would indicate. Domestic livestock grazing has damaged approximately 80% of stream and riparian ecosystems in the western United States (Belsky et al., 1999). In sum, livestock grazing is found to involved multiple negative ecological impacts, including water quality and seasonal quantity, stream channel 13-5

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morphology, hydrology, riparian soils, streambank vegetation, and aquatic wildlife (Belsky et al., 1999). 13-5

Currently, streams in the project area are in stressed conditions. Only 3 of 26 surveyed stream reaches are currently meet riparian management objectives for large woody debris as established by the Forest Plan (page S-23). Structural impacts to the riparian area and associated fluvial systems are evident within the project area in the reduction in pool sinuosity and quality of pool habitat (DEIS pages 3-10 and 3-11). 13-6

Resource damages from livestock grazing also extends well beyond the riparian areas. While the DEIS gives focused attention to commercial harvesting, precommercial thinning, and associated fuels treatment activities to reduce high fuels loading conditions, the effects of livestock grazing on upland forest ecosystem has received scant attention. Numerous studies, some dating back to the 1920s, expose the potential of livestock grazing on stand dynamics, tree species composition, and upland soils on forests of the interior West (Belsky and Blumenthal, 1997). The DEIS briefly states that "fire control, *grazing*, and timber harvesting within the last 100 years has changed the forest's species composition, density, and structure" (page 1-11). However, the DEIS does not address the environmental impacts from livestock grazing sufficiently. 13-7

If the two of the express purposes of the Silvies Canyon Watershed Restoration Project, namely, 13-8

> 1) Improve riparian conditions in reaches of streams that do not presently meet riparian management objectives; and
>
> 2) Improve the health, vigor, and resiliency of vegetation to insects, diseases, wildfire, and other disturbances, to more closely resemble historical conditions (or the historic range of variability) in order to promote long term forest sustainability;

are to be met, then the DEIS needs to evaluate the historical, current, and foreseeable future impacts of livestock grazing activities on riverine, riparian, and upland forest health conditions.

Also, in the DEIS, chapters 3 (Affected Environment) and 4 (Environmental Consequences) both stress the importance of managing noxious weeds. This silent invasion is a large threat to biodiversity and forage production, dwarfing "potential negative impacts posed by the use of chainsaw, doser, or herbivores" ((page 3-37). Here too, at the landscape and regional scale, livestock grazing may be the major factor causing and enhancing the invasion of noxious weeds (Belsky et al., 2000). 13-9

The DEIS stated that the effects of cattle grazing would be included in the cumulative effects analysis, Chapter 4. The disclosure in the DEIS of cumulative impacts on resources due to livestock grazing within the project area still remains unclear. Based on Council of Environmental Quality's (1987) directives, how will the MNF address direct, indirect, and cumulative environmental effects by livestock grazing in the 13-10 study area? In addition, while changes to the permitting process (numbers, type, distribution, timing, and duration of livestock grazed) are considered "outside the scope of this project" (DEIS, page 1-23), critical comprehensive planning strategies, as identified for this watershed project, should not be deferred until the time of grazing permit reissuance scheduled tentatively set for 2003 to 2005. 13-10

2) As a second related item, the term "head month", needs to be defined in the FEIS glossary and its abbreviation added to the abbreviation list to aid the reviewer in furthering understanding of grazing allotments within the project area. 13-11

Issue #3 – CLEAN WATER ACT SECTION 303(D) PROTOCOL

EPA would like to see the protocol, *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters*, disclosed more fully within the FEIS.

The Forest Service has a role in developing and implementing Total Maximum Daily Loads (TMDL) for impaired waterbodies on their land. This *303(d) Protocol* provides interim direction to the USFS (and the BLM) on how to address waterbodies which have been listed pursuant to § 303(d) of the CWA that are on Forest Service (and BLM) lands while Oregon develops their Total Maximum Daily Loads (TMDL) plans. The *303(d) Protocol* directs the Forest Service to: 13-12

1) validate that listed streams are impaired;

2) demonstrate that sufficiently stringent management measures are in place to prevent additional degradation; and

3) to proactively develop Water Quality Restoration Plans (WQRP) and not wait for the development of a TMDL.

The FEIS should explain the purpose of the *303(d) Protocol* and what it calls for land manager to do (i.e., the above three directives).

The FEIS should further explain at what point and how the *303(d) Protocol* will be addressed and provide more specificity on the steps the MNF will take to implement it. The DEIS should include specifics on the application of the protocol, comparison of priorities for restoration with state priorities for TMDL development and implementation, coordination and collaboration with other agencies also doing restoration planning and activities, and the development of effective feedback and monitoring plans. Monitoring and feedback should be developed to determine if the goals and restoration work targeted are moving the watershed towards desired directions. 13-13

The DEIS states that Myrtle Creek is listed in the Oregon's 303(d) report for not meeting state water quality standards for temperature. One purpose of the *303(d) Protocol* is to 13-14 support State development of TMDLs through early development of WQRPs. Plans to develop a TMDL for Myrtle Creek were not stated or described. The Silvies Watershed Restoration Project should call on the MNF to develop a WQRP to assist in long-term restoration of any 303(d) list stream for existing or high probable (sediment) water quality standard. A WQRP includes six common elements. These six elements, which should be explained within the FEIS, are: 13-14

1) Condition assessment and problem description
2) Goals and Objectives
3) Management actions to achieve objectives
4) Implementation schedule
5) Monitoring/evaluation plan, and
6) Public participation plan

Issue #4 – SMOKE MANAGEMENT PROGRAM FOR PRESCRIBED FIRES

Please provide in the FEIS an overview of the smoke management program the Forest Service intends to follow to avoid public health impacts and potential ambient air quality exceedances. 13-15

EPA's main concern from prescribed fires is that smoke from the fire will degrade the air quality, which is a statutory responsibility of EPA. In spite of this concern, EPA recognizes the valuable role fires play in the ecosystem and understands how the past practice of fire suppression has had unintended negative effects. Due to the unhealthy condition of our public wildlands, and the increase in unplanned fires, the five major land management agencies under the Departments of Agriculture and the Interior conducted a Federal Wildland Fire Management Policy and Program Review in 1995. From this review, they recommended reintroducing fire (allowing it to play its natural role) into Federal land management programs in "an ongoing and systematic manner, consistent with public health and environmental quality considerations."

Air officials are concerned about the public health impacts that may occur from the smoke which can contain many different chemical compounds. Smoke also contains particulate matter, one of the six pollutants for which EPA has set National Ambient Air Quality Standards (NAAQS). If the NAAQS for particulate matter is exceeded, the EPA is required to designate the area as a "nonattainment" area. This designation then imposes on the State certain legal requirements to bring the area back into attainment.

On May 15, 1998, the EPA issued an interim policy for addressing public health and welfare impacts caused by wildland and prescribed fires that are managed to achieve resource benefits. This *Interim Air Quality Policy on Wildland and Prescribed Fires* was prepared in an effort to integrate the public policy goals of allowing fire to function in its natural role in maintaining healthy ecosystems and protecting public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. The policy was developed with the active involvement of stakeholders, including the US Department of Agriculture. A complete copy of EPA's *Interim Air Quality Policy on Wildland and Prescribed Fires* is available on line at www.epa.gov/ttncaaa1/t1/meta/m27340.html.

This guidance is directed at Federal land managers and State and tribal air quality managers and was driven by the concern that there will be exceedances of the NAAQS in light of plans by Federal land managers to carry out more prescribed fires. If there is an exceedance of the NAAQS, the policy allows for EPA discretion in designating an area as "nonattainment," but only if the state has in place a smoke management program. Therefore, it is incumbent on federal land managers to work with the state to ensure they are operating in accordance with any smoke management programs the state may have in effect.

A smoke management program may include a number of elements (See *Interim Air Quality Policy on Wildland and Prescribed Fires*, Section VI, page 17 - Smoke Management Programs and associated subsections for more complete descriptions):

1) a process to authorize burns,
2) a requirement that land managers consider alternatives to burning to minimize air pollutant emissions,
3) a requirement that burn plans include smoke management components,
   - a) actions to minimize fire emissions
   - b) evaluate smoke dispersion
   - c) actions that will be taken to notify populations and authorities prior to burns and to reduce the exposure of people at sensitive receptors if smoke intrusions occur
   - d) air quality monitoring, especially at sensitive sites
4) a public education and awareness program,
5) a surveillance and enforcement program,
6) periodic review of its program for effectiveness.

The FEIS should describe those elements that are part of your smoke management program. The more specific environmental impacts of the planned prescribed fires on air quality and visibility should be discussed in the Environmental Consequences section of the FEIS. Section V.A.2.b of the interim report, Evaluating Environmental Impacts, lists seven pieces of information that should be provided. 13-15

We would like to inform the Forest Service that the NAAQS for particulate matter was revised in July 1997 to include a new standard for particles with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$) and a revised form of the standard for PM_{10}. However, a 1999 Federal court ruling retained in effect but remanded back to EPA the NAAQS for $PM_{2.5}$ for further consideration and vacated the revised PM_{10} NAAQS. The pre-existing (1987) PM_{10} standards remain in effect. The NAAQS for $PM_{2.5}$ are 15 micrograms per cubic meter ($\mu g/m^3$) on annual basis and 65 $\mu g/m^3$ on a 24-hour basis. The PM_{10} standards are 50 $\mu g/m^3$ on an annual basis and 150 $\mu g/m^3$ on a 24-hour basis.

13-1. Table 4-14 (DEIS pg 4-70) compares road densities by alternative. In all action alternatives, subwatersheds meet or move toward Forest Plan Standards (2.2 mi/mi² in winter range and 3.2 mi/mi² in summer range) for road densities. Alternatives 3 & 4 move the watershed towards the desired future condition road densities (1.0 mi/mi² in winter range and 1.5 mi/mi² in summer range) as described in the Record of Decision, Land and Resource Management Plan, Malheur National Forest (pg 23) (DEIS pg 2-12). See also the FEIS.

13-2. Thank you for your comment. Your comment has been incorporated into the EIS and is now part of the administrative record for this project. This discussion has been updated in the FEIS. See also response to comment 13-1.

13-3. The DEIS pg. 4-3 discloses how roads are maintained after closure, decommissioning, and seasonal closures.

The DEIS pg 2-39 states "Roads that have been closed or decommissioned would be monitored over a five-year period to inspect the effectiveness of the closure or decommissioning and hydrologic function of the remaining roadway. If monitoring determines the closure or decommissioning is not effective, it would be corrected to meet objectives." This discussion has been updated in the FEIS Chapter 2. See also response to comment 12-25.

13-4. The forest is starting a sediment-monitoring program that includes this project area; monitoring for sediment is described in the FEIS Chapter 2.

13-5. Discussion on cumulative effects of grazing is found in the FEIS Chapter 4. See also response to comment 3-5.

13-6. The FEIS chapter 3 states, "Large wood in streams is naturally low and generally does not meet Forest Plan RMOs in the Silvies Project area due to two factors. First, much of the riparian areas are meadows where the potential for recruiting large wood into the channel is low and large wood must be recruited from forested areas upstream. Approximately 59% of the surveyed stream reaches in the project area are within meadows or meadows are the predominant riparian ecosystem type.

Second, large wood RMOs in Forest Plan Amendment 29 may overestimate the potential for large wood in the Silvies Canyon project area. Forest Plan Amendment 29 RMOs for large wood were developed using data from research papers, local research in the upper M.F. John Day River watershed, and professional judgment of Forest staff (R. Gritz pers. com.). However, the southern portion of the Malheur Forest has historically been less productive than the northern portions. The area was historically (prior to 1900) less forested than presently. Approximately 20,000 acres were non-forested in the project area compared to the approximately 15,000 acres that are presently classified as non-forested. Trees 80 to 100 years old that correspond to the expansion of forested areas in the project area are currently 10 to 16" dbh (R. Schwenke pers. comm.). These trees are now just reaching the size class to be considered as potential large wood. The low number of stream reaches meeting RMOs indicates that management activities have reduced the quantity of pool habitat in the project area. Management activities that have reduced pool habitat include livestock grazing and road construction along 'C' and 'E' type channels." See also the effects section in chapter 4 of the FEIS.

13-7. Refer to response to comment 13-5.

13-8. The purpose and need for action statement has been updated in the FEIS Chapter 1. Refer also to the response to comment 13-5.

13-9. Our inventories indicate that most of the noxious weeds are in areas disturbed by mechanical means, such as along roads, in landings and in gravel pits. Livestock may be one of the factors in noxious weed invasion, but does not seem to be a major one. The biggest factor in the Silvies Canyon project area appears to be roads (human travel) and vehicular travel and equipment use. Houndstongue appears to be the only noxious weed in our area that is spread by animals. Currently there are no houndstongue sites within the project area.

13-10. More discussion on cumulative effects of grazing is found in the final EIS.

Standards for livestock use are in place in annual operating instructions (AOIs). Refer also to the response to comment 3-5.

13-11. The term HM will not be used in the FEIS. We will use Animal Month (AM), which is a more commonly used term; it will be defined in the FEIS.

13-12. This project has sufficiently stringent BMPs, design features, and management measures (INFISH), to minimize effects of ground disturbing activities as documented by the following statements (Chapter 4):

- Stream temperatures are not expected to increase due to harvest activities and downstream reaches will be monitored on short term and long basis for possible changes.
- Where riparian shrubs and trees are killed by fire, aquatic habitat can be adversely affected due to a short-term decrease in cover and increases in water temperatures.
- Overall, there is little risk from prescribed fire, but there always is a possibility that fire intensity could be higher than expected and result in reduced stream shading for short periods of time.
- Conifer removal around aspen may result in slightly higher stream temperatures for 1-3 years. As aspen re-grow, stream shade would improve beyond the level provided by conifers.
- Livestock grazing is a contributing factor to the degradation of riparian habitat resulting in higher stream temperatures. Discussions on livestock grazing are limited to Chapter 3 and the cumulative effects section of Chapter 4 since this is outside the scope of this EIS.

The Malheur N.F. has not been funded for WQRPs in this area therefore they are not done.

13-13. The Silvies Canyon Restoration Project has considered the effects of all action and no action alternatives on the resource and made every attempt to limit negative effects while still attempting to restore the vegetative component of the resource. Cumulative effects from livestock grazing are also described in the FEIS chapter 4.

Monitoring of temperature, sediment, aquatic habitat and fish populations has been identified and planned for future years in the project area. (Monitoring section of FEIS, Chapter 2)

13-14. The Malheur National Forest has not been funded for WQRPs in this area therefore they are not done.

13-15. The effects on air quality were evaluated in the DEIS on page 4-49. A more in-depth analysis was included in the FEIS chapter 4 and the Fuels Specialist Report.

We have collaborated with the State of Oregon and developed a memorandum of understanding (MOU). Forest Service has agreed to 10 provisions. This MOU is documented in the DEIS on page 4-49 and 5-20. *Memorandum of Understanding Between Oregon Department of Environmental Quality, Oregon Department of Forestry, USDI Bureau of Land Management, and USDA Forest Service, 1994.*

ONRC

Main Office
5825 N. Greeley
Portland, OR 97217
(v): 503.283.6343
(f): 503.283.0756
info@onrc.org

Western Field Office
P.O. Box 11648
Eugene, OR 97440
(v): 541.344.0675
(f): 541.343.0996
dh@onrc.org

Eastern Field Office
16 NW Kansas Ave.
Bend, OR 97701
(v): 541.382.2616
(f): 541.385.3370
tl@onrc.org

Southern Field Office
943 Lakeshore Drive
Klamath Falls, OR 97601
(v): 541.885.4886
(f): 541.885.4887
ww@onrc.org

Emigrant Creek Ranger District
Lori Bailey and Joan Suther, EIS team leaders
James Keniston, District Ranger
HC 74 – Box 12870
Hines OR 97738

April 20, 2001

Subject: ONRC comments on the Silvies Canyon DEIS

Dear Mr. Keniston, Ms. Bailey, and Ms. Suther:

Please accept the following comments from Oregon Natural Resources Council Fund (ONRC) concerning the Silvies Canyon DEIS dated February 2001. ONRC would like to urge you to restore historic vegetation patterns through prescribed fire, grazing restrictions, and other non-commercial activities while protecting the many values of inventoried and uninventoried roadless areas. Since there are risks to soil, wildlife, water, and roadless qualities from commercial logging, and since the EIS admits that there is a high likelihood that no bids will be received in today's market, we urge you to prepare a supplemental EIS to address lynx, soil, juniper, grazing and other issues raised in these comments, and then adopt either the no action alternative, or if appropriate, adopt alternative 3 — maximum restoration without harvest — modified as follows: no road building, no cutting of large trees, no juniper cutting in the inventoried or uninventoried roadless areas, more road closures, reduced livestock grazing, and conserve options until more is known about the needs of lynx.

ROADLESS CONCERNS

There are several uninventoried roadless areas that will be affected by the proposed Silvies Canyon project. Some of these roadless areas are contiguous with the inventoried Myrtle-Silvies Roadless Area and some of the roadless forest land is separated from the Myrtle Silvies area by only a single road, but in blocks larger than 1,000 acres making them ecologically significant. *See the attached map of the inventoried roadless area and uninventoried roadless areas ≥ 1,000 acres from ONRC's GIS system.* 14-1

Commercial thin unit 3.01, juniper removal unit 1.06, and precommercial thin unit 40.01 are located wholly or partially within the inventoried Myrtle-Silvies Roadless Area which is covered by the Forest Service Roadless Conservation ROD and 36, CFR 294. These units must be dropped and/or a thorough analysis done considering the multiple criteria for exempting these areas form the general prohibition on logging in inventoried roadless areas. 36 CFR 294.13. 14-2

ONRC has identified the following harvest units as located wholly or partially within uninventoried roadless areas greater than 1,000 acres:
1.06,
3.01,
4.01, 4.02, 4.03, 4.05, 4.06,
5.01, 5.02,
6.03, 6.04,
7.01, 7.02, 7.03, 7.04, 7.05, 7.06,
8.04, 8.05, 8.06, 8.07,
9.01, 9.02,
10.01, 10.03, 10.04,
11.11, 11.12,
12.01, 12.02, 12.03,
13.01, 13.02, 13.03, 13.04
14.01, 14.02, 14.03,
16.01, 16.02, 16.03, 16.04, 16.05, 16.07,
19.01, 19.02, 19.03,
20.06, 20.07,
21.01, 21.02, 21.03, 21.04, 21.05, 21.06, 21.07, 21.08, 21.09, 21.10, 21.11,
22.01, 22.02, 22.03, 22.04, 22.05, 22.06,
24.01, 24.42,
25.01,
32.02, 32.09,
33.03, 33.08, 33.09, 33.10, 33.11, 33.13
36.18,
37.01, and 37.02.

All the above units having prescriptions calling for commercial thinning, intermediate thinning, or juniper removal should be dropped to protect roadless values such as those described in the USFS roadless Conservation FEIS. The following PCT units are within uninventoried roadless so they must remain non-commercial prescriptions and they should be carefully managed to avoid harm to roadless values: 4.03, 5.01, 6.04, 7.04, 7.06, 8.04, 8.07, 9.02, 11.12, 12.01, 12.02, 13.03, 13.04, 16.02, 16.03, 16.04, 19.02, 20.06, 20.07, 21.03, 21.04, 21.10, 22.03, 22.06, 33.09, 33.11, 33.13, 40.01, and 41.01. 14-3

The Silvies Canyon DEIS does not address any effects on uninventoried roadless areas. While we do not object in principle to the use of prescribed fire in the roadless areas, please refer to our discussion of concerns about the proper use of prescribed fire below (beginning on page 10). We do however object to commercial timber harvest in the uninventoried roadless areas the impact of which are nowhere discussed in the EIS. 14-4

The Malheur NF should take note that the Rogue River National Forest considered unroaded areas in the recent Mill Creek DEIS. Although the Rogue River National Forest should be commended for acknowledging the existence of uninventoried roadless areas in an EIS, they did not do a good job of analyzing the impact of the proposed project on the values embodied by the uninventoried roadless areas.

Roadless areas greater than about 1,000 acres, whether they have been inventoried or not provide valuable natural resource attributes that must be protected. These include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other significant values. See Forest Service Roadless Area Conservation FEIS, November 2000, http://roadless.fs.fed.us/. This project involves activities in such unroaded areas. The NEPA analysis for this project does not adequately discuss the impacts of proposed activities on all the many significant values of roadless areas. 14-5

It is possible to walk (for example) from inside many units of this timber sale to the interior of recognized roadless areas without ever crossing a road. This makes these units roadless. 14-6

Roadless area boundaries are an issue that has never been validated in any NEPA process. Only arbitrary Forest Service designation, outside of any public appeal opportunity, has set these boundaries. As part of this NEPA analysis, the roadless boundaries should be validated. This is addressed clearly by the California v. Block decision and others. 14-7

An action does not have to occur inside a RARE II boundary to affect a roadless area, because RARE II is not the final word on roadless lands. As the Forest Service is abundantly aware, the court ruled in *California v. Block* that actions affecting wilderness status could not rely on RARE II. The court ruled that RARE II did not comply with NEPA and "was inadequate to support the non-wilderness designations of the disputed areas and therefore violated NEPA." In the present case, the Forest Service is relying on an illegitimate RARE II boundary of this roadless area to support its contention that logging may occur in *de facto* roadless land without affecting future wilderness designation. 14-8

Further, the Forest Service Washington Office ruled in its appeal decision of the Idaho Panhandle Forest Plan Appeal that roadless areas must be evaluated individually when logging is to occur in them.

The fact that several of the units of this timber sale do not fall within the RARE II boundary but *do* fall adjacent to it and undivided from it by any road requires the Forest Service to address roadless impacts per the NFMA and to acknowledge to the public the effects to the roadless resource.

The DEIS failed to consider the significant environmental impacts of proposed activities in uninventoried roadless areas.

GRAZING AND FOREST HEALTH

There are at least 8 livestock grazing allotment in the planning area for this project. Page 3-18 of the DEIS admits that tree density and diversity increased with the advent of grazing (and fire control). The DEIS speaks at length about fire exclusion and the need to cut trees to address overstocked stands, but the DEIS does not address the need to exclude livestock to restore natural vegetation profiles. The DEIS describes the effects "on" range resources but fails to disclose or analyze the effects "of" livestock on forest health and the desired future condition of vegetation composition. 14-9

This project does nothing to address the threat that livestock grazing causes to forest health. There is virtually no point in trying to mechanically reduce tree density unless you deal with other underlying causes of overstocking, e.g. livestock grazing. 14-10

Grazing reduces the density and vigor of grasses which usually outcompete tree seedlings, leading to dense stands of fire-prone small trees. Cows also decrease the abundance of fine fuels which are necessary to carry periodic, low intensity ground fires. This reduces the frequency of fires, but increases their severity. See Belsky, A.J., Blumenthal, D.M., "Effects of Livestock Grazing on Stand Dynamics and Soils in Upland Forest of the Interior West," Conservation Biology, 11(2), April 1997. http://www.onda.org/Archives/ForestGrazing.htm 14-11

The EA failed to address these issues and failed to consider alternative ways of avoiding these impacts by not grazing. The combination of fire suppression, past high-grading, and livestock grazing together caused the overstocked condition of the stands in the analysis area. Logging and prescribed fire will only partially address the problem. To be effective, livestock grazing must also be eliminated. Grazing and logging cause cumulative effects that must be considered together in one NEPA document.

SNAGS AND CAVITY DEPENDENT SPECIES

Currently there are only about 1 snag per acre in the planning area which can support only 40% of the potential population of cavity dwellers. DEIS page 3-53. In addition, the DEIS indicates that mixed conifer stands may be deficient in down woody debris. Removing lots of trees (i.e. future snag habitat and down woody debris) as proposed in the DEIS (plus felling snags for safety reasons as always happens) will only exacerbate the problem. 14-12

Bats, martens, woodpeckers, bears, and many other species are dependant upon snags. Current direction for protecting and providing snags does not meet the needs of the many species associated with this unique and valuable habitat component. See PNW Research Station, "Dead and Dying Trees: Essential for Life in the Forest," Science Findings, Nov. 1999 (http://www.fs.fed.us/pnw/sciencef/scifi20.pdf) ("Management implications: Current direction for providing wildlife habitat on public forest lands does not reflect findings from research since 1979; more snags and dead wood structures are required for foraging, denning, nesting, and roosting than previously thought.") 14-13

Snags should be carefully inventoried by species, size, decay status, quality, and location during project planning, and they should be treated as "special habitats" and given special protection during project planning and implementation (i.e. keep workers out of the vicinity of snags so that OSHA doesn't order them cut). The EA does not adequately address the need to protect and provide snag habitat. 14-14

The snag retention requirements in the applicable management plan Standards & Guidelines for this project fail to retain enough snags to provide habitat for viable populations of cavity dependent species. Since snags have a patchy spatial distribution, surveys to determine snag abundance require very large sample sizes relative to other general vegetation surveys. This was not recognized until relatively recently, so most past surveys conducted to determine natural snag abundance have therefore grossly underestimated the true abundance of snags. This has lead the agency to underestimate the number of snags necessary to protect species. This new information must be disclosed and documented in a supplemental DEIS and it requires a forest plan amendment.

The agency must do away with the caveat that they will protect snags "except where they create a safety hazard." This is based on a false choice between snags and safety. The agency can simply buffer snags from activities that involve unprotected workers, then all ecologically important snags can be protected. The agency must consider this as an alternative to their proposed "management by caveat." An example of this was the Umpqua National Forest, Cottage Grove Ranger District's 2001 decision to remove a picnic table near Moon Falls in order to avoid placing the public in a hazardous situation with respect to a nearby snag. Similarly, the agency here should save the snags by avoiding the activity in the hazard zone around the snags. 14-15

The EA must at least disclose how many large snags will be protected vs. felled for safety under the preferred alternative. 14-16

SOILS CONCERNS

According to the regional guidelines soils in 80% of an activity area must be maintained in a non-compacted, non-displaced, and non-puddled condition. Soils must be "maintained," not "mitigated" or "restored" to attain that objective. Mitigation should not be used as an excuse for violation of the regional soil guidelines. 14-17

Scarification, ripping, and subsoiling does not alleviate the following negative impacts, therefore not completely mitigating: 14-18

- compaction of soil and alteration of the soil ecosystem;
- alteration of hydrology, water storage, flow, timing, from soil compaction;
- alteration or loss of native plant communities, and tendency to create conditions which favor noxious weeds or other non-native plants;
- disruption of soil foodweb and biotic communities that serve important soil functions and processes such as aeration, nutrient cycling,

Soil productivity must be zealously guarded in order to protect our forests for future generations. This project will cause unacceptable impacts to soil resources. Use of ground-based logging equipment almost always compacts soil causing reduced site productivity, drastically altered soil food web relationships, reduced infiltration, and increase surface runoff. Spring burning can also be very harmful to soil and the thousands of creatures that live all or part of their lives in the soil profile. The DEIS needs to consider these impacts and consider alternative ways to avoiding these impacts. 14-19

Ground-based logging causes higher incidences of root damage and scarring of residual trees (compared to skyline systems). Kellog, L., Han, H.S., Mayo, J., and J. Sissel, "Residual Stand Damage from Thinning— Young Stand Diversity Study," Cascade Center for Ecosystem Management. 14-20

Soil disturbance caused by logging also causes erosion that adversely impacts both soil and water resources. The existing level of soil disturbance has not been measured and disclosed in the DEIS so the Agency cannot say with any factual basis whether forest plan standards will be met. This is arbitrary and capricious. Existing soil impacts must be measured and future impacts estimated so that an adequate cumulative effects analysis can be prepared and included in a supplemental EIS. 14-21

JUNIPER

The DEIS cited the Belsky paper on juniper, but failed to address its main points. The scientific basis for juniper control is highly questionable. 14-22

> Many ranchers, rangeland managers, and range scientists in the Pacific Northwest consider western juniper (*Juniperus occidentalis* Hook.) to be an invading weed that reduces water infiltration, dries up springs and streams, increases erosion, reduces biodiversity, and reduces the quality and quantity of forage for livestock and wildlife species. Although there is little scientific evidence supporting most of these beliefs, they are currently being used as rationales for controlling juniper on public and private lands. Similar views were held about pinyon-juniper woodlands in the Southwest and Great Basin from the 1940's through the 1960's, when efforts were also made to control woodland expansion. 14-23
>
> Pressures to control the further spread of western juniper and reduce its density in woodlands are increasing. Because of the paucity of information on the environmental effects of western juniper expansion in the Northwest, this paper primarily reviews evidence from earlier studies of pinyon-juniper woodlands in the Southwest and Great Basin. These studies rejected similar assumptions about the deleterious effects of pinyon-juniper expansion on ecosystem properties and call into question current rationales for controlling western juniper in the Northwest. These studies also suggest that while the expansion of juniper might alter species composition and decrease herbaceous biomass in grasslands and shrublands, they have few detrimental effects on streamflow, aquatic organisms, soil properties, or wildlife habitat.

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> . . . while the expansion of juniper might alter species composition and decrease herbaceous biomass in grasslands and shrublands, they have few detrimental effects on streamflow, aquatic organisms, soil properties, or wildlife habitat. . . . [P]opular conclusions about junipers ignore many of the complexities of natural ecosystems, including the following:
>
> 1. In arid and semi-arid climates, most snow- and rain-water simply recharges the soil column; little excess is available to move downslope to streams (Hibbert 1983, West 1984),
> 2. Herbaceous plants and shrubs that replace trees also intercept rain and snow, reducing the amount of water reaching the ground;
> 3. Replacement plants also transpire and deplete soil water (Clary et al. 1974, Brown 1987a);
> 4. Tree removal exposes the soil and understory plants to direct sunlight, causing elevated temperatures and increased evapotranspiration (Clary et al. 1974, Everett and Sharrow 1985);
> 5. Tree removal exposes soils and understory plants to more wind, which increases evapotranspiration (Everett and Sharrow 1985); and
> 6. In areas where water is in excess of that needed to recharge the soil, this water may go to shallow aquifers rather than to streams (Hibbert 1983).
>
> In other words, studies showing that junipers intercept precipitation and transpire water (Young and Evans 1987, Eddleman and Miller 1992) cannot be used to conclude that this lost water would have ended up in streams and springs. To do so, water budgets of juniper-dominated and juniper-free sites would have to be compared, or long-term changes in streamflow following juniper removal measured.
>
> A. JOY BELSKY, Viewpoint: Western juniper expansion: Is it a threat to arid northwestern ecosystems? Journal of Range Management 49:53-59 January 1996, pp. 53-59. http://www.onda.org/Archives/BelskyJuniper.html.

14-23

Livestock, by further decreasing herbaceous cover, cause many of the same effects, and many more that are far more deleterious. We propose the agency remove livestock before controlling juniper. By removing livestock maybe the herbaceous component can increase enough to carry fire and reestablish a mosaic of fire driven seral development. 14-24

A supplemental DEIS should be prepared to discuss whether removing livestock and removing roads would be as effective or more effective than juniper control in restoring hydrologic function, fire ecology, and vegetation composition.

LYNX CONCERNS

The "NO EFFECT" finding for lynx is highly questionable. The BE says that lynx habitat is always associated with subalpine fir and spruce. This is incorrect. Lynx are often associated with Rocky Mountain conifer which is a much broader vegetation type 14-25 which this project clearly falls within, and this project is also highly likely to result in a decline in the population of species likely to be preyed upon by lynx. The BE raises an inference that lynx do not occur in the state of Oregon (by saying that further surveys and research is needed before considering lynx to be self-maintaining in Oregon), but it can be just as easily said that further research is needed before lynx can be considered extirpated in Oregon and before considering all lynx in Oregon to be transient individuals as is often implied in the BE. The decision-maker and the public have been mislead by the BE and DEIS discussion concerning the likely impacts of this project on lynx. 14-25

The Oregon Natural Resources Council is greatly disturbed over the impacts the Silvies Canyon project could have on lynx, a federally listed species. We are also concerned with the lack of analysis the Draft Environmental Impact Statement gives to lynx and lynx habitat and feel it misses several factors that are crucial to the survival of the species. The Silvies Canyon DEIS gives merely cursory attention to lynx. It does not take a close look at the possibility of lynx occurring in the project area and therefor fails to analyze potential impact the proposed action could have on lynx. 14-26

The ONRC believes that the project area is potentially lynx habitat. What is mapped as lynx habitat is constantly being changed and/or redefined. The Forest Service knows very little about lynx habitat associations (Forest Service GTR RM-254, 1994 and the Science Team Report) and quite clearly faces the dilemma of conserving lynx with little knowledge of their habitat needs or ecology. In light of this lack of information on lynx both the Science Team Report (page 6 chapter 1) and the Lynx Conservation Assessment and Strategy (see the Executive Summary and on Page 75) adopt the need to "err on the side of conservation". 14-27

The DEIS for Silvies Canyon has taken the opposite approach. The Forest Service has tried to downplay the lynx issue in this document and has failed to consider several important facts. First, under the new mapping direction (From the Lynx Biology Team in their 8/22/00 letter) the Silvies Canyon project area meets the cut off criteria for lynx habitat: it is above 4000 feet in elevation and is within the Rocky Mountain Conifer Type "outer boundary" set by McKelvey in Fig. 8.19 in the Science Team Report. Additionally most of the forest in the project area is of the Western Ponderosa or Grand Fir/ Douglas Fir subtypes of the Rocky Mountain Conifer Type. These subtypes have shown a strong association with lynx occurrence reports for North East Oregon. Of the 33 occurrence records here 27 (about 82%) fall within these subtypes.

Secondly, there are good quality reports of lynx reasonably close to the project area. In 1997, less than 20 air miles to the west of the project there was a sighting of a lynx by a Forest Service biologist and two other Forest Service employees. The USFWS rates the reliability of this sighting as "very good". Roughly the same distance east of the project area there is a confirmed report of a lynx that was trapped in 1993 and a "good" reliability sighting. There are historically confirmed reports of lynx from both Grant and Harney counties, but this record is incomplete and lacks, among other things, predatory bounty records from these counties (The ONRC expects to have this information soon). Also of interest is the 1942 "Estimate Wildlife Census" from the Ochoco National 14-28

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Forest's Big Summit District which predicts that there are twenty lynx on the district. We have been unable to produce any of these type of reports from the Malheur. 14-28

The DEIS fails to show us the whole picture on lynx and presents only the facts that meet its goal of ignoring lynx and proceeding with the project. The ONRC believes its analysis is biased and incomplete. Lynx should receive proper analysis before this project can proceed. We ask that the Forest Service revisit its mapping of this area for lynx habitat and keep the following concerns in mind when continuing to develop this project:

1. The project involves habitat fragmentation: Fragmentation of habitat is a very plausible reason for the dubious status of lynx in the state of Oregon and across the southern portion of their range. Habitat Fragmentation can impact lynx by directly destroying habitat, favoring generalist species over lynx, and facilitating the access of competitors into lynx habitats where they are normally excluded in natural environments. Habitat fragmentation can be especially damaging to lynx in the southern part of their range. This project will fragment habitat by construction and reconstructing roads and through timber harvest. The Oregon Natural Resources Council is especially concerned with the increase in the ability of species that compete with lynx to access and use the project area that this fragmentation will facilitate.

2. The project will impact lynx prey: Data is lacking on the food habits of lynx in Oregon and this represents a critical research need. It is well accepted that lynx are dependant on snowshoe hares as a prey base but in the southern portions of lynx range (especially in the western mountains, where this project occurs) squirrels may always be an important part of lynx diet. It is critical to understanding how this project may impact lynx to examine how it will impact lynx prey. The DEIS ignores this critically important potential impact. Forest Service researcher Evelyn Bull (1999) has shown that the types of logging proposed in the project could impact lynx prey. 14-29

3. The project will facilitate increased human access to lynx habitat: Increased human access into lynx habitat is seen by the USFWS as a 'significant threat to the continued existence of lynx in the lower 48 states". Minimal human disturbance is important to lynx denning sites and security from such disturbance is seen as a requirement for establishing lynx refugia. The increased area use, road construction/reconstruction, fragmentation, skid trails, and logging resulting from this project will create a potential for increased human access into the project area. This could be harmful to lynx especially when this project is held cumulatively with the increased human access facilitated by other projects on the district and surrounding lands. A lynx mortality east of the project area resulted from trapping in 1993. Trapping in the project area could increase if one of the action alternatives is implemented.

4. The project will impact lynx habitat: Lynx require an mosaic of forest conditions. They rely on early successional phases for hunting, cover for security, prey stalking,

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and travel, and late successional forests for denning. Lynx seem to require these habitat types in continuity, preferring to move from denning to foraging areas and from den to den in mature forests. The EIS should discuss the impacts of each alternative on each of these components of lynx habitat. We are especially concerned with the potential impacts to travel habitat and the harvest units that may be located on ridges and saddles or next to previously harvested areas, burns or meadows. 14-29

5. The project could destabilize lynx metapopulation structure: Lynx in Oregon are likely to exist in a metapopulation (see the lynx Draft BA). Based on lynx occurrence records the project area is a potentially important area for dispersing lynx and the project could impact this structure. This project includes activities that will fragment lynx habitat and could create barriers to lynx movement. The EIS should address how each alternative of the project will affect lynx metapopulation structure. The EIS should discuss what the results of this will be on metapopulation structure, especially when the project is held cumulatively with the many other projects in lynx habitat in the state. Each action alternative could impact the ability of lynx to form a stable metapopulation, which requires the lynx to be able to move between habitat patches. This needs to be addressed in both a project specific and a cumulative sense.

Prescribed fire

ONRC generally supports the use of prescribed fire to re-establish natural fire and fuel regimes. However, we also feel that fire must be used appropriately. Few fires occurred in the spring under natural conditions and serious adverse effects on plants and animals could occur form the overuse of fire at the wrong time of year. Arthur R. Tiedemann, James O. Klemmedson, Evelyn L. Bull recently suggested: 14-30

> that a broader array of resource questions be considered before prescribed burning is implemented. We think the objectives of prescribed burning must be clearly defined and realistic estimates stated for out- comes for all affected resources. If the objective is to restore forest health, then we suggest that forest productivity, wild- life, biodiversity, and other resources and values are as much a part of the forest health equation as are the structure of a forest stand and its tolerance to fire. Thus, management aimed at returning forests to an open, seral condition should be carefully evaluated from the perspective of all the key resources and values. 14-31
> * * *
> we question how well presettlement forest conditions are understood. How pervasive was the influence of fire throughout forests of the Blue Mountains? Hall (1976) indicates that the ponderosa pine/pinegrass (Calamagrostis rubescens Buckl.) association was burned by surface fires at 7±10-year intervals. Of 22 habitats now dominated by grand fir and subalpine fir (Abies lasiocarpa (Hook.) Nutt.) listed by Johnson and Clausnitzer (1992), however, only three were historically seral ponderosa pine that were burned by periodic surface fires (personal communication, Dr. F.C. Hall, Pacific Northwest Region, USDA Forest Service). 14-32
> * * *

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> A primary concern whenever prescribed fire is used in forest management is loss of nutrients and impaired site productivity. . . . If sites are harvested and residues are burned, not only will nutrients removed in trees be lost, but also — potentially— much of the nutrient pool in slash and forest floor, depending on burning conditions. Thus, the potential to adversely affect long-term site productivity is always present. 14-33 14-34
>
> * * *
>
> The consequences of large-scale prescribed burning on wildlife in the Pacific Northwest are largely unknown because studies have been limited to investigating the effects of small prescribed burns on specific species for a relatively short time after burning. The potential effects of prescribed burning on a landscape scale should be examined carefully to determine if the changes caused by prescribed burning are compatible with other management objectives for wildlife. 14-35

Tiedemann, A.R., Klemmedson, J. O., and Evelyn L. Bull, *Solution of forest health problems with prescribed Fire: Are forest productivity and wildlife at risk?*, Forest Ecology and Management 127 (2000) 1±18 3, http://147.46.94.112/forestfire/f14_20001271301.pdf. These issues do not appear to have been addressed in the DEIS. 14-36

No Road-building Please

This project involves 15-18 miles of new road construction.

> Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity - habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting - are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals. Road-building in National Forests and other public lands threatens the existence of de facto wilderness and the species that depend on wilderness. 14-37

http://www.wildrockies.org/WildCPR/reports/ECO-EFFECTS-ROADS.html

See also NRDC Report: "End of the Road: The Adverse Ecological Impacts of Roads and Logging: A Compilation of Independently Reviewed Research" (1999) which discusses the fact that roads:

1. Harm Wildlife
2. Spread Tree Diseases and Bark Beetles
3. Promote Insect Infestations
4. Cause Invasion by Harmful Non-native Plant and Animal Species
5. Damage Soil Resources and Tree Growth

D-68

6. Adversely Impact Aquatic Ecosystems

Table 4-15 on page 4-71 of the DEIS has a nice outline of the general effects of roads on wildlife but the site-specific effects of each proposed road segment in this sale area are still lacking. 14-38

Weeds

The invasive weed sites in the analysis area and along all log and gravel haul routes should be fully inventoried and documented as part of the NEPA process for this project. In the absence of valid and complete weed survey information, harvest and road and fuel treatment activities planned as part of this project might exacerbate the problem instead of contain it. 14-39

We find it highly unlikely that conducting ground disturbing activities over so many acres of this planning are will not make the weed problems worse instead of better. These weeds are "a slow motion explosion" that should not be taken lightly. It is often better to just close roads and avoid ground disturbing activities while sending crews in to do hand-pulling of weed infestations as necessary. 14-40

Page 3-41 of the DEIS discusses some management actions that could limit the spread of weeds, but it is unclear whether or how these potential management actions were incorporated into the NEPA alternatives. The management actions discussed also leave out some reasonable alternatives, such as avoiding ground disturbing activities such as yarding and grazing, ands requiring pressure washing of all vehicles, not just off-road vehicles. 14-41

ECONOMIC ANALYSIS

The economic analysis needs to be clarified. The DEIS says that preferred alternative 2 has a positive net present value of about$65,000, yet this estimate, spread over the 30,000-40,000 acres of activities with all the uncertainties associated with implementation and market fluctuations, must have a huge confidence interval. It would be useful to know the confidence that the FS has in that figure.

ASPEN RESTORATION

We object to the adoption of a forest plan amendment that would allow cutting trees over 21 inches dbh to enhance aspen stands. The photo on page 3-14 of the DEIS looks more like aspen encroaching on an old-growth pine stand rather than the reverse, as claimed. Those pine trees have been here too long to be certain they are the product of human intervention. Aspen can co-exist with conifers and we can be sure that the stands will be reset by fire eventually, so let's just leave the larger trees. 14-42

We also object to commercial use of conifers that may be cut in RHCAs. These trees must be left live if large and left standing (girdled) if smaller or left on the ground as LWD for the stream and the soil and wildlife. 14-43

BIG GAME

Habitat effectiveness for big game, especially in terms of cover and road density, is currently not in compliance in large portions of the planning area. How did this happen? 14-44

CONFUSION

The proposal is confusing making the effects analysis hard to use. We are unclear whether road 3700117 will be closed or open after the project. It has been identified as a problem road that bleeds sediment directly into a stream but since the preferred alternative is a combination of alternatives 4 (which leaves the road open) and 10 (which closes the road), we are unclear on the intended outcome. Please close the road to protect the stream. The entire roads analysis on pages 4-11 though 4-16 is unclear because of the merged preferred alternative. The road density discussion starting on page 4-68 is also unclear for the same reason. Just know that we favor the maximum road closures.

Sincerely,

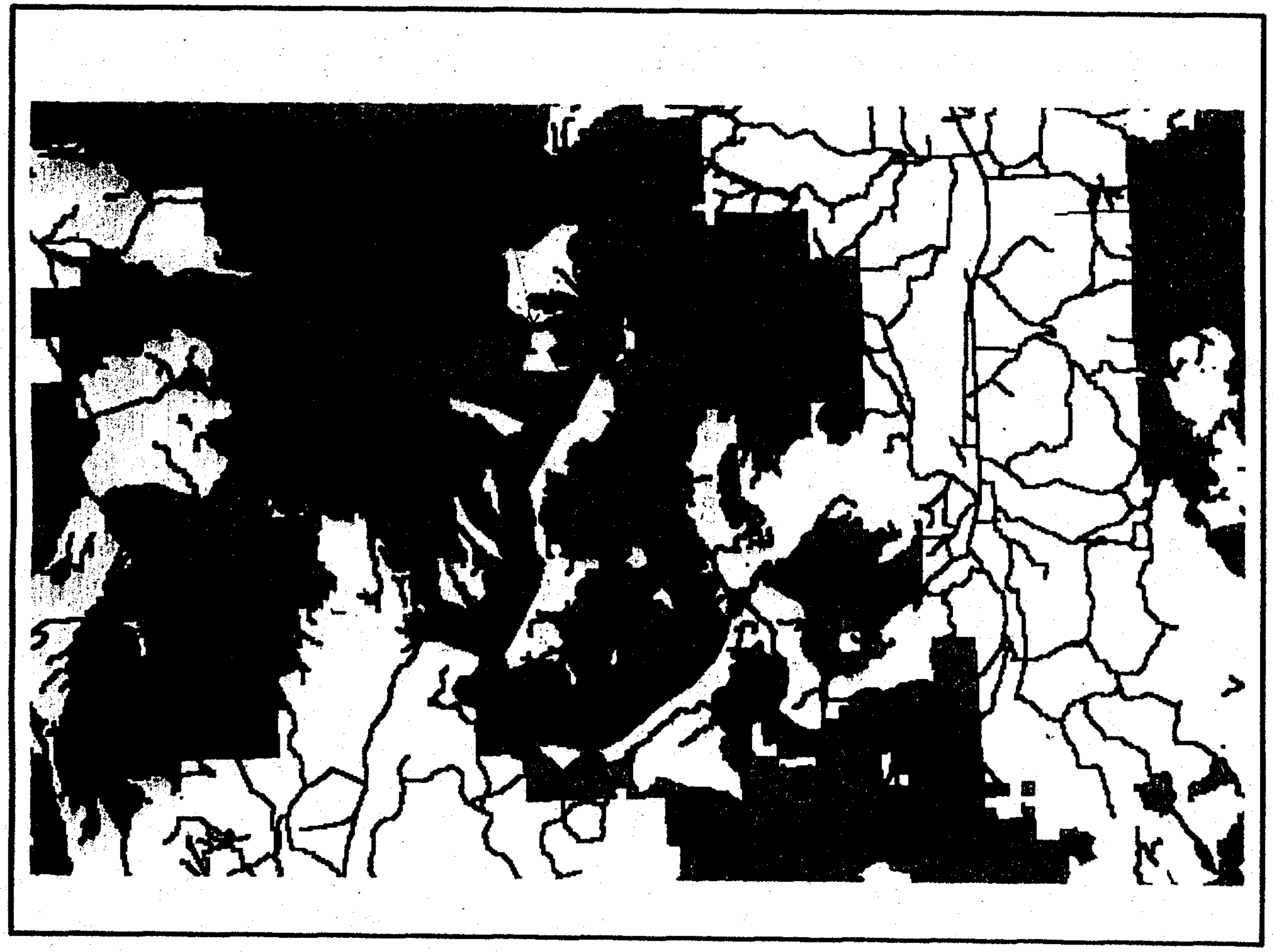
Doug Heiken
Western Oregon Field Representative

Attachment: map of the inventoried and uninventoried roadless areas around the Myrtle-Silvies inventoried roadless area

D-70

ESRI ArcExplorer 2.0

Silvies Canyon - Malheur



Roads

Wilderness

Rare II (Myrtle-Silvies)

Uninv-Roadless

National Forests (OWN)

0

11

N

Tuesday, Apr 17 2001

ONRC - Eugene

14-1. For the Forest Service, the definition of roadless areas is "those areas identified in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November 2000, which is held at the National headquarters of the Forest Service, or any update, correction, or revision of those maps" (66 FR 65802). These areas came from the FEIS Land and Resource Management Plan, Malheur National Forest Appendix C. The Malheur National Forest is not proposing boundary changes to those identified in the Roadless Area Conservation FEIS. The request to make these units "roadless" is therefore out the scope of this project FEIS.

All action alternatives in the DEIS were developed not to preclude implementation of National Forest System Land and Resource Management Planning regulations at 36 CFR 219 (65 FR 67514, November 9, 2000), Administration of the Forest Development Transportation System regulations at 36 CFR 212 and Forest Service Transportation Administrative Policy (66 FR 3206, January 12, 2001), and Roadless Area Conservation regulations at 36 CFR 294 (66 FR 3244, January 12, 2001). Since the DEIS, interim direction for Roadless Area Protection was published in the *Federal Register* on August 22, 2001 (66 FR 44111) and Forest Transportation System Analysis and Roadless Area Protection on December 20, 2001 (66 FR 65796). This direction was used for alternative development and management of roadless areas in the FEIS. Inventories to consider areas that might be eligible for wilderness designation are done as part of Forest Plan revision. The Malheur Forest Plan revision process is due to start in fiscal year 2004. The current criteria used for these areas are found in Forest Service Handbook 1909.12 – Land and Resource Management Planning Handbook, Chapter 7.

14-2. Commercial thin unit 3.01 and juniper removal unit 1.06 are not wholly or partially within the Myrtle-Silvies Roadless Area, they are adjacent to it. The effects of proposed commercial thinning and juniper removal adjacent to the Myrtle-Silvies Roadless Area for each alternative are found in Chapters 3 and 4 of the DEIS. This discussion has been updated in the FEIS.

Precommercial thin unit 40.01 is wholly within the Myrtle-Silvies Roadless Area. Proposed precommercial thinning and associated fuels treatment (hand piling and burning) within roadless areas meets the interim direction for Roadless Area Protection, as published in the *Federal Register* on August 22, 2001 (66 FR 44111). Specifically, the exception is for cutting of generally small diameter trees, which maintains or improves roadless characteristics. Proposed precommercial thinning of small diameter trees, (less than 9" dbh) and hand piling and burning thinning slash piles on 729 acres of potential bald eagle winter roost areas would improve habitat for the bald eagle, a threatened species, and move towards restoring ecosystem composition and structure, thus reducing the risk of uncharacteristic wildfire effects. The effects of proposed precommercial thinning within the Myrtle-Silvies Roadless Area for each alternative are found in Chapters 3 and 4 of the DEIS. This discussion has been updated in the FEIS.

Analysis of the roadless characteristics of the Myrtle-Silvies Roadless Area has been expanded in the FEIS. See also Response number 14-1.

14-3. This long list of units is not within the roadless area. See also response to comment 14-1.

14-4. Roadless inventories were done as part of the development of the 1990 Malheur National Forest Land and Resource Management Plan. The areas you indicated were considered in that inventory and were not included in a roadless area. The areas you indicated that are within the Silvies Canyon Watershed Restoration Project Area were allocated to MA 1/2 - General Forest, MA 4A – Big Game Winter Range, MA 10 – Semi-Primitive Non-Motorized Recreation Area, MA 13 – Old Growth, and MA 14M – Visual Corridors. The decision was made in the ROD for the Forest Plan; therefore, it is outside the scope of this project. It may be considered in the Forest Plan revision (see also response to 14-1).

14-5. See Response to comment 14-1.

14-6. See Response to comment 14-1.

14-7. Roadless area boundaries have been through several NEPA processes: the 1972 Roadless Area Review and Evaluation (RARE), the 1979 RARE II, and the 1990 Malheur Land and Resource Management Plan. Additionally, a DEIS and FEIS were prepared for the Roadless Area Conservation regulation in 2000. The

1990 Malheur Land and Resource Management Plan decision had a public appeal opportunity under which the Forest received 15 appeals.

14-8. The DEIS and FEIS are following the direction and decisions made in the 1990 Malheur National Forest Land and Resource Management Plan which met the court ruled requirements identified in *California v. Block*. Also see Response number 14-4.

14-9. The DEIS page 3-18 refers to the increase in juniper and ponderosa pine encroachment on historically non-forest lands. See also response to comment 3-5.

14-10. The cumulative effects from grazing have been updated in the FEIS Chapter 4. See also response to comment 3-5.

14-11. The cumulative effects from grazing have been updated in the FEIS Chapter 4. See also response to comment 3-5. The effects of grazing on the vigor and density of grass were updated in the FEIS. However, current utilization standards leave fuel on the ground. Observations over the past 15 years show that livestock grazing has not stopped the spread of wildfires.

Periodic moderate disturbance usually increases the density and vigor of bunchgrass, whether from historical disturbances such as fire, or from grazing by ungulates. Over grazing by ungulates can reduce the density and vigor of grasses. Whether historically grasses out competed trees due to greater density and vigor in this area is not known. It is more likely there were fewer trees and more grasses, because grasses respond favorably to periodic low intensity fire, while conifer trees require a favorable seed year.

14-12. The FEIS was updated to include conditions as they relate to DecAID (Mellen et al. 2003). DecAID is an internet-based computer program being developed as an advisory tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats. DecAID includes recommendations for snags of all sizes. Chapter 2 of the FEIS states, “Retain all snags… Snags, which are deemed a hazard to operations, may be felled, but should be left to provide down logs...” No snags are designated for harvest in this project. In addition to snags, no downed logs would be harvested. Green trees would be left at basal areas averaging 50-60 ft^2/ac. after treatment (higher in corridors and untreated areas) to provide for replacement snags in the future. All action alternatives would retain green replacement trees above Forest Plan standards to provide for management of future snag and down log levels at or above Forest Plan standards. The proposed level of green tree replacements in all action alternatives would allow for management of snags and down wood at the 50% to 80% tolerance level or higher for white-headed woodpecker and closer to the 50% tolerance level for pileated woodpecker. Effects of harvest on future snags and downed wood and the effects of snag removal for safety reasons are further discussed in the FEIS Chapter 4.

14-13. DecAID (Mellen et al. 2003) was used to compare both existing conditions and the current direction for snag and down log management to the effects of the alternatives. DecAID suggests that the Forest Plan standard for snag density lies between the 50% to 80% tolerance level for white-headed woodpecker and well below the 50% tolerance level for pileated woodpeckers (see Chapter 3 of the FEIS for more information). However, the Forest Plan and the Regional Foresters Forest Plan Amendment # 2 provides the standards used for snags and downed wood levels needed to provide for 100% potential population levels. The Forest Service would monitor post management snag numbers and may mitigate with snag creation in designated areas. Mitigations and monitoring for snags are described in FEIS chapter 2. Reintroduction of fire in the ecosystem is expected to create a limited number of snags, which should replace those burned. Effects to snags are described in the FEIS chapter 4.

14-14. Snag surveys were conducted in this area as disclosed in Chapter 3 of the FEIS. Only hard snags were inventoried in the size classes above the Regional Foresters Amendment #2 minimum size class (15” dbh) (DEIS page 3-53). The soft snags would be protected where possible. Mitigations to protect snags are in FEIS chapter 2. The effects of snag removal for safety reasons are discussed in the FEIS Chapter 4. Please also see response to 14-13.

14-15. Public safety is the overriding concern for the Forest Service and will not be compromised in high public use areas such as along roads. Snags around landings and roadways pose a threat to human safety and would be removed. Since there is no intent to harvest snags, the attempt to avoid them as much as possible would be employed.

14-16. This is an unknown at this time. Roadways and potential landing sites have not been inventoried for hazard trees. Under the current firewood cutting policy, snags within 150' of open roads are available to the general public for firewood. While the number of snags to be removed for safety reasons is unknown the expected effects of this removal are discussed in the FEIS Chapter 4.

14-17. See FSM 2520, R-6 Supp. No. 2500.98-, which speaks of "the cumulative detrimental effects from project implementation and restoration." The FEIS, chapter 3 fully describes the existing soil conditions. Briefly, soil quality standards have been met in about 99% of the units according to the sampling.

14-18. Mitigation does not have to be complete. "Soil quality is maintained when soil compaction, displacement, puddling, burning, erosion, loss of organic matter and altered soil moisture regime are maintained within defined standards and guidelines." FSM 2520, R-6 Supp. No. 2500.98-1.

14-19. The effects to soil properties are described in the FEIS chapter 4.

14-20. While it is true that ground based logging potentially causes more incidents of root damage compared to skyline systems, compliance with the soil quality standards and guides will minimize damage to the soils and soil ecosystems (FSM 2520, R-6 Supp. No. 2500.98-1). The standards and guidelines are designed to "manage…lands under ecosystem management principles without permanent impairment of land productivity and to maintain or improve soil and water quality." Refer also to the FEIS chapter 4.

14-21. Existing soil conditions have been assessed by transecting and traversing units (see Soils Existing Conditions, Chap. 3). The largest source of soil erosion is from road construction and road travel. Road closures and decommissioning of selected roads, where erosion is chronic, would reduce erosion. Soil quality standards have been met in about 99% of the units according to the sampling. Soil quality standards would be met by application of design features or mitigation measures. See also FEIS chapter 4.

14-22. The Silvies EIS is not a scientific, professional or technical review of the Belsky paper or any other reference used. We are not required by the National Environmental Policy Act of 1979 to do a scientific, professional or technical review of an article that is referenced.

The Silvies DEIS acknowledges that according to Belsky (1996) there is little scientific information to substantiate the anecdotal reports that suggest that removal of conifers (Judy Hallisey, USFS, pers. comm.) and junipers (Eddleman and Miller, 1992) adjacent to springs can increase spring flows. Belsky though, did not provide any scientific evidence to support her claim that removal of conifers and juniper adjacent to springs does not increase spring flows; she simply stated her opinion.

14-23. This is not a substantive comment because it is not a site-specific issue, concern or question concerning the Silvies DEIS. These paragraphs are a word for word copy of the abstract and article of "Viewpoint: Western juniper expansion: Is it a threat to arid northwestern ecosystems" by A. Joy Belsky published in the January 1996 Journal of Range Management.

14-24. See response to comment 3-5.

Lack of herbaceous cover is not a limiting factor in reestablishing a mosaic of vegetation structure in most of the Silvies Project Area. The limiting factor is the window of opportunity when a light intensity fire can be reintroduced where it will accomplish a mosaic burn objective under current fuel loads.

14-25. Appendix D of the BE/BA and the expanded discussion of lynx in the BE/BA describe lynx habitat and the rationale for determination of effects. This information is summarized in Chapters 3 and 4 of the FEIS. The BE/BA cites several scientific references about the distribution of lynx in Oregon and surrounding states. The BE/BA also states the records of the confirmed lynx findings in Oregon. The U. S. Fish and Wildlife Service, Region 6 and the Malheur National Forest concur on the habitat classifications for lynx illustrated in Appendix D of the BE/BA. As discussed in the BE/BA and Chapter 4 of the FEIS, the Silvies watershed/project area does not provide enough habitat to sustain a lynx home range. Throughout all versions of lynx habitat analysis, the Silvies Canyon project area was never in an LAU and was never considered to be lynx habitat because of the lack of adequate habitat. In addition, this project area is not within or adjacent to a Malheur LAU or any other LAUs because the Ochoco National Forest does not have LAUs. The closest significant area of possible lynx habitat is located over 22 miles to the north.

As discussed in the BE/BA, many of the lynx records in the contiguous United States, including Oregon, are of transient animals that dispersed during cyclic population increases. Animals that are considered “dispersing” and found in unsuitable habitat are considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USF&WS 2000). In all alternatives, should dispersing lynx move through the area, they could use the connectivity corridors left to connect late and old stands, as required by the Forest Plan.

14-26. The BE/BA (Appendix C of the FEIS) thoroughly describe habitat, distribution, status and records of lynx in Oregon, and the effects and determination of the proposed project on lynx and lynx habitat. Please also see the response to comment 14-24.

14-27. See response to comment 14-25.

14-28. The BE/BA clearly defines the difference between confirmed and unconfirmed sightings on pages 8 & 9. A “very good” sighting does not constitute a confirmed sighting. Please refer to literature by Ruggiero 1999 and Verts and Carraway 1998 on lynx sightings in Oregon; these references were cited in BE/BA pages 8-9.

14-29. 14-29. See response to comment 14-25.

14-30. We agree that the majority of natural fires did not occur in the spring but some did. With 50 to 100 years of fire suppression we now have unnatural fuel loading. Until we reduce this unnatural fuel loading, prescribed burning during the time of year when historical fires usually occurred is not possible with the same results as historical fires. If we burned during the time of year when most historical fires occurred we would kill most of the trees in the forest and burn up most of the large woody material. Eventually, after the introduction of prescribed burning and the resulting reduction in fuel loading, when natural fires occur they can be left to burn naturally.

14-31. The purpose and need for action has been updated in the FEIS chapter 1. Sustainability of vegetation was also described in FEIS chapters 3 and 4.

14-32. It is unclear to which 22 habitats Tiedemann, Klemmedson, and Bull were referring. Johnson and Clausnitzer had 18 subalpine fir plant associations (and communities) and 25 Grand fir plant associations (and communities). We have no subalpine fir in this area, and none of the subalpine fir plant association has a ponderosa pine component (Plant Associations of the Blue and Ochoco Mountains by Johnson and Clausnitzer, 1992, Table of contents and pages 25-43, 45-79). Of the 25 Grand Fir plant associations only nine occur on the Emigrant Creek RD, and of these, only five occur in the project area. Of the five plant associations (communities) that occur in the project area, by far the three most common ones are Grand fir/pinegrass plant association (ABGR/CARU), Grand fir/elk sedge plant association (ABGR/CAGE), and Grand fir/heartleaf arnica plant association (ABGR/ARCO). These three often had a seral ponderosa pine overstory that was burned by periodic surface fires (Plant Associations of the Blue and Ochoco Mountains by Johnson and Clausnitzer, 1992, p72, 74, 75).

14-33. Kimmins (1987) states, “Most investigations have concluded that medium to long (80-120 years) rotating harvesting of temperate forests in which only stems are removed poses little threat of site nutrient depletion. It is short rotations combined with intensive biomass utilization that may create problems of reduced soil fertility” (Kimmins. 1987).

“When fire oxidizes organic compounds, elements that form anions (e.g., N, P, and Cl) are lost in much greater quantities than elements such as Ca, K, and Mg, which form cations.” “In cooler fires, most of the elemental content of the burned material remains on site.” The objective of fuel treatments is to reduce large high intensity wildfires. “In very hot fires with high fire induced winds and a strong convection column, most of the ash and the nutrients contained therein may be removed from the site" (J.P. Kimmins. 1987. Forest Ecology. Macmillan Publishing Company).

Due to the build up of forest floor residues we now have higher site productivity than historically. Under No Action a stand replacement fire is likely and would move forest site productivity to or below historic levels. By actively managing the sites through thinning and prescribed burning, site productivity would be maintained at or above historic levels.

14-34. There is always a potential to affect the long-term site productivity of this area regardless of whether or not we choose to actively manage it. The potential of having a high intensity wildfire is greater if we choose not to manage the area, and so the potential to adversely affect the long-term site productivity is greater with the no action alternative than the other action alternatives.

14-35. Historically, the project area was maintained within a low-severity fire regime by frequent low intensity fire on a 5-23 year cycle. Prescribed burning is being reintroduced to mimic this process. Effects on wildlife should include enhanced habitat for species that developed in this type of fire regime, but might tend to select against wildlife species that have benefited due to the era of fire suppression and associated changes to habitat because of this fire exclusion. This EIS was prepared, in part, to analyze the effects of a large-scale prescribed burn project on wildlife. See Chapter 4 of the FEIS for that discussion.

14-36. These issues were not raised during scoping; consequently, they were not addressed in the DEIS. These sections in the FEIS have been updated.

14-37. Approximately 15 miles of temporary road were proposed under Alternatives Two and Four, and eight miles under Alternative Five (see DEIS pages 2-40 to 41). This information has been updated in the FEIS chapter 2 to 2.8 miles in Alternative Five, and 3.5 miles under Alternatives Two, Four, Seven and Seven a. No new construction of permanent roads is planned for any activities within the Silvies Watershed. See also response to comment 12-25. Roads would be closed after use and reseeded, reducing the potential for long-term effects to wildlife based on use by humans, fragmentation, and loss of forage (FEIS, Chapter 4).

14-38. Road densities and effects have been categorized by subwatershed and management area (see Table 4-14, DEIS page 4-70). Appendix A, page A-19, discloses roads proposed for closure or decommissioning. The purpose for the closure is stated, but the factors affecting wildlife in most cases are unknown. No data has been collected on the effects of specific roads in the project area.

14-39. The Malheur National Forest Noxious Weed Management EA (Environmental Assessment Noxious Weed Control Malheur National Forest June 26, 2000) has an inventory of the area. This document identifies that the Forest may treat 65 sites in the Silvies Canyon Watershed. An additional 12 sites have been documented and are identified for manual treatment under all of the action alternatives. See FEIS chapter 2.

14-40. Malheur National Forest has a weed treatment strategy, which is identified in the Environmental Assessment Noxious Weed Control Malheur National Forest June 26, 2000. This project's proposals are designed to meet that strategy. See also the FEIS chapter 2 for design criteria and mitigation measures for noxious weeds.

14-41. All were incorporated in the FEIS chapter 2.

It is not feasible to require the pressure washing of every vehicle that goes through the Forest. It is reasonable to include the types of preventative measures identified in the FEIS chapter 2. Even requiring washing of vehicles would not stop the dispersal of noxious weeds already present in the project area.

14-42. Not all trees over 21 inches would be cut. Aspen regenerates mainly by vegetative clonal sprouting. The aspen stems are usually short lived, but most clones in the Great Basin survive hundreds or even thousands of years; one literature source states aspen clones can be as old as 8,000 years (Debyle and Winiur, 1985). Most ponderosa pines in this area are less than 300 years old. We agree that aspen can co-exist with conifers, but due to past fire exclusion practices, increases in ungulate foraging, and the lack of recognition of the importance and the decline of this key component of the ecosystem, our aspens stands tend to be in poor shape. In this watershed there are probably between 100 and 200 aspen clones (not individual aspen stems) while the number of ponderosa pine trees number in the hundreds of thousands. Some of these aspen clones only have a couple of live trees. Each year we probably lose several clones. Historically, fire would regenerate these clones, but most of the clones that burned in the recent (last 10 years) high intensity large fires have been lost.

14-43. This has been changed in the FEIS. No commercial harvest is proposed in RHCAs.

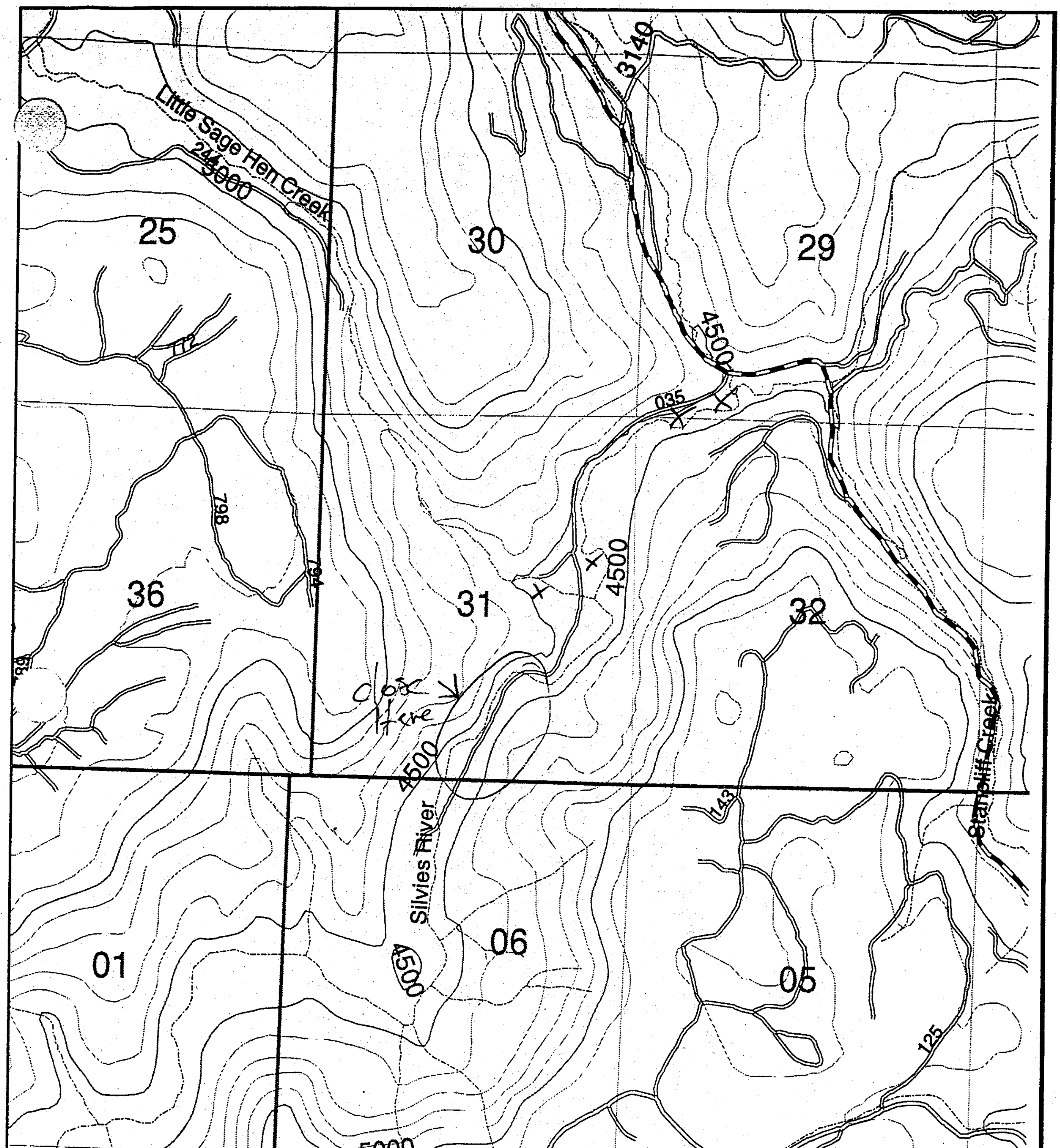
14-44. Tables 4-13, 4-14, and 4-16 (DEIS) display the conditions for cover, roads, and habitat effectiveness index. The data in these tables has been updated in the FEIS (Chapter 4). The description of the existing condition of cover has been expanded in the FEIS (see Chapter 3, Cover). As further explained in Chapter 3, “four conditions/actions have determined the extent of existing canopy cover in the Silvies Canyon project area: natural conditions (low site potential and past fire history), past harvest, recent growth of trees in formerly non-forested areas, and increased stocking and changes in tree species composition due to past treatment or lack of treatment.” Roads were historically constructed for logging systems. The proposals are to reduce the road systems to move toward or comply with forest standards. Effects to big game habitat are explained in FEIS, chapter 4.

Lori, 7-24-01 15

I heard that the Silvies Canyon EIS/EA will be closing FS Road 3100-035. As a private citizen I have a concern with this closure. My family uses some of the dispersed camp sites along that road. Also I know that a few hunters camp there as well. As a FS employee I have volunteer groups camp at those sites also. On the map on the back of this sheet I have identified where the campsites are. I also identified our potential closure area. 15-1

Thanks for the opportunity to participate

Howard Richberg



~~Pileated Woodpecker Surveys In Designated Old Growth Stands 2001 Survey Year~~

Emigrant RD, Malheur NF

D-79

1:24000

1320 0 1320 2640 3960 Feet

X = Dispersed camp sites, used every year

Legend

N

- 100 Foot Contour Lines
- 500 Foot Contour Line
- Arterial Roads
- Collector Roads
- Local Roads
- Old Growth
- Ranger District Boundary
- Section
- Streams
- Township/Range

/go/bu/wildlife/richburg/pileatedsurvey2001.apr

15-1. Forest Road 3100035 was closed under the Forest Plan at the first river crossing and then breached. In 2001 the road was closed again. This portion of the road that was previously closed is within the Myrtle-Silvies Roadless Area. The Preferred Alternative proposes to decommission that portion of the road previously closed.

The No Action Alternative, Proposed Action, Preferred Alternative and Alternatives Five, Six, and Seven-A propose to leave the road open to the first river crossing. Alternatives Three and Four propose to close the entire length of the 3100035 road.

As per 40 CFR 1502.14(a) an agency shall rigorously explore and objectively evaluate all reasonable alternatives. (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

The effects of the proposed activities for each alternative are found in Chapter 4 of the FEIS.

Tom Conner
EPA

no cumulative effects from Cattle Grazing
what's an HM?

Concerned about how we are going to keep ATV's off of road closures -

→ monitoring closures for effectiveness, also near streams for sediment levels
can be done visually

FEIS - What the ecosystem as a whole would look like at HRV
What would HRV look like

Cottonwood - 2 sites
Concerned about them

Exactly what activities are we doing in an FHCA & how it brings us towards HRV

Concerned about the "Fuel breaks"

TO: Lori

☐ YOU WERE CALLED BY— ☐ YOU WERE VISITED BY—

Tom Conner

OF (Organization) EPA

☐ PLEASE PHONE ▶ (Enter area code, if necessary) ☐ DSN

☐ WILL CALL AGAIN ☐ IS WAITING TO SEE YOU

☐ RETURNED YOUR CALL ☐ WISHES AN APPOINTMENT

MESSAGE

Faxing Comments

RECEIVED BY	DATE	TIME

NSN 7540-00-634-4018
50363-111
UNICOR FPI-SST

OPTIONAL FORM 363 (Rev. 7-94)
General Services Administration

Comments from Tom Conner, EPA (from phone conversation with Lori Bailey).

16-1 The DEIS had no cumulative effects from grazing.

16-2 What's an HM?

16-3 Expressed concern about how we will keep ATVs off of closed roads.

16-4 Wanted to know how we will monitor road closures for effectiveness.

16-5 Wondered how we will monitor sediment levels near streams.

16-6 Wanted to know what the ecosystem as a whole would look like at HRV; what would HRV look like?

16-7 Expressed concern about the two cottonwood sites.

16-8 Wanted to know what activities would be done in RHCAs and how they bring us toward HRV.

16-9 Expressed concern about the fuel breaks.

16-1. A more thorough discussion on cumulative effects of grazing is in the FEIS chapter 4.

16-2. Thank you for this question on clarification. HM = (head-month) the land-use of any livestock over six months of age for one month. The FEIS will use AM (animal-month), which has the same meaning, but is more commonly used.

16-3. The Forest Service budget does not allow for a daily patrol of the forest. Breaches that are reported are investigated. The Law Enforcement Officers encourage anyone seeing vehicles that breach closures to report the license plate numbers. The DEIS (page 4-3) discloses how roads are maintained after closure, decommissioning, and seasonal closures. See also the FEIS chapters 2, 3, and 4.

16-4. Monitoring of roads is reported annually. The DEIS (page 2-39) states, “Roads that have been closed or decommissioned would be monitored over a five-year period to inspect the effectiveness of the closure or decommissioning and hydrologic function of the remaining roadway. If monitoring determines the closure or decommissioning is not effective, it would be corrected to meet objectives.” This discussion has been updated in the FEIS.

16-5. Sediment levels in streams would be monitored through repeated Level II stream surveys with Wolmen pebble counts and bank stability ratings. This usually occurs on a five-year cycle. McNeil sampling methods are currently being developed at the Forest level for sediment surveys across the forest. Proper Functioning Condition ratings, the Silvies Canyon Watershed Analysis and the Silvies Road Analysis also provide data on sediment sources that assist with treatment through this project. Refer also to the FEIS monitoring section in chapter 2.

16-6. Historic forested vegetation conditions were described in the DEIS pages 3-16 through 3-30 and in Chapter 4. Briefly, the forest would be a lot more open due to fewer trees per acre. There would be more western larch and aspen and less Douglas-fir, white fir and juniper. The stands would have a higher percentage of ponderosa pine than presently. There would be more grasses, forbs, and shrubs in the understory, creating a more diverse and complex forest. Throughout the watershed the trees would be much larger.

16-7. We are concerned about these sites too. Both sites are to be protected from management activities (DEIS pages 2-26, 3-20, 4-16, 4-36, and 4-38). See also the FEIS chapters 2, 3, and 4.

16-8. The project proposes to restore about 147 acres of aspen stands in the RHCAs. Removing conifer and juniper trees would mimic disturbances that previously occurred by fire. This type of restoration would move aspen stands towards their HRV.

About one acre of cottonwood stands would be treated at two known sites within the RHCAs. Treating and protecting these sites would protect this important part of the ecosystem.

No harvest or harvest related activities would occur in RHCAs. This includes the use of landings and skidding logs across streams.

Between nine and 17 miles of road would be treated within the RHCAs. This includes 2-12 miles of decommissioned roads, and 5-11 miles of closed roads, depending on the alternative selected. Treating these roads would reduce sediment input into streams and restore the natural function of the floodplain.

Landscape scale fuels treatment activities would occur in 12 different burn blocks, including portions of 2869 acres located within RHCAs. Ignitions would not occur in the RHCAs, but low intensity ground fire would be allowed to creep into RHCAs in a mosaic pattern; therefore, the actual acres burned would be significantly less than 2869 acres in RHCAs identified through the burn blocks. This type of fire would mimic natural fires that historically occurred in riparian areas and would move these areas towards HRV.

About five noxious weed sites have been identified in RHCAs and would be treated by hand pulling. Eliminating weeds would allow native species to repopulate these sites and move them toward HRV.

16-9. The DEIS (pgs. 4-8 to 4-10) states "Currently the Myrtle Canyon portion of the roadless area is at very high risk of a high intensity wildfire and protecting it from such a fire would be almost impossible within the steep canyon. Access within the canyon is limited. A stand replacement fire could drastically affect the natural integrity of the roadless area, and wildlife and fish habitat…there would be indirect burning in Myrtle Creek and West Myrtle Creek portions of the Myrtle-Silvies Roadless Area. Indirect burning would occur by allowing fire to back down, off the rim into Myrtle and West Myrtle Creek canyons. This indirect burning would occur in the late fall to create a fire line for the burning of fuel blocks 2, 5, and 10. Due to late fall conditions, this creeping-smoldering type fire should not creep far from the rim. By burning fuel blocks 2, 3, 4, 5, and 10, a fuel break would be formed around the Myrtle Creek portion of the roadless area." What this is referring to is that treating the fuels in fuel blocks 2, 3, 4, 5, and 10, which surround the Myrtle-Silvies Roadless Area, would essentially create an area with lower fuels (fuel break). This section in the FEIS has been updated.

Malheur National Forest
Emigrant Creek Ranger District

Memo

To: Silvies Canyon Watershed Restoration Files

From: Lori Bailey

CC:

Date: 2/28/2002

Re: Comments on Draft EIS

The Silvies Canyon Watershed Restoration Draft EIS was released to the public in March 2001. The public comment period was from March 9 to April 23, 2001. I spoke with Mike Clark (a permitte within the watershed) during the comment period. He had concerns about the proposed spring restoration activities. His main concerns were how our activities would impact his permit. For instance, proposed spring restoration activities include fencing the spring area. He had a hard time figuring out which springs proposed for restoration were within his allotment. I asked him if he wanted a better map, he said no. I told him we would try to make this easier to understand in the FEIS.

Mr. Clark also had some concerns about fuel blocks and how they were aligned with his allotment. I asked him if he wanted a map with fuel blocks and allotments, he said yes. I had GIS make the map and gave it to Jim Walker who delivered it to Mr. Clark at a meeting they had scheduled. 17-1

I confirmed with Zelley Mr. Clarks allotments and associated pastures:

- Rainbow Allotment
    - Squaw Flat pasture
    - West Myrtle Creek pasture
- West Myrtle Allotment
    - Cooley pasture

17-1. Design criteria and mitigation measures were listed on pages 2-37 and 38, and effects were evaluated on pages 4-49 through 52 of the DEIS. All fuels activities would be coordinated with permittees through the District Range Specialist. See also the FEIS chapter 2 design criteria and mitigation measures.

18

FOREST CONSERVATION COUNCIL

James Keniston, District Ranger
Burns Ranger District
Malhuer National Forest
HC 74 - Box 12870
Hines, OR 97738

April 17, 2001

RE: Comments on the Silvies Canyon Watershed Restoration Timber Sale E.I.S.

Dear Mr. Kensiton,

Forest Conservation Council and the National Forest Protection Alliance are tax exempt, public interest organizations with individual and business members throughout the United States. We are concerned with the adverse economic effects of the national forest logging program, and the Forest Service's failure to quantify such effects at the project level or for the program as a whole. The logging program increases costs of water purification and filtration, decreases the value of private timberlands, unfairly competes against alternative fiber and building material businesses, increases wildfire risk, increases repair and maintenance costs for highways and public roads, and decreases the number of jobs in recreation, tourism, fisheries, and alternative forest products.

Our organizations generally support the genuine restoration objectives of the Silvies Canyon Watershed Restoration Timber Sale E.I.S. including prescribed burning, road closures and maintenance, campsite closures, and wildlife travel corridor designation. However, the commercial harvest of timber renders that project overall unsupportable and erodes the public's faith in the Forest Service and its restoration efforts. It is unfortunate that the Forest Service cannot decouple commercial timber harvest activities from genuine restoration activities and until it does so, the goals of the Silvies Canyon Watershed Restoration Timber Sale project will remain dubious at best.

The Silvies Canyon Watershed Restoration Timber Sale will jeopardize the viability of species that thrive in naturally disturbed forests, intervene in natural disturbance processes that are vital to ecosystem sustainability, and degrade water quality and watershed condition. The analysis on which the Forest has relied is inadequate, flawed

Western Regional Office
P.O. Box 22488
Santa Fe, New Mexico 87502
(505) 986-1163

Southeastern Regional Office
P.O. Box 276268
Boca Raton, Florida 33427
(561) 347-0949

Mid-Atlantic Regional Office
3526 Firey Run Road
Linden, Virginia 22642
(540) 364-9651

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and biased in a number of ways, rendering any potential decision arbitrary and capricious.

Further, The Forest Service has failed to analyze an adequate range of alternatives. Given the insignificant contribution of wood fiber to America's consumption requirements from national forest lands, the vast economic contribution of non-timber related jobs and income, and the growing body of scientific knowledge recognizing the ecological and economic advantages of non-commercial restoration, the agency has no excuse for not analyzing a non-commercial, restoration only alternative. The no-action alternative is not a no-harvest, restoration only alternative. We request that such an alternative be developed and analyzed in the final E.I.S. and that all costs and benefits, both monetary and non-monetary, of such an alternative be disclosed. Until, such action is taken, this NEPA analysis is considered incomplete. Our concerns with the Silvies Canyon Watershed Restoration Timber Sale include: 18-1

1. Socioeconomic Benefits

USFS timber sales are the end result of inter-related planning decisions and analyses made at the national, forest, and project level. 36 C.F.R. § 219.4. At the national level, the Forest Service prepares the Renewable Resources Program (RPA), which determines output levels for all national forest resources based upon a comprehensive environmental and economic assessment of present and anticipated demands for and supply of renewable resources from forests in all ownership. At the forest level, the Forest Service has prepared the Deschutes National Forest Land and Resource Management Plan ("LRMP"), which is an "extension" of the RPA Program and which identifies lands that are suitable for timber sales, the amount of timber to be offered each year, and under what conditions timber sales will be offered. At the project level, the Forest Service makes decisions about the specific configuration of individual timber sales, including Silvies Canyon Watershed Restoration Timber Sale. At each level, the Forest Service must engage in environmental and economic analyses of its decisions as required by the National Environmental Policy Act.

The Forest Service is required by law to manage national forest system lands and programs to maximize social and economic benefits for the American people.
As with other projects planned on the National Forests of Oregon and throughout Region 6, the Forest Service has failed to complete an economic analysis of the Silvies Canyon Watershed Restoration Timber Sale that provides the public with a full and fair accounting of net economic benefits. Instead, the economic analysis is limited to net costs incurred by the Forest Service and project administrators for county receipts as well as sale preparation and administration costs. 18-2

The E.I.S. and project record fail to place any economic value on existing uses and functions of the sale area, including recreation, flood control, pest control, carbon sequestering, and many other "ecosystem services." In addition, the economic analysis

D-88

fails to consider a wide range of costs that will be incurred by the public through loss of these "ecosystem services" and other externalized costs such as increased flooding, increased risk of death, injury, and property damage from logging operations, and increased fire risk.[1] 18-2

Forest Conservation Council has raised these economic issues in the context of numerous appeals in Region 6. We incorporate, by reference, these appeals for a more complete description of our issues on this subject.

2. Value of Unlogged Forest

The dollar value of undisturbed forest or standing timber should have been calculated and used in the analysis of economic costs associated with the Silvies Canyon Watershed Restoration Timber Sale. The value of "ecosystem services" provided by standing forests has never been evaluated and compared with their value as lumber. Economic benefits of standing forests include but are not limited to clean air and water, balance of global geochemical cycles, and buffering of carbon emissions resulting from the burning of fossil fuels. It has been shown that the rate of carbon lost to that of accumulation is much greater during harvest, and there is a net transfer of carbon from biomass to atmospheric CO_2. Further, the carbon stored in forest regrowth is less than that in the original forest biomass. 18-3

3. Range of Alternatives

A non-commercial restoration alternative for the Silvies Canyon Watershed Restoration Timber Sale should have been analyzed. The E.I.S. dismisses our original request in scoping that such an alternative be considered on the vague assertion that the agency has "discretion." This is a weak and indefensible position and could be considered a classic case of abuse of discretion. The no-harvest, restoration alternative is clearly reasonable and should have been analyzed. We contend that:

(1) all restoration objectives can be met without conducting a commercial timber sale; 18-4

(2) a commercial timber sale can only exacerbate current problems, no commercial timber sale will eliminate these problems, and;

(3) the Forest Service cannot exclude a non-commercial alternative merely because existing funding structure would make it difficult.

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[1] The E.I.S. fails to examine how both increased access and increased slash in the short term will create a window of time where fire risk will be increased above what currently exists now. 18-5

4. Species Viability

The Silvies Canyon Watershed Restoration Timber Sale includes commercial harvest, ground-disturbing activities associated with timber harvest and other vegetative manipulation. These activities are likely to jeopardize the viability of species that find optimal habitat in forests with well-developed structures, and forests naturally disturbed by fire, disease and insect pathogens. These include threatened, endangered, and sensitive species, as well as management indicator species including but not limited to the American marten, northern goshawk, pileated woodpecker, flammulated owl, black-backed woodpecker, Canada lynx, as well as Neotropical migratory birds.

For many of these species the Forest Service has no up-to-date population data describing population numbers, locations, and trends, nor monitoring data on which the agency can rely to determine that the actions proposed in the context of Silvies Canyon Watershed Restoration Timber Sale will maintain numbers and distribution of these species sufficient for insuring long term viability. Nor has the Forest Service determined the "minimum number" of reproductive individuals that would constitute a viable population. The Forest Service is required by law to determine this minimum number of reproductive individuals before implementing activities that might impact those individuals or populations such as are planned in the Silvies Canyon Watershed Restoration Timber Sale. The Forest Service cannot permit these activities without knowing the location and number of individuals of these species that would enable determination of whether habitat for each vertebrate is well-distributed to facilitate interaction. Until such information is provided the Forest Service cannot know whether it is providing sufficient habitat to support the minimum number of reproductive individuals nor that the habitat is distributed in such a manner as to permit interaction. 18-6

Because the Forest Service has no such data for most species adversely affected by the proposed management activities, and because what data there is suggests that such species are declining and otherwise at risk, the Forest Service runs afoul of viability and diversity requirements set forth in forest planning regulations 36 C.F.R. § 219.19 and § 219.26. In addition, the any decision made on the Silvies Canyon Watershed Restoration Timber Sale and associated activities without the above-described information would be considered arbitrary and capricious and constitute agency action unlawfully withheld or unreasonably delayed in violation of the APA. (5 USC §§ 706[1] & 706[2]).

Please address these issues in your final environmental impact statement. Thank you for your time and consideration.

Sincerely,

Bryan Bird

Forest Conservation Council
Southeastern Regional Office
Member, NFPA Board of Directors

18-1. The DEIS analyzed three alternatives including the No Action alternative that proposed no commercial harvest activities. The FEIS analyzes eight alternatives, including three (Alternatives One – No Action, Three and Six) that propose no commercial harvest or commercial post and pole sales. Alternatives Three and Six propose restoration activities, including road closures, spring, cottonwood, and aspen restoration, noxious weed treatment, and fuels treatments. Effects of these alternatives as well as the other five are analyzed for effects to all resources and areas of concern, including socio-economics.

18-2. Forest plans establish goals and objectives identifying the mix of activities and uses that maximizes net public benefits. The determination of net benefits includes assessment of market and non-market resource uses and values both quantitatively and qualitatively. This analysis is done at the forest planning scale, where the mix of activities across a large landscape can be assessed and measured. Forest plans include standards and guidelines intended to prevent or mitigate adverse effects to both the socioeconomic and physical environments. These standards and guidelines are requirements for subsequent projects. The Malheur Land and Resource Management Plan FEIS (1990), as amended by the Regional Forester (1995) is the applicable forest plan.

Project-level environmental analysis is used to assure that projects are consistent with forest plan goals, objectives, and standards and guidelines, as well as to disclose environmental effects and assure informed decisionmaking. Economic analysis is used in project planning when needed to assess the costs and benefits of different alternatives. Such an analysis is provided in the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).. However, in the absence of new information, decisions made at the forest plan level, including the mix of activities found to maximize net public benefits, are not reconsidered. Your letter does not identify any specific adverse economic effects directly associated with this project. In this situation, therefore, reconsideration of forest plan decisions at the project level is inappropriate.

18-3. See response to comment 18-2.

18-4. See response to comment 18-1.

18-5. The DEIS page 4-44 states that “Timber harvesting would have little affect on slash levels, as the trees would be whole tree yarded to landings.” “Precommercial thinning would have a short term negative effect of increasing slash levels. An estimated 30 to 50 tons per acre of slash would be created after precommercial thinning. This slash would be either hand piled or grapple piled the same field season or the following field season. Burning of piles would take place no later than the second field season after piling.” See also the FEIS chapter 4.

18-6. See response to comment 12-28. Effects to proposed, endangered, threatened, and sensitive (PETS) species, Management Indicator Species (MIS) and other species of concern, including neotropical migratory birds, have been analyzed and are disclosed in the FEIS, chapter 4 and the BE/BA (Appendix C). In addition, the Malheur Forest Plan, as amended, was designed to meet the requirements of maintaining viable populations (219.19), and diversity (219.26). Since the Silvies project was designed to meet the Forest Plan standards, as amended, for connectivity, the project itself meets these requirements.

Public Comments

&

Responses

On

Supplemental Draft EIS

Burns Paiute Tribe
NATURAL RESOURCE PROGRAMS
HC-71 100 PASIGO STREET
BURNS, OREGON 97720
PHONE (541) 573-2421
FAX (541) 573-2422

RECEIVED
NOV 13 2001
By

11/6/01

Joan Suther
IDT Leader
Emigrant Creek Ranger District
HC 71, 12870
Hines, OR 97738

Ms. Suther:

I was pleased to see that information about the Burns Paiute Tribe was included in the Silvies Canyon Watershed Restoration Project Supplemental Draft EIS. I have a few comments regarding the supplement:

Page 1-2, "Socio-economics is the only area identified for re-examination". I would think that both the socio-economic and cultural discussion would be re-examined. 1-1

Page 2-2, If the Malheur Forest decides to pursue the designation of the Myrtle-Silvies Roadless Area as wilderness, I would recommend that forest personnel make every effort to make contact with the Burns Paiute Tribe. A wilderness designation may effect how the Tribe accesses and uses this area. 1-2

Page 2-11, The Burns Paiute Tribe has also obtained a ranch near Juntura. 1-3

Page 2-13, Off road vehicle use may also be in conflict with cultural uses of the area. 1-4

Page 2-14, You should use the specific tribal name instead of the generic "American Indians". Not all American Indians lived in this area. 1-5

Page 3-2, Recreational uses of the area also includes gathering. 1-6

Page 3-8, The Malheur Forest needs to coordinate with the Burns Paiute Tribe when a prescribed burn occurs in case tribal members are using the Silvies area for gathering or other purposes. 1-7

Please feel free to call or write me for additional information. Tribal members enjoyed the field trip and meeting your staff.

Sincerely,

L Jerofke

Linda Jerofke
Burns Paiute Cultural Consultant
541-962-0434
ljerofke@eoni.com

D-95

1-1. The statement referred to on page 1-2 was describing the scope of the reanalysis and that not all items discussed in the DEIS would be reevaluated. Culture is part of the socio-economics discussion. Paiute tribal culture and needs were discussed in the SDEIS pages 2-3 thru 2-5, 2-8, 2-9, 2-11, 2-14, 2-16, 3-3 thru 3-7, and 3-14. See also the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

1-2. No further wilderness study is planned at this time. Inventories to consider areas that might be eligible for wilderness designation are done as part of Forest Plan revision. The Malheur Forest Plan revision process is due to start in fiscal year 2004. The current criteria used for these areas are found in Forest Service Handbook 1909.12 – Land and Resource Management Planning Handbook, Chapter 7. If the Malheur National Forest does further wilderness reevaluation of the Myrtle-Silvies Roadless Area, the Burns Paiute Tribe would be involved.

1-3. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

1-4. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

1-5. In the DEIS, the term “Native American” was used so as not to exclude the probable use and claims of use of the project area by other American Indians. This has been updated in the FEIS. Refer to the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

1-6. Thank you for your comment; this will be included in the FEIS.

1-7. Thank you for your comment, the Malheur National Forest will coordinate with the Burns Paiute Tribe when prescribe burning.

Malheur Lumber Company
P.O. Box 160 • John Day, Oregon 97845
(541) 575-2054 FAX 575-2057

December 12, 2001

James M. Keniston, District Ranger
Emigrant Ranger Dist.
HC 74 Box 12870
Hines, OR 97738

Dear Mr. Keniston,

Thank you for the opportunity to comment on the Silvies Supplemental Draft Environmental Impact Statement. I believe that this document does a very good job of illustrating the need for timber to support the local economy. Due to this need, and the fact that timber is in short supply, the preferred alternative should be chosen and implemented in calendar year 2002. 2-1

Sincerely,

Steven J. Courtney, CF
Operations Forester

2-1. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

3

MALHEUR
Timber Operators, Inc.

P.O. Box 928 • John Day, OR 97845 • (541) 575-2711 • FAX (541) 575-2808

December 17, 2001

James M. Keniston
Emigrant Creek Ranger District
HC-74 Box 12870
Hines, OR 97738

RE: Silvies Canyon SDEIS

Dear Mr. Keniston:

Malheur Timber Operators, Inc. and KLE Enterprises, Inc. offer the following comments concerning the Silvies Canyon SDEIS prior to the end of the comment period on December 31, 2001.

Please reference our first comment under "In a general way…" on page 2 of our April 2, 2001 DEIS input letter. Our original input to this project was on December 31, 1999. A major concern about the Silvies DEIS is the long period of time it is taking to complete the project and the financial impact these delays have caused. This project exemplifies the recent statements by Chief Bosworth where he states that we are in a state of "paralysis by analysis" and that "in most projects the first 30 to 35% of the information gathered is adequate to support a sound resource decision". 31

We recommend that the project be expeditiously moved forward utilizing the description of the Preferred Alternative disclosed on DEIS page 2-30. Even though we are not in agreement with the silvicultural prescriptions and the management access restrictions resulting from road decommissioning and closures, it is imperative that this project move forward and that the timber sales be offered in FY 02.

Please keep us informed of any additional opportunities to comment on this EIS. Contact Malheur Timber Operators, Inc. at the letter head address, and KLE Enterprises, Inc. at Box 653 John Day, OR 97845, phone 575-0447.

Sincerely,

Malheur Timber Operators, Inc.

Ken Evans

Ken Evans CF
Forester

cc:
bonnie wood
roger williams

3-1. We regret the time it is taking to complete the Silvies EIS. However, the legally required analysis process is lengthy. On the average it has been estimated that the EIS process requires 27 months to complete, barring significant unforeseen delays. We have had a couple of delays including the need to develop and release a supplement to the DEIS as well as some administrative delays beyond our control.

Ochoco Lumber Company
Manufacturers of Ponderosa Pine
P.O. Box 668 • Prineville, Oregon 97754
(541) 447-6296

December 18,2001

Mr. James M. Keniston
District Ranger
Burns Ranger District
HG74 Box 12870
Hines, OR 97738

RE: Silvies Canyon Watershed Restoration Project

Dear Mr. Keniston:

I am writing to comment on the Silvies Canyon Watershed Restoration project SDEIS. The Socio-Economic impact of this project is very important to the counties of Grant and Harney. As you work toward a management strategy for this watershed, you need to be particularly aware of the Socio-Economic impact that your decisions have on the well being of the communities, both in the public and private sectors. The overall management decisions can find a balance and still result in a healthy ecosystem. Many things are interdependent but can be addressed and work out in your decision making process. 4-1

Public concerns and issues involving recreation, wildlife, timber, range, water, roadless, tribal, ect. need to be evaluated along with the Socio-Economic impacts. However, the real economic base of both Grant and Harney County evolves around the timber and ranching industries and supplemented by seasonal recreational activities. Unemployment is very high compared to the rest of Oregon and the rest of the nation. Counties can't take another major detrimental blow. You need to analyze carefully the effects of your decision on the economic issues. Your management scenario needs to be responsive to the diversity of these communities that are dependent on forest and rangeland resources for their livelihood.

Commercial timber harvest is needed to improve the health of the forest while at the same time, stimulating the economy. You don't need to over do the environmental restrictions and put undo higher costs on your projects. The driving force behind any vegetative restoration projects must include watershed enhancement but again, don't go overboard. Any enhancement project should be looked at as a long-term investment. Many project activities may have short-term drawbacks, but the long-term benefits will outweigh the short-term negative implications.

As you have mentioned, some people advocate a "hands off" or "natural regulation" approach to management of national forests. The underlying principle behind this approach is a belief that nature will correct forest imbalances without need of human intervention. Don't get caught up in this thinking. Step up and make good sound active management decisions. Nature does also correct forest imbalances when management interventions are implemented. Be pro-active not passive in your management plan's. New high-tech ground based equipment is available to accomplish commodity production from public lands without detrimental effects on the environment. You don't always have to use an expensive helicopter system or other expensive systems that take away the overall economic base of a project. Think economics in conjunction with environmental protection while planning your project activities.

You need to revamp your propose alternative 2 to have a more favorable Socio-Economic result, or adopt alternative 4 as your proposed action alternative. Also, you need to listen more from people in your local communities and implement more of their feelings about these alternatives when making your decisions. 4-2

Please consider this input as you derive at your management alternative for the Silvies Canyon Watershed Restoration project. Please keep us informed on how this project is progressing.

Sincerely,
OCHOCO LUMBER COMPANY

John Morgan

John Morgan
Resource Manager

4-1. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

4-2. Alternative 2 is the proposed action as was used to solicit comments from the public. In the DEIS, the Preferred Alternative was the vegetation treatments from Alternative 4 and the road treatments from Alternative 10. In the FEIS, the Preferred Alternative is Alternative 7. Regulations specify an agency to "identify the agency's preferred alternative or alternatives, if one or more exists, in a draft statement and identify such alternative in the final statement" (40 CFR 1502.14(e)) (DEIS page 2-30).

5

Western Regional Office
P.O. Box 22488
Santa Fe, NM 87502
505.466.2459

James Keniston, District Ranger
Burns Ranger Districts
Malhuer National Forest
HC-74, Box 12870
Hines, OR 97738

December 18, 2001

RE: Comments on the Silvies Canyon Watershed Restoration Project ("Silvies Canyon Timber Sale") Supplemental DEIS.

Dear Mr. Keniston,

Forest Conservation Council and the National Forest Protection Alliance are tax exempt, public interest organizations with individual and business members throughout the United States. We are concerned with the adverse economic effects of the national forest logging program, and the Forest Service's failure to quantify such effects at the project level or for the program as a whole. The logging program increases costs of water purification and filtration, decreases the value of private timberlands, unfairly competes against alternative fiber and building material businesses, increases wildfire risk, increases repair and maintenance costs for highways and public roads, and decreases the number of jobs in recreation, tourism, fisheries, and alternative forest products.

FCC previously commented on the Silvies Canyon Timber Sale DEIS when if was first published. Our comments are dated April 17, 2001 and should be on file in the Silvies Canyon Project Record. Many of our concerns remain the same and we request that you refer to that document for further detail. Our organization and its membership would like to emphasize our disapproval of any mechanical treatments in the Myrtle-Silvies Roadless Area. 5-1 In addition, we have grave concerns that the USFS has not met the letter and intent of the laws and direction governing NEPA. In particular, the DEIS seems to have ignored forest ecosystem science especially pertaining to dry western forest types. 5-2

The Silvies Canyon Timber Sale E.A. is woefully inadequate and does not even begin to meet the requirements of NEPA.[1] 5-3

[1] 40 CFR 1500.1(b)

> "[I]nsure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. ***The information must be of high quality.*** Accurate scientific analysis, expert agency comments and public scrutiny are essential". 40 CFR 1500.1(b).

The analysis on which the Forest has relied is inadequate, flawed and biased in a number of ways, rendering any potential decision arbitrary and capricious. 5 U.S.C. § 706. Very little substantive, site-specific information is offered anywhere in the DEIS. The Silvies Canyon Timber Sale E.A. is mostly a qualitative narrative of the Forest Service's predicted and conjectural environmental consequences. 5-4

The proposed actions are not supported by any scientific body of knowledge an in fact; many of the predicted impacts are contrary to the best available science. The Forest Service is required by NEPA to provide scientific support for its assumptions and predictions. The best available science supports a very different scenario for restoration and recovery of the Silvies Canyon Project Area. The U.S. Forest Service must rely on this science and not on its professional opinion. Several conclusions can be made based on the best available science:

- Stand replacing fires are a natural occurrence to which the forest is adapted with the exception of some lower elevation forest types. (Beschta, et. al., 1995; Interior Columbia Basin EIS, 2000). 5-5
- Even ponderosa pine forests have been found to have originated in stand replacing fire events. (Arno et al. 1995) 5-6
- Drought and other climatic factors are the primary causes of large-scale fires, which occur regardless of fuel conditions. (Schmoldt, Daniel L. et. al.,PNW-GTR-455, USFS, 1999). 5-7
- Fire suppression, logging, and grazing are the primary causes of unnatural fuel conditions. (Beschta, et. al., 1995; McIver and Starr, PNW-GTR-486, 2000; Schmoldt, Daniel L. , et. al., PNW-GTR-455, USFS, 1999). 5-8

Until this information is incorporated into the E.A. the document cannot meet the standards of NEPA or the directives found in the Forest Service Manual and Handbook.

FCC generally supports the genuine restoration goals of the Silvies Canyon Timber Sale. We challenge however, uncategorically, the USFS contention that commercial timber harvest can achieve the desired restoration goals, especially of wildlife habitats, in a manner that maximizes environmental and economic benefits to costs. We contend the opposite: that a timber sale and all of its associated activities can only exacerbate the problems and results in more costs economically and ecologically than benefits. Prescribed fire alone in most cases would meet the purpose and need in the most cost efficient manner. The Sand Ecosystem Blind Review conducted on the Wenatchee National Forest supports this position. It is unfortunate that the Forest Service cannot 5-9 decouple commercial timber harvest activities from genuine restoration activities and until it does so, the goals of the Silvies Canyon Timber Sale project will remain dubious at best.

As FCC stated in its original comments, many of the existence values, market and non-market of unharvested forests are ignored in the supplemental DEIS and further, none of the costs of logging (particularly externalized, e.g. downstream sedimentation) have been calculated and incorporated into the SDEIS. The SDEIS is mostly conjectural and incorporates no standard methods of contemporary natural resource economics. See Talberth and Moskowitz (1999) *The Economic Case Against National Forest Logging* and on file with Regional Forester (hereby incorporated in its entirety as if repeated verbatim). The U.S. public as a whole enjoys many of these non-timber contributions, such as carbon sequestering and biological diversity, which provide benefits on a local and global basis. 5-10

For example, not one of the alternatives accounts for "base and secondary" jobs related to recreation or hunting and fishing in the project area or the potential impacts on these jobs from logging activities, short or long term. The figures in Chapter 3 of the SDEIS simply give each the alternatives a zero for jobs in recreation. All Ranger Districts track Recreation Visitor Days and the Washington Office has developed region-specific values associated with every category of RVD. Thus, it is a simple exercise to take the number of RVDs on a Ranger District, multiply that number by the associated dollar values and then divide by the District's acreage to arrive at a per acre dollar value associated with each recreation category. The SDEIS failed to include even this elementary degree of analysis. 5-11

Regarding roadless areas, the Wilderness Society has calculated that every 10,000 acres of roadless lands in the West results in 11,000 recreation visitor days annually valued at $462,000 and supports at least six jobs with a total value per acre to be $22.[2] Thus the No Action alternative should have at very least accounted for these jobs and associated income. 5-12

Further, recent research has shown that historical economic performance of rural counties is positively correlated with amount of protected lands, including roadless areas. A Southwick and Associates (2000) study found,

- In rural Oregon counties, during the period 1969-1997, the amount of protected lands (roadless areas, wilderness, national parks and national monuments etc.) within 50 miles of the county's center is positively and significantly correlated with employment and income growth; and 5-13

[2] http://www.wilderness.org/standbylands/forests/TWS_Values.pdf. Economic Values of Protecting Roadless Areas in the United States.

- Between 1969 and 1997 the amount of income generated by lodging businesses grew by 120%, income generated by drinking and eating establishments grew by 151% and income generated by amusement and recreation services grew by 459%.[3] | 5-14

The analysis on which the Forest has relied is inadequate, flawed and biased in a number of ways, rendering any potential decision arbitrary and capricious.

Please address these issues in your final environmental impact statement. Thank you for your time and consideration.

Sincerely,

Bryan Bird
Forest Conservation Council
Western Regional Office

Member, NFPA Board of Directors

Literature Cited

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[3] Southwick Associates. 2000. Historical economic performance of Oregon and western counties associated with roadless and wilderness areas

5-1. Alternatives 3, 4, 5, 6, and 7 propose precommercial thinning by manual methods in two potential bald eagle roost stands. Slash in these stands would be hand piled and burned. Alternatives 2, 3, 4, 5, 6, and 7 propose spring restoration on two springs in the Roadless Area. Thinning of conifers around springs would be done manually, fencing and developing springs would all occur through manual methods. Prescribed burning would be accomplished in the Silvies River portion and would occur through aerial ignition. Alternatives 1 and 7a propose none of these activities in Roadless areas. See also the FEIS chapter 4 for effects to the Myrtle-Silvies Roadless Area.

5-2. The literature cited section of the FEIS has been updated.

5-3. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

5-4. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

5-5. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

5-6. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

5-7. Drought and other climatic factors are primary causes of large-scale fires however ground and ladder fuels and topography are also contributing factors. We have no control over drought and other climatic factors and topography. We can however control ground and ladder fuels. Refer also to the purpose and need for action in the FEIS chapter 1.

5-8. Thank you for your comment; refer also to the FEIS chapters 3 and 4.

5-9. An alternative that proposed utilizing prescribed fire for fuel reduction without thinning, similar to the Sand Creek Ecosystem Restoration Project and the Dry Forest Strategy by the Wenatchee National Forest, was considered but eliminated from detailed analysis. Refer also to the FEIS chapter 2.

5-10. Forest Service Handbook 2409.18 provides direction to analyze financial efficiency and, if needed, economic efficiency to identify the most efficient alternative that achieves the desired objectives of the project. Consideration of the proposal that maximizes net public benefits is an important consideration of the decision-making process.

An economic efficiency analysis was completed that focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value (benefits minus costs) to assess which alternative comes nearest to maximizing net public benefits (36 CFR 219.3). See pages S32-S33, DEIS Summary; pages1-22 to 1-23, 3-42 to 3-46, and 4-56 to 4-61, DEIS. It was mentioned in the introduction to the SDEIS that both documents would be needed to give a total picture of the social and economic impacts. The SDEIS addresses additional non market values and social effects. This discussion on quantifiable and non-quantifiable measures will be further expanded in the FEIS.

5-11. This section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003). A number of economists and recreation specialists at both state and federal levels were contacted prior to the economic analysis in attempts to determine the economic effects of project level management upon recreation at the local (county) level. There are no known studies that relate to this scale. As stated in the analysis, project level management effects are usually not measurable beyond the local county level due to the size and dilution factor of the state and regional economies. Coefficients developed at national, regional, or sub regional basis are usually not applicable in determining economic effects at local levels as they include disparate situations that often do not reflect local conditions. For example, ICBEMP and regional recreation figures include contributions of destination recreation areas such as Bend, Owyhee Reservoir or the Columbia Gorge, which do not match the local conditions. Project effects on recreation were evaluated, but analysis showed less than 1/10 of a job was potentially affected, so a zero was shown. The approach described in your letter was considered, but not used in this analysis, as reliable recreation visitor day data is unavailable. The Forest Service has recognized this need for better recreation use data and a national effort is underway to sample recreation use on National Forest lands. The Malheur National Forest is scheduled to begin recreation use sampling in 2003.

5-12. The Wilderness Society study, Economic Values of Protecting Roadless Areas in the United States by Loomis and Richardson, The Economic Case Against National Forest Logging by Talberth and Moskowitz and the Southwick and Associates Study have been considered, however many of the activities and situations described in these references are either not applicable to local conditions or don't match the type of activities proposed in this analysis. Some of the benefits claimed for roadless areas in the Loomis and Richardson article also occur in roaded or actively managed areas as well. For example, soil carbon sequestration increases with saw log harvesting, and long term (10 years) following fire. The greatest results were due to increases in nitrogen fixing vegetation. (Johnson, Dale W. and Peter S. Curtis, Effects of Forest Management on Soil C and N Storage: Meta Analysis. Forest Ecology and Management 140 (2001) 227-238). Nitrogen fixing vegetation is typically greatly reduced under overstocked timber conditions and dense tree canopies, such as found in the Myrtle Silvies Roadless Area, as well as other areas with overstocked timber stands within the Silvies analysis area.

5-13. See response to comment 5-11. Also refer to the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

5-14. See response to comment 5-12.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

#6.

Reply To
Attn Of: ECO-088 January 29, 2002 Ref: 99-090-AFS

James M. Keniston
District Ranger
Burns Ranger District
Malheur National Forest
HG74 Box 12870
Hines, OR 97738

Dear Mr. Keniston:

We have reviewed the Supplemental Draft Environmental Impact Statement (SDEIS) for the proposed **Silvies Canyon Watershed Restoration Project** pursuant to the Environmental Review Process, under section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act as amended. Section 309, independent of NEPA, directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions.

The Silvies Canyon watershed is located within Malheur National Forest (MNF) of the Burns and Bear Valley District. The Draft EIS (DEIS), developed last year by the MNF for this Restoration Project, proposed an action plan to implement ecosystem restoration on more than 80% of the watershed area lying within the Burns and Bear Valley District. In this previous NEPA document, the Forest Service proposed to implement a variety of management activities, including silvicultural prescriptions, prescribed burning, wildlife enhancement projects, road decommissioning, and new road construction and reconstruction.

Based on comments received in response to the Draft EIS, the Forest Supervisor chose to develop this Supplemental Draft EIS to provide additional information on environmental impacts and the effects of the alternatives raised in the Draft EIS. Primarily, the Supplemental Draft EIS was developed to disclose additional information on the potential impacts to the social and economic environments within the project area.

EPA has reviewed the Supplemental Draft EIS. The Forest Service has accomplished measurable improvements in the socio-economic sector of the SDEIS. We find this document insufficient, however, towards adequate disclosure of tribal consultation and coordination and therefore, we have assigned the Draft Supplement EIS a rating of EC-2 (Environmental Concerns - Insufficient Information).

There are important cultural, social, and economic issues related to the proposed Silvies Canyon Watershed Restoration Project within the Malheur National Forest (MNF). The Burns Paiute Tribe, a federally recognized Tribe, has historical ceremonial and cultural activities associated with the project area (SDEIS, page 2-3), as well as the greater Silvies River system. Also, the local community has a long-standing interests in the project area (SDEIS, pages 2-4 and 2-5).

EPA encourages active communications and information exchange on a regular basis in matters of concern with the Burns Paiute Tribe. Such active government-to-government activities would greatly facilitate development, design, and implementation of a FEIS for the Silvies Watershed Project. The MNF is in a special situation to help the local community and the Tribe, both economically and culturally. The MNF, through the Silvies Watershed Project, can design and implement a long-term ecological restoration program that is culturally and ecologically sensitive.

In addition, EPA wishes to extend its offer to help in this ecological restoration plan if the Tribe agrees. Linda Storm, a wetland ecologist at EPA (Region 10) with a background in ethnoecology, and Tom Connor, an environmental specialist, would be eager to assist with these issues in the future from both the ecological restoration and traditional resource rights perspectives.

Enclosed please find our detailed comments, which elaborate further on these issues. The rating and a summary of our comments on the SDEIS will be published in the *Federal Register*. A summary of the rating system we used in our evaluation of this SDEIS is enclosed for your reference. We are interested in working with MNF in the resolution of these issues. I encourage you to contact Tom Connor at (206) 553-4423 of my staff at your earliest convenience to discuss our comments and how they might best be addressed.

Thank you for the opportunity to review this SDEIS on the Silvies Canyon Watershed Restoration Project in the Emigrant Creek and Blue Mountain Ranger Districts of the Malheur National Forest.

Sincerely,

Judith Leckrone Lee

Judith Leckrone Lee, Manager
Geographic Unit

Enclosure

cc Scot Sufficool - Director, Tribal Office, EPA Region 10
Clarence Ortman - EPA Tribal Coordinator, Oregon
Dave Evans - Facilities and Environmental Director, Burns Paiute Tribe
Daniel Gonzalez - Program Manager, Burns Paiute Fish and Wildlife Department

EPA COMMENTS ON THE SILVIES CANYON WATERSHED RESTORATION PROJECT
SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT (SDEIS)

IMPORTANT AND RELEVANT BACKGROUND INFORMATION (portions of which, we believe should be considered for inclusion in the FEIS)

The Silvies Watershed project area is situated within the boundaries of the former Malheur Reservation (Burns Paiute Tribe, 2001). The Burns Paiute Tribe (Tribe) has inhabited the surrounding central southeastern region of Oregon for thousands of years. The Tribe is the primary Tribal user of the project area whose members continue to actively utilize the Silvies region for hunting, fishing, plant gathering, and religious purposes (Burns Paiute Tribe, 2001). Currently, tribal members hunt for deer, elk, and groundhogs or yellow bellied marmots (*Marmota flaviventris*) and fish for redband trout (*Oncorhynchus mykiss gairdneri*). Historically, tribal members were able to fish and supplement their diet with salmon (Daniel Gonzalez, Program Manager, Burns Paiute Fish and Wildlife Department, personal communication). In addition, tribal members gather culturally important plants, such as biscuit root (*Lomatium spp*), bitterroot (*Lewisia redivia*), and wild onions (*Allium spp*). Other culturally important plants include chokecherries (*Prunus emarginata*), willow (*Salix spp*), dogwood (*Cornus spp*), and camas (*Camassia quamash*). Finally, the Tribe continues to conduct ceremonial activities within the project area. 6-1

REGARDING TRIBAL CONSULTATION AND COORDINATION

The Supplemental Draft EIS did not thoroughly or adequately address the scope and extent of the potential impacts that proposed alternatives might have on the Burns Paiute Tribe (Tribe). The FEIS should include ethnographic research and discuss any inter-governmental coordination on proposed activities within and adjacent to the proposed project area related to rights or historical utilization by the affected Tribe. Below, we highlight specific concerns.

(1) The FEIS must disclose how the MNF consulted and coordinated with the Tribe in development of the EIS as required by the Executive Order 13175. 6-2

EPA is concerned about the lack of consultation with the Tribe and members. During our review of the SDEIS, we were informed by the tribal Fish and Wildlife Manager, Mr. Gonzales, that no one had contacted him to discuss tribal concerns related to fishing and hunting in the project area.

Paraphrasing EPA Region 10's Tribal Consultation Process, "Consultation" means the process of seeking, discussing, and considering the views of federally recognized tribal governments at the earliest time in the decision-making process. Consultation generally means more than simply providing information about what the agency is planning to do and allowing comment. Rather, consultation means two-way communication that works toward a consensus reflecting the concerns of the affected federally recognized tribe(s).

(2) The FEIS must disclose whether the Tribe considers lands within the project area to be "sacred sites" and provide a prescriptive accommodation plan to resolve concerns, yet not publically disclose actual site locations. 16.3

According to Executive Order 13007, federal land managers are to "accommodate access to and ceremonial use of Indian sacred sites." The SDEIS has not disclosed if the MNF has consulted with the Burns Paiute Tribe on this issue.

(3) The FEIS must disclose how decommissioning and closing roads in the project area may affect tribal rights to access "historical properties." The definition of "historic properties" is found within 36 CFR 80016(k) which "includes properties of traditional religious and cultural importance of an Indian tribe." 16.4

The SDEIS has not adequately or thoroughly addressed the scope or extent of potential adverse affects that decommissioning roads and associated access might have on tribal rights to "historic properties," including access to traditional hunting, gathering, and fishing sites.

The National Historic Preservation Act, 16 USC 470, requires federal agencies to take into account the effects of their undertakings on historic properties (36 CFR 800.1). In addition, the 1992 amendments specifically gave more rights to Indian Tribes, and added more requirements for federal agencies to consult before taking actions that affect tribal historic properties.

(4) The MNF should work with the Tribe in a government-to-government relationship whereby the Tribe can work with MNF as co-managers of the natural resources. (Also, please note related comment #7 below).

MNF should work with the Tribe on areas of mutual concern, such as access issues tied to road decommissioning and closure; management of off-road vehicle use; riparian and fish habitat issues tied to water quality concerns due to 303(d) listings of water resources in the project area; and air quality issues tied to prescribed burning. 16.5

Regarding prescribed burning, in a phone discussion with the Tribe's Facilities and Environmental Director (Dave Evans), we were informed that the Tribe is pursuing long-range plans to initiate and establish haze and particulate monitoring stations. Currently, the airshed around the City of Burns and the Tribe's reservation lands are in attainment and contain some of the best air quality within the state. The Tribe is highly interested in retaining current air quality in the region.

Also, designation of the Myrtle-Silvies Roadless Area as wilderness could pose a problem to the Tribe. Such designation could be problematic for people for whom this place has been part of their homeland territory for thousands of years. As expressed in Ms. Jerofke's letter to the Burns Ranger District of November 6, 2001, the Forest Service should again engage in consultation with the Tribe before reaching a decision of designation.

Precedents have already been established for just such an approach within the Forest Service. For example, the Gifford-Pinchot National Forest has been working out and implementing co-management of Indian Heaven Wilderness Area and other traditional use areas. The Siletz and Grand Ronde have also been working with the Forest Service to find ways to integrate and support tribal access to harvesting traditional and non-traditional Non-Timber Forest Products.

(5) A separate cultural discussion should be included in the FEIS, in addition to the socio-economics section, pertinent to the project area. A separate and expanded cultural discussion section to address Tribal issues and concerns would facilitate pertinent cultural awareness for the reviewer and decision-maker.

We recommend that large portions of Linda Jerofke's letter to the Burns Ranger District of February 21, 2001, be included in the FEIS. 6-6

We recommend that all general tribal information should be pooled together into one heading. For example, "Tribal uses" (SDEIS, page 2-3) should not be included under "Recreational Uses" section, but in a separate Tribal section. Tribal use rights should include hunting, gathering, fishing, and ceremonial activities where it can be more thoroughly addressed. Furthermore, the practices of traditional resource harvest fall within the categories of 'recreation', economic, and spiritual. All of these are tied to cultural identity and legal rights. The supplemental EIS needs improvement in acknowledging the significance of these tribal resource rights for the Burns Paiute Tribe so as to more fully disclose tribal trust responsibilities.

6) Regarding the *Economic Diversity* section, there is an omission of the importance of subsistence activities both for the Tribe. As presented, there is insufficient treatment of potential impacts to restricted access within the project area as posed by some of the alternatives. 6-7

The SDEIS does present strong evidence of subsistence activities by local residences and communities (many local families use big game and fish to supplement their food supply; furthermore, firewood is a primary heating source for residences due to its availability and lower energy cost, SDEIS, p. 2-4). But the SDEIS did not directly reference the importance of subsistence activities for the Tribe. Subsistence activities has always been a integral element for the Tribe, both from a cultural and practical perspective. The SDEIS should enlarge its discussion of this Tribal element.

7) Under the discussion *What are the Nature of Relationships Among the Community, the Forest and Larger Ecosystem?* (SDEIS, page 2-14), the concerns of "American Indians" are lumped with local resident concerns. As noted in Linda Jerofke's letters from the Burns Paiute Tribe, specific portions of southeastern Oregon are in the traditional territory of the Burns Paiute Tribe and not "American Indians" generally. This section does not adequately address the government-government responsibility of the Forest Service to recognize the rights of the Burns Paiute Tribe and their long term relationship with this landscape. Even if members of the Burns Paiute Tribe only visit areas within the Malheur Forest several times a year (as noted bottom of p. 2-14) this use is not the same kind of relationship as local residents who are not of Native American descent. The temporal connection with the landscape is much longer for those of Native American descent. The multi-generational connection, stories, place names and long-term, and repeat returns to hunting, gathering and fishing places is a very different kind of relationship. As noted in Linda Jerofke's letter, these relationships are part of heritage, culture, spiritual meaning and resource rights for Burns Paiute Tribal members. 6-8

Again, we suggest the Malheur Forest consider taking a more active approach to inviting and involving the Burns Paiute Tribe in co-management approaches to implementing its Watershed Restoration Plan. Such an approach could support attaining goals and objectives of the Watershed Restoration plan in ways that engage the tribes traditional ecological knowledge and resource management practices. We believe such approach would lead to finding a common ground to continue to accommodate and foster the Tribe's resource harvest rights and the essential long-term goals of ecological restoration.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

6-1. This section of the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003) and the Silvies Canyon Project Cultural Resource Report.

6-2. Consultation did occur and was documented in the DEIS page 1-19. This section in the FEIS has been updated. During the DEIS development consultation was done with Ms. Linda Reed-Jerofke. With recent personnel losses at the Tribal Offices, we have asked the Tribal Council to confirm the process they wish to use for consultation.

6-3. This type of information is generally not shared outside the Burns Paiute tribe.

6-4. The SDEIS attempted to disclose effects of reduced road systems on needs of Tribal members. This discussion will be expanded in the FEIS chapter 4. Refer also to the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

6-5. Most of the issues mentioned had been previously identified in consultation with Tribe on this project. Further study of the area as wilderness has never been part of this project. The subject came up only as a result of contacts with environmental interests during scoping for this project.

6-6. This section in the FEIS will be updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

6-7. The SDEIS attempted to describe the high importance of subsistence activities by both Paiute and non-Paiute members of the local communities. This distinction will be better made in the FEIS, see also response to comment 6-6. The effects to the Burns Paiute Tribe are fully disclosed in the FEIS chapter 4 see also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

6-8. In the DEIS, the term “Native American” was used so as not to exclude the probable use and claims of use of the project area by other American Indians. This has been updated in the FEIS. Refer to the FEIS chapters 3 and 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

JAN 2 2002 — Bonnie Bill S. 7

RECEIVED
JAN 1 8 2002
By Emigrant Creek RD

Karen Coulter
Co-Director
Blue Mountains Biodiversity Project
27803 Williams Lane
Fossil OR, 97830
also submitted on behalf of:
Tim Lillebo and Doug Heiken
Oregon Natural Resources Council
16 NW Kansas St.
Bend, Oregon 97701

Bonnie J. Wood
Forest Supervisor
Malheur National Forest
431 Patterson Bridge Road
P.O Box 909
John Day, OR 97845

The Supplemental Draft Environmental Impact statement (SDEIS) for the Silvies Canyon Watershed Restoration Project (SCWRP) inadequately considers and displays the full range of effects to both public and private sector income and employment resulting from federaldecisions and actions. There is a lack of consideration given to the full range of relevant factors in measuring present net value, benefit/cost ratios, and other short and long term social and economic effects from this project.

It is not clear from the DEIS and SDEIS that the timber industry comprises a large portion of portion of the Grant and Harney County economies. Statements that refer to these counties as being "heavily dependent on raw material exports, mostly in the form of wood products, livestock, or agricultural products" (SDEIS p.2-12, par. 4) give little insight into the matter. Lumping timber products together with all other raw material exports presents an unrealistically inflated view of the importance of timber to the local economy. The DEIS shows that only 10% of the non-farm wages are in lumber and wood manufacturing.(DEIS p.3-44, table 3-7) While it may be possible that the "Trade" section of this table includes other jobs related to local raw material exports of timber products, this is never made clear in the document. In general, the overall economy of Grant and Harney counties are small enough that any changes are likely to be noticed, but this does not automatically translate into a timber dependent local economy. 7-1

D-118

We have concerns about the way coflicts are presented in the SDEIS regarding the goals of conservation and modern timber management. Critics of current U.S. Forest Service (and other public lands agencies) actions are not just basing their perceptions on past timber management practices. Concerned individuals and groups such as Blue Mountains Biodiversity Project make a point to get involved in the planning process for projects such as the SCWRP. Most of the time, public involvement is a result of having a direct connection and interest in a particular area. It is not typically a result of information found on the Internet, as was indicated in the SDEIS (p.2-20) The involvement process includes reading the planning documents, commenting at different phases of the project, and walking the project units that will be affected. 7-2

The units of the SCWRP we have seen so far are heavily marked to cut. In fact, many units we have seen are marked as virtual clearcuts, not the "thinning" described in the documents. In units with a multi-storied canopy, the understory and most of the midstory would be eliminated. if the currently proposed project was implemented, there would be numerous negative effects to area soils, wildlife, hydrology, and waterways. Our other concerns about the SCWRP are detailed in our earlier written comments on the DEIS, incorporated here by reference. 7-3

The SDEIS refers to dips in the local economy in recent years from "less available wood fiber due to environmental restrictions" (SDEIS p.2-12, par. 4) While increased market competition is mentioned in passing as another factor, it is unclear what percentage of the economic decline is attributed to each trend. Also, other factors such as the wide-scale overcutting of Northwest forests, increased automation and mechanization, exports of minimally processed wood, importing of exotic woods, the shifting of wood production overseas, and increased financial costs associated with deforestation are not given as reasons for the decline of the local and national timber industry. Neglecting to describe the full range of reasons for this decline demonstrates a biased and compromised approach to economic analysis. 7-4

D-119

The section "Desired Conditions of the Forest"(SDEIS, p.2-15) demonstrates continued bias. While we agree with some of the "desired conditions" listed, it has not been shown that the SCWRP will enhance these conditions. Unfortunately, it is likely to be detrimental to forest ecosystems. This section also delves into a false dichotomy of the conflict between those advocating a "hands off" approach to management and those interested in promoting the "desired conditions of the forest" It is true that conservationists advocate for forest conditions described in par. 8 on p. 2-15 (SDEIS), but can you clarify who is advocating for a totally "hands-off" approach as described in SDEIS? 7-5 7-6

While many conservationists support currently proposed legislation to end commercial logging on public lands, this is in no way synonomous with having no management whatsoever of public lands. This legislation would redirect some of the millions of dollars lost yearly by the federal timbersale program into much needed worker retraining and restoration projects. This would occur at a much lower cost to U.S. taxpayers and still allow personal aquisition of firewood, posts and poles, and non-timber forest products. Truly beneficial thinning could occur in areas where fire has been suppressed and it is needed for forest health or reducing fuel loading. It is unfair to present a false dichotomy between an unspecified group wanting a "hands-off" approach with no management and the desires of local communities and federal managers. Such a simplistic characterization works to polarize those interested in what happens on public lands. Resources would be better spent planning projects that acheive the common goals of everyone involved. 7-6

With the case of the SCWRP, we feel that there are some management actions that could have positive ecological and economic effects. However, we have many concerns about the currently planned management by the Forest Service. While field checking we saw some very dense areas where it would be acceptable to do some pre-commercial thinning by hand of young trees. 7-7

However the perceived need to reduce fuel loading in much of the area is unfounded. Much of the forest we have seen so far is composed of mostly green (live), widely spaced pine trees with very little underbrush. Many units have already been thinned or have undergone prescribed burning. The risk of a high intensity fire is low in these areas. On the contrary, the heavy logging proposed by the SCWRP could increase the risk of fire in the area. On the ground experience has shown, and scientists concur that fire can burn with great intensity through logged and clearcut areas. The logging creates areas with increased wind speed, drier microclimate conditions, and concentrated fuels such as slash piles. We are not advocating for an "undisturbed uniform landscape" (SDEIS p. 2-16, par. 5). We agree that it is natural for the forests of Eastern Oregon to have a "varying range of forest structure." (SDEIS p. 2-16, par. 3) However, we feel that the massive scale of disturbance planned by the SCWRP will result in a less diverse landscape. This project is not comparable to historic disturbance activities, including the fires set by Native Americans. The scale is much larger, the effects more intense, and the negative impacts are far greater, especially when the cumulative effects of previous Forest Service management are assessed. For example, the forest canopy is already fragmented from past logging, much large structure has already been removed, and soils are heavily compacted from logging and livestock grazing. 7-7 7-8

While we agree that the forest contributes to the quality of life, we question why the economic value of intact forest ecosystems was not calculated into the net present value for the SCWRP. It is not true that ecosystem services are not "measureable at the project level in terms that provide meaningful comparisons of commensurate dollar values" (DEIS p. 4-59, pa par. 1). Factors are conspicuously absent from the F.S. analysis of economic benefits such as those associated with: 7-9

1) Recreational opportunities and tourism;
2) Commercial and recreational fisheries within the boundries of the Malheur National Forest and downstream and offshore; 7-10

D-121

3) Habitat for important game species and hunting both within and outside of tn Malheur National Forest;
4) Water for cities, industries, businesses, and individual households downstream from the Malheur National Forest;
5) The regulation of water flowing through rivers and streams, including flood control;
6) Non-timber forest products such as wild mushrooms, herbs, and medicinal plants
7) Mitigation of global climate change through absorption and storage of vast amounts of carbon;
8) Enhancing the quality of life of neighboring communities;
9) Harboring biological resources that either have value now or have as yet unknown but potentially large economic and social value;
10) Harboring biological and genetic resources that can improve the long-term productivity of all forest land;
11) Pest-control services provided by species that prey on agricultural and forest pests, and;
12) Pollination services provided by species that pollinate important forest and agricultural crops

7-10

These are important economic benefits generated by national forests throughout the U.S., including the Malheur National Forest. The Forest Service has extensive literature to quantify the magnitude of these economic benefits at the national, Forest, and project level. While lumber and wood products are readily available from the 80% of forested land in the U.S. outside of National Forests, clean water, recreation, wildlife, and other public uses are not.

The section of the SDEIS describing recent social and economic trends relevant to managemant of ecosystems does not relay information about recent political events which could affect county payments. A recent congressional proposal would reduce the amount of funding that counties with large percentages of federal land ownership would receive from the federal government in lieu of the ability to assess property taxes. The SCWRP may not provide a significant amount of money to the local economy.

7-11

Payments to counties should be decoupled from federal timber receipts. Relying on the fluctuations of the timber market is is an unsustainable way to fund watershed restoration, schools, and other important county projects.

In the section on Technological Change (SDEIS p.2-18) new job opportunities are only discussed in terms of ways to employ people in the timber industry. There is not a similar section detailing opportunities for non-extractive forest related employment or opportunities for non-forest work. In reviewing the SDEIS and DEIS, it is not shown that the proposed project will generate a positive income. The U.S. Forest Service never substantiated that recovering the economic value of the trees and providing timber to the economy was necessary. Notably, the price of timber has dropped dramatically, especially for eastside forest products. It does not make sense to portray this project as being necessary to provide timber to an already glutted market. This is demonstrated by the statement "continued research is needed to determine economic uses of the type of wood available." (SDEIS p.2-19, par.4) Moreover, Table 4-12 in the DEIS shows that all commercial logging alternatives for the SCWRP have a high risk of receiving no bids in today's market. The presumption that this project will benefit the local economy is unfounded. 7-12 7-13

We feel that significant and potentially significant social and economic consequences are not fully disclosed for any of the alternatives in the SDEIS. First, there is inadequate analysis of effects to recreation. Why is there an assumption that the more roads that remain open, the better an area is at meeting the motorized recreation need? Isn't it possible to meet this need, but with less open roads? For those who hunt and fish, less open roads may change access but result in greater success at these pursuits because of increased wildlife and fisheries numbers. The beneficial effects to non-motorized recreation may be offset by the negative effects from the actions planned in the Myrtle-Silvies Roadless Area, as well as negative impacts 7-14 7-15 to wildlife, scenic beauty, and overall ecosystem damage. ↑7-15

It is not quantified how opportunities for restoration and enhancement work would help to maintain human populations in Grant and Harney Counties over the next ten years (SDEIS p.3-3, par.6). Are these "opportunities" based on mitigation measures with unguaranteed funding? 7-16

There is inadequate analysis comparing the more restoration-focused alternatives to the alternatives with commercial logging This is partially because many aspects of truly restoring the watershed have been left out, such as including more road obliteration as opposed to superficial gated closures. Second, the economic benefits of standing trees are given no present net value. Third, external costs of logging are not calculated. Fourth, no explanation is provided about why it is such a given that restoration projects will not be funded any time in the near future. No mention is made of the possibility of taking bids on contracts to do restoration work. Instead, we are to accept that it simply will not happen. Finally, we have concerns that effects from all alternatives (besides alternative 1) are being evaluated as though it is guaranteed there will be companies offering the minimum bid. There is no evidence indicated in the SDEIS or DEIS that there will be any companies offering the minimum bid. There is no evidence indicating that the money spent on preparing the sale will be recouped. 7-17

Despite Forest Service claims, it is not substantiated in the SDEIS that the currently proposed vegetative actions would have any benefit , or have more benefit to disadvantaged groups than Alternative 1. 7-18 We also take issue with the assertion that maintaining the current level of open roads (in Alt. 1) would provide the most benefit to elderly or mobility impaired people and the Burns-Paiute for access into the area. While roaded access to the watershed is important for these groups, it is not confirmed in the SDEIS or DEIS that these groups are currently using all 314 miles of roads. Isn't it possible to close many of these roads while still ensuring good access? 7-19

Most roads that are typically suggested for closure by the Forest Service are from past logging use, are currently little-used, and produce negative impacts to streams, soils, plant cover and wildlife, fisheries, and increase the chance of introducing noxious weeds.

Since opportunities for firewood gathering already exist in the project area and are often offered under categorical exclusion, it is confusing why the No Action Alternative Alternative is deemed to have a negative impact on the elderly, low-income people, and tribal members who rely on firewood. The SCWRP is not necessary to provide this already available resource. 7-20

TheSDEIS makes the conclusion that the No-Action Alternative would have the most negative effects to disadvantaged groups by providing only 10 potential jobs, butis unclear how likely it is that people from these groups will be the ones hired for the estimated 280 jobs that could be available if the preferred alternative is implemented. Does the Malheur have data showing the number of people from these groups who have been hired since February 1994 when Executive Order 12898 was issued (focusing on Environmental Justice)? If so, it should have been disclosed. While "76,000 acres of sustainability work is listed as a positive impact on disadvantaged groups, it is not quantified how many jobs this will likely provide for the Burns-Paiute and low-income or elderly people. 7-21

In describing the negative impacts of the No-Action Alternative, the SDEIS includes the absence of proposed activities to "make forest resources sustainable over the long-term." (SDEIS p.3-5, par.4) What activities are being referred to by this statement? Certainly the proposed vegetative actions of the SCWRP are not sustainable. Many units are currently marked heavily enough to pass as clearcuts. 7-22 The socio-economic benefits of intact forests to disadvantaged groups are given no consideration in the SDEIS. 7-23 The Burns-Paiute could be negatively affected by the degradation of traditional hunting and fishing sites and gathering areas for non-timber resources, and negetive impacts to cultural,recreational, 7-24 and spiritual sites. Other potential impacts to the Burns-Paiute include loss of wildlife abundance and diversity and asthetic values. 7-24

As in the situation with firewood, the SCWRP is unnecessary to provide small ranchers with posts and poles. This resource is already available to ranchers and others in the area. Post and pole cutting is often offered as a categorical exclusion and as such the No-Action Alternative would not negate this resource. 7-25

As far as public health is concerned, we do not follow the logic that the proposed vegetative actions will improve hydrologic function or water quality in the short or long-term. This assumption is not explained or justified. We feel that many of the purposed actions may degrade water quality by decreasing shade, filtering capacity, and riparian vegetation and by increasing erosion and sedimentation of streams, potentially impairing watershed or subwatershed hydrologic flows. The SCWRP fails to address the negative effects of compacted soils, eroded streambanks, denuded riparian vegetation, lowered water table, and contaminated local water flows. 7-26

We are concerned that the contributions of standing forests to clean air and water are being completely discounted by the planners of the SCWRP. Stating that the No Action Alternative presents greater risks to human health because of high fire potential is an assumption based on opinion, not evidence. True the amount of wood smoke affects air pollution. However forests also affect the degree of air pollution by acting as filters to purify the air. The occurence of stand replacement wildfire is not a given in this area, and as we stated earlier, treatments may increase the risk of high intensity fires. However, the loss of air-filtering capacity and carbon storage resulting from logging and the smoke released from prescribed burning will have quantifiable negative effects to human health and global warming. 7-27

These effects should be analyzed. Equating all fuel treatments with long term decreased air quality is not backed up by evidence.

We are concerned that many of the conclusions in the Silvies SDEIS are based on opinion and not evidence. The data presented 7-28

is the end result of analysis that was inadequate in the first place. 7-28
This indicates bias on the part of the agency. It is never specified 7-29
how many local mills could take the trees from the commercial
logging portion of the SCWRP. While alternatives are analyzed 7-30
in terms of "potential" jobs, it is not shown that loggers and
other workers will be hired locally. The summary of effects to
other counties (SDEIS-Figure 12, p.3-13) shows that over one
fourth of the potential income from the project would go
outside of Grant and Harney counties. In evaluating this
project, the Forest Service has failed to incorporate information
about externalized costs passed on to communities, businesses,
and individuals when national forests are logged. These
include the direct, indirect, and cumulative economic costs
associated with:

1) Lost recreational opportunities and decreased tourism;
2) Degraded commercial and recreational fisheries within the boundries of the Malheur National Forest and downstream;
3) Increased pollution of water for cities, industries, businesses, and individual households downstream from the Malheur National Forest and increased costs of water filtration;
4) Increased flooding and disruption of the normal flows in rivers and streams; 7-31
5) Loss of non-timber forest products such as wild mushrooms herbs, and medicinal plants;
6) Exacerbation of global warming through release of greenhouse gasses
7) Diminished quality of life of neighboring communities;
8) Loss of biological resources that either have value now or have as yet unknown but potentially large economic and social value;
9) Degraded habitat for important game species and loss of hunting opportunities both within and outside of the Malheur National Forest;
10) Loss of biological and genetic resources and species that can improve the long-term productivity and

aesthetic qualities of all forest land;

11) Diminished pest-control services provided by species that prey on agricultural and forest pests;

12) Diminished pollination services provided by species that pollinate important forest and agricultural crops;

13) Lost jobs and income associated with the production of alternative and recycled products that is displaced by subsidized Malheur National Forest timber sales;

14) Lost jobs and income associated with the production of timber on private lands that is displaced by Malheur National Forest timber sales;

15) Death, injury, and property damage associated with logging on the Malheur National Forest, and;

16) Increased risk of severe wildfires caused by adverse changes in micrclimate, higher wind speeds, and slash generated by timber sales

7-31

The Forest Service has extensive literature and sources of data that it can rely upon to quantify the magnitude of these externalized costs at the national, forest, and project level. However, this information was not utilized in the economic analysis for the SCWRP. Failure to incorporate externalized costs and otherwise adequately analyze all relevant factors relating to costs and benefits of the SCWRP is in violation of numerous statutes, regulations, and government directives.

We are concerned that the SDEIS and DEIS neglect to disclose all project costs beyond net project value. While the Forest Service does disclose the $268,000 invested in planning, public scoping, and environmental analysis at the time the DEIS came out, it is not clear that all costs of preparing the project are being made public. These costs may include administrative overhead, publication costs, survey costs, road maintainence and construction, future monitoring, future restoration to repair damages caused by the project, and other long term expenditures such as reforestation and mitigation measures. Potential litigation costs are also left out of the analysis. We also have concerns that the preferred alternative is the one that will result in the most money going towards federal salaries. While job opportunities are important, we are concerned that this may represent a conflict

7-32

733

of interest on the part of the Forest Service.

A recent GAO report concurs that Forest Service accounting systems are meaningless because they cannot accurately account for expenses and incomes. The Malheur National Forest has not shown that it has overcome this deficiency. Given the situation, we question the rationale to proceed with such a large scale project that will detrimentally impact the resources in the planning area. 7-33 7-34

7-1. This has been updated in the FEIS chapters 3 and 4. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-2. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-3. The effects to soils, wildlife, hydrology, fisheries, and water quality are fully described in the FEIS chapter 4.

7-4. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-5. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-6. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-7. Thank you for your comment, the FEIS chapter 3 describes the existing fuel conditions and chapter 4 describes the effects of our proposed actions.

7-8. Thank you for your comment. The existing vegetation condition has been described in the FEIS chapter 3. Existing soil conditions are also described in the FEIS chapter 3, briefly, soil quality standards have been met in about 99% of the units according to the sampling.

7-9. Refer to response to comment 5-9.

7-10. Refer to response to comment 5-9.

7-11. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-12. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-13. The purpose and need statement in the FEIS chapter 1 has been updated. The statement in the SDEIS pg 2-19 par. 4 refers to the small round wood (less than 10 inches dbh) that is abundant in the forest. Refer to the SDEIS pg 2-18 par. 1. This section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-14. These sections in the FEIS have been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003). Generally, people who prefer roaded access would be better served by the Alternative that has the most open roads. Effects to roaded access are fully described in the FEIS chapter 4.

7-15. The effects to the Myrtle-Silvies Roadless Area are fully described in the FEIS chapter 4.

7-16. Thank you for your comment, this section in the FEIS has been updated. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-17. The effects of each alternative are described in the FEIS chapter 4. Forest Service budgets, especially in Region 6 continue to be reduced every year. With a reduction in budgets, fewer projects get funded each year. See also response to comments 5-9 and 5-10. Refer also to the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003). You are correct, there is no guarantee the money spent on preparing the sale will be recouped. The purpose and need for action in the FEIS chapter 1 has been revised and describes the need for action.

7-18. Thank you for your comment, this section in the FEIS has been updated. Refer also to response to comment 7-21. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-19. Yes, it is possible to close many roads while still ensuring good access. However, when roaded access is very important to certain groups like the elderly, mobility impaired and the Burns Paiute Tribe, and these groups do not specific exactly which roads they use, then the alternative that provides the most open roads would benefit these groups the most. See also the FEIS chapter 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-20. Thank you for your comment, this section in the FEIS has been updated. In the FEIS, Alternatives 2, 4, 5, 7 and 7a would make firewood available that Alternatives 1, 3 and 6 would not. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-21. The strength of the economy not only affects the average worker and businesses in the community, it also affects low income and minorities (Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects, June 1, 2003). See also the FEIS chapter 4.

7-22. Commercial harvesting, precommercial thinning, prescribed burning, post and pole sales, juniper reduction, noxious weed treatments, aspen restoration, cottonwood restoration and spring restoration are all activities that would aid in making forest resources sustainable over the long term. See also the FEIS chapters 3 and 4.

7-23. Thank you for your comment, see also the response to comment 5-9.

7-24. The effects to the Burns Paiute Tribe are described in the FEIS chapter 4. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-25. The effects to the Burns Paiute Tribe are described in the FEIS chapter 4. See also the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-26. The SDEIS pg. 3-7 par. 7 states, "Alternatives that improve watersheds and bring vegetation back into sustainable conditions potentially increase hydrologic function and subsurface water movement, and thus would benefit aquifers and streams in the long term." See also the FEIS chapter 4.

7-27. Current vegetation conditions within the project area are not sustainable. A stand replacement fire is probable. See also response to comments 5-9 and 5-10. Refer to the FEIS chapters 3 and 4 for more information on vegetation condition. Effects to air quality in the FEIS chapter 4 have been updated.

7-28. Thank you for your comment, in the absence of site-specific information we cannot properly respond to this comment. Refer to the FEIS chapter 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-29. Any of the local mills could submit a bid for commercial harvesting contracts.

7-30. There is no guarantee that local loggers and other workers would be hired.

7-31. See the response to comment 5-9 and 5-10.

7-32. See the response to comment 5-9. Also refer to the FEIS chapter 4 and the Silvies Canyon Watershed Restoration Project FEIS Social and Economic Conditions and Effects (June 1, 2003).

7-33. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

7-34. Thank you for your comment, it has been incorporated into the EIS and is now part of the administrative record for this project.

#8

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

In Reply Refer To:
ER 02/30

JAN 14 2002

Mr. James M. Keniston
District Ranger,
Burns Ranger District
HC-74 Box 12870
Hines, Oregon 97738

Dear Mr. Keniston:

This is in regard to the Department of the Interior's comments for the Supplemental Draft Environmental Impact Statement for the Silvies Canyon Watershed Restoration Project, Malheur National Forest, Grant and Harney Counties, Oregon.

This is to inform you that the Department may have comments, was unable to reply before the comment deadline. Please consider this letter as a request for an extension of time in which to comment on the document.

Our comments, if any, should be available by February 19, 2002.

Sincerely,

Terence N. Martin

Terence N. Martin
Team Leader
Natural Resources Management
Office of Environmental Policy
and Compliance

8-1. No response necessary.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356
Portland, Oregon 97232-2036

FEB 28 2002

Bill nos
Lori Bailey

IN REPLY REFER TO:

#9

February 27, 2002

ER 02/30

Ms. Bonnie J. Wood, Forest Supervisor
Malheur National Forest
431 Patterson Bridge Road
P.O. Box 909
John Day, Oregon 97845

Dear Ms. Wood:

The Department of the Interior reviewed the Supplemental Draft Environmental Impact Statement for the Silvies Canyon Watershed Restoration Malheur National Forest, Grant and Harney Counties, Oregon. The Department does not have any comments to offer.

We appreciated the opportunity to comment.

Sincerely,

Preston Sleeger

Preston A. Sleeger
Regional Environmental Officer

9-1. No response necessary.

Appendix E
Soils Information

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
1.01	123	CT*	Curry I #1	71/85	Low	0	5-7	Yes
1.02	74	CT*	Curry I #1	71/74	Low	0	5-7	Yes
1.03	14	PCT		71/85	Low	0	5-7	Yes
1.04	4	JR		71	Low	0	5-7	Yes
1.05	28	CT*	Curry I #1	71/85	Low	0	5-7	Yes
1.06	15	JR		71/74	Low	0	5-7	Yes
1.07	10	JR		71/85	Low	0	5-7	Yes
3.01	200	CT*	Curry I #2	9/71/74/77/85	Low	0	5-7	Yes
3.02	7	PCT		71/85	Moderate	0	5-7	Yes
3.03	22	JR		71/77/85	Low	0	5-7	Yes
3.04	9	PCT		71/77/85	Low-Moderate	0	5-7	Yes
3.05	7	PCT		71/85	Low-Moderate	0	5-7	Yes
4.01	47	CT*	Curry I #3	9/68/77/85	Low-Moderate	4	9-11	Yes
4.02	480	CT*	Curry I #3 & Curry I #4	8/8X/9/9X/68/71/71C 74/74/77/85	Low-Moderate	4	9-11	Yes
4.03	7	PCT		8X/9/68/71C74	Low			
4.05	3	JR		58	Moderate			
4.06	94	CT	Curry II #5 & Curry II #6	71/77	Low	3-6**	8-13	Yes
4.07	5	JR		68/71C74	Low-Moderate			
5.01	113	PCT		7/8/9/68	Low-Moderate			
5.02	150	IT*	Curry II #19	9/68/71/77	Low-Moderate	5	10-12	Yes
5.03	50	PCT		7/9/68/71	Low-Moderate			

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
5.04	113	CT*	Curry II #6 & Curry II #15	7/68/71/74C85/77	Low-Moderate	4-6**	9-13	Yes
5.05	11	CT*	Curry II #6	71	Low-Moderate	4-6**	9-13	Yes
5.06	67	PCT		68/71/74C85/77	Low-Moderate			
5.07	102	CT		68/71/74C85	Low-Moderate	****		
5.08	141	CT	Curry II #6 & Curry II #7	68/71/74/77	Low-Moderate	3-6**	8-13	Yes
5.09	206	CT	Curry II #7	68/71/74C85/77	Low-Moderate	3-5**	8-11	Yes
5.1	116	CT	Curry I #4	71/74/77	Low	< 13	< 20	Yes
5.11	59	CT	Curry II #7	68/74C85/77	Low-Moderate	3-5**	8-11	Yes
6.01	101	CT*	Curry II #8	3/71C81/74C85	Low-Moderate	3-5**	8-11	Yes
6.02	63	PCT		71C74/71C81/74C85	Low-Moderate			
6.03	37	CT*	Curry II #9	3/71C74/74C85	Low-Moderate	3-11**	8-18	Yes
6.04	39	PCT		3/71C74/74C85	Low-Moderate			
6.05	133	CT	Curry II #13	71C74/74C85/77	Low	3	8-10	Yes
6.06	158	CT*	Curry II #13	71C74/74C85/77	Low	3	8-10	Yes
6.07	27	PCT		71C74/74C85	Low			
6.08	11	JR		71C74	Low			
6.09	94	CT*	Curry II #9	71C74/71C81	Low-Moderate	3-11**	8-18	Yes
6.1	108	CT	Curry II #9	3/71C74/71C81	Low-Moderate	3-11**	8-18	Yes
6.11	10	JR		71C81	Low			
6.12	7	CT	Curry II #9		Low-Moderate	3-11**	8-18	Yes
6.13	19	CT*	Curry II #12	71C74/71C81	Low-Moderate	14	19-21	No
6.14	43	CT	Curry II #12	71C74/71C81/77	Low-Moderate	14	19-21	No
6.15	11	PCT		71C74/71C81	Low-Moderate			
6.16	48	CT	Curry II #12	71C74/71C81/77	Low-Moderate	14	19-21	No
6.17	148	CT	Curry II #11	71C74/71C81/77	Low-Moderate	4	9-11	Yes
6.18	9	PCT		71C74/71C81/74C85	Low-Moderate	< 10	< 17	Yes
6.19	44	PCT		71C74/74C85/77	Low			

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
6.2	60	CT*	Curry II #10	71C74/77	Low	3-11**	8-18	Yes
6.21	3	JR		71C74	Low			
6.22	18	CT*	Curry II #10	71C74/77	Low	3-11**	8-18	Yes
6.23	11	JR		71C74/77	Low			
6.24	55	PCT		71C74	Low			
6.25	44	CT	Curry II #10	71C74/77	Low	3-11**	8-18	Yes
6.26	25	PCT		71C74/74C85/77	Low-Moderate	< 10	< 17	Yes
6.27	33	CT	Curry II #8	71C81/74C85	Low-Moderate	3-5**	8-12	Yes
6.28	9	JR		71C74	Low			
6.29	30	CT*		3/71C74	Low	****		
6.3	34	CT*		71C81	Low-Moderate	****		
6.31	15	JR			Low-Moderate			
7.01	83	CT*	Curry II #14	71C74/74C85	Low-Moderate	2-4**	7-11	Yes
7.02	23	CT	Curry II #14	71C74/74C85	Low-Moderate	2-4**	7-11	Yes
7.03	65	CT*	Curry II #14	71C74/74C85	Low-Moderate	4-6**	9-13	Yes
7.04	28	PCT		3/71C74/74C85	Low-Moderate	< 11	< 18	Yes
7.05	37	CT	Curry II #14	3/71C74/74C85	Low-Moderate	2-6**	7-13	Yes
7.06	61	CT*	Curry II #14	71C74/74C85	Low-Moderate	2-6**	7-13	Yes
8.01	93	CT	Curry II #16	71/74C85	Low	3-4**	8-11	Yes
8.02	71	CT*	Curry II #16	71/77	Low	3-4**	8-11	Yes
8.03	22	CT	Curry II #16	71C81	Moderate	3	8-10	Yes
8.04	56	PCT		71/77	Low			
8.05	53	CT	Curry II #17	71	Moderate	2-4**	7-11	Yes
8.06	101	CT	Curry II #17	71/71C81/74C85	Low-Moderate	4	9-11	Yes
8.07	124	PCT		71/71C81/74C85	Low-Moderate			
8.08	109	PCT		71/77	Moderate	< 11	< 18	Yes
8.09	9	PCT		71	Moderate	6	11-13	Yes
8.1	5	PCT		71/77	Moderate			
8.11	104	PCT		71/71C81/74C85	Low-Moderate			
8.12	57	PCT		7/74C85/77	Low-Moderate			
9.01	55	IT*	Curry III #18	3/7/71C74/77/7C8	Low	8	13-15	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
9.02	65	IT*	Curry III #18	71C74/74C85/77	Low	8	13-15	Yes
9.03	71	CT	Curry III #18	3/71C74/74C85/77	Low	8	13-15	Yes
9.04	89	CT*	Curry III #18	1/3/71C74/74C85/77	Low	8	13-15	Yes
9.05	33	CT	Curry III #18	71C74/74C85	Low	8	13-15	Yes
10.01	35	CT*	Curry III #20	3/71C74/74C85/77	Low	9-10**	14-17	Yes
10.02	40	IT*	Curry III #20	74C85	Low	9-10**	14-17	Yes
10.03	58	IT*	Curry III #20	7/74C85/77/8	Low	9-10**	14-17	Yes
10.04	49	IT*	Curry III #20	7/77/7C8/8	Low	9-10**	14-17	Yes
10.05	95	IT*	Curry III #21	7/71C74/71C81/74C85/8	Low	11	18	Yes
10.06	41	CT*	Curry III #21	71C74/74C85	Low	11	18	Yes
10.07	67	CT*	Curry III #22	71C74/77	Moderate	8	13-15	Yes
10.08	15	PCT		71C74	Low			
10.09	34	PCT		71C74/77	Low			
10.1	5	PCT		71C74	Low			
10.11	3	PCT		71C74	Low			
10.12	7	IT*	Curry III #20	74C85	Low	9-10**	14-17	Yes
10.13	4	CT		71C74	Low	****		
11.01	119	CT	Curry III #22 & Curry III #23	3/71C74/77	Low	3-8**	8-15	Yes
11.02	118	CT	Curry III #23	3/71C74/71C81	Low	3	8-10	Yes
11.03	31	JR		3/71C81	Low-Moderate			
11.04	117	CT*	Curry III #23	71C74/71C81/74	Low-Moderate	3	8-10	Yes
11.05	7	JR		71C81	Low-Moderate			
11.06	31	JR		71C81/74	Low-Moderate			
11.07	108	PCT		3/71C74/71C81/7X/8	Low-Moderate			
11.08	61	CT*	Curry III #24	7/71C81/7X/8	Low	24	29-31	No
11.09	74	CT*	Curry III #24	71C81/74/7X/8	Low	24	29-31	No
11.1	134	PCT		71C81/74/7X/8	Low			

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
11.10a	12	CT		71C81/74/7X/8	Low	****		
11.11	36	CT*	Curry III #26	7X/8	Low	8	13-15	Yes
11.12	67	CT*	Curry III #26	7/71C81/8	Low	8	13-15	Yes
11.13	11	PCT		3/71C74/71C81	Low-Moderate			
11.14	7	PCT		71C74	Low			
11.15	12	CT*	Curry III #28		Low	< 13	< 20	Yes
12.01	57	CT*	Curry III #27	7X/8X	Low	13	< 20	Yes
12.02	60	CT*	Curry III #27	7/7X/8/8X	Low	13	< 20	Yes
12.03	40	CT*		7/7X/8X	Low-Moderate	< 10	< 17	Yes
13.01	54	CT	Curry IV #13	7/71C81	Low	< 12	< 19	Yes
13.02	17	CT	Curry IV #13	7/71C81	Low	< 11	< 18	Yes
13.03	49	CT*	Curry IV #13	7/71C81	Low-Moderate	0	5-7	Yes
13.04	19	CT*	Curry IV #13	7/71C81/77	Low	0	5-7	Yes
14.01	214	CT	Curry IV #10	71/77/8/85C87	Low	< 12	< 19	Yes
14.02	26	JR		71/71C81/77/8	Low-Moderate			
14.03	145	CT	Curry IV #10	7/71/71C81/77/85C87	Low	< 12	< 19	Yes
15.01	24	CT	Curry IV #12	7/71/8	Low-Moderate	< 12	< 19	Yes
15.02	38	CT	Curry IV #12	7/71/8	Moderate	< 12	< 19	Yes
15.03	41	CT	Curry IV #11	71/8	Moderate	< 13	< 20	Yes
16.01	57	JR		8/81C85/85C87	Low-Moderate			
16.02	62	PCT		8/81C85/85C87	Low-Moderate			
16.03	4	PCT		81C85/85C87	Low-Moderate			
16.04	6	JR		81C85/85C87	Low-Moderate			
16.05	1	JR		81C85	Low-Moderate			
16.06	3	JR		8/85C87	Low-Moderate			
16.07	65	JR		68/71/8/81C85/85C87	Low-Moderate			
16.08	129	JR		81C85/85C87	Low-Moderate			
17.01	85	CT*		41/43C44/71C74	Moderate	< 10	< 17	Yes
17.02	62	PCT		43C44/7/71C74	Moderate	< 12	< 19	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
17.03	8	IT*	Burnt 1	3/41/43C44	Low-Moderate	5	10-12	Yes
17.04	36	-			Moderate	8	13-15	Yes
17.05	34	CT	Burnt 2	43C44/7/71C74	Moderate	3	8-10	Yes
17.06	5	JR		71C74	Low-Moderate	< 10	< 17	Yes
17.07	8	PCT		7/71C74	Moderate	< 10	< 17	Yes
17.08	15	IT*		7/71C74	Low	< 10	< 17	Yes
17.09	16	PCT		71C74	Low-Moderate	< 10	< 17	Yes
17.1	1	IT		43C44/71C74	Low	****		
17.11	32	CT	Burnt 1	3/41/81C85	Low-Moderate	5	10-12	Yes
18.01	38	CT*	Burnt 3	3/81C85	Moderate	19	24-26	No
18.02	10	PCT		65/81C85	Moderate	< 11	< 18	Yes
18.03	96	IT*		65/71/81C85	Low	< 10	< 17	Yes
18.04	35	IT*		65/71/81C85/9	Moderate	< 10	< 17	Yes
18.05	60	CT		71	Moderate	< 10	< 17	Yes
18.07	33	CT		71/9	Low	9	14-16	Yes
18.08	31	PCT		7/71/81C85/9	Low-Moderate			
19.01	30	CT	Burnt 8	65/71	Moderate	8	13-15	Yes
19.02	54	PCT		65/71	Moderate	9	14-16	Yes
19.03	46	CT*		71	Moderate	<12	< 19	Yes
19.04	82	CT*	Burnt 8	65/71/74	Moderate	8	13-15	Yes
19.05	15	CT*	Burnt 9	71/74C77	Low	<12**	< 19	Yes
19.06	56	IT*	Burnt 6	3/65/71/73	Low-Moderate	3	8-10	Yes
19.07	81	CT*		71/73/74C77	Low-Moderate	< 12	< 19	Yes
19.08	37	PCT		71/74C77	Low-Moderate	< 13	< 20	Yes
19.09	48	CT*		65/71/74	Low-Moderate	****		
20.01	52	CT*		65/71/74	Low-Moderate	****		
20.02	131	CT*	Burnt 5	3/71/74	Moderate	10	15-17	Yes
20.03	39	CT*	Burnt 5	3/71/74C77	Low	2-10**	7-17	Yes
20.04	47	PCT		71/74/74C77	Moderate	< 12	< 19	Yes
20.05	52	CT*	Burnt 4	71/74C77/9	Low	< 12**	< 19	Yes
20.06	14	CT*		71/9	Low	****		

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
20.07	19	PCT		71/9	Low	< 10	< 17	Yes
20.08	41	CT		71/74	Low-Moderate	****		
21.01	35	CT	Burnt 13	71/74	Low-Moderate	< 11	< 18	Yes
21.02	28	CT*	Burnt 13	68/71/74	Low-Moderate	< 11	< 18	Yes
21.03	13	CT*		68/71/74/74C77	Low-Moderate	****		
21.04	31	PCT		68/71/74	Low	< 11	< 18	Yes
21.05	57	CT*	Burnt 12	71/74	Moderate	4	9-11	Yes
21.06	86	CT*	Burnt 12	68/71	Moderate	4	9-11	Yes
21.07	27	CT*	Burnt 10	71/74C77	Moderate	< 12	< 19	Yes
21.08	55	CT*	Burnt 11	68/71	Low	4-8**	9-15	Yes
21.09	32	CT*	Burnt 11	71/74	Low	8	13-15	Yes
21.1	49	CT*		68/7/71/73/74	Low	****		
21.11	31	CT*		68/71/74C77	Low-Moderate	< 12	< 19	Yes
21.12	25	JR		71/74C77	Low			
22.01	100	IT*		65/71/73/9/9X	Low-Moderate	****		
22.02	103	IT*	Burnt 7	65/71/73/81C85	Low-Moderate	< 12	< 19	Yes
22.03	11	PCT		65/81C85	Low-Moderate			
22.04	30	IT*	Mud #25	65/81C85	Low-Moderate	< 12	< 19	Yes
22.05	35	IT*	Mud #25	65/81C85	Low-Moderate	< 12	< 19	Yes
22.06	69	PCT		65/73/81C85	Low-Moderate			
23.01	128	CT	Mud #22	43C44/46C47/65/81C85	Low	< 13	< 20	Yes
23.02	17	IT*	Mud #21	65	Low-Moderate	< 11	< 18	Yes
23.03	57	IT*	Mud #20	65/81C85	Low	< 10	< 17	Yes
23.04	26	IT*	Mud #20	81C85/85C87	Low	< 10	< 17	Yes
23.05	6	JR		81C85	Low-Moderate			
23.06	33	IT*	Mud #21	65/81C85/85C87	Low-Moderate	6	11-13	Yes
23.07	95	IT*	Mud #21	43C44/65/81C85	Low	8	13-15	Yes
24.01	45	IT*		65/71/81C85	Low	< 12	< 19	Yes
24.02	39	PCT		65/81C85	Moderate			
24.03	23	IT*	Mud #25	65/81C85	Low-Moderate	< 12	< 19	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
24.04	117	IT*		81C85	Low-Moderate	< 12	< 19	Yes
24.05	28	IT*	Mud #24	81C85	Low	2	7-9	Yes
24.06	33	IT*	Mud #24	3/81C85	Low-Moderate	8	13-15	Yes
24.07	14	IT*	Mud #24	3/81C85	Low-Moderate	< 12	< 19	Yes
24.08	16	IT*	Mud #24	3/81C85	Low-Moderate	< 12	< 19	Yes
24.09	46	IT*	Burnt 3	3/81C85	Moderate	19	24-26	No
24.11	125	IT*		3/41/43C44/46C47/65 /81C85	Low	< 12	< 19	Yes
24.12	57	PCT		65/81C85				
24.13	7	IT*	Mud #23	81C85	Low	< 12	< 19	Yes
24.14	20	PCT		65/81C85	Low-Moderate			
24.15	16	JR		43C44/46C47/81C85	Moderate	< 11	< 18	Yes
24.16	2	JR		46C47/81C85	Moderate	< 11	< 18	Yes
24.17	6	PCT	Burnt 1	46C47/81C85	Low-Moderate	5	10-12	Yes
24.18	19	CT	Burnt 1	41/46C47/81C85	Low-Moderate	5	10-12	Yes
24.19	6	JR		46C47	Moderate	< 10	< 17	Yes
24.2	1	IT*		41/43C44/46C47	Low	****		
24.21	40	PCT		43C44/46C47/65	Moderate	< 11	< 18	Yes
24.22	4	JR		43C47	Low-Moderate	< 11	< 18	Yes
24.23	11	JR		43C44/46C47	Low-Moderate	< 11	< 18	Yes
24.24	10	PCT		43C44/46C47/65	Low-Moderate	< 12	< 19	Yes
24.25	73	IT*	Mud #17	65/81C85	Low	< 12	< 19	Yes
24.26	287	IT*		65/71/81C85	Low	< 12	< 19	Yes
24.27	50	IT*	Mud #18	65/81C85	Low-Moderate	9	14-16	Yes
24.28	34	PCT		65	Moderate			
24.29	87	CT*	Mud #19	65/81C85	Low	< 13	< 20	Yes
24.3	38	PCT		81C85	Moderate			
24.31	3	PCT	Mud #19	81C85	Low-Moderate			
24.32	52	IT*	Mud #19	81C85	Low-Moderate	< 11	< 18	Yes
24.33	13	IT*	Mud #24	81C85	Low-Moderate	< 12	< 19	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
24.34	10	PCT		65	Moderate	3	8-10	Yes
24.35	24	PCT		65	Moderate	< 10	< 17	Yes
24.36	39	PCT		65/81C85	Moderate			
24.37	15	IT*	Mud #19	65/81C85	Moderate	< 13	< 20	Yes
24.38	27	PCT		65	Moderate	5	10-12	Yes
24.39	25	IT*		65/81C85	Moderate	< 10	< 17	Yes
24.4	9	JR		65/81C85	Low-Moderate			
24.41	25	IT*	Mud #18	65/81C85	Low-Moderate	< 10	< 17	Yes
24.42	28	IT*		65/81C85	Low-Moderate	3	8-10	Yes
24.43	44	IT*	Mud #17	65/71	Low-Moderate	< 12	< 19	Yes
24.44	60	IT*	Mud #17	65/71/74	Low-Moderate	3	8-10	Yes
24.45	33	IT*		81C85	Low-Moderate	< 12	< 19	Yes
24.46	21	IT*		81C85	Low-Moderate	< 11	< 18	Yes
24.47	51	IT*	Mud #16	81C85	Low-Moderate	< 11	< 18	Yes
24.48	10	JR		81C85	Low-Moderate			
24.49	19	CT	Mud #16	81C85	Low-Moderate	< 10	< 17	Yes
24.51	23	CT	Mud #16	81C85	Low	< 10	< 17	Yes
24.52	15	IT*		46C81/81C85	Low-Moderate	< 11	< 18	Yes
24.53	42	IT*	Mud #15	65/81C85	Low-Moderate	< 10	< 17	Yes
24.54	8	IT*	Mud #15	65/81C85	Low-Moderate	< 10	< 17	Yes
24.55	20	IT*	Mud #15	48/65/81C85	Low	< 11	< 18	Yes
24.56	52	IT*	Mud #15	46C81/48/81C85	Low	****		
24.57	68	IT*	Mud #15	42/46C81/48/65	Low	< 11	< 18	Yes
25.01	22	IT*		68/71/8/9	Low-Moderate	****		
26.01	58	PCT		71C74/71C75	Low	5	10-12	Yes
26.02	97	IT*	Dry #12	71C74/71C75	Low	10	< 17	Yes
26.03	35	PCT		71C74/71C75	Low			
26.04	67	IT*	Dry #11	71C74/71C75	Low	< 12	< 19	Yes
26.05	41	PCT		71C74/71C75	Low-Moderate	8	13-15	Yes
26.06	62	IT*	Dry #11	71C74/71C75	Low	3-19**	8-26	No
26.07	3	-	Dry #11		Low-Moderate	< 10	< 17	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
26.08	10	PCT		71C74/71C75	Low	< 13**	< 20	Yes
26.09	94	IT*	Dry #11	71C74/71C75	Moderate	< 10	< 17	Yes
27.01	76	IT*	Dry #10	71C75	Low-Moderate	10	15-17	Yes
27.02	131	IT*	Dry #13	71C75	Low	< 12	< 19	Yes
27.03	99	PCT		71C74/71C75	Low-Moderate	8	13-15	Yes
27.04	92	IT*	Dry #13	71C75/9	Low	2	7-9	Yes
27.05	37	IT*	Dry #13	71C75/74C77	Low	< 12	< 19	Yes
27.06	44	IT*		71C74/71C75	Low	< 10	< 17	Yes
27.08	112	IT*	Dry #13	71C74/71C75/74C77	Low	< 10	< 17	Yes
27.09	19	JR		71C75/74C77	Low	< 10	< 17	Yes
27.1	101	CT*	Dry #14	71C75/74C77	Low-Moderate	0	5-7	Yes
27.11	45	IT*	Dry #13	71C75	Low-Moderate	0	5-7	Yes
27.12	108	IT*	Dry #10	71C75	Low-Moderate	10	15-17	Yes
27.13	12	PCT		71C75	Low-Moderate	9	14-16	Yes
27.14	4	PCT		71C75	Low-Moderate	13***	18-20	Yes
27.15	5	PCT		71C75	Low-Moderate	13***	18-20	Yes
27.16	9	JR		71C75	Low-Moderate	< 10	< 17	Yes
28.01	12	PCT		71C75	Low-Moderate	< 13	< 20	Yes
28.02	64	IT*	Dry #9	71C75/74	Low-Moderate	< 10	< 17	Yes
28.03	13	PCT		71C75	Low-Moderate	< 10	< 17	Yes
28.04	228	IT*	Dry #8	71C75/74	Moderate	< 10	< 17	Yes
28.05	54	IT*	Dry #9	71C75/74	Low	< 10	< 17	Yes
29.01	126	IT*	Dry #7	42C48/71C75/9	Low	< 10	< 17	Yes
29.02	42	IT		42C48/58/9	Low-Moderate	11	16-18	Yes
29.03	44	IT*	Dry #7	42C48/58/9	Moderate	< 10	< 17	Yes
30.01	334	IT*	Dry #1	3/41C42/41C68/65C82/68C83	Moderate	< 10	< 17	Yes
30.02	307	IT*	Dry #2	3/42/65C82/68C83	Moderate	< 10	< 17	Yes
30.03	253	IT*	Dry #3	3/41/42/42C58/68C83	Low-Moderate	13-19**	18-26	No

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
30.05	185	P&P*		3/42/65C82/68C83	Moderate	< 10	< 17	Yes
30.06	120	P&P*		41/41C42/42C48/42C58/43/68C83	Moderate	< 10	< 17	Yes
31.01	172	IT*	Dry #4	41/42C58	Moderate	< 12	< 19	Yes
31.02	49	IT*	Dry #5	41/42	Low	< 13	< 20	Yes
31.03	82	IT*	Dry #6	42/42C58	Low-Moderate	10-13**	15-20	Yes
31.04	183	IT*	Dry #6 & Mud #7	41C42/42/42C48/42C58/71C75	Low	30**	35-37	No
31.05	44	P&P*		41C42/42	Low-Moderate	****		
31.06	85	IT*	Mud #1	41/41C42/42	Low-Moderate	< 12	< 19	Yes
31.07	102	P&P*		41/41C42/42/42C48	Moderate	< 12	< 19	Yes
31.08	49	IT*	Mud #12	41C42/42C48/71C75	Moderate	< 11	< 18	Yes
31.09	80	IT*	Mud #7	41C42/42C4842C58	Low	< 12	< 19	Yes
31.1	164	IT*	Dry #6 & Mud #11	41/42/42C48/42C58/71	Moderate	< 11	< 18	Yes
31.11	12	PCT		41C42/42				
32.01	92	CT*	Mud #3	3/41/42	Moderate	0	5-7	Yes
32.02	125	IT*	Mud #3 & Mud #4	3/41/42/47C85	Low	> 30	> 37	No
32.03	2	IT		41	Low	****		
32.04	52	CT*	Mud #5	41	Low	3-4**	8-11	Yes
32.05	71	IT*	Mud #5	41	Low	3	8-10	Yes
32.06	17	IT*	Mud #3	41/42	Low-Moderate	2	7-9	Yes
32.07	11	IT*	Mud #2	42	Moderate	0	5-7	Yes
32.08	87	IT*	Mud #9	3/41/41C42/48	Moderate	< 11	< 18	Yes
32.09	217	IT*	Mud #10	3/41C42/42C48/47C85/48/65/71	Low	< 13	< 20	Yes
32.1	59	-						
33.01	49	IT*	Mud #12	42C48/71C75	Low	< 10	< 17	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
33.02	17	IT*	Mud #12	41C42/42C48/71C75	Moderate	< 16	< 23	No
33.03	59	IT*	Mud #12	3/41C42/42C48	Moderate	< 10	< 17	Yes
33.04	67	PCT		3/41C42	Moderate	5**	10-12	Yes
33.05	40	PCT		42C48	Low-Moderate	3-9**	8-16	Yes
33.06	47	IT*	Mud #12	41C42/42C48	Low	4	9-11	Yes
33.07	44	PCT		41C42/42C48	Moderate	5**	10-12	Yes
33.08	53	IT*	Mud #11	41C42/42C48	Moderate	< 12	< 19	Yes
33.09	47	PCT		41C42/42C48	Moderate	6	11-13	Yes
33.1	74	IT*	Mud #13	3/41C42/42C48	Moderate	14	19-21	No
33.11	54	PCT		42C48	Moderate	6	11-13	Yes
33.12	34	IT*	Mud #14	42C48/75	Moderate	< 10	< 17	Yes
33.13	117	IT*	Mud #14	42C48/65/75	Moderate	< 10	< 17	Yes
33.14	60	IT*	Mud #14	65	Low	< 13	< 20	Yes
33.15	54	IT*	Mud #14	65/75	Low	11	16-18	Yes
33.16	61	IT*	Mud #14	3/65/75/9	Low	< 20	< 27	No
33.18	146	IT*	Mud #6 & Mud #8	41/41C42/42C48	Moderate	< 13	< 20	Yes
33.19	61	IT*	Mud #12	41C42/42C48	Low-Moderate	< 10	< 17	Yes
33.2	80	IT*	Mud #12	41C42/42C48	Low	< 12	< 19	Yes
34.01	166	PCT		71/75	Low-Moderate			
35.01	593	PCT		3/44/44C85/48C82/71/81C82	Low-Moderate			
35.02	5	JR		44/81C82	Low-Moderate			
35.03	7	JR		44C85/81C82	Low-Moderate			
35.04	7	JR		44/81C82	Low-Moderate			
35.05	3	JR		81C82	Low-Moderate			
36.01	119	IT*	Curry IV #5	41C44/42/46C81/71	Low-Moderate	< 10	< 17	Yes
36.02	68	IT*	Curry IV #6	46C81/48/81C85	Moderate	< 10	< 17	Yes
36.03	63	IT*	Curry IV #6	41C81/46C47/46C81/48	Moderate	< 11	< 18	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
36.04	25	JR		41C81/46C47/46C81	Low-Moderate			
36.05	36	IT*	Curry IV #5	46C47/46C81	Low	< 11	< 18	Yes
36.06	62	IT*	Curry IV #5	41C44/41C81/46C47/ 46C81/71	Moderate	< 12	< 19	Yes
36.07	46	IT*	Curry IV #5	41C81/46C47/71	Moderate	< 12	< 19	Yes
36.08	23	IT*	Curry IV #2	41C46/41C81/46C47	Low	< 13	< 20	Yes
36.09	24	PCT		41C46/41C81/46/46C 47	Low-Moderate			
36.1	35	IT*	Curry IV #5	41C81/46C47/71	Low	< 12	< 19	Yes
36.11	16	IT*	Curry IV #5	41C81/46C47	Moderate	< 12	< 19	Yes
36.12	25	JR		41C81/46C47	Low			
36.13	41	IT*	Curry IV #3	41C46/41C81/46/46C 47	Low-Moderate	< 12	< 19	Yes
36.14	26	IT*	Curry IV #3	1/41C46/46	Low	< 12	< 19	Yes
36.15	51	IT*	Curry IV #3	1/41/41C46/46C47	Low-Moderate	< 12	< 19	Yes
36.16	15	IT*	Curry IV #4	1/41C42	Moderate	< 11	< 18	Yes
36.17	28	IT*	Curry IV #7	41C81/46/81C85	Low	3	8-10	Yes
36.18	95	IT*	Curry IV #8 & Curry IV #9	68/81C85	Low	3-6**	8-13	Yes
36.19	87	IT*	Curry IV #6	46C81/81C85	Low-Moderate	< 12	< 19	Yes
36.2	70	IT*	Curry IV #6	81C85	Moderate	< 10	< 17	Yes
36.21	22	IT*	Curry IV #6	81C85	Moderate	< 10	< 17	Yes
37.01	36	IT*	Mud #15	42/65	Low	< 11	< 18	Yes
37.02	82	IT*	Mud #15	65/71/74	Low	< 11	< 18	Yes
38.01	51	IT*	Curry IV #1	41C46/46C47/48C82/ 81C82	Low	7	12-14	Yes
38.01a	15	JR			Low			
38.02	19	IT*	Curry IV #1	46C47/48C82	Low	< 13	< 20	Yes
38.03	6	IT*	Curry IV #1	46C47/48C82	Low	< 10	< 17	Yes

Stand #	Acres	Preferred Alternative Treatment	Harvest Unit	Soil Mapping Unit	Subsoiling Potential	Existing Detrimental Conditions (%)	Detrimental Conditions (%) Expected After Implementation	Post Treatment Conditions Expected to Meet Standards
38.04	9	JR		46C47	Low			
38.05	2	JR		41C46/46C47	Low			
39.01	198	PCT		68/71/73/74/8	Low-Moderate			
40.01	468	PCT		7/71/74/87/9/9X	Low			
41.01	258	PCT		7/71/73/74/8/87/9/9X	Low	< 11	< 18	Yes

* Following the primary treatment, the unit (or part of the unit) would be precommercial thinned. If a primary treatment is not economically viable than the unit would be precommercial thinned.

** Two or more separate estimates were made on this stand.

*** Data does not account for % of unit in roads and landings. Assume at least an additional 2% in roads and landings.

**** No data for these stands.

Soils

The Soil Resource Inventory for the Malheur National Forest was consulted to determine what soils may be encountered within the project area. Soils and parameters of concerns are listed on the following table.

Soil Unit	Erosion Potential	Cut slope Erosion Potential	Fill slope Erosion Potential	Road Surface Erosion Potential	Compaction Hazard	Mixing and Displacement
1	L	L	L-M	L	H	L
3	L	L	L-M	L	H	L
5	L	M	M	M-H	L	H
7	H	N/R	L	M	L	M
8	H	M	M	M	L-M	M
9	VH	H	H	M	L	M
41	L-M	L	M	M	M-H	L-M
42	L-M	L	M	M	L-M	M
43	H	M	M	M	M-H	L-M
44	H	L	L	L	L-M	L-M
46	M	L	L	L	L-M	L-M
47	M	N/R	L	L	L	L-M
48	H-VH	M	M	M-H	L-M	M
58	M	M	H	H	L	H
65	H-VH	M	M	H	L	H
68	M-H	M	M	M-H	L	M-H
71	L	L	M	M-H	L	M
73	H	L	L	L	L	M
74	M	L	L	L	L	M
75	M	M	M	M-H	L	M
77	L	N/R	L	L	L	L
81	L-M	M	M	M	H	L
82	L-M	M	M	M	Sur –L Sub - H	Sur – M Sub – L
83	M	M	H	M-H	Sur – L Sub - H	Sur – H Sub – L
85	M	L	L	L-M	H	L
87	H	L	L	L-M	H	L

L= Low, M = Moderate, H =High. VH = Very High, N/R = No Rating

Soils Constraints

Loamy and Clayey soils - any ground disturbance that removes the groundcover can cause unacceptable accelerated erosion.

Loamy soils - Minimize amount of disturbed area; maintain revegetation/erosion control measures current with operations. Soils in this group generally have southerly aspects, which can create excessively high surface soil temperatures if excessive amounts of vegetation and litter are removed. This can create regeneration and revegetation problems.

Clay soils - Avoid when wet, keep erosion control measures current.

Ash Soils - If the vegetative cover and litter are removed or broken up; and if water is then allowed to concentrate, excessive erosion can occur. Avoid when wet, keep erosion control measures current.

Soils Definitions

Surface Soil Erosion Potential. This rating is based on expected losses of surface soil when all vegetative cover, including litter, is removed.

> Low - Little or no loss of soil materials is expected. Some minor sheet and rill erosion may occur.
>
> Moderate - Some loss of surface soil materials can be expected. Rill erosion and some small gullies or sheet erosion may occur. Sheet erosion is indicated by some soil pedestals and observable accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a probable fertility loss.
>
> High - Considerable loss of surface soil materials can be expected. Rill erosion, numerous small gullies or evidence that considerable loss from sheet erosion may occur. Sheet erosion is indicated by frequent occurrence of soil pedestals and considerable accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a fertility loss.
>
> Very High - Large loss of surface soil material can be expected in the form of large losses from sheet erosion, numerous small gullies and rills or large gullies. Sheet erosion loss is exhibited by numerous examples of soil pedestals and extensive accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a fertility loss.

Cut Slope Erosion Potential. This rating predicts the potential of soils exposed in a road cut to erode without erosion control measures.

> Low – Factors indicate little erosion is likely to occur.
>
> Moderate – Factors indicate that a moderate amount of erosion can be expected.
>
> High – Factors indicate that a large amount of erosion can be expected.

Fill Slope Erosion Potential. This rating predicts the potential of soil material on a fill slope to erode without erosion control measures.

Low – Factors indicate little erosion is likely to occur.

Moderate – Factors indicate that a moderate amount of erosion can be expected.

High – Factors indicate that a large amount of erosion can be expected.

Road Surface Erosion Potential. This rating predicts the erosion potential on unsurfaced roads with grades less than 10 percent.

Low – Factors indicate little erosion is likely to occur. Much of the road running surface is coarse rock fragments.

Moderate – Factors indicate that a moderate amount of erosion can be expected.

High – Factors indicate that a large amount of erosion can be expected. Most of the running surface is highly erodible soil material.

Compaction Hazard. This is a relative prediction of soil behavior under the physical influences of foot, hoof, vehicular, or log traffic. It is a combined rating of the length of time that a soil is at optimum moisture for compaction and the comparative force necessary to get compaction.

Low – Factors indicate that detrimental compaction will be a minor problem.

Moderate – Factors indicate that compaction will be a problem in the spring and early summer.

High – Factors indicate that compaction will be a problem for a large part of the spring and summer.

Mixing and Displacement. This interpretation rates the land type as to the ease with which its soil material can be loosened and moved after its vegetation and litter are removed. Mixing and displacement can be done by hoof, foot, vehicular, or log traffic.

Low – Factors indicate that these soils are not easy to loosen and/or dissipate.

Moderate – Factors indicate that these soils are moderately easy to loosen and dissipate.

High – Factors indicate that these soils are easy to loosen and/or dissipate.

General Land type Description of Each Soil Unit.

1 Typically occurs along stream bottoms and large springy areas. These areas remain wet throughout the year. These soils may have a surface peat layer or are high in organic matter and are generally more

than 36 inches deep. Soil textures include silt loams to clay loams, silty clay loams and some clays. Nebraska sedge, Ovalhead sedge and bentgrass are the dominant grass and sedges on this mapping unit.

3 Typically occurs along stream bottoms and other areas that are wet for a portion of the summer. These areas may or may not be sub-irrigated during the growing season. The surface soils are generally high in organic matter. Soil texture ranges from silt loams to loams to clay loams and some clays. Soil depth is greater than 24 inches. Dominant vegetation is Kentucky bluegrass and tufted hairgrass.

5 Typically occurs in areas that have am accumulation of recent volcanic ash in cold air settlement areas. These areas occur around meadow areas, in depression or basin-like areas, and along stream bottoms. Dominant vegetative types are lodgepole pine and grouse huckleberry, which are cold soil indicator species.

7 Generally occurs on slopes with a south aspect. Soil texture varies from loam to clay. Dominant vegetation consists of juniper, scattered ponderosa pine, big sagebrush, low sagebrush, mahogany, fescue, wheatgrass, and sandberg bluegrass.

8 Generally occurs on slopes with a south aspect. Bedrock is generally highly stratified and variable. Soil texture varies from loam to clay. Dominant vegetation consists of ponderosa pine, fescue, elk sedge, wheatgrass and sandberg bluegrass.

9 Occurs on slopes with a variable aspect. The soils generally have an 8 to 12 inch recent volcanic ash surface layer over a variety subsurface material. Bedrock is generally highly stratified and variable. Dominant vegetation is ponderosa pine, white fir, douglas fir, pinegrass and elk sedge.

41 Typically occurs on upland flats and side slopes with a southerly aspect. It supports ponderosa pine with a groundcover of elk grass, wheatgrass, fescue, and sandberg bluegrass.

42 Occurs on upland flats and side slopes. It supports ponderosa pine, douglas fir, and white fir with a groundcover of elk sedge and pinegrass.

43 Occurs on steep southerly facing side slopes. It supports ponderosa pine with a groundcover of elk sedge, wheatgrass, fescue, and sandberg bluegrass.

44 Occurs on steep side slopes. It supports juniper, mahogany and big sagebrush, with a groundcover of wheatgrass, fescue, and sandberg bluegrass.

46 Occurs on upland flats and side slopes. It supports juniper, mahogany, few ponderosa pine and big sagebrush with a groundcover of sandberg bluegrass and wheatgrass.

47 Occurs on upland flats and side slopes. It supports stiff and low sagebrush with a groundcover of wheatgrass and sandberg bluegrass.

48 Typically occurs on steep side slopes with variable aspect. It supports ponderosa pine, douglas fir and white fir with a groundcover of elk sedge and pinegrass.

58 Typically occurs on upland flats and side slopes with gradients less than 30 percent. It supports white fir, douglas fir, larch, and lodgepole pine with a groundcover of huckleberry, pinegrass, and Columbia brome.

65 Occurs on upland flats and side slopes. It supports ponderosa pine, douglas fir, and white fir with a groundcover of pinegrass and elk sedge.

68 Occurs on southerly facing upland flats and side slopes. It supports ponderosa pine with a groundcover of fescue, elk sedge, wheatgrass, and sandberg bluegrass.

71 Occurs on upland flats. It supports ponderosa pine and bitterbrush with a groundcover of ross sedge, elk sedge, fescue, and wheatgrass.

73 Occurs on steep exposed side slopes with a variable aspect. It supports juniper, mahogany, big sagebrush, scattered ponderosa pine and a of wheatgrass, fescue and sandberg bluegrass.

74 Occurs on upland flats. It supports juniper, mahogany, big sagebrush, scattered ponderosa pine and a groundcover of wheatgrass, fescue and sandberg bluegrass.

75 Occurs on upland flats. It supports ponderosa pine, douglas fir, white fir with a groundcover of elk sedge and pinegrass.

77 Occurs on upland flats. It supports low and stiff sagebrush and sandberg bluegrass.

81 Typically occurs on upland flats, side slopes, and toe slopes with slope gradients les than 30 percent. It supports ponderosa pine with a groundcover of fescue, elk sedge, and pinegrass.

82 Typically occurs on upland flats, side slopes, and toe slopes with gradients less than 30 percent. It supports ponderosa pine, douglas fir, and white fir with a groundcover of pinegrass and elk sedge.

83 Typically occurs on upland flats and northerly-facing side slopes with gradients less than 40 percent. It supports white fir, douglas fir, larch, and lodgepole pine with a groundcover of huckleberry, pinegrass, and Columbia brome.

85 Occurs on upland flats and side slopes. It supports juniper, scattered ponderosa pine, low sagebrush, fescue, wheatgrass, and sandberg bluegrass.

87 Typically occurs on steep side slopes with gradients of 30 to 70 percent. It supports juniper, scattered ponderosa pine, low sagebrush, fescue, wheatgrass, and Sandberg bluegrass.

SOIL DISTURBANCE ASSESSMENT
Malheur National Forest

Draft September 19, 2002

The objectives of this paper are: 1) Establish consistency in soil assessment methods on the Malheur National Forest and across the Blue Mountains (Wallowa-Whitman and Umatilla National Forests) and 2) Ensure compliance with the Forest's Land and Resource Management Plan and FSM (Forest Service Manual) 2520.3. Testing of this interim assessment protocol will occur during the next several months, with revisions made if necessary.

This protocol describes how to assess existing condition of soils in areas where proposed or current management activities have the potential to affect the soil resource, with emphasis on those areas receiving mechanical treatments. Summaries and interpretations of soil management direction in the Forest Land and Resource Management Plan and FSM 2500.98-1 are also given.

Background and Direction

The Malheur and Ochoco National Forests Land and Resource Management Plans and FSM 2520.3 provide direction for the management of soils within activity areas. This direction is summarized below, with interpretations and recommendations.

FSM 2520.3-1: Design new activities that do not exceed detrimental soil conditions on more than 20 percent of an activity area. (This includes the permanent transportation system.)

> Interpretation: Refers to proposed activities in areas that have not been managed or disturbed. New management activities cannot exceed detrimental soil conditions on more than 20 percent of an activity area.
>
> Recommendation: Design activities that result in less than 20 percent detrimental soil disturbance.

FSM 2520.3-2: In areas where less than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 20 percent.

> Interpretation: Refers to areas that have been managed in the past and show obvious signs of detrimental soil conditions. Activities that temporarily result in more than 20 percent detrimental soil conditions are allowed if restoration activities result in a net reduction in detrimental soil conditions back below 20 percent.
>
> Recommendation: If restoration activities are required to meet soil quality standards, then site-specific prescriptions must be written by a qualified soil scientist (or other resource professional), based on evaluation of on-site soil conditions. Restoration prescriptions should be considered as part of an overall management strategy for the activity area(s). Emphasize long-term maintenance or improvement of soil quality in light of the resource needs and management objectives of the site.

<u>FSM 2520.3-3:</u> *In areas where more than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects of project implementation, and restoration must, at a minimum, not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality.*

> Interpretation: Refers to areas that have been impacted in the past and show obvious signs of detrimental soil conditions on more than 20 percent of the activity area. Activities that result in additional soil disturbance is allowed if restoration activities result in a net reduction in detrimental soil conditions, or at a minimum do not exceed the conditions prior to the activity. Management activities should not be precluded in activity areas that exceed the 20 percent standard.
>
> Recommendation: If restoration activities are required to meet soil quality standards, then site specific prescriptions must be written by a qualified soil scientist (or other resource professional), based on evaluation of on-site soil conditions. Restoration prescriptions should be considered as part of an overall management strategy for the activity area. Emphasize long-term maintenance or improvement of soil quality in light of the resource needs and management objectives of the site. Restoration does not necessarily have to achieve a goal of 20% or less detrimental soil conditions.

<u>Forest Plan Standard:</u> *The total acreage of all detrimental soil conditions shall not exceed 20% of the total acreage within any activity area, including landings and system roads. Consider restoration treatments if detrimental conditions are present on 20% or more of the activity area. Detrimental soil conditions include compaction, puddling, displacement, and severely burned soil, and surface erosion.*

Interpretation: It is permissible to enter areas where detrimental soil conditions exceed 20 percent of the total acreage within the activity area. However, several stipulations must be met. First, an acceptable analysis of existing soil conditions needs to be made. This not only includes an assessment of soil disturbance, but also a determination of what kinds of soils exist within the activity area. Based on soil capability, site-specific restoration prescriptions can be developed. These should include an estimated timeline for achieving restoration objectives. The forest plan standard lacks specificity in terms of existing and proposed conditions, and is more general than the FSM direction.

Recommendation: Rely on the FSM for more specific direction.

The following is a short step-by-step summary of the current Soil Disturbance Assessment used by the Malheur National Forest.

<table>
<tr><th>STEP</th><th>DESCRIPTION</th></tr>
<tr><td>1</td><td>Obtain timber sale area maps or ortho/aerial photographs of the project area/watershed.</td></tr>
<tr><td>2</td><td>On the map or orthophoto's, stratify the planning area or watershed into areas having the highest probability of soil impacts exceeding 20% (high level of concern related to existing conditions) and areas thought to have impacts less than 20% (low level of concern related to existing conditions).
Use the District's activity (harvest and thinning) and/or Silvicultural Activity Tracking (SAT) GIS layers to aid in mapping "high level of concern" areas.
"High level of concern" areas can also be mapped by means of photo interpretation – look for changes in canopy density as well as on-the-ground impacts such as skid trail, landings, etc.
Digitize polygons to create a GIS layer.</td></tr>
<tr><td>3</td><td>Assess the potential for soil impacts based on proposed management activities and soil type (see Soil Resource Inventory). For instance, categorize potential impacts into low (e.g. helicopter or skyline), moderate (e.g. cut-to-length forwarding system), and high (e.g. skidding or machine piling).</td></tr>
<tr><td>4</td><td>Prioritize units using the conceptual model shown in <u>Attachment 2</u>. If time is available, sample all "high priority" areas and at least 15% of the "low and medium priority" areas (a minimum of 5 units sampled). If time is limited, randomly select 50% of the "high priority" units in each soil group with a minimum of 10 units being sampled.</td></tr>
<tr><td>5</td><td>Sample the appropriate units and categorize the soil conditions using the Soil Class Disturbance Definitions <u>(Attachment 3)</u> and the Soil Survey Data Forms <u>(Attachments 4)</u>. When calculating the percentage of an activity area that contains detrimental soil conditions, use the percentage of points designated as Class 2 and Class 3. A soil scientist or other properly trained individual can complete the soil disturbance survey, however, a soil scientist will determined the sampling method. Do not sample non-forest inclusions. The following methods should be considered based on the quantity and quality of data desired.
Statistical Point Sampling Method: See Howes, S., Hazard, J., and Geist, J. 1983. Guidelines for Sampling Some Physical Conditions of Surface Soils. R6-RWM-146-1983, p. 5-6. Sampling intensity should be 5 20-point transects per 10 acres, all random. This is an average of 10 data points per acre.
Random Points: A minimum of 2 random data points per acre, with a minimum of 30 data points per analysis area.
Transects: A minimum of 1 transect across a representative section of an analysis area (this is not a statistical sample). From the beginning of the transect walk in a straight line sampling every 4-5 feet (1 pace). If possible, starting and ending points for each transect should be identified spatially with a GPS. Collect a minimum of 200 points along each transect. Record soil impacts at each sampling point based on Attachment 3. Definitions of compaction, displacement, erosion, puddling, and severely burned can be found in <u>Attachment 1</u>. Find a "no impact" area to calibrate your foot/sharpshooter or penetrometer (e.g. under a large tree, etc.). Also, find an obvious skid trail or landing to get a feel for detrimental compaction.</td></tr>
</table>

Attachment 1
Description of Detrimental Soil Conditions[1]

Detrimental Compaction – An increase in soil bulk density of 20 percent, or more, over the undisturbed level for volcanic ash soils. For all other soils it is an increase in soil bulk density of 15 percent, or more, over the undisturbed level. Assess changes in compaction by sampling bulk density, macro porosity, or penetration resistance in the zone in which change in relatively long term and that is the principal root development zone. This zone is commonly between 4 to 12 inches in depth.

Detrimental Displacement – The removal of more than 50 percent of the topsoil or humus enriched A horizon from an area of 100 square feet, or more, which is at least 5 feet in width.

Detrimental Puddling – When the depth of ruts or imprints is 6 inches or more. Soil deformation and loss of structure are observable and usually bulk density is increased.

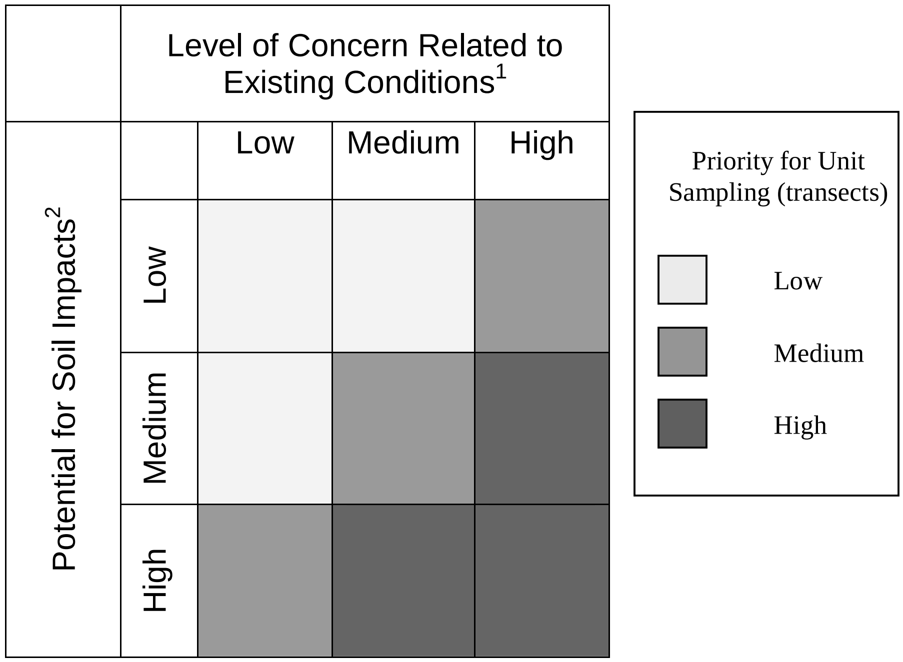
Detrimental Surface Erosion – Visual evidence of soil loss in areas greater than 100 square feet, rills or gullies and/or water quality degradation from sediment or nutrient enrichment.

Detrimental Burned Soil – Top layer of mineral soil has been significantly changed in color, oxidized to a reddish color, and the next one-half inch blackened from organic matter charring by heat conducted through the top layer. The detrimentally burned soil standard applies to an area greater than 100 square feet, which is at least 5 feet in width.

[1]FSM 2500 – Watershed and Air Management R-6 Supplement 2500-98-1

Attachment 2

Unit Prioritization Model



[1]Judgement call based on Step 2 of the Assessment
[2]Judgement call based on the potential for soil impacts

Attachment 3
Soil Disturbance Class Definitions

Class 0: Undisturbed Natural State. **Soil surface:** • No evidence of past equipment operation. • No depressions or wheel tracks evident. • Litter and duff layers present and intact. • No soil displacement evident.	**Class 1: Low Soil Disturbance** **Soil surface:** • Faint wheel tracks or slight depressions evident (e.g. <2” deep). • Litter and duff layers usually present and intact. • Surface soil has not been displaced. • Some evidence of burning impacts including a mosaic of charred and intact duff layer to partially consumed duff layer with blackened surface soil. **Soil resistance to penetration with tile spade or probe:** • Resistance of surface soils may be slightly greater than observed under natural conditions. Concentrated in top 0-4 inch depth. **Observations of soil physical conditions:** • Change in soil structure from crumb or granular structure to massive or platy structure, restricted to the surface 0-4 inches.
Class 2: Moderate Disturbance **Soil surface:** • Wheel tracks or depressions evident (e.g. 2-6” deep. • Surface soil partially intact with minimal displacement (area must meet the size requirement). **Soil resistance to penetration with tile spade or probe:** • Increased resistance is present throughout top 4-12 inches of soil. **Observations of soil physical conditions:** • Change in soil structure from crumb or granular structure to massive or platy structure, restricted to the surface 4-12 inches. • Platy structure is generally continuous and holds together when shaken. • Large roots may penetrate the platy structure, but fine and medium roots may not.	**Class 3: High Disturbance** **Soil surface:** • Wheel tracks or depressions highly evident (e.g. >6” deep) • Evidence of topsoil removal, gouging and piling. • Soil displacement has removed the *majority* of the surface soil. Subsoil partially or totally exposed. • Burning consumed duff layer, root crowns and surface roots of grasses. Evidence of severely burned soils (mineral surface soil red in color) in an area that meets the size requirement. **Soil resistance to penetration with tile spade or probe:** • Increased resistance is deep into the soil profile (>12 inches). **Observations of soil physical conditions:** • Change in soil structure from granular structure to massive or platy structure extends beyond the top 12 inches of soil. • Platy structure is continuous. • Roots do not penetrate the platy structure.

Attachment 4
Soil Disturbance Transect Form

Project ___________________ Unit _______ Observer ______________ Date ___________ Survey Level _____
Approx. Years Since Last Skidding (Prev. Sale and Unit) ______________ % in Roads and Landings____________

Transect Number	**Distur-bance Class**	**Tally of Disturbance Class Observations Along Transect** (recommended procedure: minimum of 100 observations, multiple of 100 observations, and /// tally method)	**Percent**	**Comments**
	0			
	1			
	2			
	3			
			100%	
	0			
	1			
	2			
	3			
			100%	
	0			
	1			
	2			
	3			
			100%	

Comments:

Attachment 4 (cont.) – Back of Form
Soil Disturbance Transect Form

Where are transects? (Describe and sketch map below)

Can & should existing skid trails be reused? If not, why not?

If it appears that the unit will be near 20% detrimental impacts, include notes on suitability of the soil for subsoiling in terms of depth, stoniness, and slope. ("Near 20%" = roads% + % increase this entry + existing%)
(% increase this entry = 6% for logging + 2% for grapple piling) (existing% = "3"% +"2"%)

Note conditions that may call for special mitigations: steep slopes, scab inclusions, moist soil, draws

Do these transects appear representative of other parts of the unit?

General notes: (e.g. General character of existing impacts? What are "2" & "3" due to: displacement, compaction? Was there a lot of displacement? Any off-skid-trail disturbance visible? General character of soil? Is one part of unit hit harder than others?

Appendix F-BMPs

General discussions of Best Management Practices (BMP's) and their effectiveness are found in the General Water Quality Best Management Practices, Pacific N.W. Region, 1988 and Seyedbaghei, K. 1996. BMP's for the Silvies Canyon Restoration Project are identified below, as well as an estimation of the ability to implement BMP's, their anticipated effectiveness, timing and responsibility for monitoring. For protection of resources, see Design Features and Mitigation Measures in this document.

1. Maintain all Riparian Habitat Conservation Areas (RHCAs). INFISH provides default standard widths for RHCAs based on one of four categories: fish bearing; perennial, non-fish bearing; ponds, lakes, wetlands greater than 1 acre; and intermittent or small wetlands. The following standard widths, applied to each side of the stream, define the RHCAs for this project:

Fish-bearing streams (Category 1):

- The area on either side of the steam extending from edges of active stream channel to the top of the inner gorge, or the outer edges of the 100-year floodplain, or the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), which ever is greatest.

Permanently flowing non-fish-bearing streams (Category 2):

- The area on either side of the steam extending from edges of active stream channel to the top of the inner gorge, or the outer edges of the 100-year floodplain, or the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 150 feet slope distance (300 feet, including both sides of the stream channel), which ever is greatest.

Ponds, lakes, reservoirs, and wetlands greater than 1 acre (Category 3):

- The area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, lake, which ever is greatest.

Intermittent streams and wetlands less than 1 acre (Category 4):

- The intermittent stream channel and the area to the top of the inner gorge
- The intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation.
- The area to the edge of the channel, wetland to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, which ever is greatest.

In the GIS stream layer, Class I and II streams are Category 1, Class III streams are Category 2, and Class IV streams are Category 4.

2. Ephemeral stream channels should have protections to minimize equipment disturbance of duff and soil, and should not be used as skid trails, landing sites, or as road locations. Ephemeral draws, not within RHCAs, are to meet the following down wood requirements to reduce risk of upward migration and channel initiation: retain all wood embedded in the soil; retain at least 5 pieces of wood >12" diameter and >20' in length per 1000' of draw bottom (average 1 piece per 200'); retain at least 20 pieces of wood >6" diameter and >10' in length per 1000' of draw bottom (average 1 piece per 50'). Ephemeral draws with a gradient of 5% or more will need to be visited by the hydrologist to determine if any additional site-specific mitigation is required.

3. All temporary roads shall be obliterated at the completion of their intended use (see BMP R-23) - NFMA requires that all temporary roads be returned to resource production within 10 years. Reclose all roads, with sufficient drainage structures, which are opened for project activities. For all temporary roads:

- obliterate as soon as feasible after use
- season of use shall be specified to minimize rutting, erosion, sedimentation, and water concentrations
- plan, locate, design, and construct temporary roads with ease of obliteration as a priority - stockpile topsoil and duff for re-shaping after use or obliteration
- horizontal and vertical alignments should conform to the natural contour as closely as possible - outsloped rolls in the grade effectively break up water concentrations during use and can be crafted into silt traps and planting pockets during obliteration

4. Wet meadows and dry meadows or scabrock flats would not be skidded across or have landings located within them, unless approved by the hydrologist. BMP VM-2,

5. The following BMP's are identified for the Silvies Canyon Watershed Restortation Project, along with an estimation of the ability to implement them, as well as their anticipated effectiveness, timing and responsibility for monitoring.

T-1 - Timber Sale Planning Process
Estimates will be made on the potential changes to water quality and instream beneficial uses.
Responsibility: Hydrologist and Fisheries Biologist
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

T-2 - Timber Harvest Unit Design
Unit design will ensure favorable conditions of water flow, water quality, and fish habitat through INFISH RHCAs.
Responsibility: Hydrologist and Fisheries Biologist
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

T-4 - Use of Sale Area Maps for Designating Water Quality Protection Needs
The Sale Area Map will include locations of streams to be protected and the required harvest method (ephemeral draws would be protected during skid trial/harvester route design, but not under the protected stream course provision).
Responsibility: Presale Technician
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

T-5 - Limiting the Operating Period of Timber Sale Activities
The Timber Sale Contract (TSC) will specify the Normal Operating Season and soil protection requirements.
Responsibility: Presale Technician and Soil Scientist
Timing: Prior to activity
Ability to Implement: High
Effectiveness: Moderate

T-10 - Log Landing Location
Harvest plans will include proposed landing locations. Landing locations and size will be approved by the Forest Service in advance.
Responsibility: Presale Technician and Sale Administrator
Timing: Prior to and during activity
Ability to Implement: High

Effectiveness: High

T-13 - Erosion Prevention Measures During Timber Sale Operations
Equipment shall not operate when ground conditions are susceptible to detrimental soil disturbances (not more than 20% of the logged area is permitted to have detrimental soil disturbance). Erosion control work will be kept current.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

T-14 - Revegetation of Areas Disturbed by Harvest Activities
The TSC will include provisions for seeding and fertilizing severely disturbed areas. The Forest Service will designate disturbed areas where seeding and fertilizing are required (generally landing and temporary roads or other areas where more than 200 sq. ft. of exposed mineral soil due to harvest operations).

Responsibility: Presale Technician and Sale Administrator
Timing: Prior to and during activity
Ability to Implement: High
Effectiveness: Moderate

T-15 - Log Landing Erosion Prevention and Control
The Forest Service will designate areas for landing scarification and erosion control seeding as well as any necessary water bars or other drainage structures.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

T-18 - Erosion Control Structure Maintenance
The Purchaser will provide maintenance of soil erosion control structures as required in the TSC.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: Moderate
Effectiveness: High

T-19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
The effectiveness of erosion control measures will be evaluated periodically during the life of the TSC.

Responsibility: Sale Administrator and Hydrologist
Timing: During activity
Ability to Implement: High
Effectiveness: High

T-21 - Servicing and Refueling of Equipment
The Forest Service will designate refueling and servicing areas. A Spill Prevention Control and Countermeasures Plan is required if on site fuel storage exceeds 660 gallons in a single container or if total storage exceeds 1320 gallons.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

T-22 - Modification of the TSC
The TSC will be modified if new evidence indicates that unacceptable damage is likely to occur as planned.

Responsibility: District Ranger

Timing: During activity
Ability to Implement: High
Effectiveness: High

R-1 - General Guidelines for the Location and Design of Roads
Road reconstruction will assure design creates minimal resource damage.
Responsibility: Engineering Technician
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

R-2 - Erosion Control Plan
Limit erosion and sedimentation through effective planning and contract administration.
Responsibility: Engineering Technician
Timing: Prior to and during activity
Ability to Implement: High
Effectiveness: Moderate

R-3 - Timing of Construction Activities
Road reconstruction will occur during minimal runoff periods to minimize erosion.
Responsibility: Engineering Technician
Timing: During activity
Ability to Implement: High
Effectiveness: Moderate

R-6 & R-7 - Dispersion of Subsurface and Surface Drainage Associated with Roads
Ditch relief and cross drainage will assure intercepted ground water and surface water is moved from road prism before it develops enough energy to undermine cut slopes or erode fill slopes.
Responsibility: Engineering Technician
Timing: During activity
Ability to Implement: High
Effectiveness: Moderate

R-18 - Maintenance of Roads
Ditches and culverts will be kept open and ruts repaired.
Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-19 - Road Surface Treatment to Prevent Loss of Material
Watering and grading will be kept on schedule to assure surface material is not lost.
Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-20 - Traffic Control During Wet Periods
Haul and other associated traffic will be controlled when road damage is likely to occur due to road/weather conditions and only during the time frame from July 1 - October 1.
Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-21 - Snow Removal Controls to Avoid Resource Damage

Snow removal will assure water can drain from road prism before it develops enough energy to erode road surface or fill slopes.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-22 - Restoration of Borrow Pits and Quarries
Borrow Pits will be stabilized such that banks are stable and access road provides necessary drainage.

Responsibility: Engineering Technician
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-23 - Obliteration of temporary roads
Temporary roads will be obliterated at the completion of their intended use to reduce chronic sediment sources and restore productivity. Effective obliteration is generally achieved through a combination of the following measures: temporary culverts and bridges removed and natural drainage configuration reestablished, road surface ripped, sideslopes reshaped and stabilized, road effectively drained and blocked, road returned to resource production through revegetation (grass, browse, or trees).

Responsibility: Sale Administrator, with advice from hydrologist
Timing: At the completion of activity
Ability to Implement: High
Effectiveness: High

F-1 - Fire and Fuel Management Activies
Activity related fuel will be managed to assure the risk of wildfire is not increased. The timber sale contract will be utilized to ensure that LRMP standards and guidelines for down woody material are met without necessitating additional impacts due to use of machinery. Some slash should be retained on the forwarder trails to reduce the chances of erosion, to trap sediment, and to provide nutrients to the soils for productivity.

Responsibility: Fire Management Officer
Timing: During activity
Ability to Implement: High
Effectiveness: High

F-2 - Consideration of Water Quality in Formulating Prescribed Fire Prescriptions
The prescribed fire plan will be developed to assure fire mortality does not exceed 8% of the tree canopy or remove effective ground cover from more than 3% of the burn area. Fire ignitions will not occur within RHCAs.

Responsibility: Fire Management Officer
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

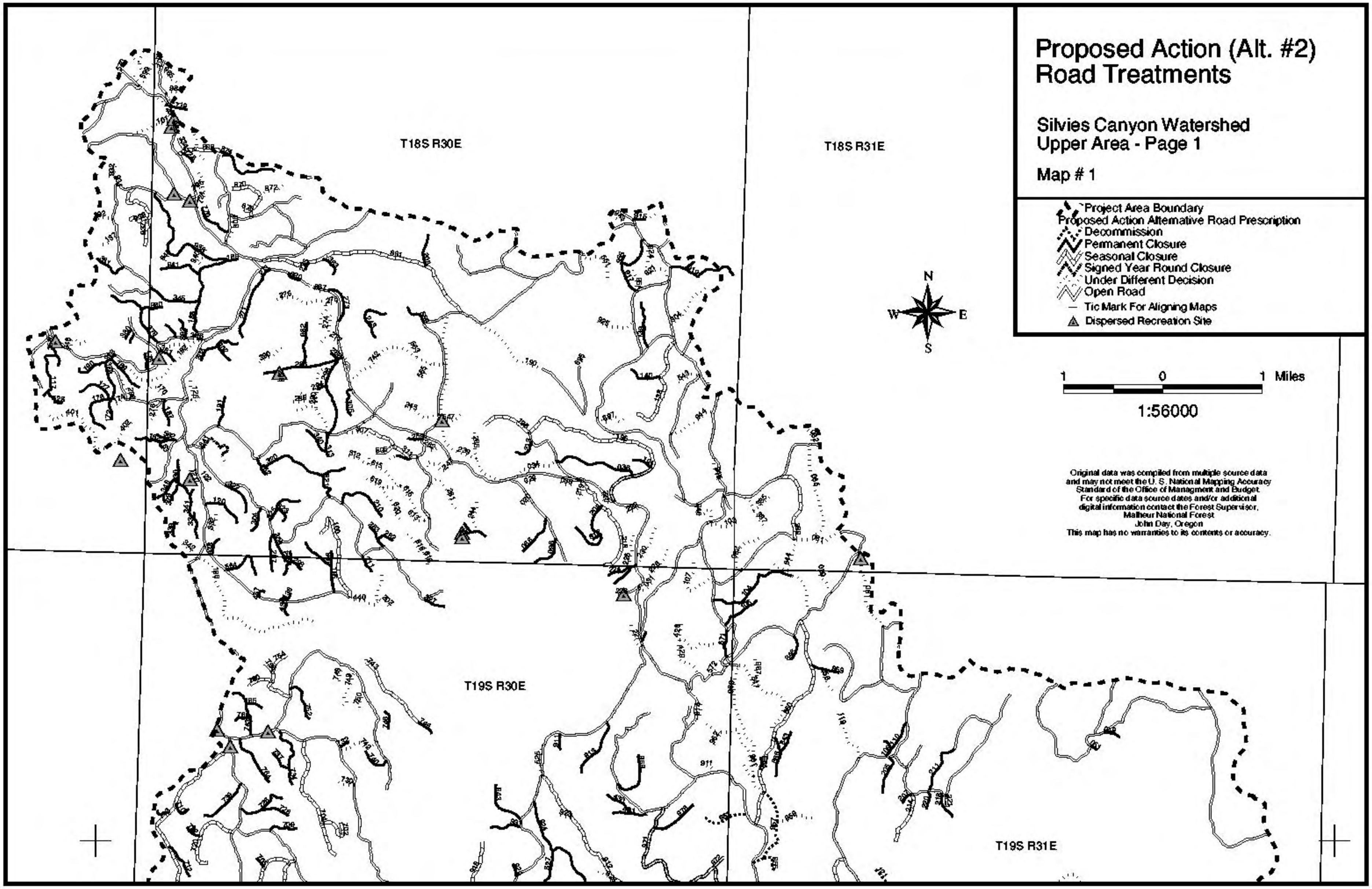
F-3 - Protection of Water Quality During Prescribed Fire Operations
The prescribed fire will follow the burn plan. Adjustments will be made during firing operations if objectives are not being met.

Responsibility: Fire Management Officer
Timing: Prior to and during activity
Ability to Implement: High
Effectiveness: High

W-5 - Cumulative Watershed Effects

To ensure that the additional effects of the proposed management activities, when added to the existing conditions, do not exceed thresholds of concern or result in adverse (degraded) water quality or channel/fish habitat conditions.

Responsibility: Hydrologist
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High


Proposed Action (Alt. #2)
Road Treatments
Silvies Canyon Watershed
Upper Area - Page 1
Map # 1
Project Area Boundary
Proposed Action Alternative Road Prescription
Decommission
Permanent Closure
Seasonal Closure
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Under Different Decision
Open Road
Tic Mark For Aligning Maps
Dispersed Recreation Site
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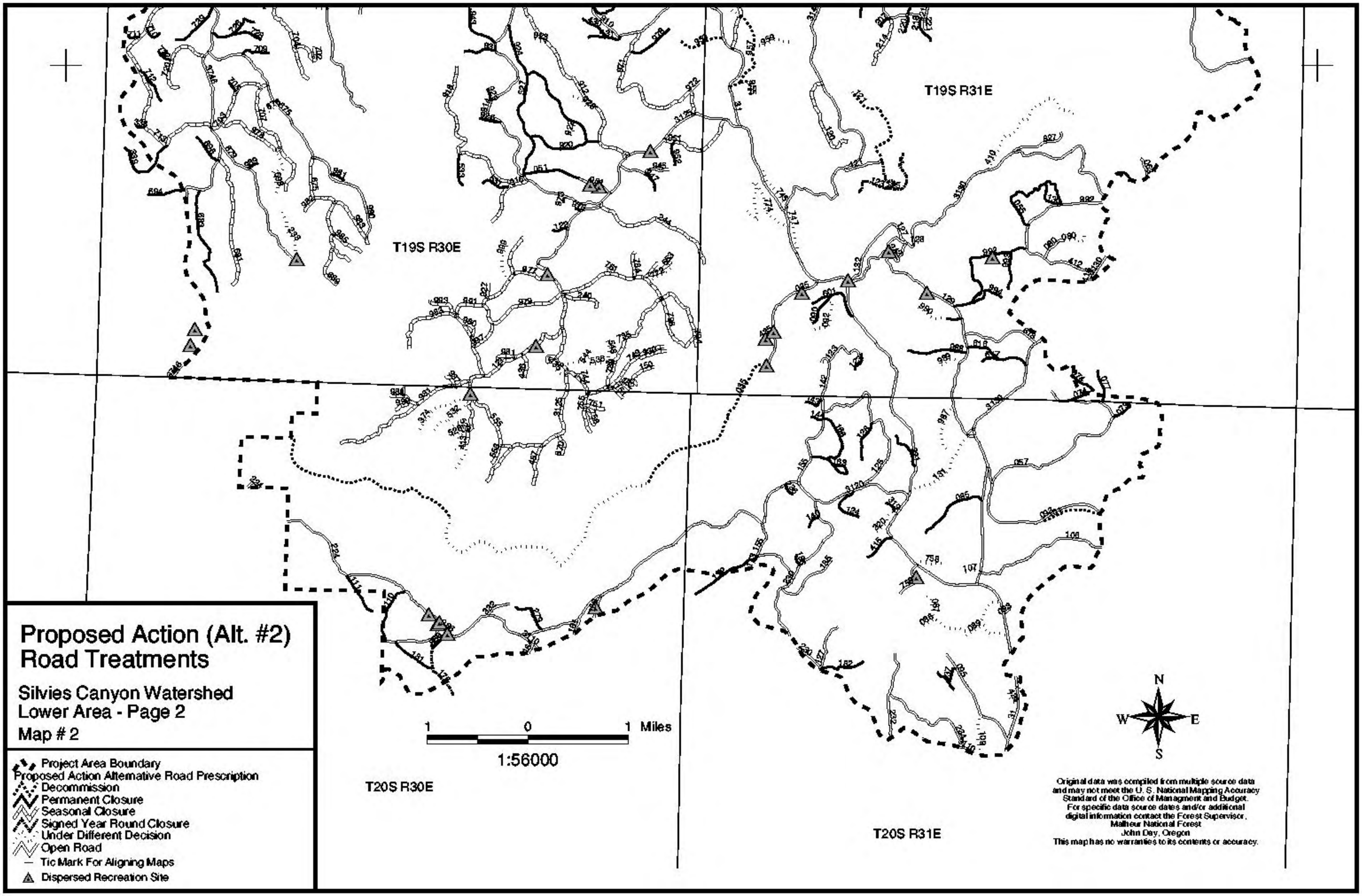
Proposed Action (Alt. #2)
Road Treatments
Silvies Canyon Watershed
Lower Area - Page 2
Map # 2
Project Area Boundary
Proposed Action Alternative Road Prescription
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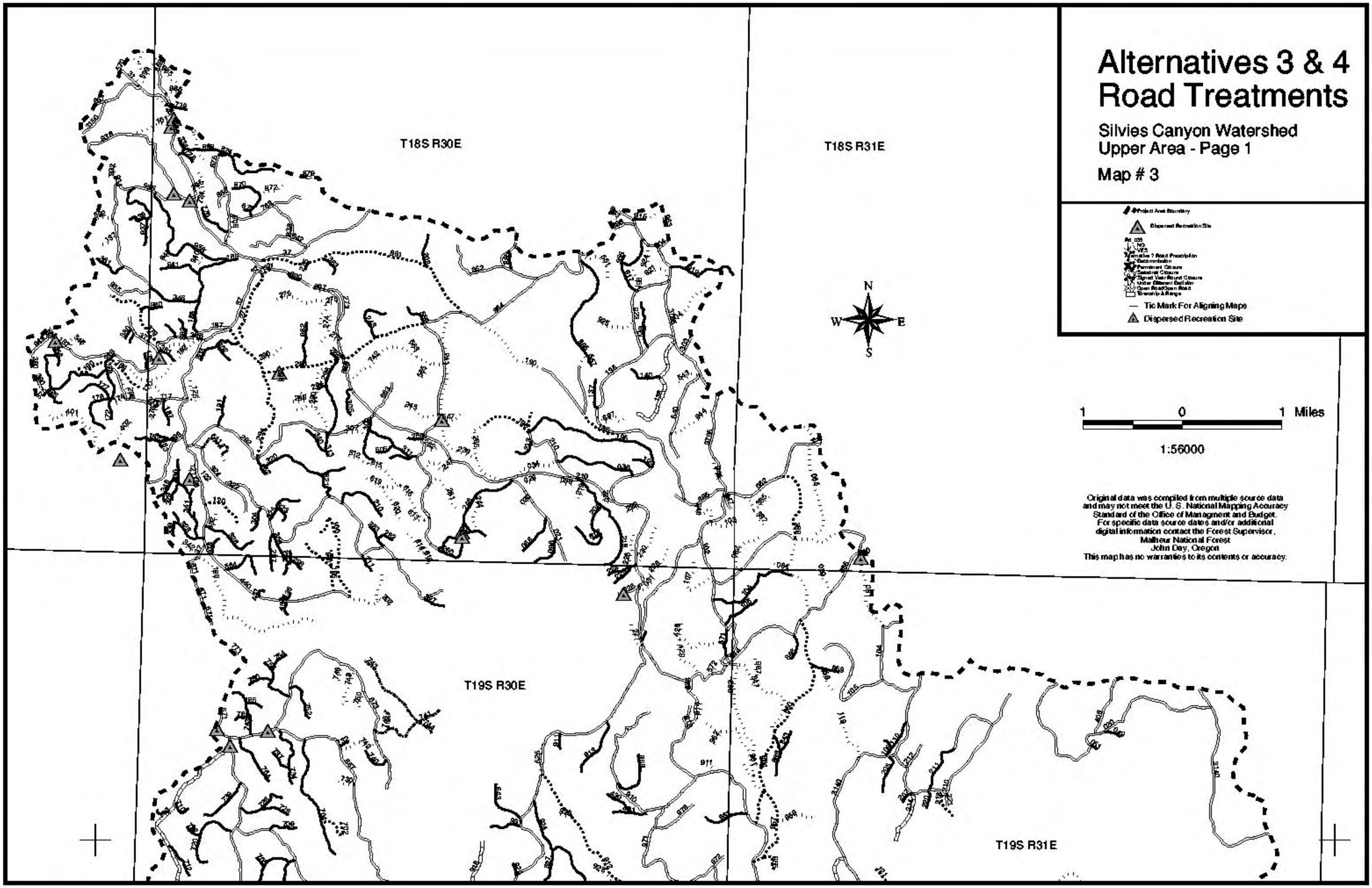
Alternatives 3 & 4
Road Treatments
Silvies Canyon Watershed
Upper Area - Page 1
Map # 3
Tic Mark For Aligning Maps
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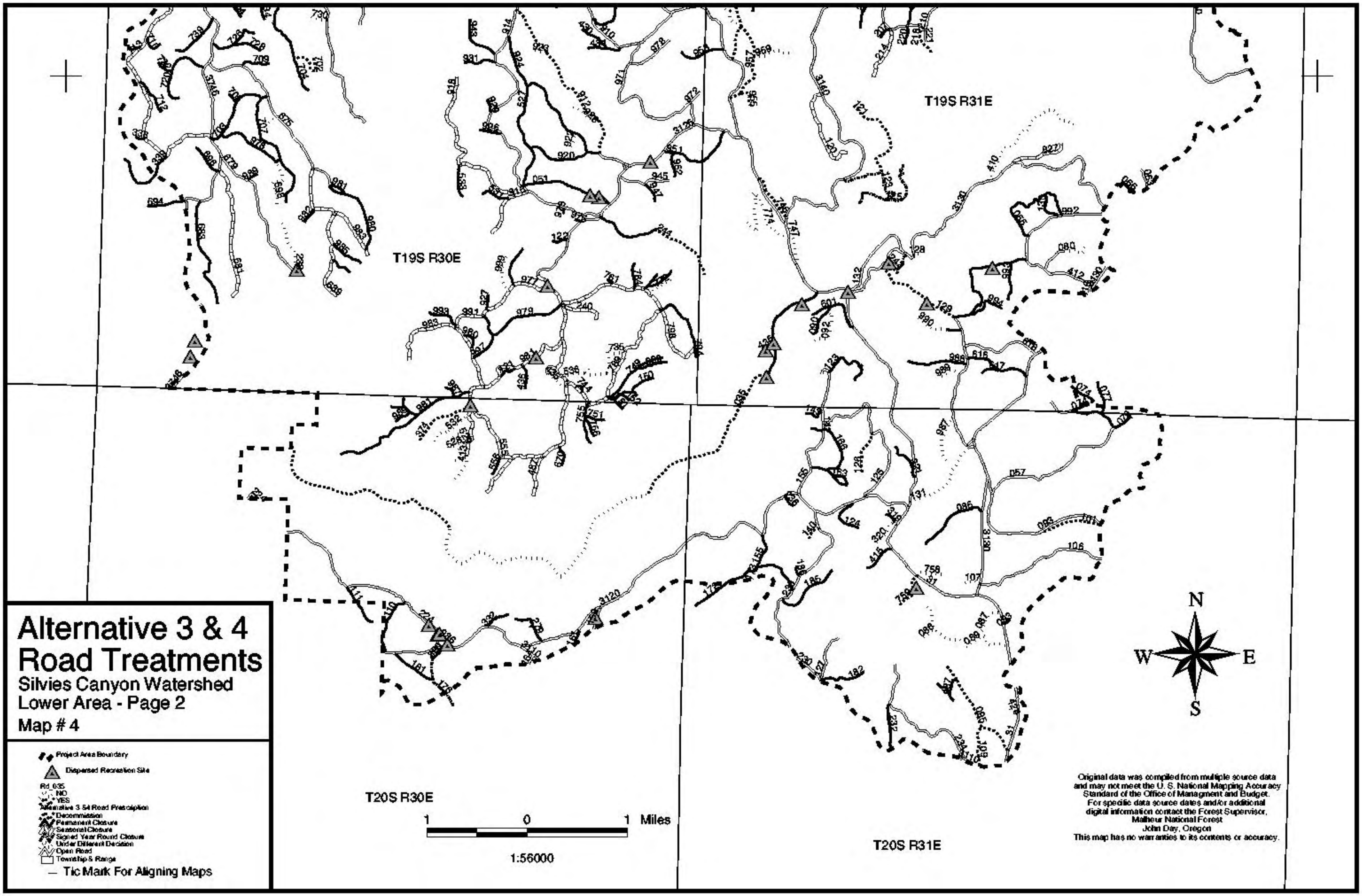
Alternative 3 & 4
Road Treatments
Silvies Canyon Watershed
Lower Area - Page 2
Map # 4
Project Area Boundary
Dispersed Recreation Site
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Alternative 3 &4 Road Prescription
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Seasonal Closure
Signed Year Round Closure
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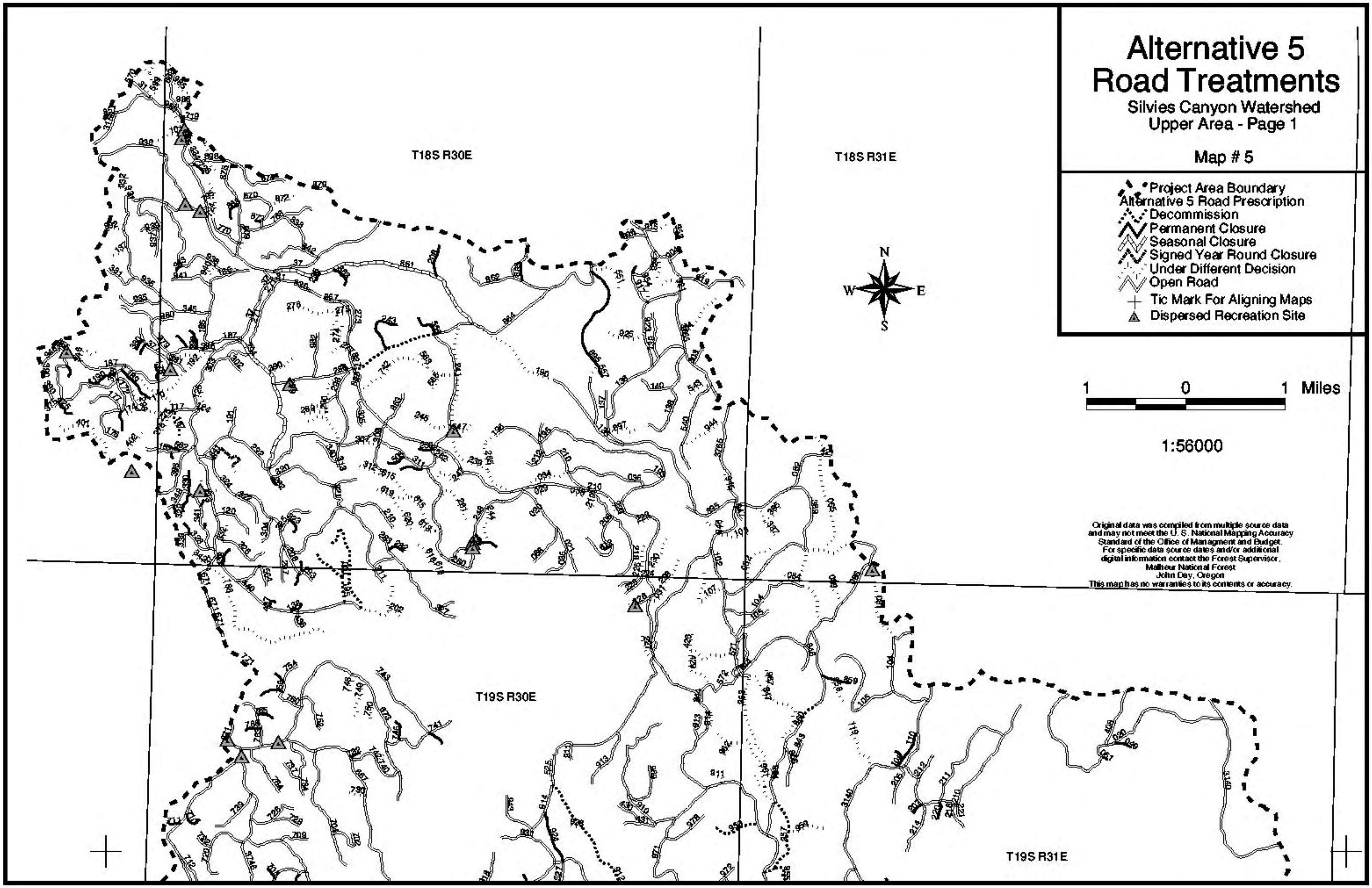
Alternative 5
Road Treatments
Silvies Canyon Watershed
Upper Area - Page 1
Map # 5
Project Area Boundary
Alternative 5 Road Prescription
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Signed Year Round Closure
Under Different Decision
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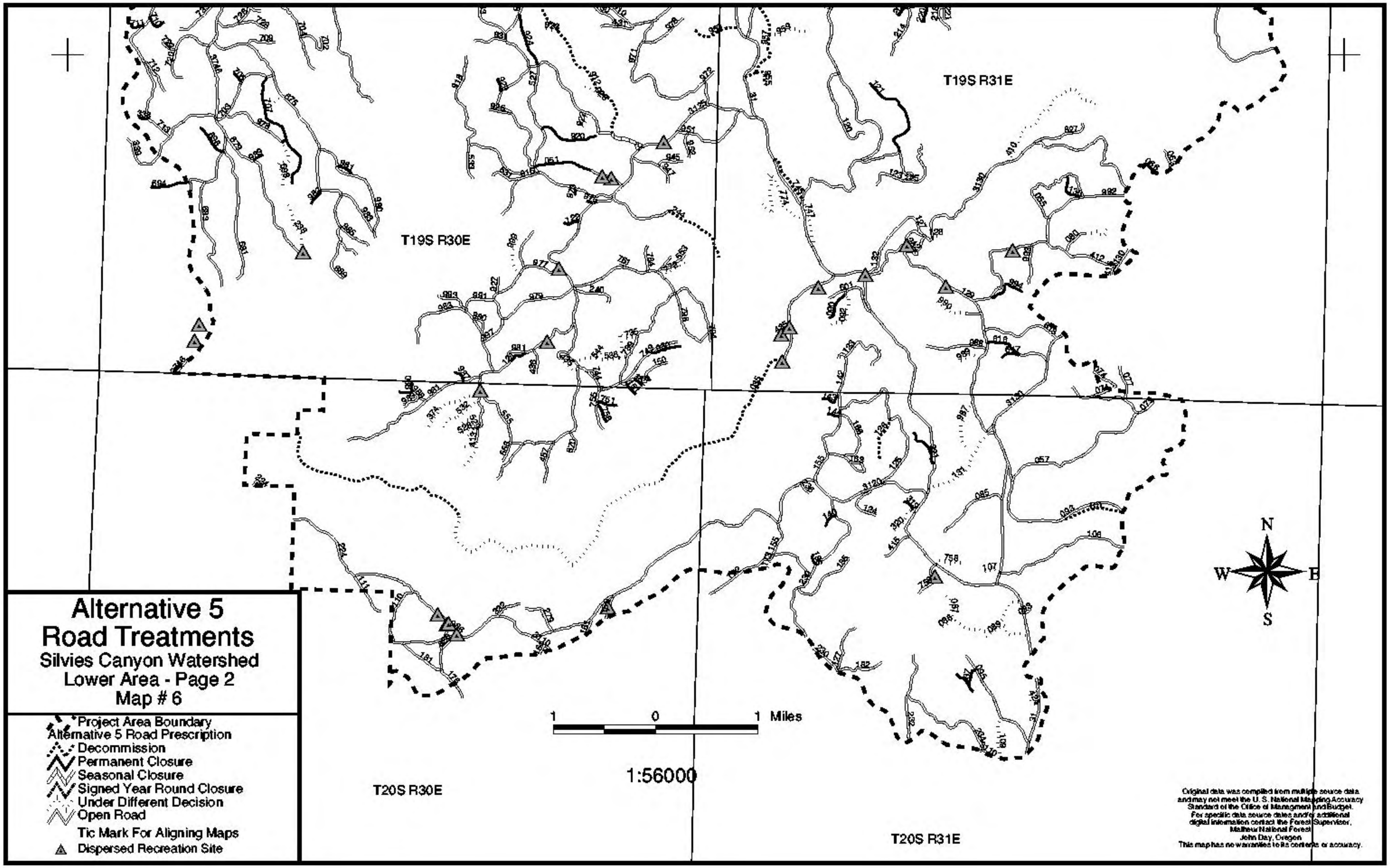
Alternative 5
Road Treatments
Silvies Canyon Watershed
Lower Area - Page 2
Map # 6
Project Area Boundary
Alternative 5 Road Prescription
Decommission
Permanent Closure
Seasonal Closure
Signed Year Round Closure
Under Different Decision
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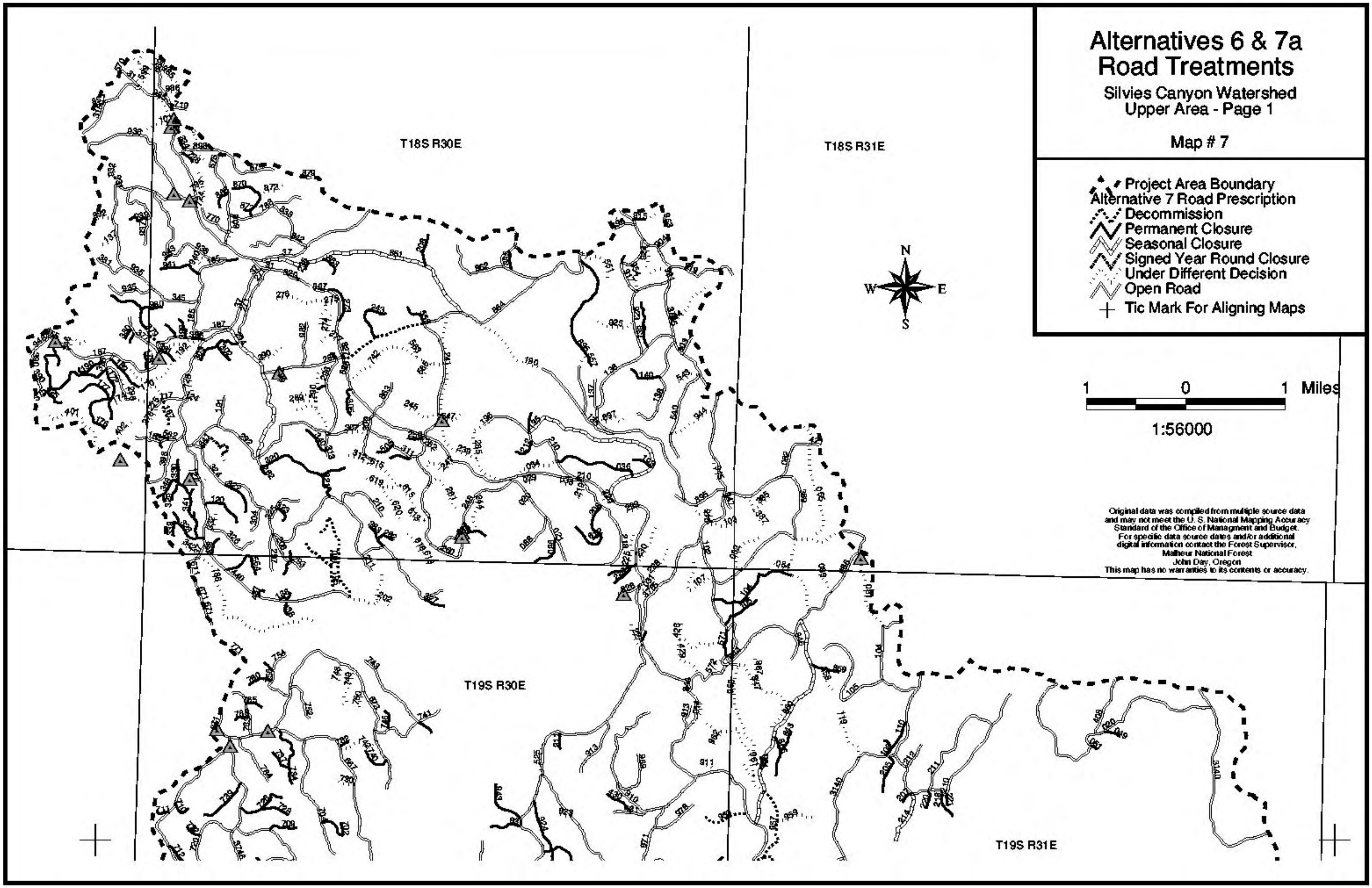
Alternatives 6 & 7a
Road Treatments
Silvies Canyon Watershed
Upper Area - Page 1
Map # 7
Project Area Boundary
Alternative 7 Road Prescription
Decommission
Permanent Closure
Seasonal Closure
Signed Year Round Closure
Under Different Decision
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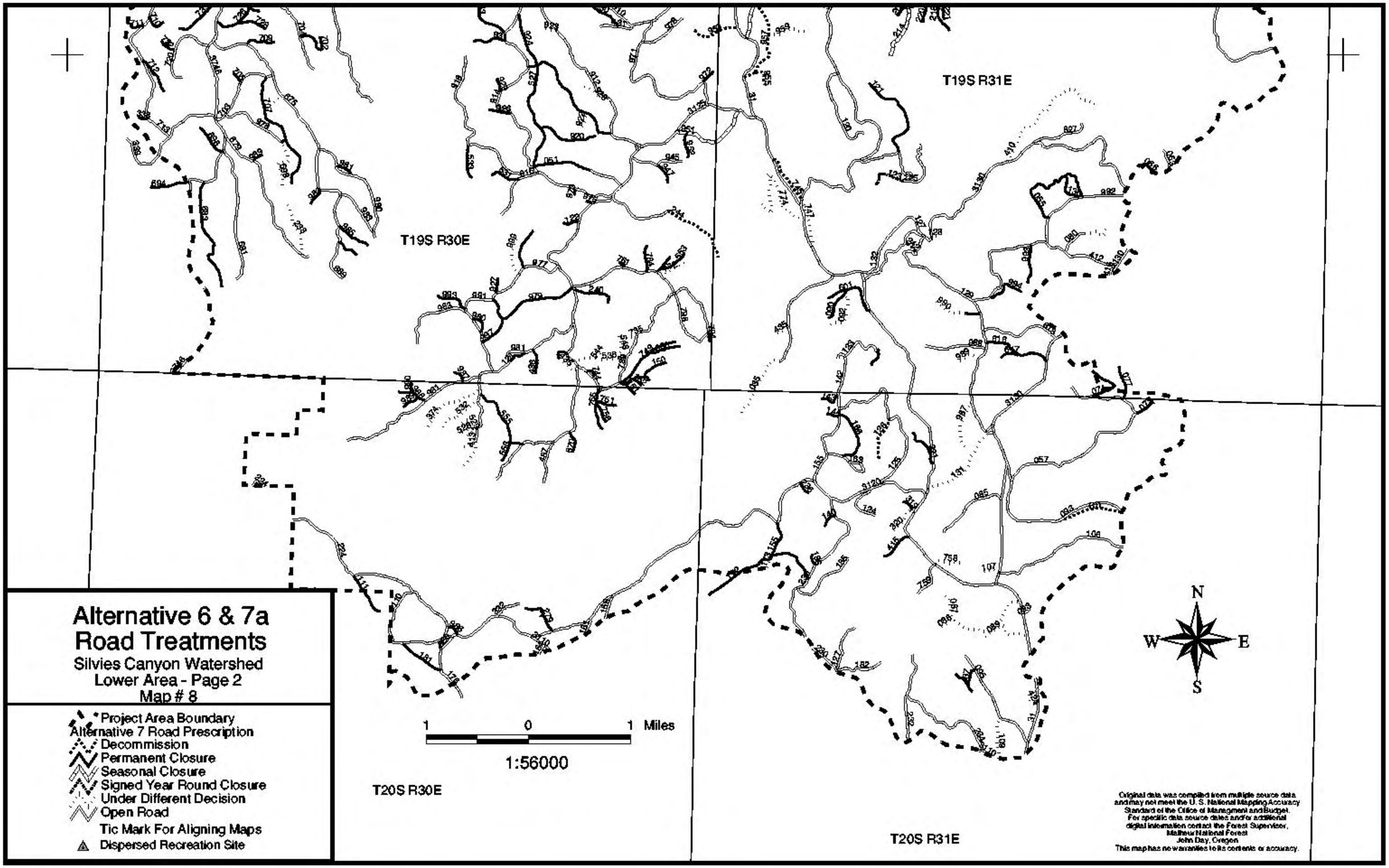
Alternative 6 & 7a
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Silvies Canyon Watershed
Lower Area - Page 2
Map # 8
Project Area Boundary
Alternative 7 Road Prescription
Decommission
Permanent Closure
Seasonal Closure
Signed Year Round Closure
Under Different Decision
Open Road
Tic Mark For Aligning Maps
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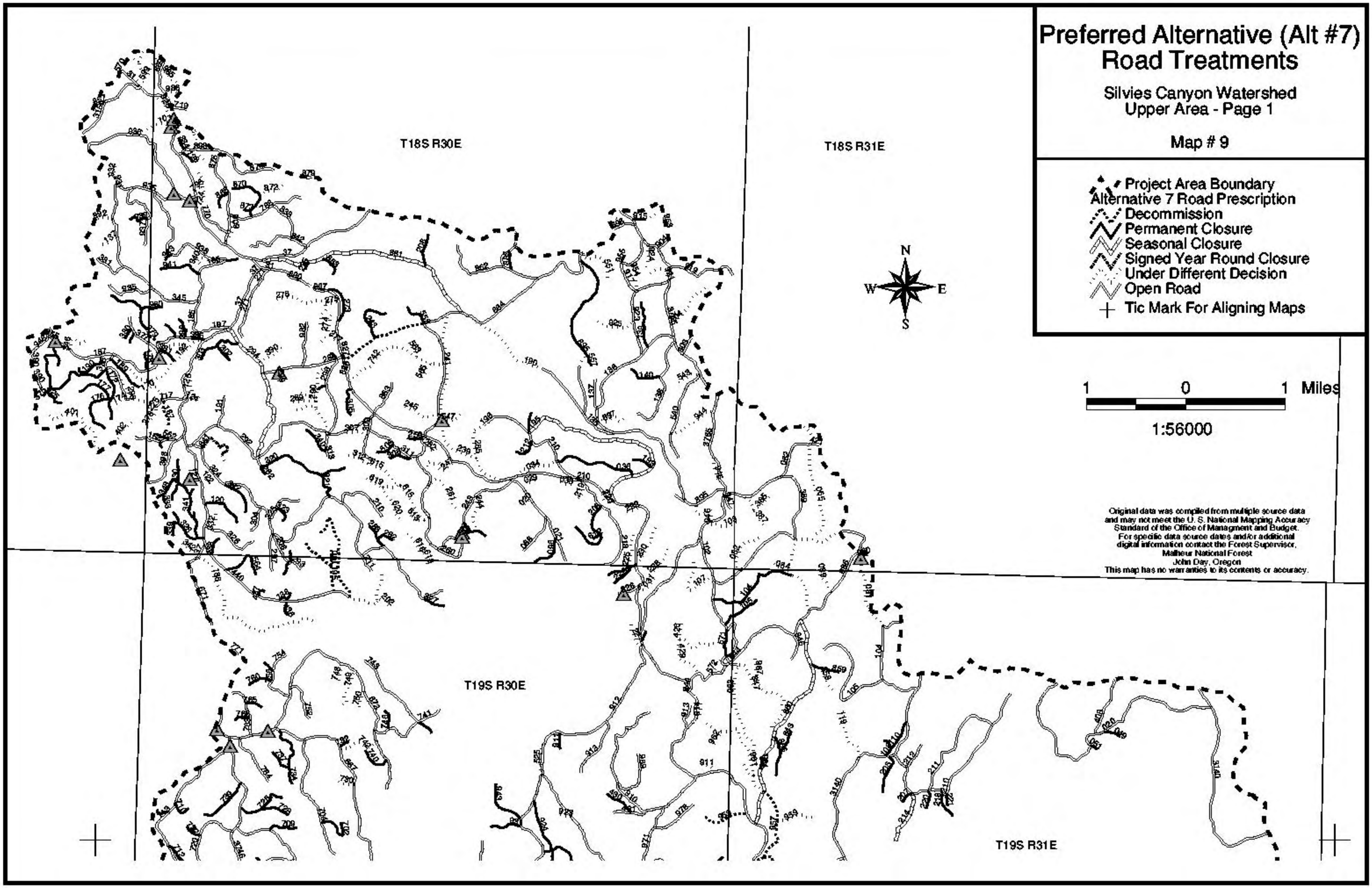
Preferred Alternative (Alt #7)
Road Treatments
Silvies Canyon Watershed
Upper Area - Page 1
Map # 9
Project Area Boundary
Alternative 7 Road Prescription
Decommission
Permanent Closure
Seasonal Closure
Signed Year Round Closure
Under Different Decision
Open Road
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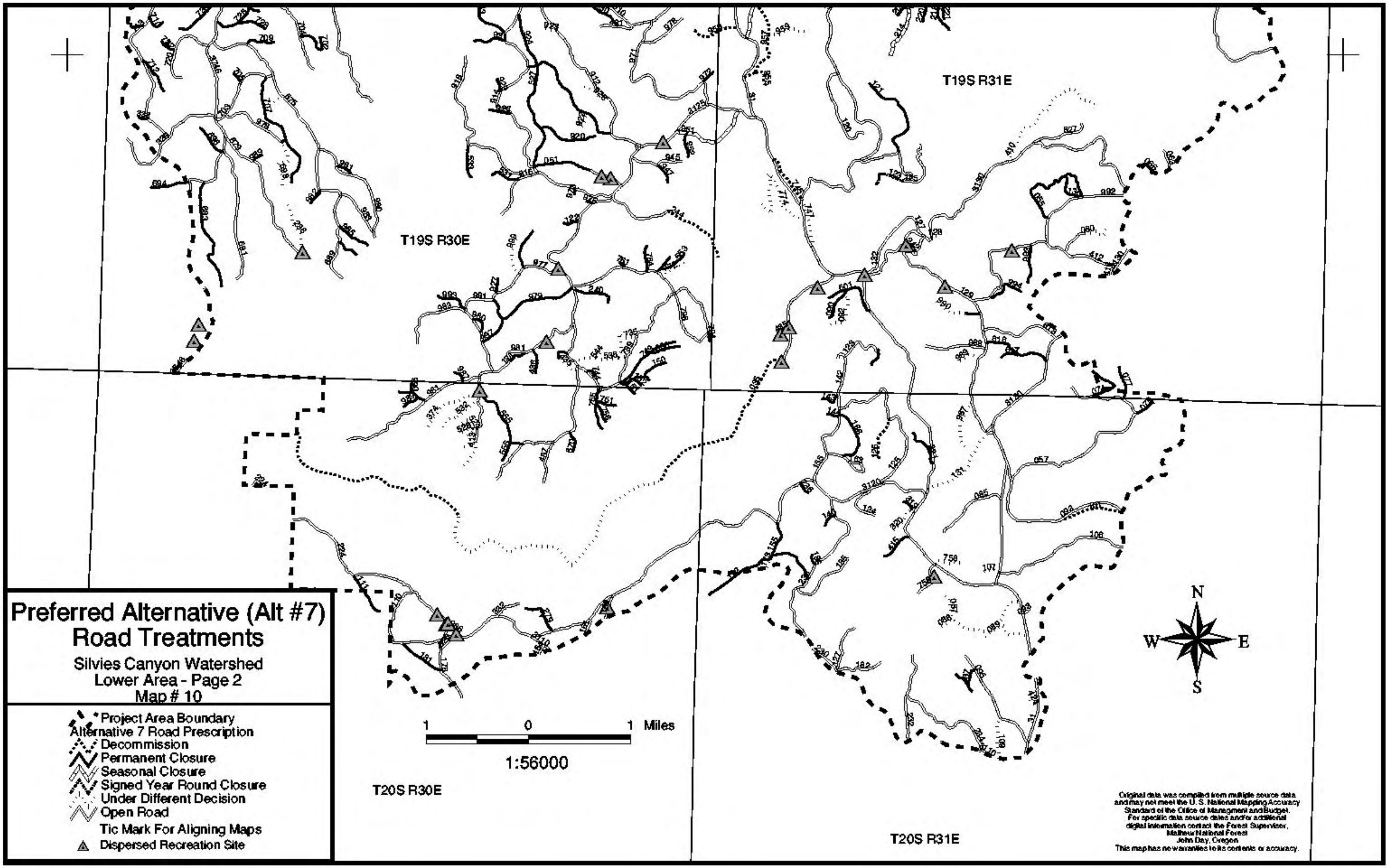
Preferred Alternative (Alt #7)
Road Treatments
Silvies Canyon Watershed
Lower Area - Page 2
Map # 10
Project Area Boundary
Alternative 7 Road Prescription
Decommission
Permanent Closure
Seasonal Closure
Signed Year Round Closure
Under Different Decision
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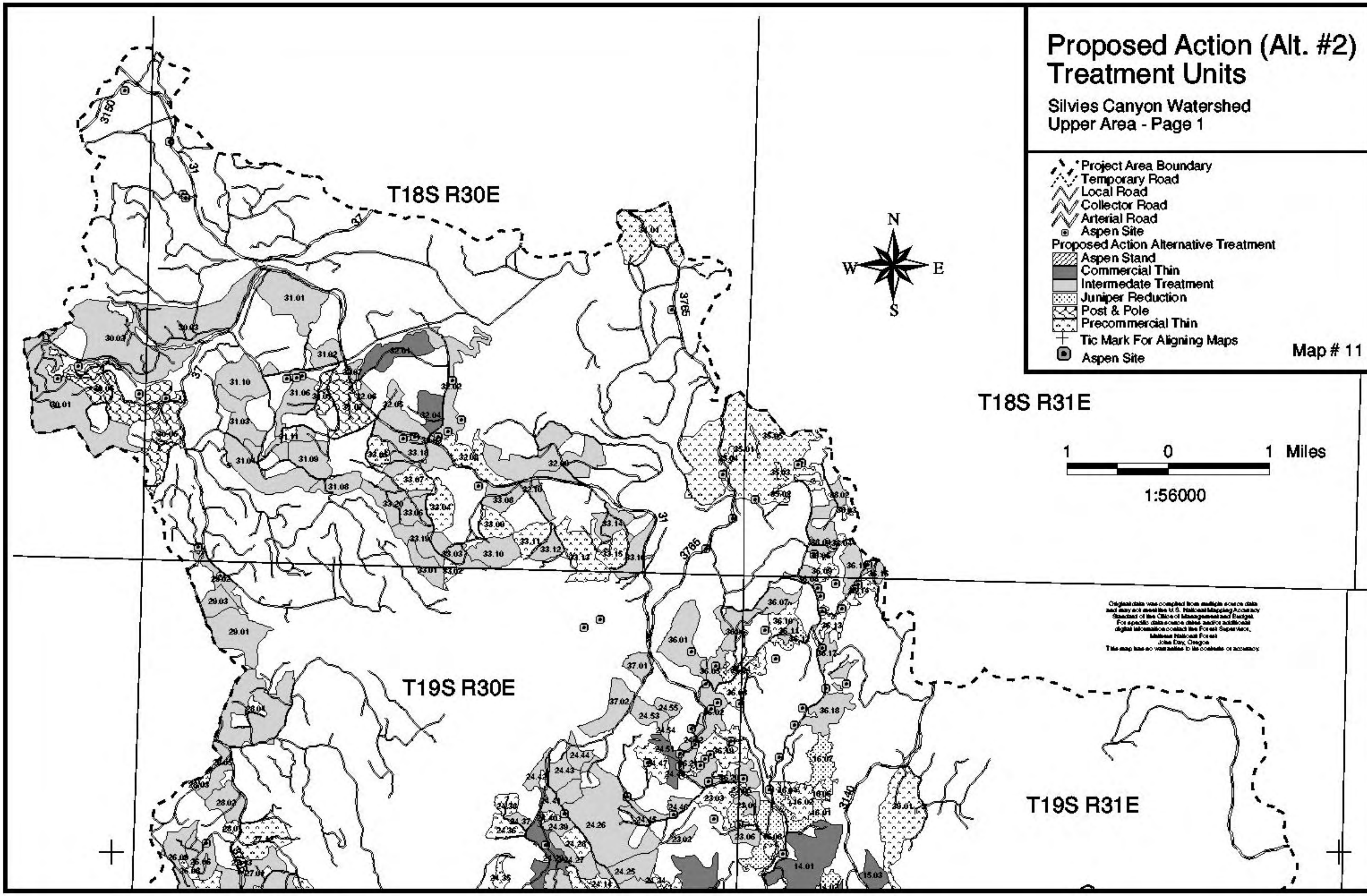
Proposed Action (Alt. #2)
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Aspen Site
Proposed Action Alternative Treatment
Aspen Stand
Commercial Thin
Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
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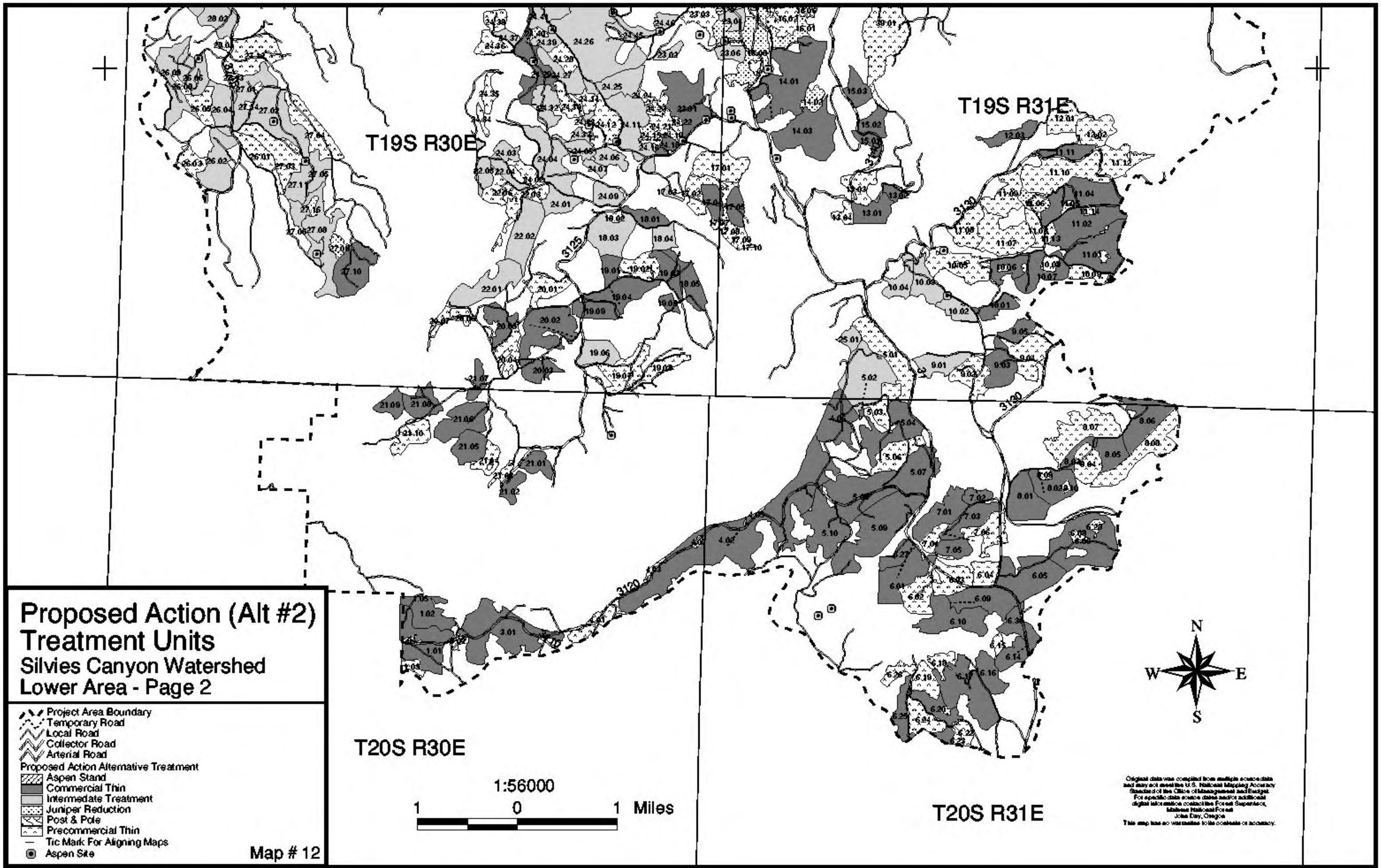
Proposed Action (Alt #2)
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Proposed Action Alternative Treatment
Aspen Stand
Commercial Thin
Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
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Aspen Site
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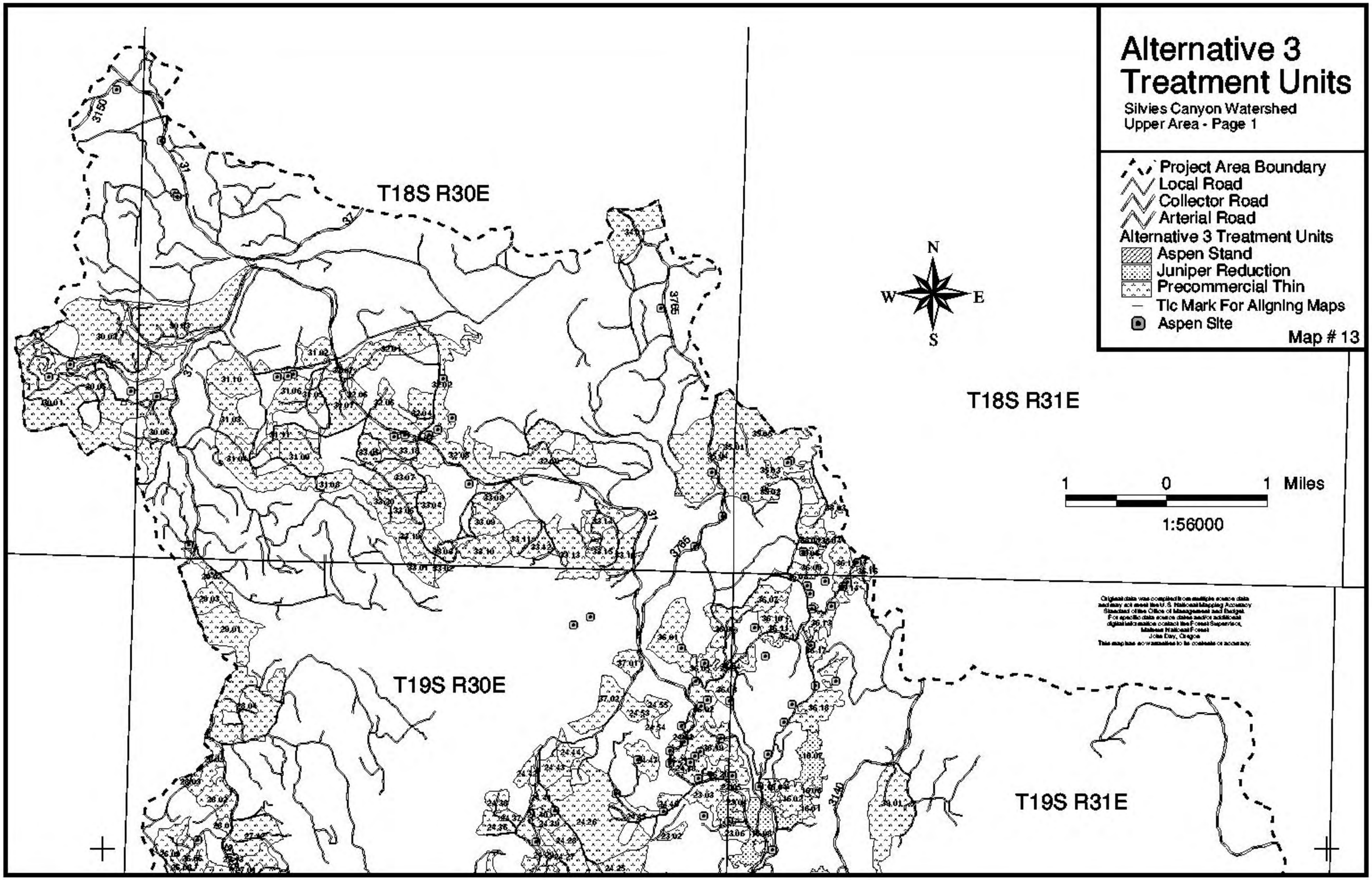
Alternative 3
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Project Area Boundary
Local Road
Collector Road
Arterial Road
Alternative 3 Treatment Units
Aspen Stand
Juniper Reduction
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
Map # 13
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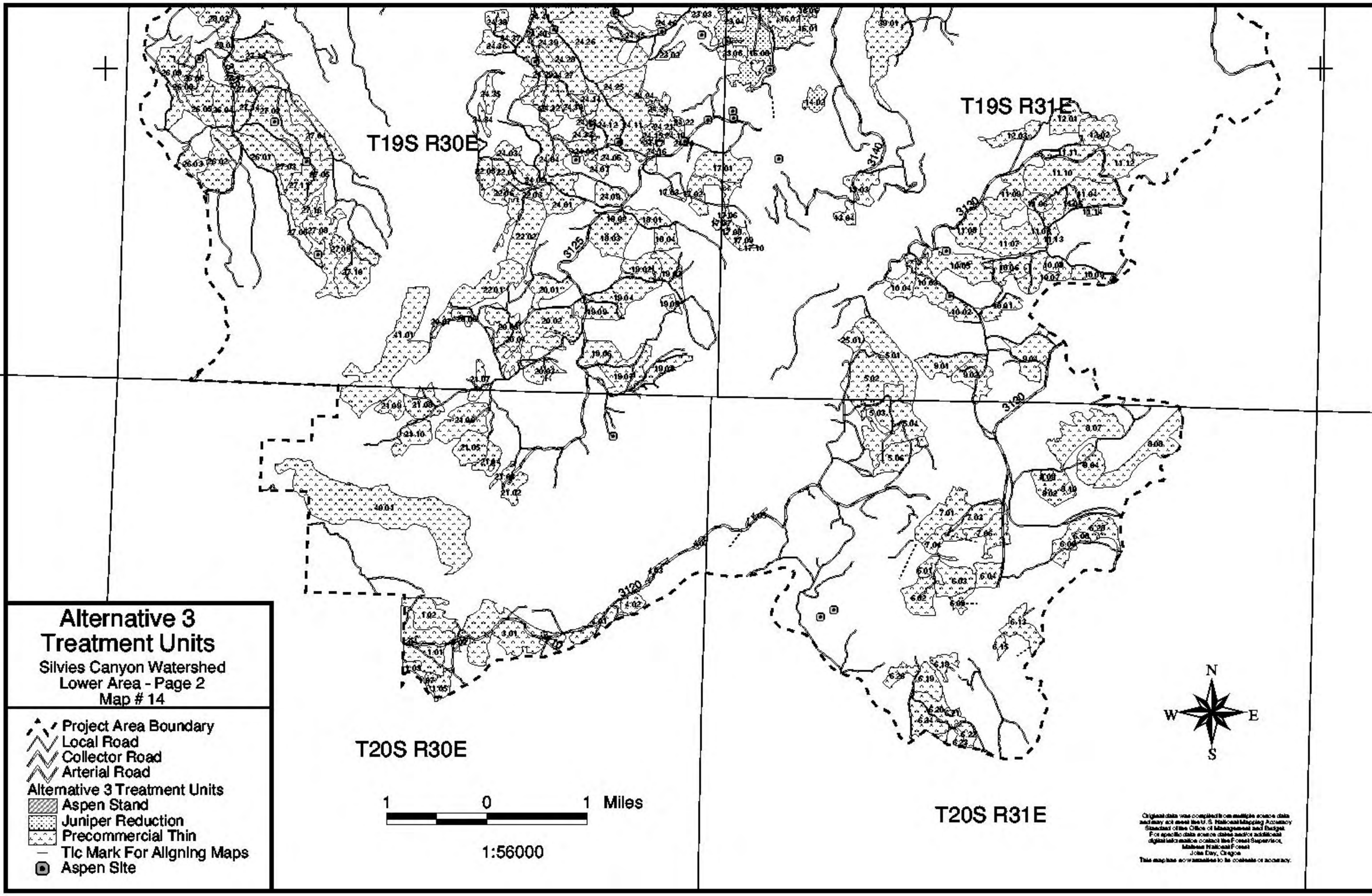
Alternative 3
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Map # 14
Project Area Boundary
Local Road
Collector Road
Arterial Road
Alternative 3 Treatment Units
Aspen Stand
Juniper Reduction
Precommercial Thin
Tic Mark For Aligning Maps
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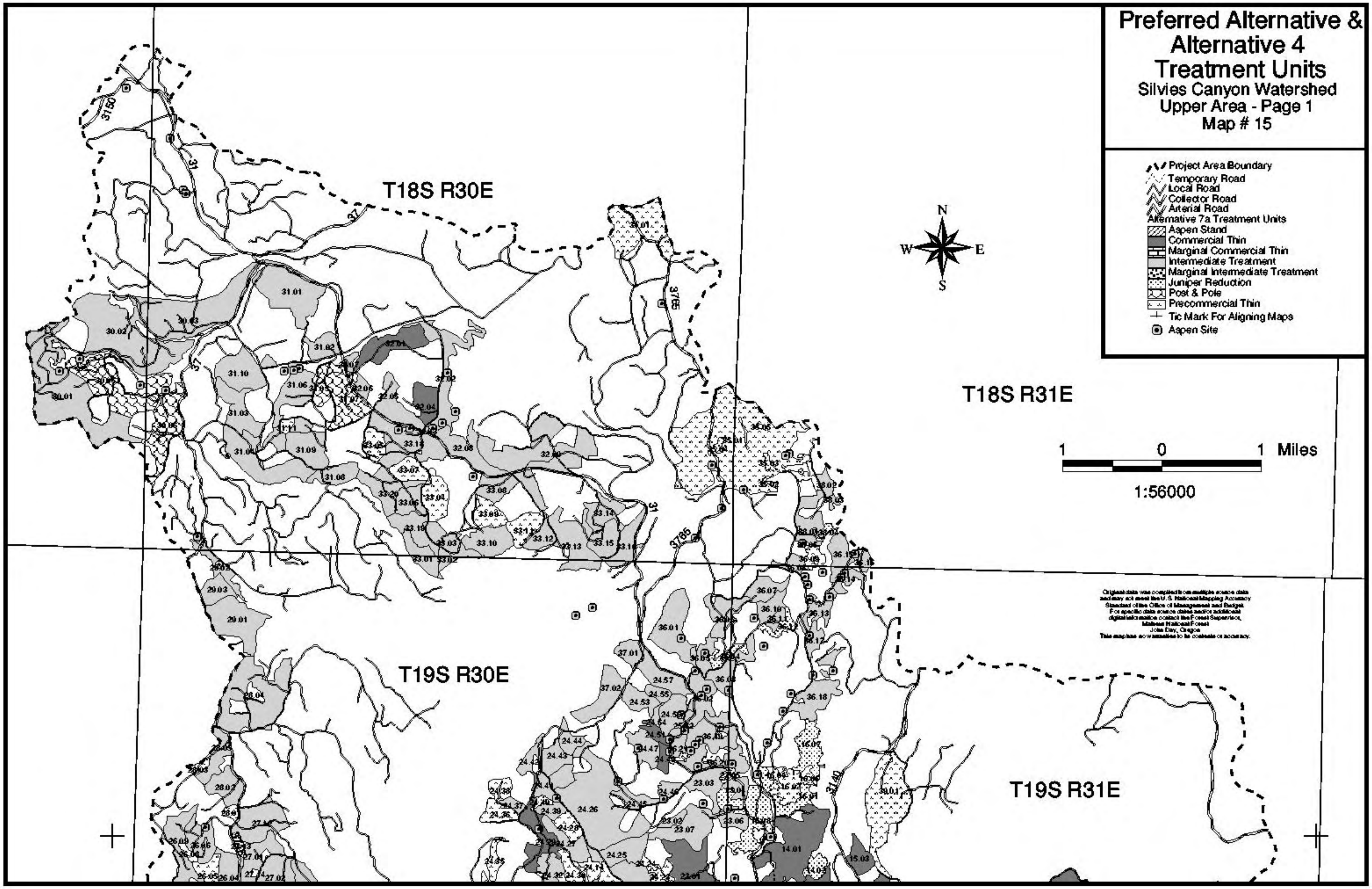
Preferred Alternative & Alternative 4
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Map # 15
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 7a Treatment Units
Aspen Stand
Commercial Thin
Marginal Commercial Thin
Intermediate Treatment
Marginal Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
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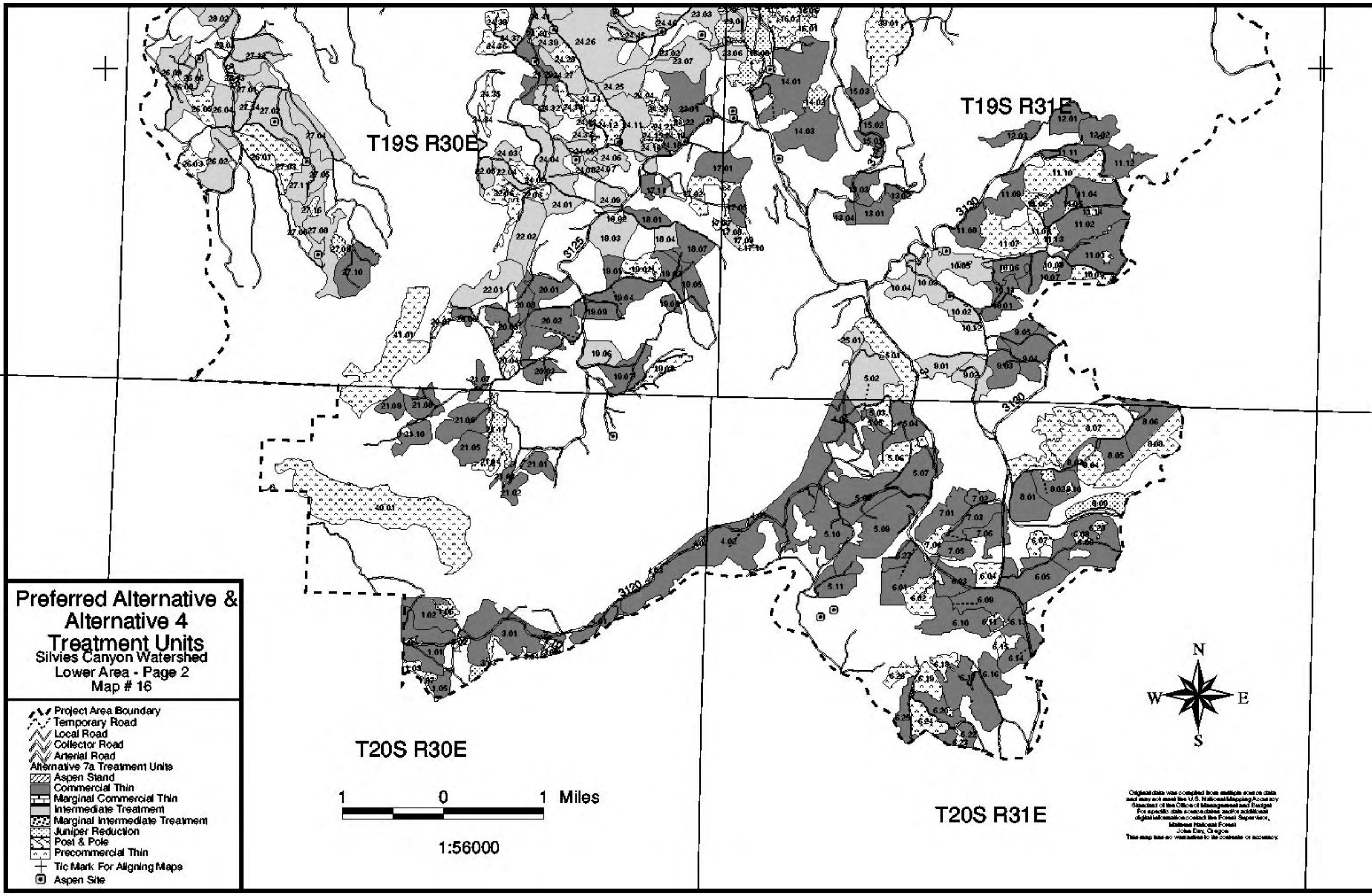
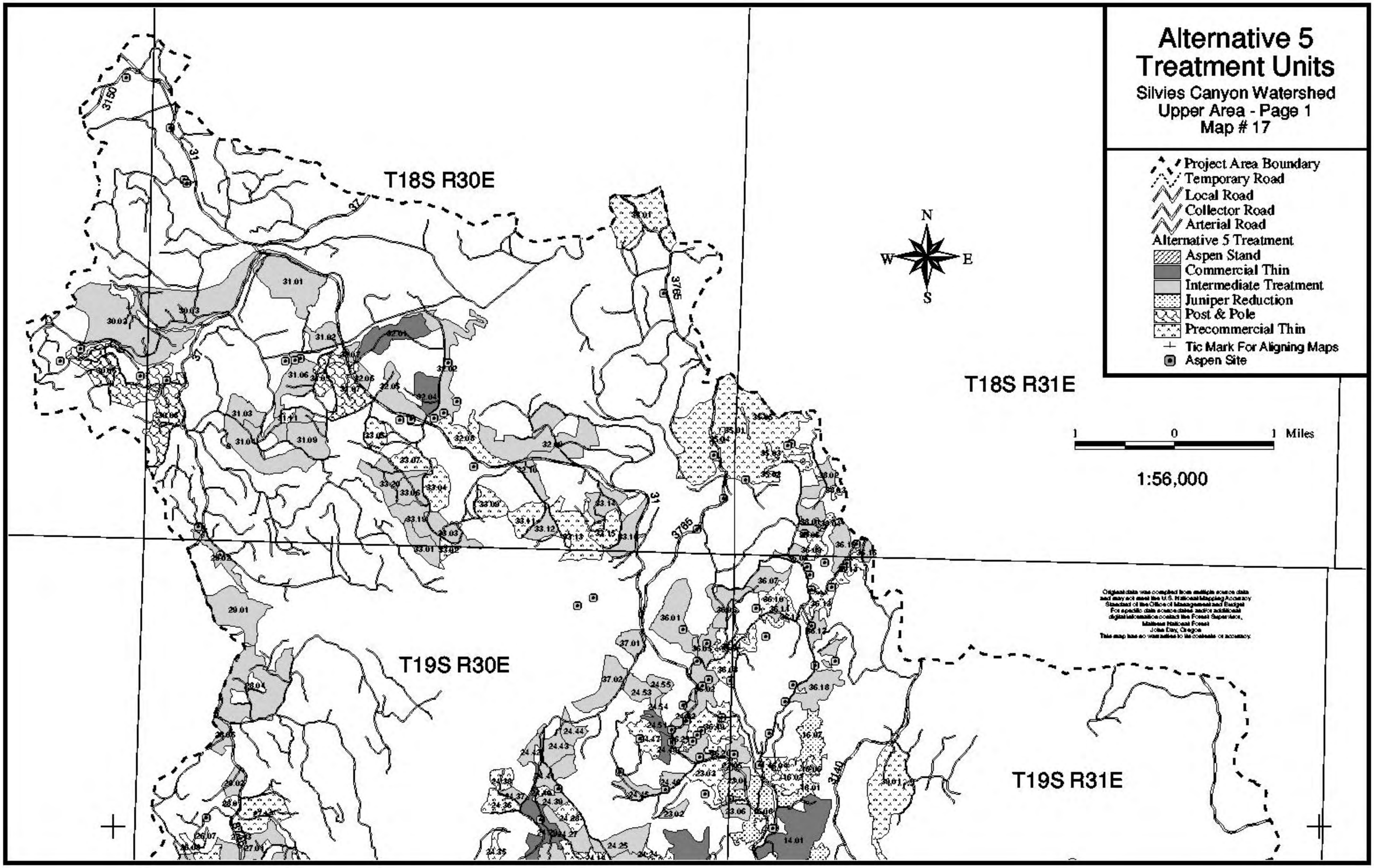
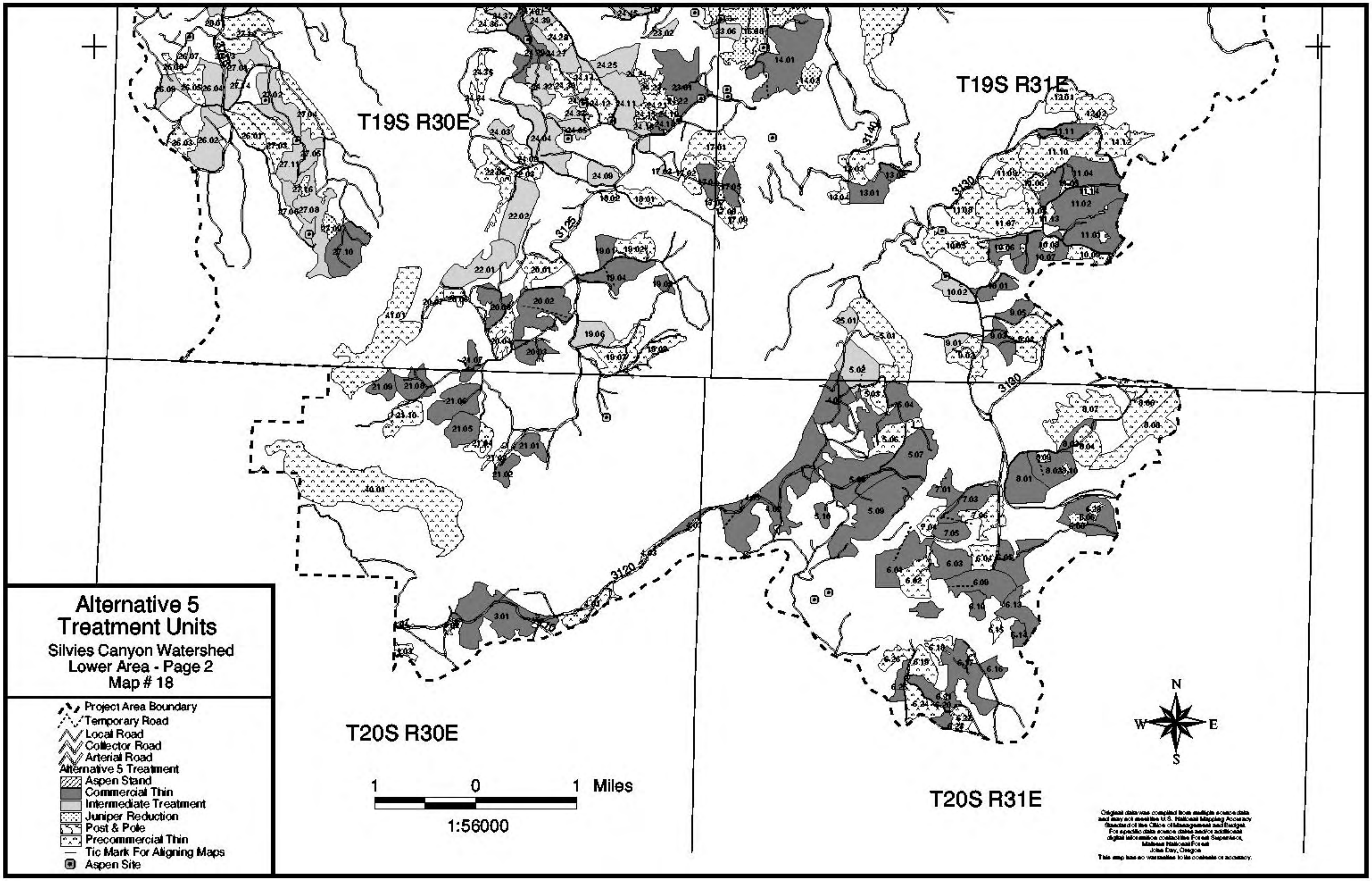
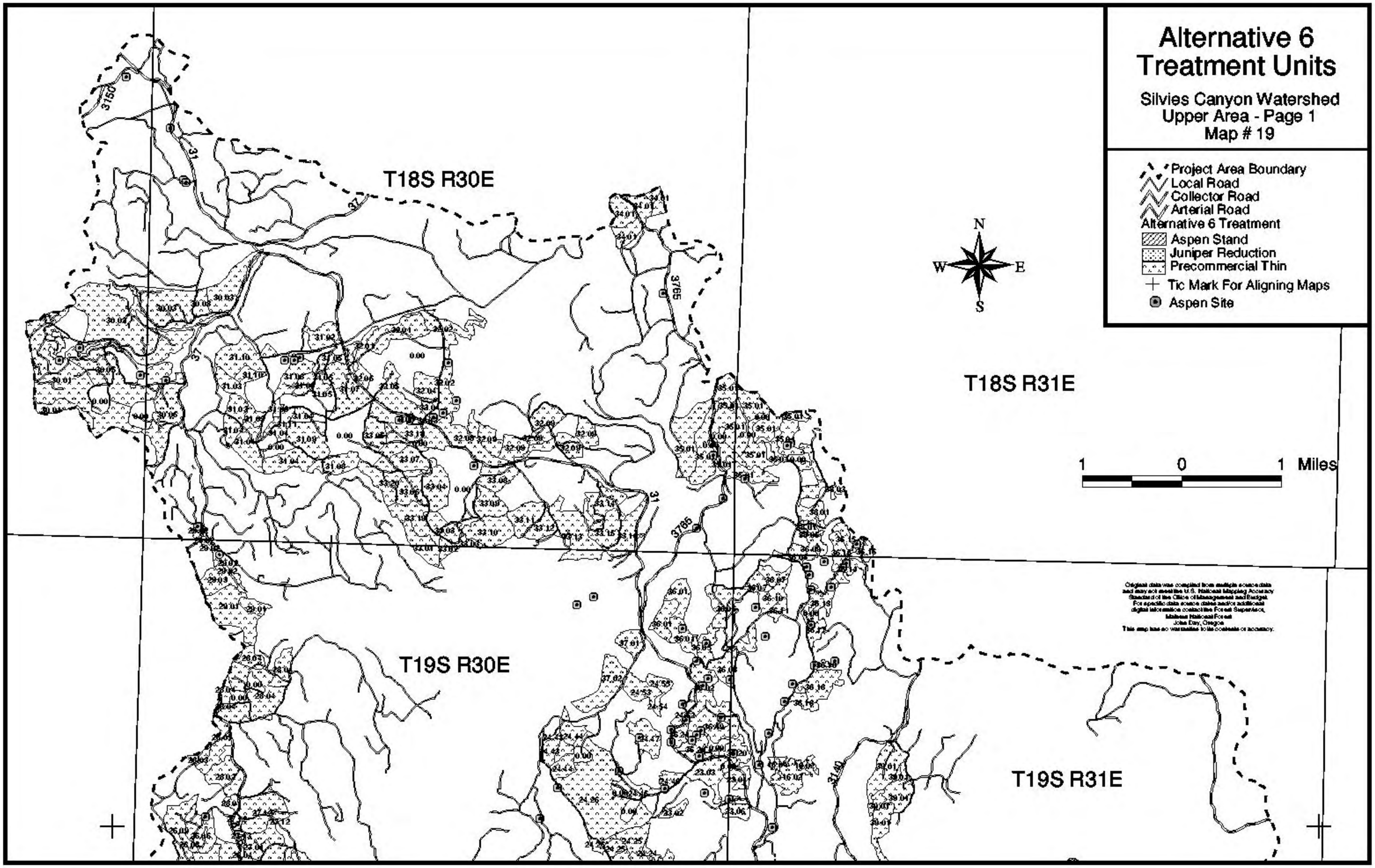
T19S R30E
T19S R31E

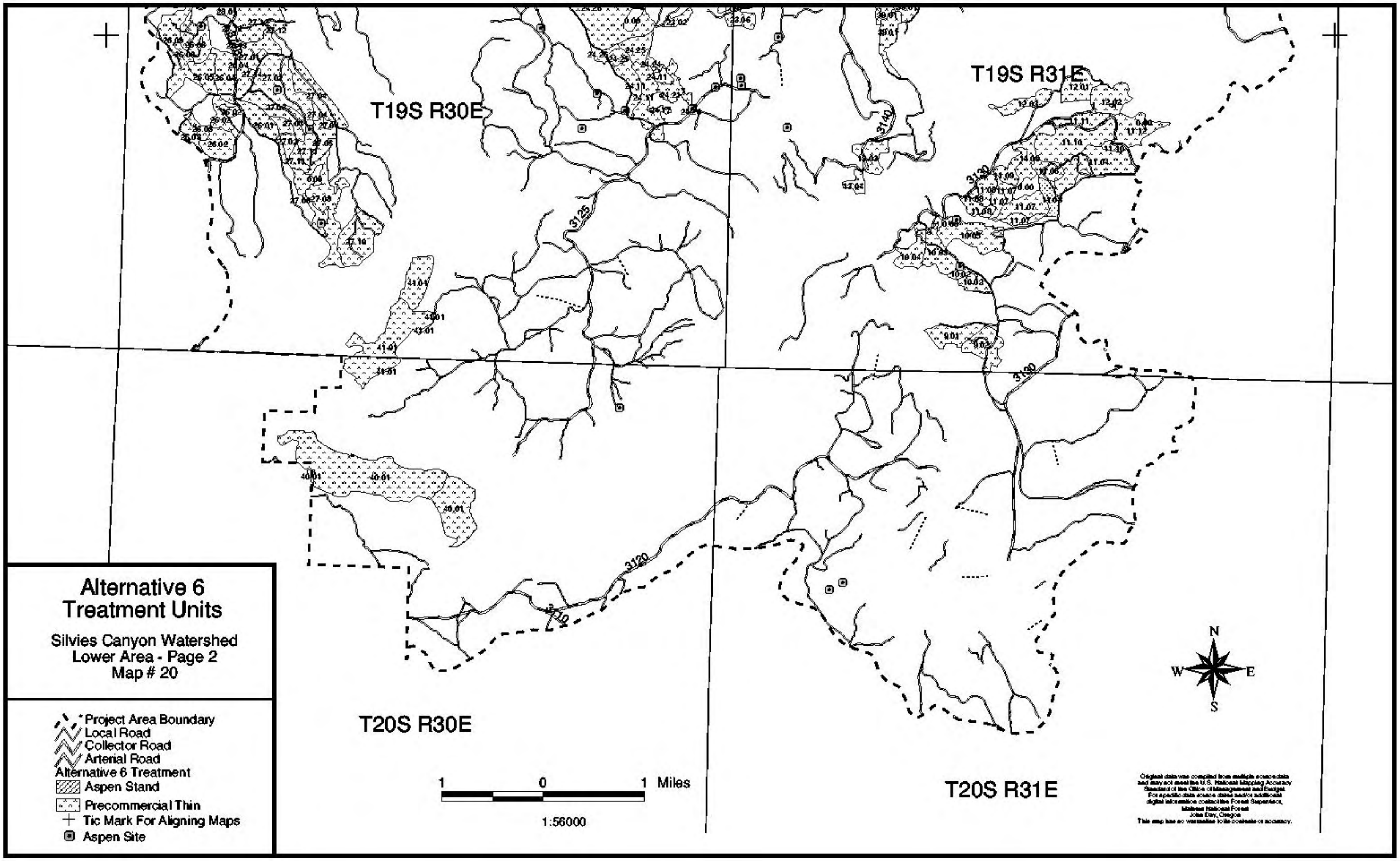

Preferred Alternative &
Alternative 4
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Map # 16
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 7a Treatment Units
Aspen Stand
Commercial Thin
Marginal Commercial Thin
Intermediate Treatment
Marginal Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
T19S R30E
T19S R31E
T20S R30E
T20S R31E
1 0 1 Miles
1:56000
N
W
E
S
3120
3125
3130

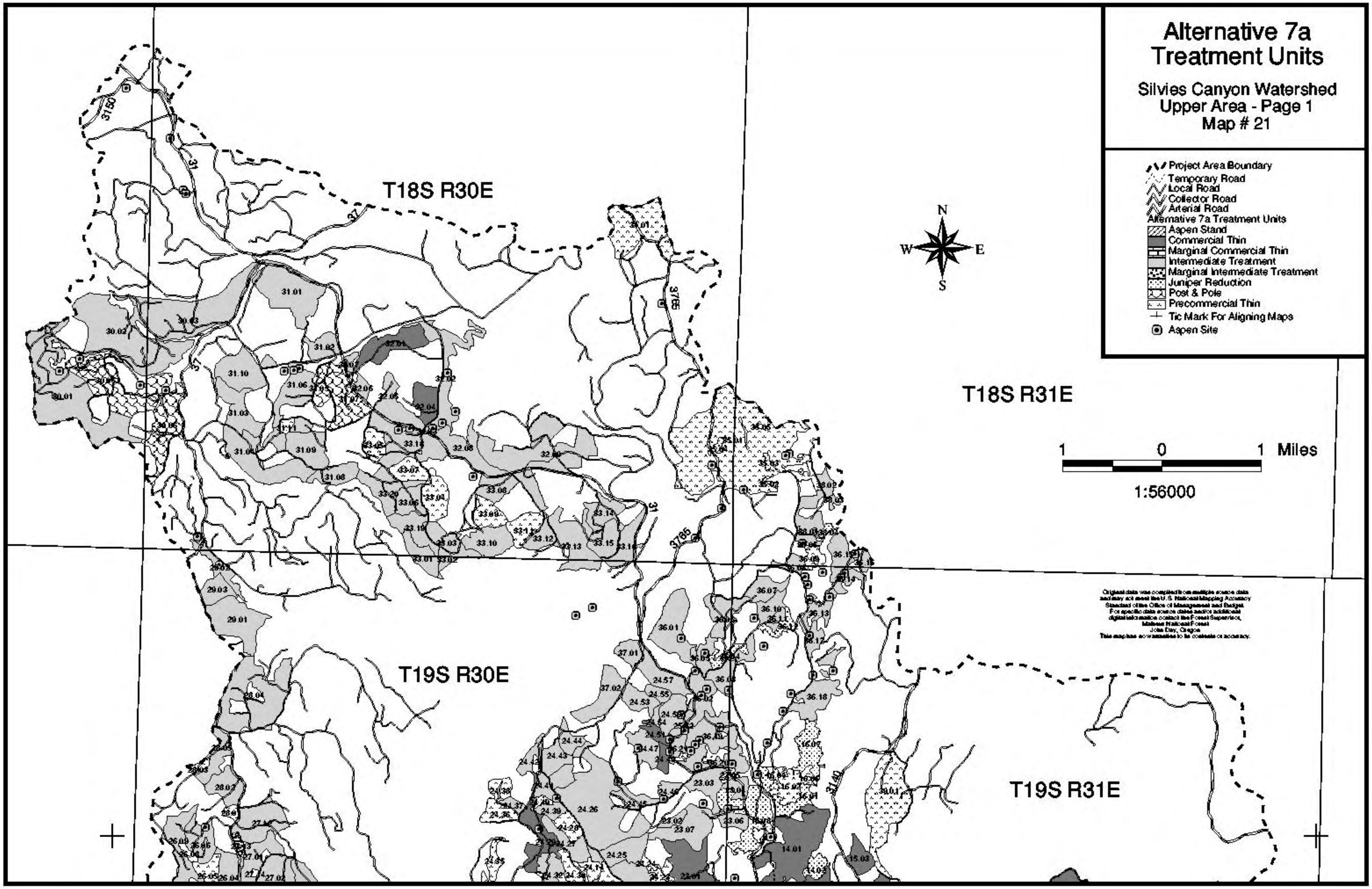

Alternative 5
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Map # 17
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 5 Treatment
Aspen Stand
Commercial Thin
Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
N
W
E
S
1
0
1
Miles
1:56,000
T18S R30E
T18S R31E
T19S R30E
T19S R31E
3150
31
37
3765
3785
3140



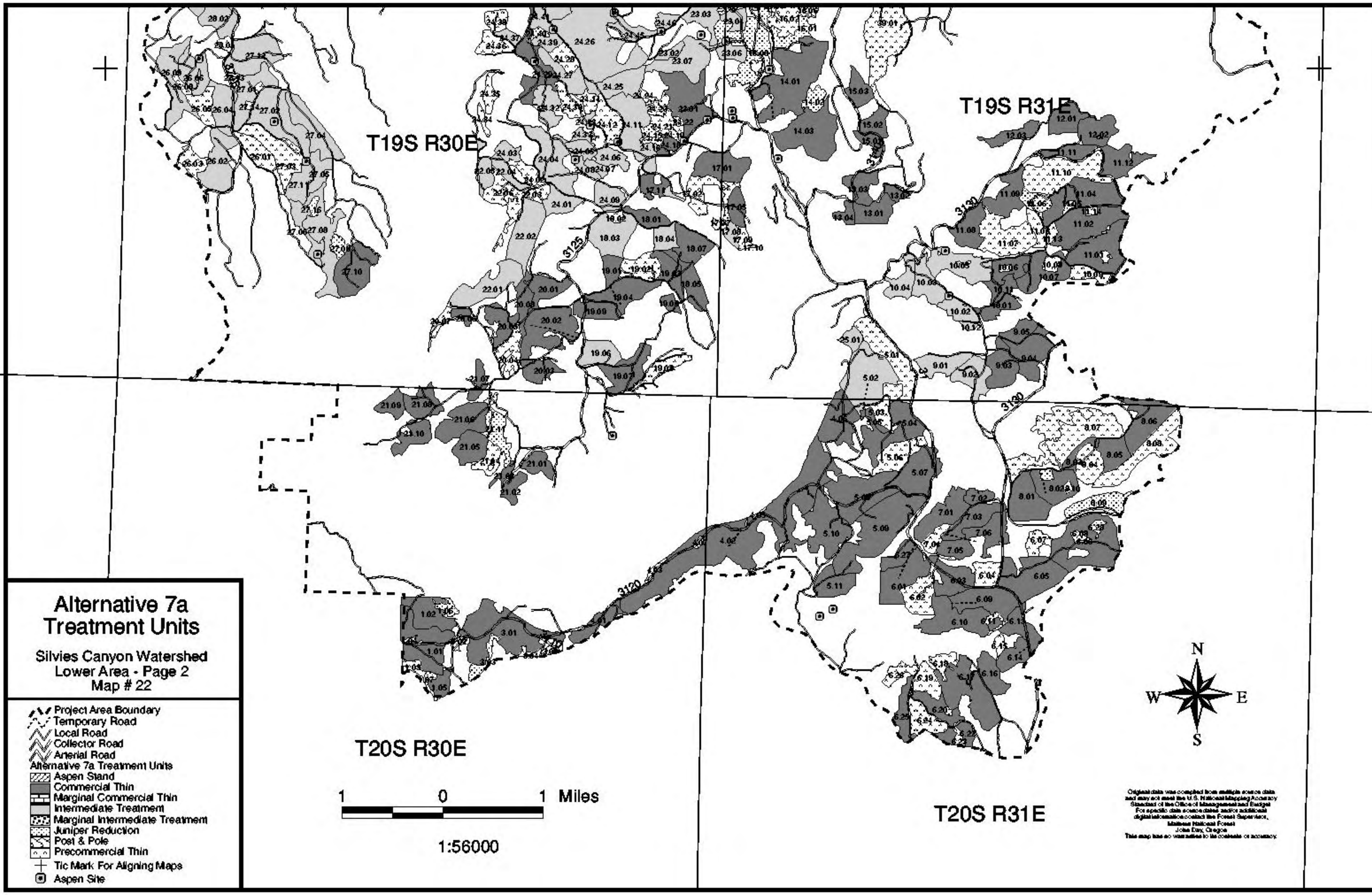
Alternative 5
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Map # 18
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 5 Treatment
Aspen Stand
Commercial Thin
Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
T19S R30E
T19S R31E
T20S R30E
T20S R31E
1 0 1 Miles
1:56000
N
W
E
S
3125
3130
3140
3120

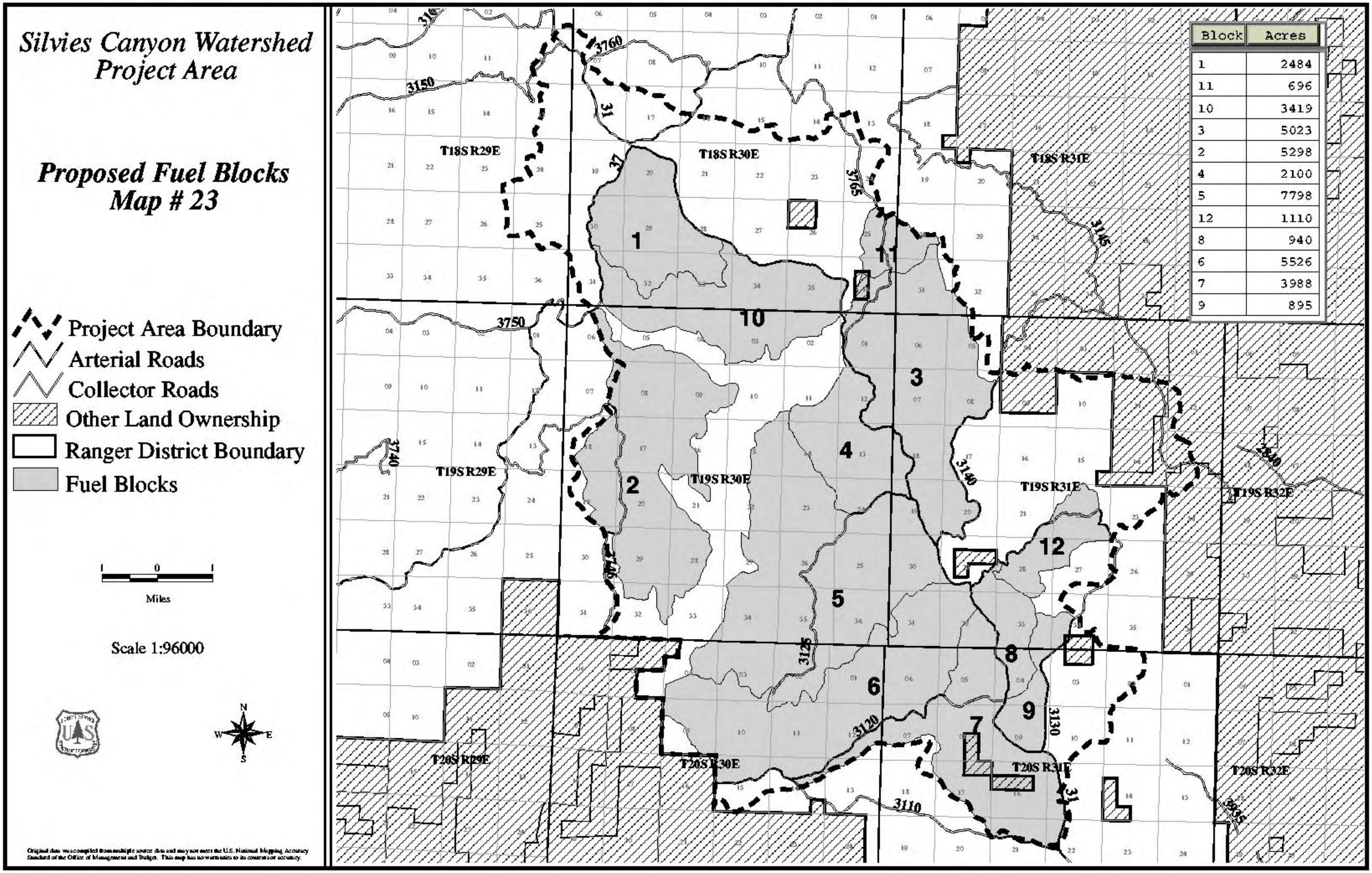

Alternative 6
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Map # 19
Project Area Boundary
Local Road
Collector Road
Arterial Road
Alternative 6 Treatment
Aspen Stand
Juniper Reduction
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
N
S
W
E
1 0 1 Miles
T18S R30E
T18S R31E
T19S R30E
T19S R31E


Alternative 6
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Map # 20
Project Area Boundary
Local Road
Collector Road
Arterial Road
Alternative 6 Treatment
Aspen Stand
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
T19S R30E
T19S R31E
T20S R30E
T20S R31E
1 0 1 Miles
1:56000
N
S
E
W
3125
3120
3130
3140

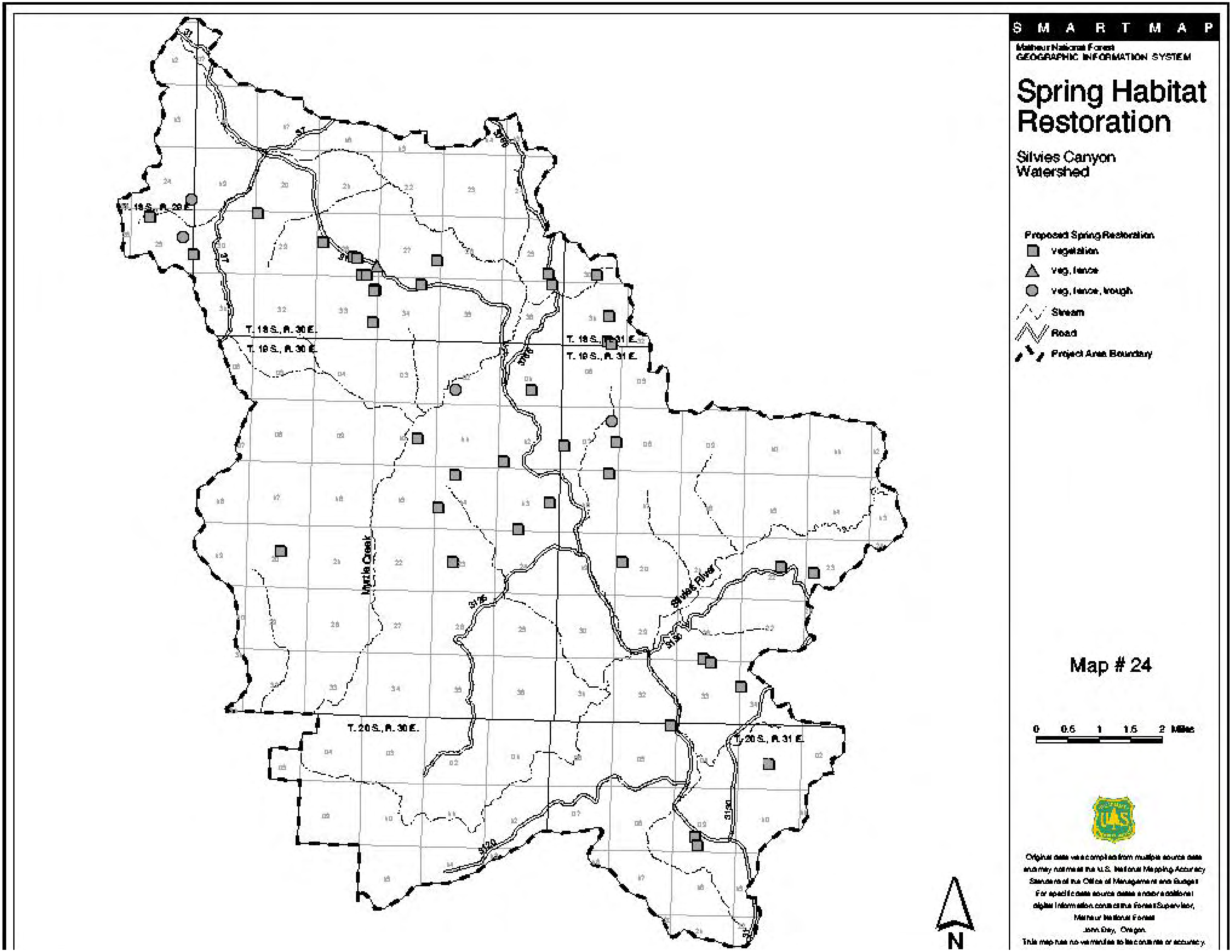


Alternative 7a
Treatment Units
Silvies Canyon Watershed
Upper Area - Page 1
Map # 21
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 7a Treatment Units
Aspen Stand
Commercial Thin
Marginal Commercial Thin
Intermediate Treatment
Marginal Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
T18S R30E
T18S R31E
T19S R30E
T19S R31E
1 0 1 Miles
1:56000
N
S
E
W

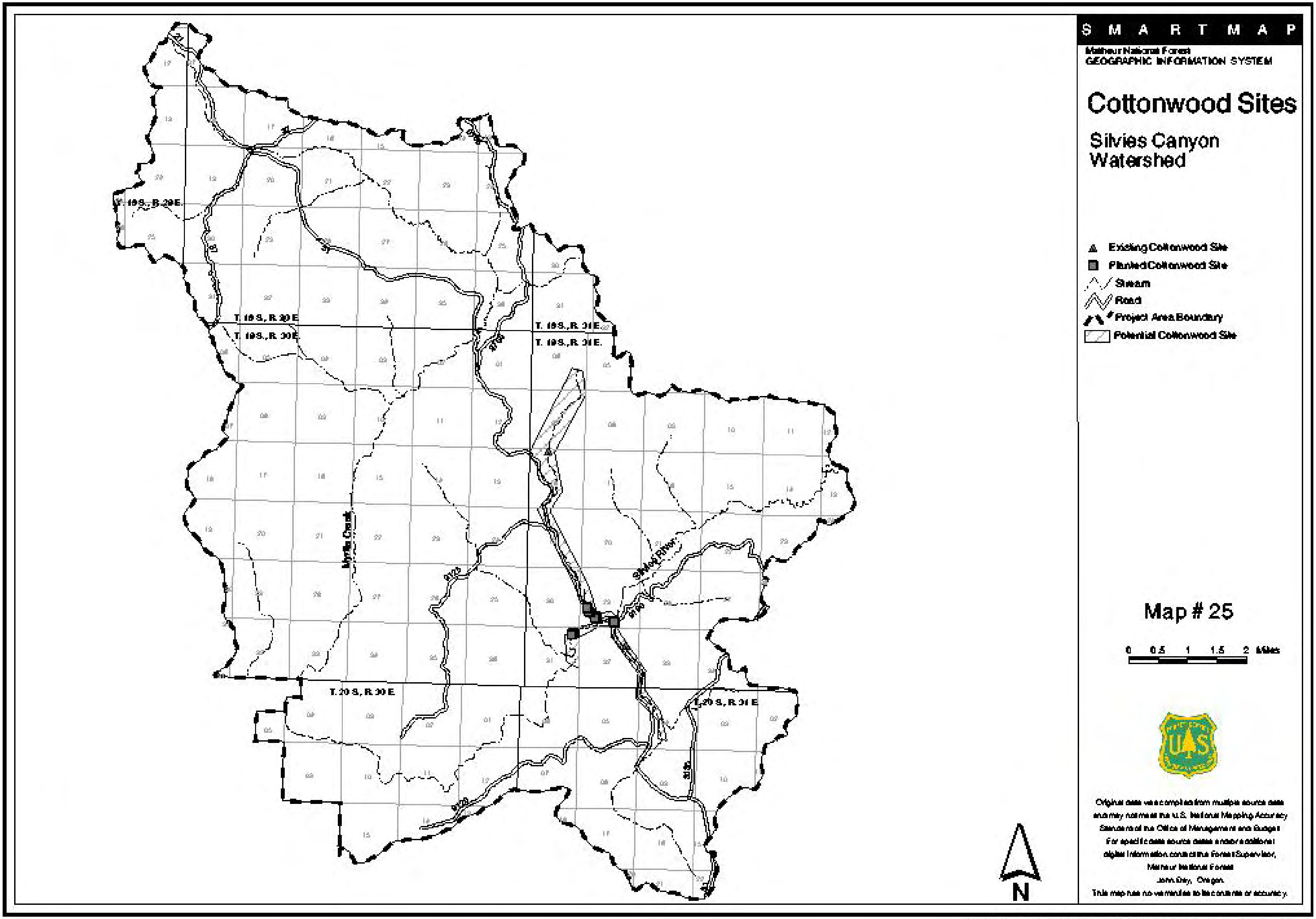

Alternative 7a
Treatment Units
Silvies Canyon Watershed
Lower Area - Page 2
Map # 22
Project Area Boundary
Temporary Road
Local Road
Collector Road
Arterial Road
Alternative 7a Treatment Units
Aspen Stand
Commercial Thin
Marginal Commercial Thin
Intermediate Treatment
Marginal Intermediate Treatment
Juniper Reduction
Post & Pole
Precommercial Thin
Tic Mark For Aligning Maps
Aspen Site
T19S R30E
T19S R31E
T20S R30E
T20S R31E
1 0 1 Miles
1:56000
N
S
E
W



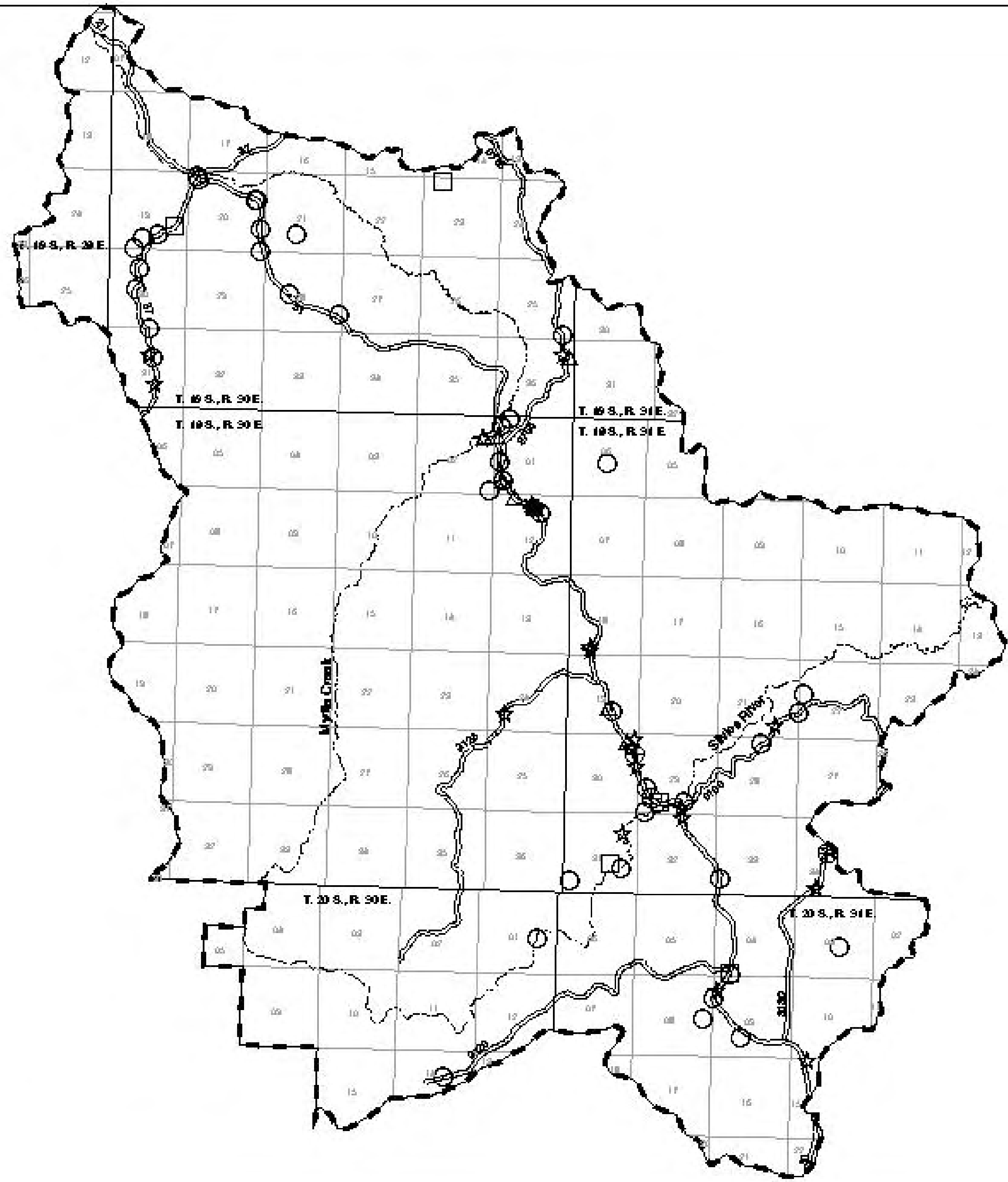
Block	Acres
1	2484
11	696
10	3419
3	5023
2	5298
4	2100
5	7798
12	1110
8	940
6	5526
7	3988
9	895


S M A R T M A P
Malheur National Forest
GEOGRAPHIC INFORMATION SYSTEM
Spring Habitat Restoration
Silvies Canyon Watershed
Proposed Spring Restoration
Vegetation
Veg, fence
Veg, fence, trough
Stream
Road
Project Area Boundary
T. 18 S., R. 30 E.
T. 19 S., R. 30 E.
T. 18 S., R. 31 E.
T. 19 S., R. 31 E.
T. 20 S., R. 30 E.
T. 20 S., R. 31 E.
Myrtle Creek
Silvies River
Map # 24
0 0.5 1 1.5 2 Miles
N
Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standards of the Office of Management and Budget. For specific data source dates and/or additional digital information contact the Forest Supervisor, Malheur National Forest John Day, Oregon. This map has no warranties to its contents or accuracy.

Plot date: Jun. 16, 2003; /go/bu/silcan/arcview/eric/all4spring.apr



Plot date: Dec 22, 2000; /go/bur/f/silican/arcview/eric/cottonwood.apr



SMARTMAP

Malheur National Forest

GEOGRAPHIC INFORMATION SYSTEM

Noxious Weed Old Sites

Silvies Canyon Watershed

Noxious Weed Species

- CANADA THISTLE
- DALMATIAN TOADFLAX
- RUSSIAN KNAPWEED
- SPOTTED KNAPWEED
- ST. JOHNSWORT
- WHITETOP
- Stream
- Road
- Project Area Boundary

Map # 26

0 0.5 1 1.5 2 Miles

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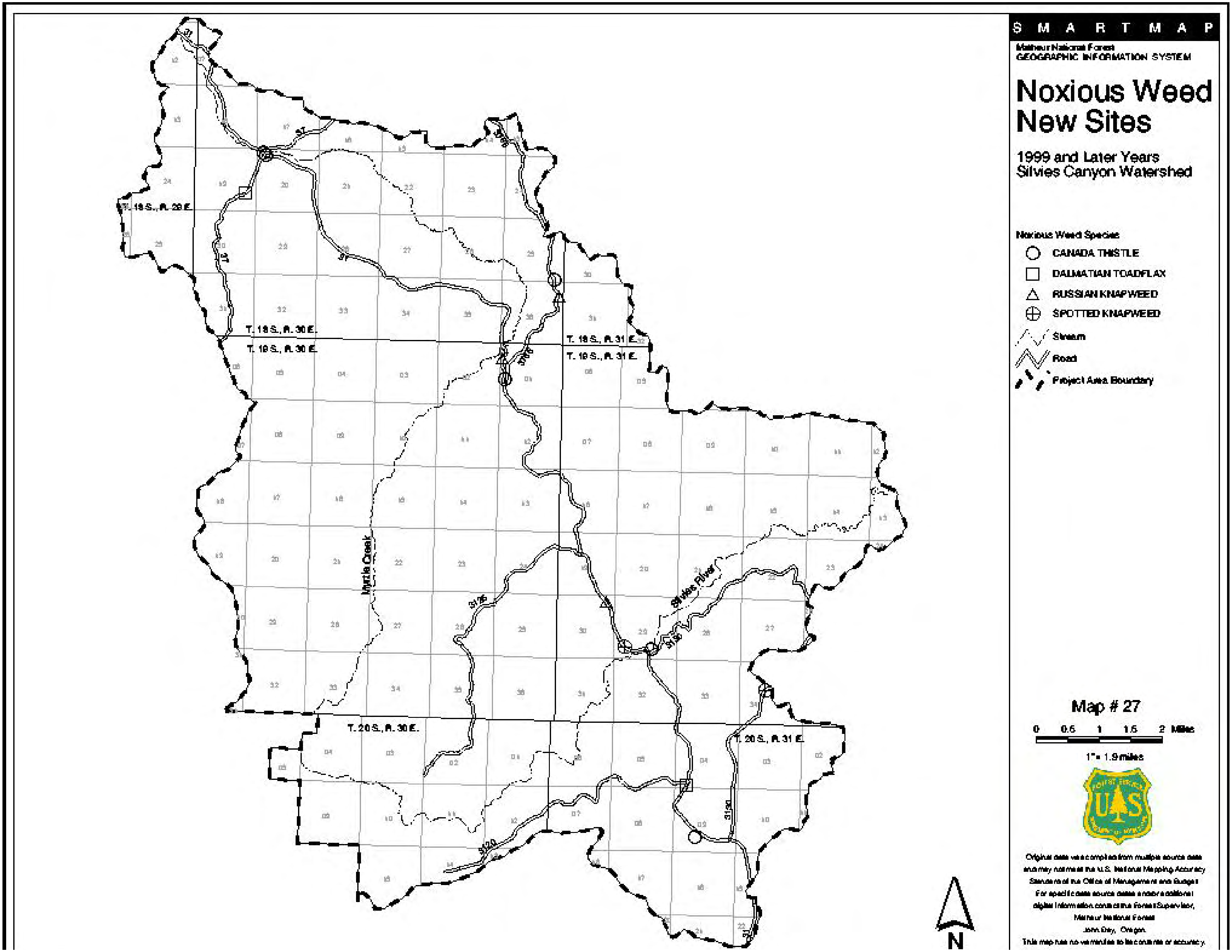
Plot date: Jan 25, 2001; /gis/burd/silican/arcview/eric/nw.apr


S M A R T M A P
Malheur National Forest
GEOGRAPHIC INFORMATION SYSTEM
Noxious Weed New Sites
1999 and Later Years
Silvies Canyon Watershed
Noxious Weed Species
CANADA THISTLE
DALMATIAN TOADFLAX
RUSSIAN KNAPWEED
SPOTTED KNAPWEED
Stream
Road
Project Area Boundary
Map # 27
0 0.5 1 1.5 2 Miles
1" = 1.9 miles
T. 18 S., R. 29 E.
T. 18 S., R. 30 E.
T. 19 S., R. 30 E.
T. 18 S., R. 31 E.
T. 19 S., R. 31 E.
T. 20 S., R. 30 E.
T. 20 S., R. 31 E.
Myrtle Creek
Silvies River
N
Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standards of the Office of Management and Budget.
For specific data source dates and/or additional digital information contact the Forest Supervisor, Malheur National Forest
John Day, Oregon.
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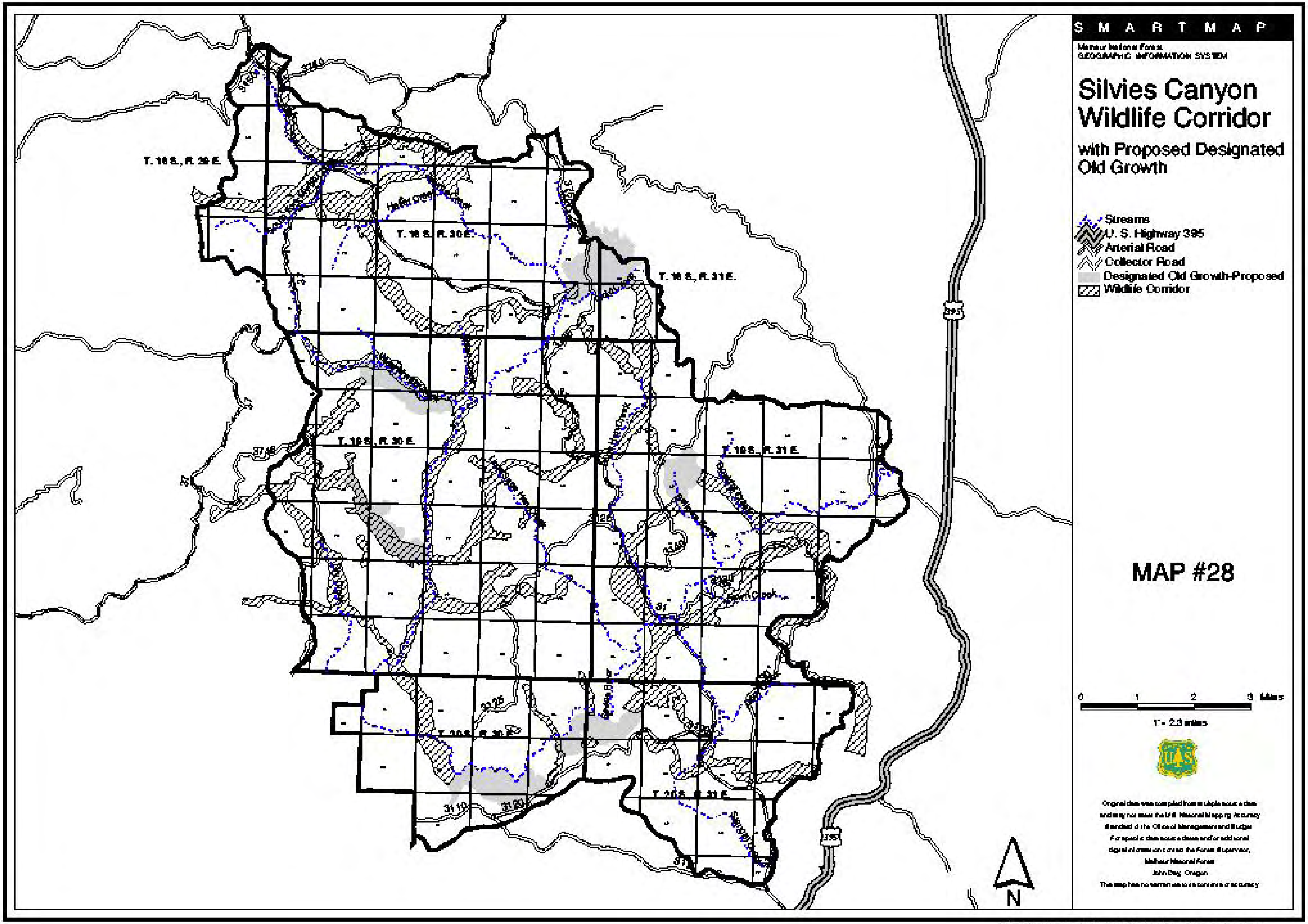
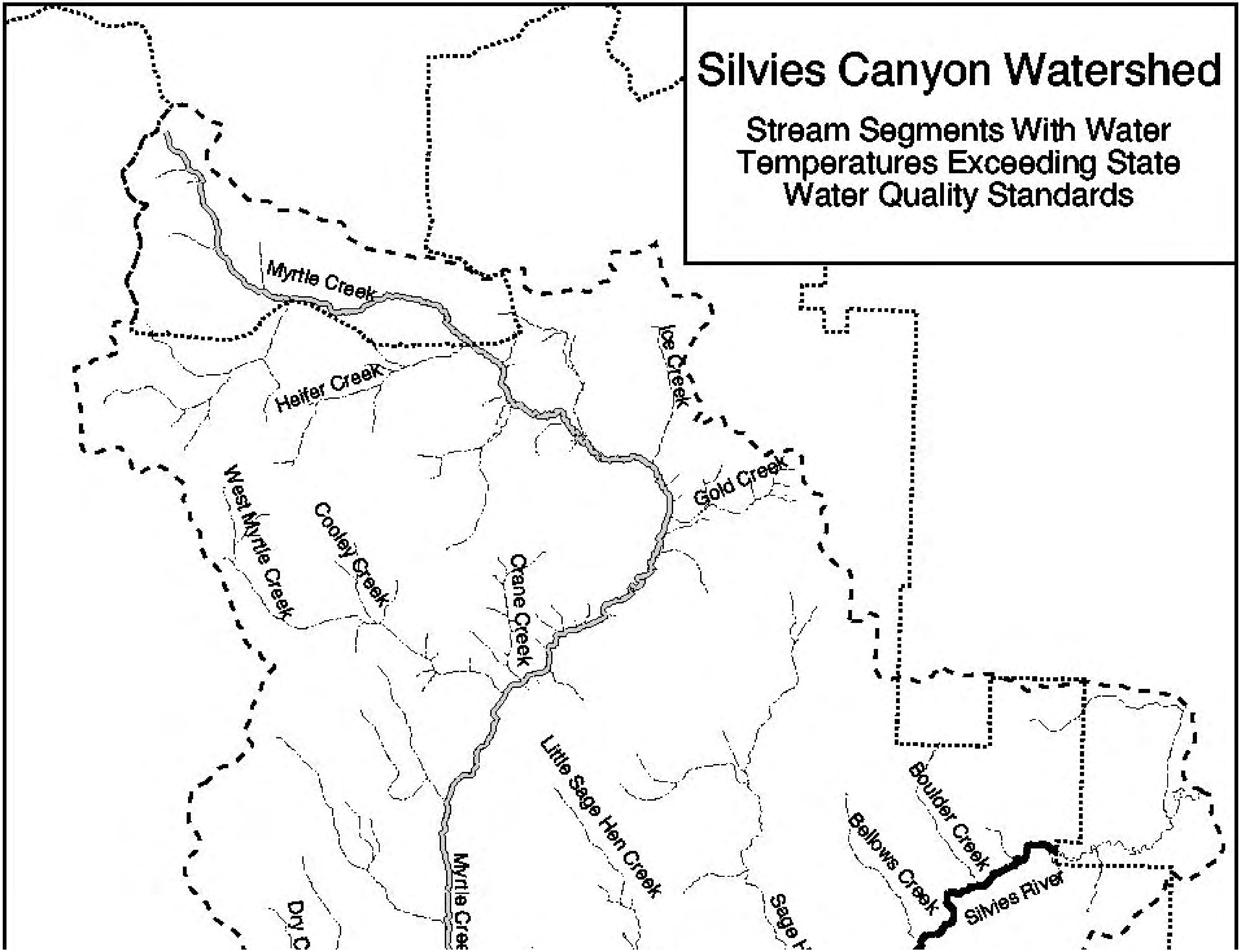
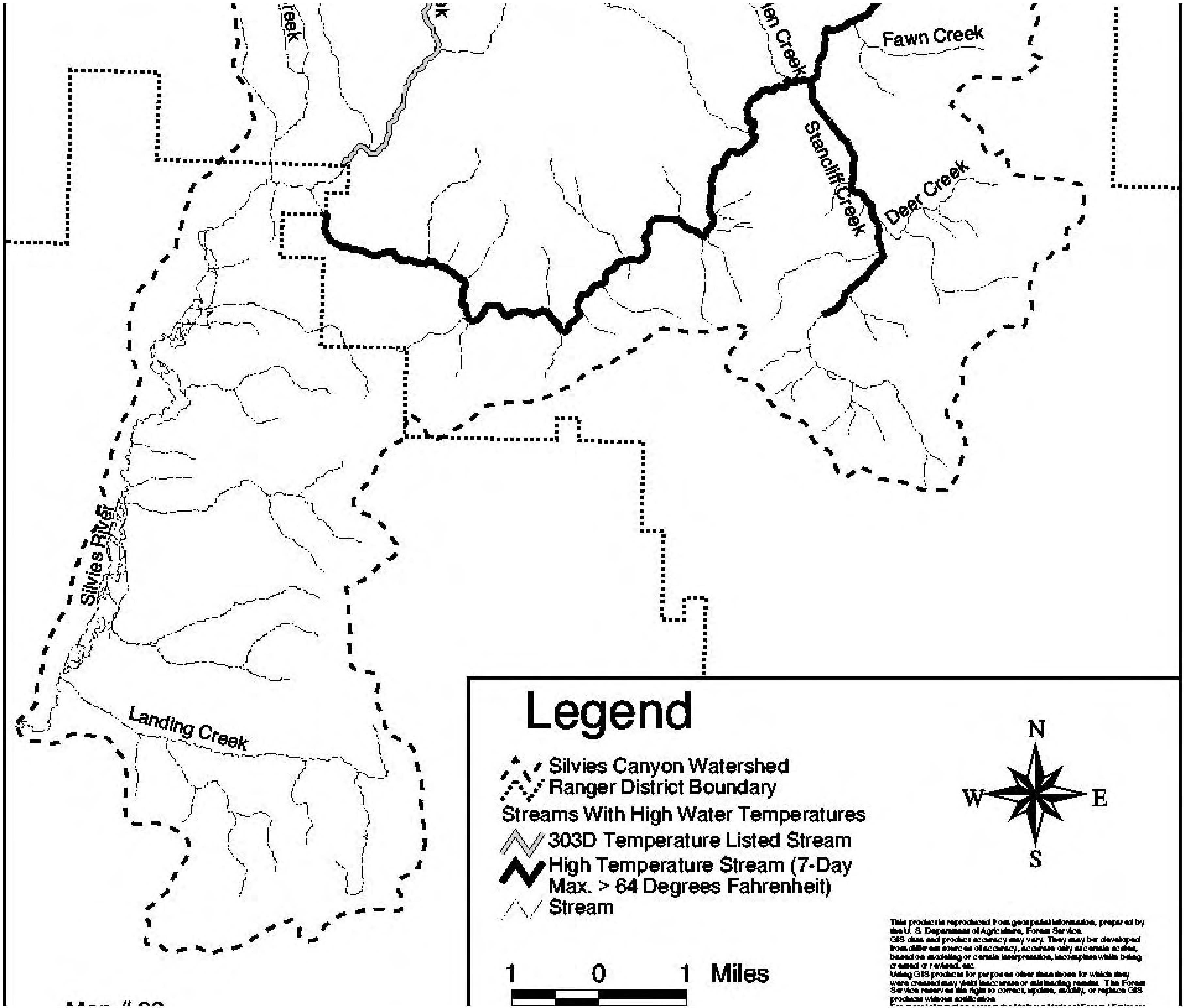
Plot date: Jun 24, 2003; /go/burd/silcan/arcview/eric/nwlels.apr http://www.fs.fed.us/r6/malheur/projects/silvies/maps/map28_wc.jpg



Plot date: Jun 24, 2003

http://www.fs.fed.us/r6/malheur/projects/silvies/maps/map28_wc.jpg6/11/2008 5:24:51 AM


Silvies Canyon Watershed
Stream Segments With Water Temperatures Exceeding State Water Quality Standards
Myrtle Creek
Heifer Creek
Ice Creek
Gold Creek
West Myrtle Creek
Cooley Creek
Crane Creek
Little Sage Hen Creek
Boulder Creek
Bellows Creek
Silvies River
Myrtle Cree
Dry C
Sage

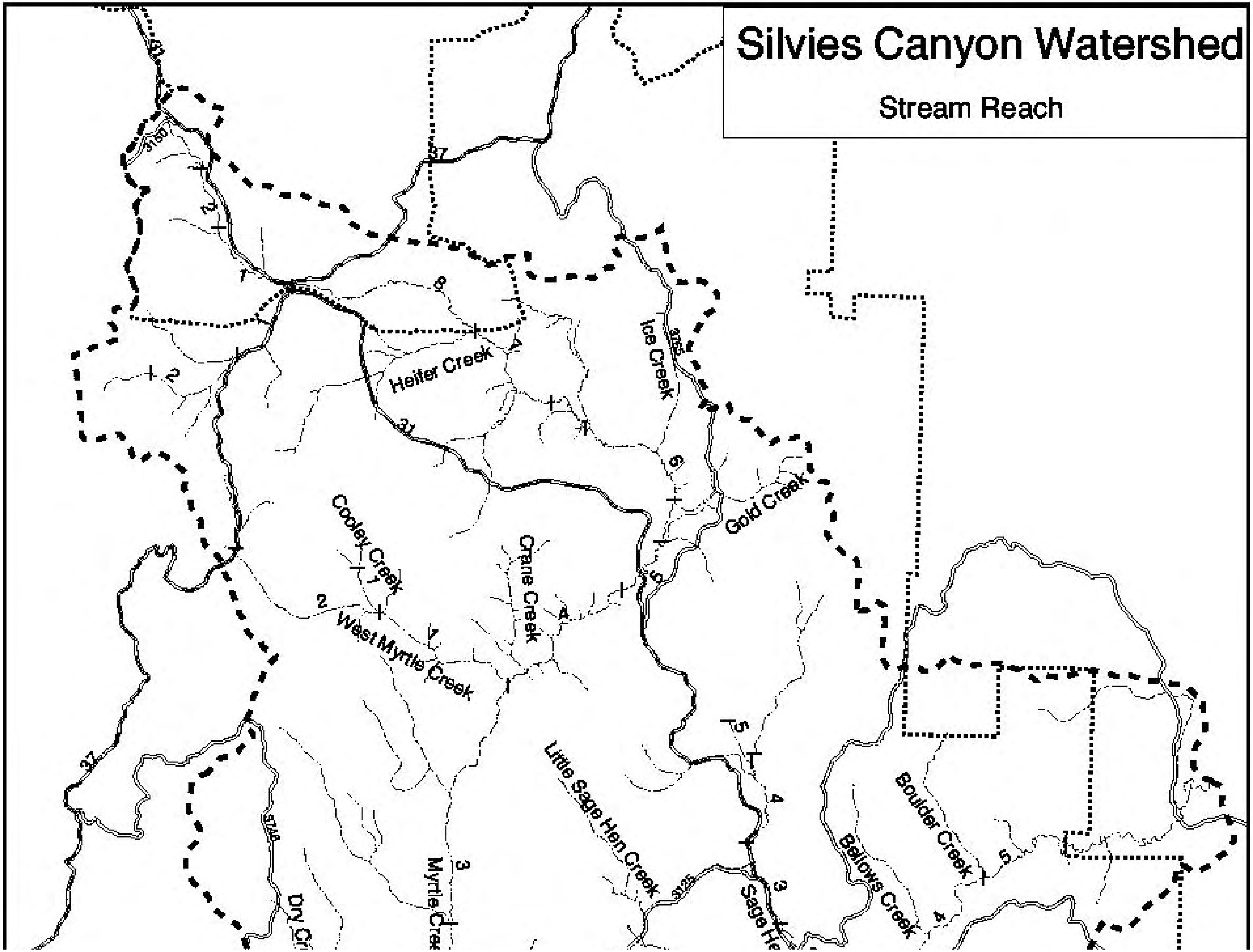

Fawn Creek
Creek
Stancliff Creek
Deer Creek
Silvies River
Landing Creek
Legend
Silvies Canyon Watershed
Ranger District Boundary
Streams With High Water Temperatures
303D Temperature Listed Stream
High Temperature Stream (7-Day Max. > 64 Degrees Fahrenheit)
Stream
N
W
E
S
1 0 1 Miles

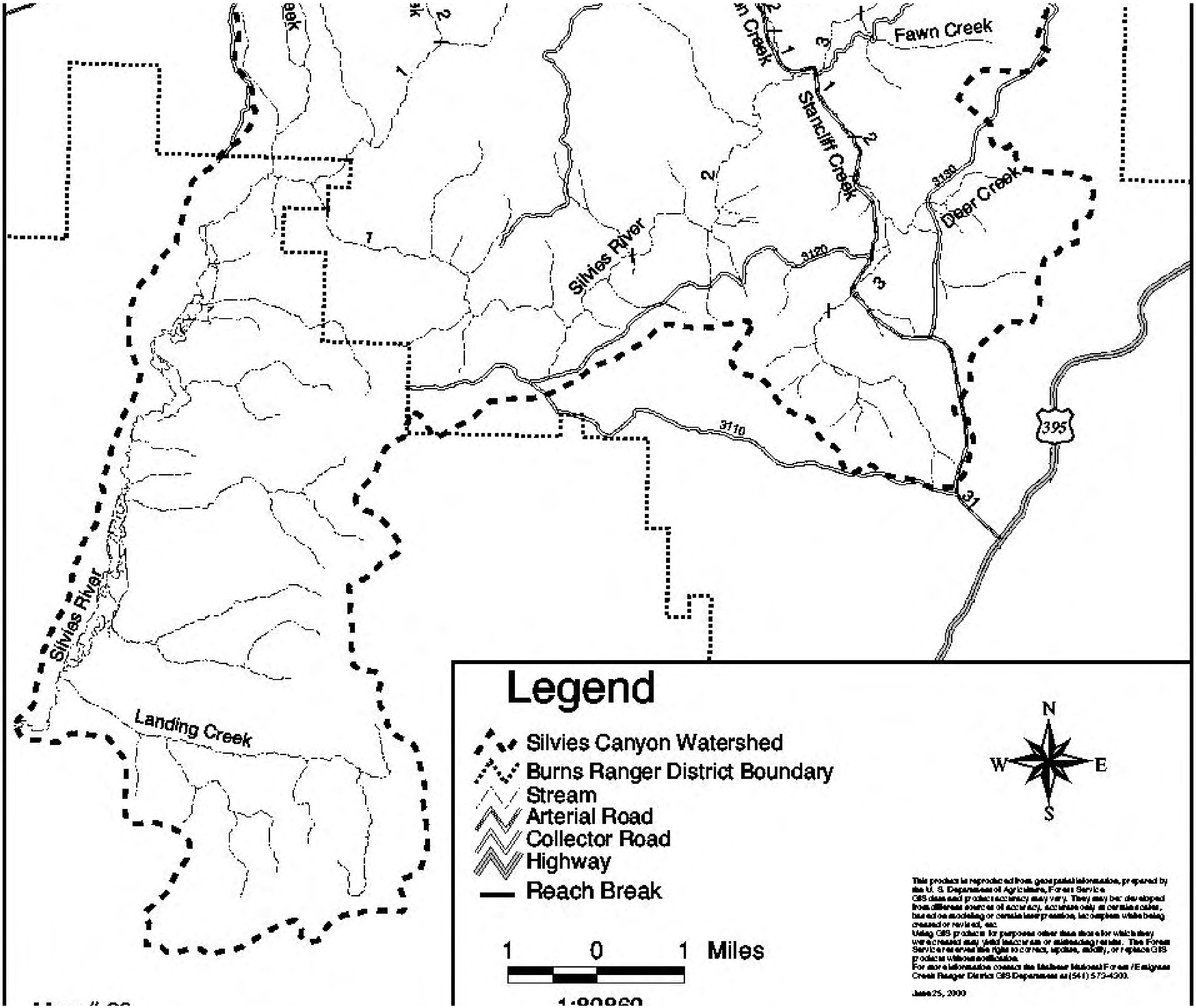
Map # 29

1:89869

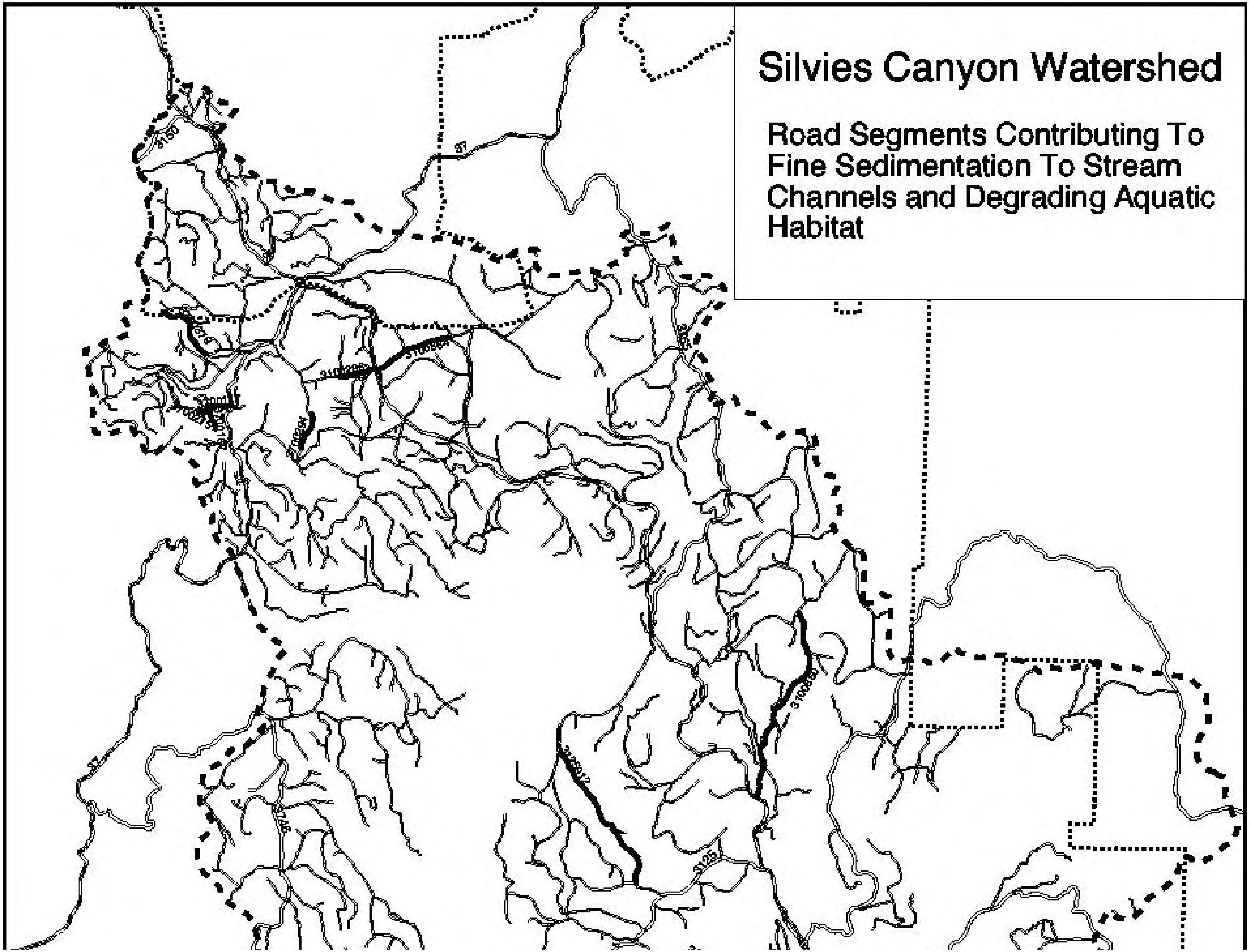
For more information contact the Malheur National Forest / Emigrant Creek Ranger District GIS Department at (541) 573-4300.

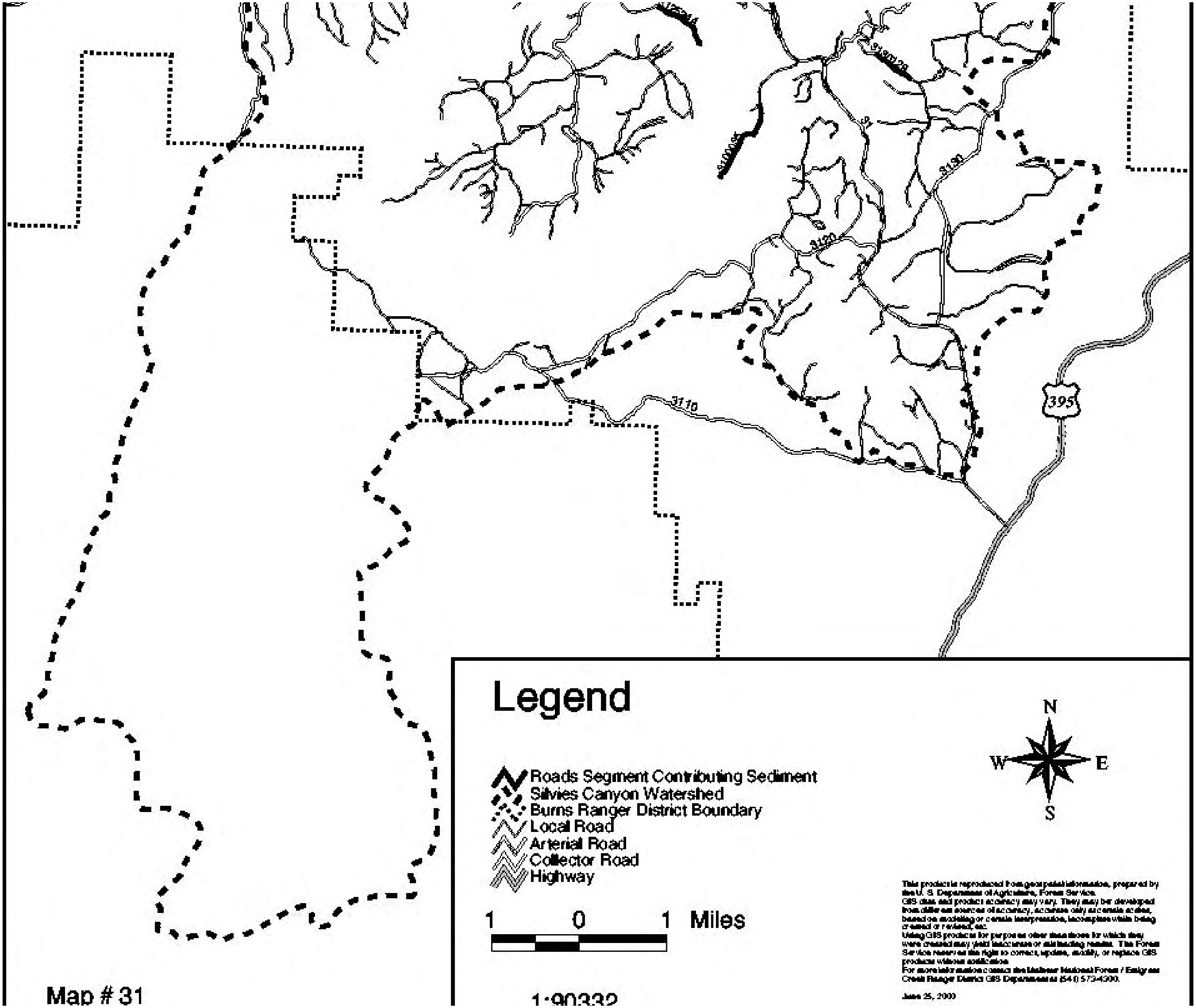
June 25, 2003


Silvies Canyon Watershed
Stream Reach
Heifer Creek
Ice Creek
Gold Creek
Cooley Creek
Crane Creek
West Myrtle Creek
Little Sage Hen Creek
Boulder Creek
Bellows Creek
Myrtle Cree
Sage He
Dry Cr
31
37
3150
3725
3746
3125


Fawn Creek
Stancliff Creek
Deer Creek
Silvies River
Silvies River
Landing Creek
3120
3110
31
395
Legend
Silvies Canyon Watershed
Burns Ranger District Boundary
Stream
Arterial Road
Collector Road
Highway
Reach Break
1 0 1 Miles
N
S
E
W

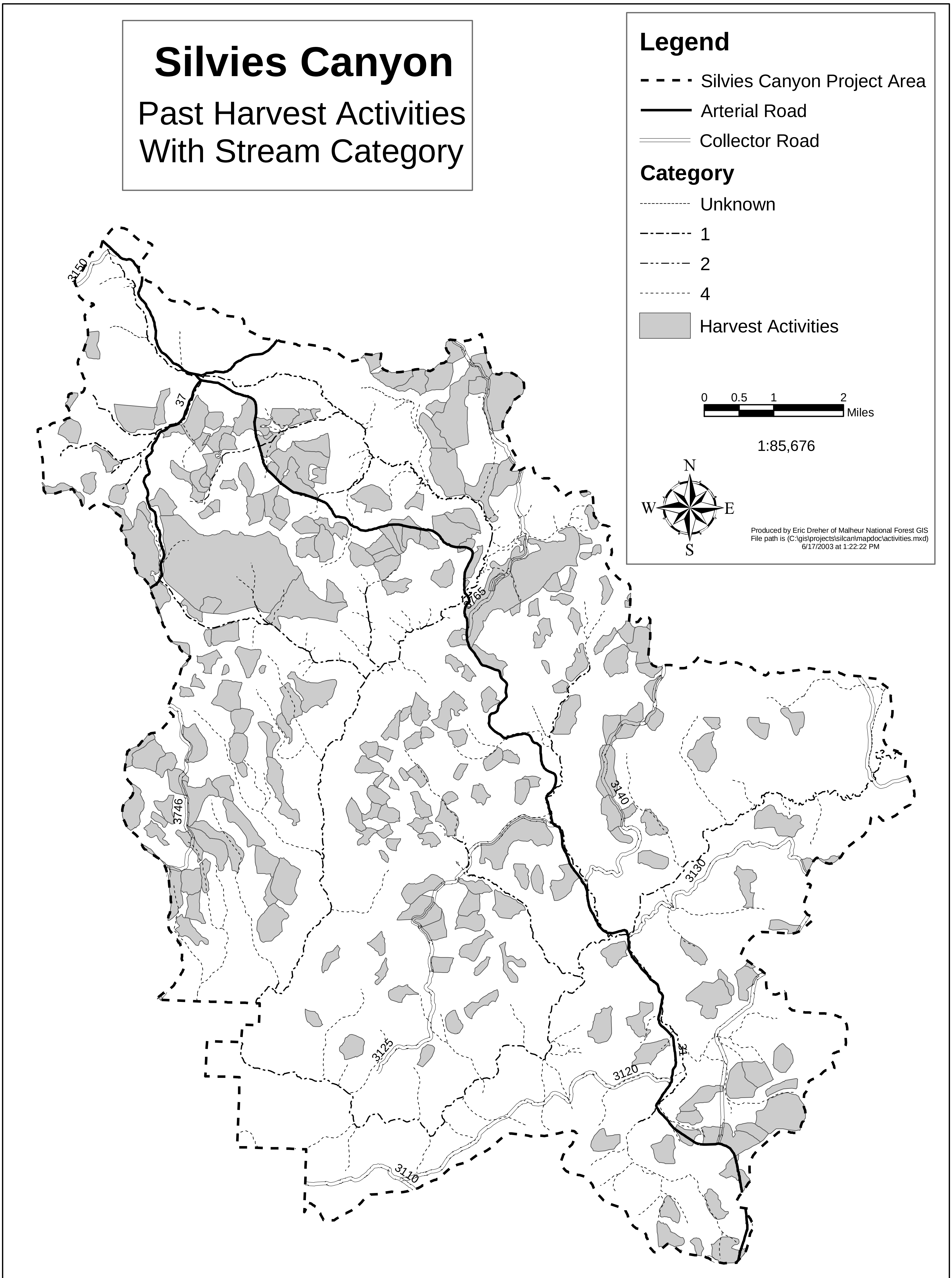
Map # 30	1:69809


Silvies Canyon Watershed
Road Segments Contributing To Fine Sedimentation To Stream Channels and Degrading Aquatic Habitat
3150
37
37

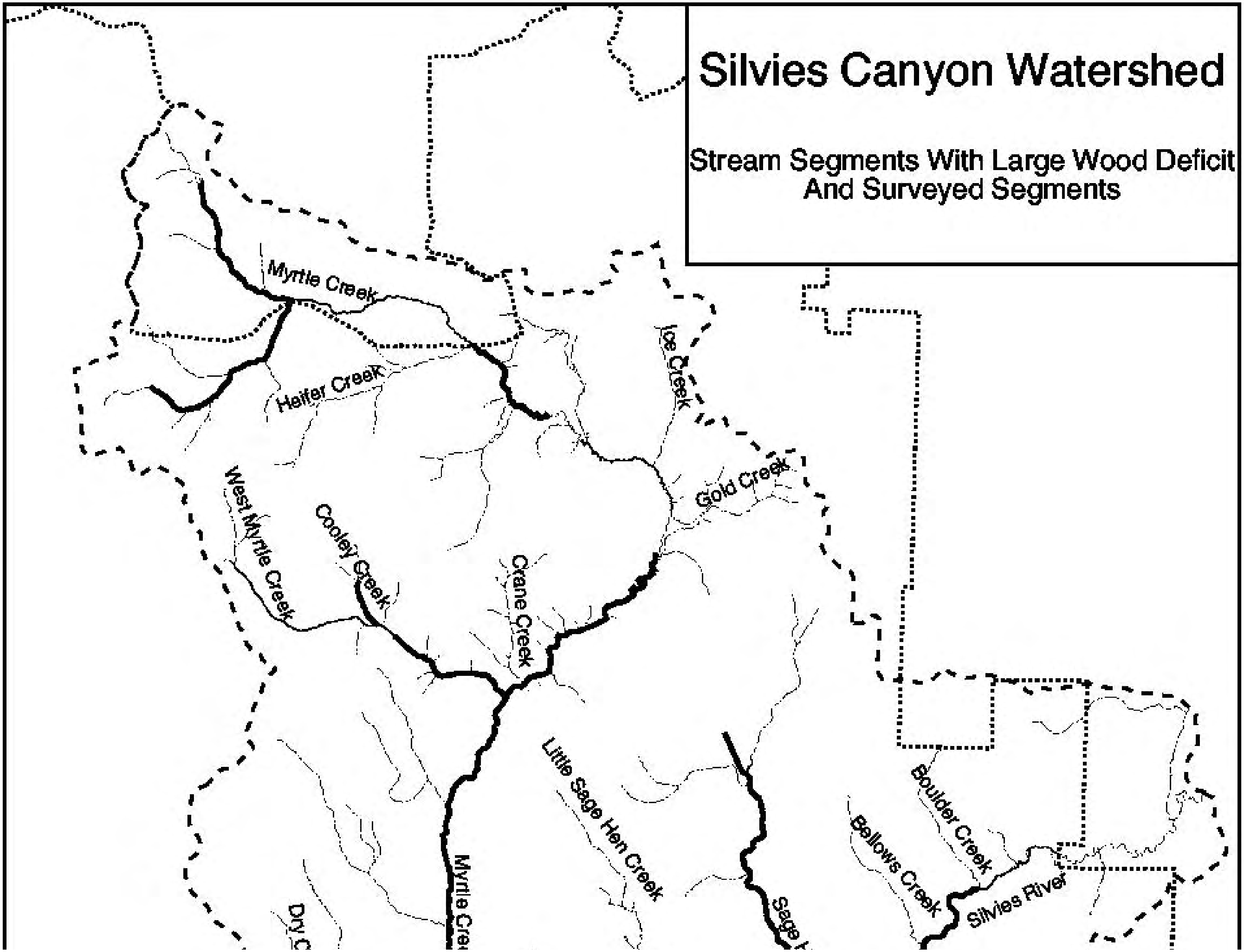

3110
3120
3190
395
Legend
Roads Segment Contributing Sediment
Silvies Canyon Watershed
Burns Ranger District Boundary
Local Road
Arterial Road
Collector Road
Highway
1 0 1 Miles
N
S
E
W
Map # 31

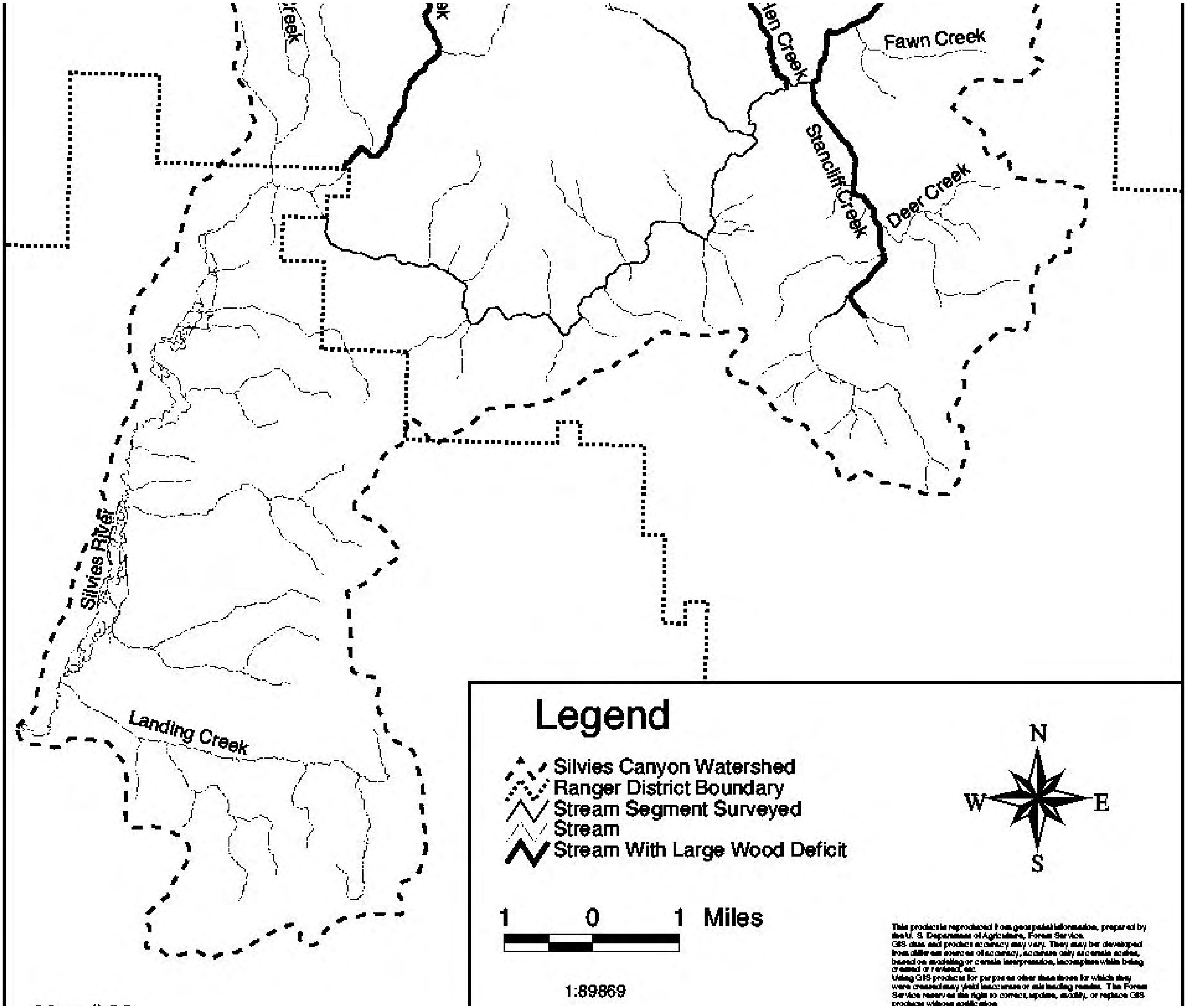
Silvies Canyon

Past Harvest Activities With Stream Category



Map #32


Silvies Canyon Watershed
Stream Segments With Large Wood Deficit
And Surveyed Segments
Myrtle Creek
Heifer Creek
Ice Creek
Gold Creek
West Myrtle Creek
Cooley Creek
Crane Creek
Little Sage Hen Creek
Boulder Creek
Bellows Creek
Silvies River


Fawn Creek
Stancliff Creek
Deer Creek
Silvies River
Landing Creek
Legend
Silvies Canyon Watershed
Ranger District Boundary
Stream Segment Surveyed
Stream
Stream With Large Wood Deficit
N
W
E
S
1 0 1 Miles
1:89869
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Map # 33

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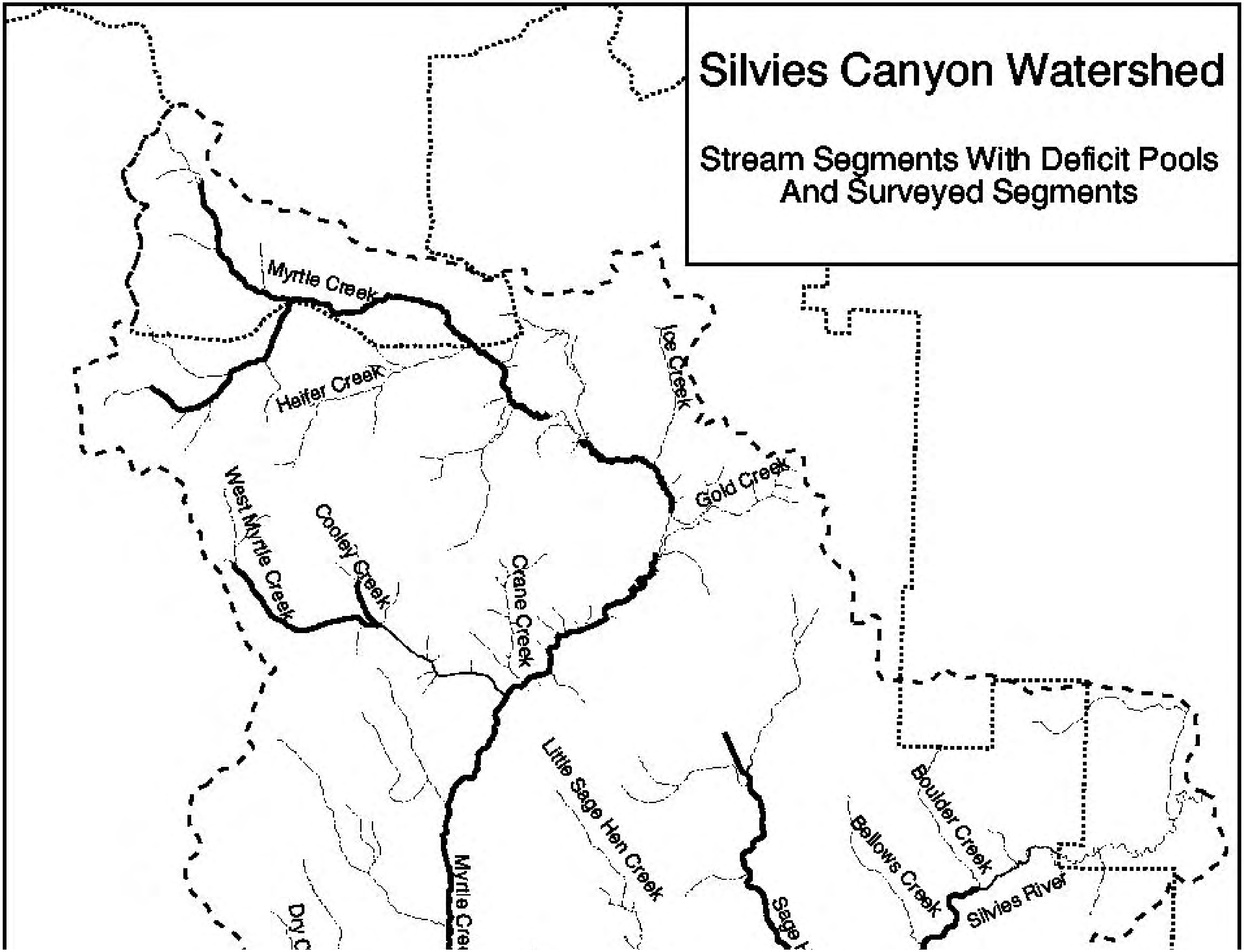
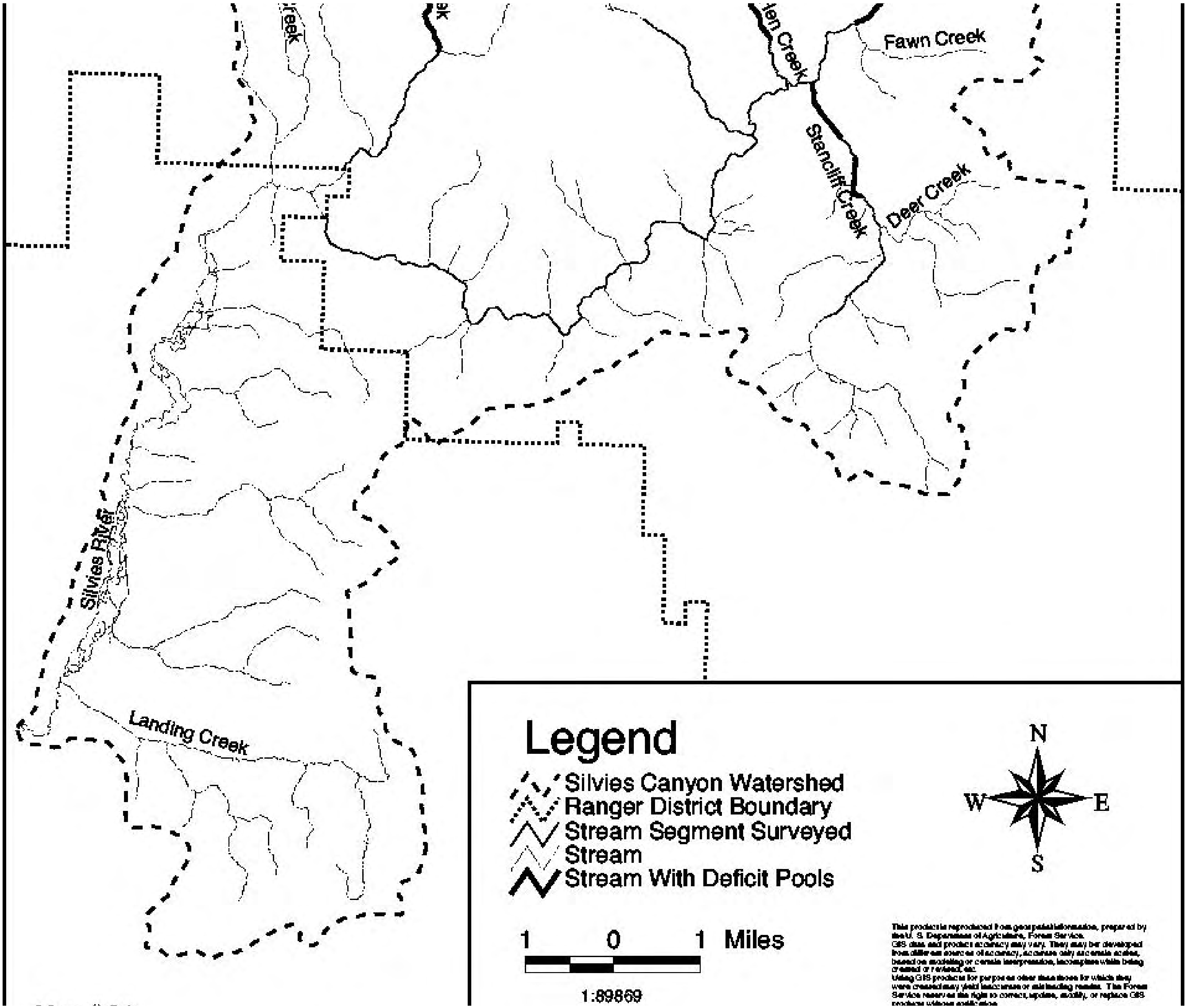
June 24, 2003


Silvies Canyon Watershed
Stream Segments With Deficit Pools
And Surveyed Segments
Myrtle Creek
Heifer Creek
Ice Creek
Gold Creek
West Myrtle Creek
Cooley Creek
Crane Creek
Little Sage Hen Creek
Boulder Creek
Bellows Creek
Silvies River


Fawn Creek
Stancliff Creek
Deer Creek
Silvies River
Landing Creek
Legend
Silvies Canyon Watershed
Ranger District Boundary
Stream Segment Surveyed
Stream
Stream With Deficit Pools
1 0 1 Miles
1:89869
N
W
E
S

Map # 34

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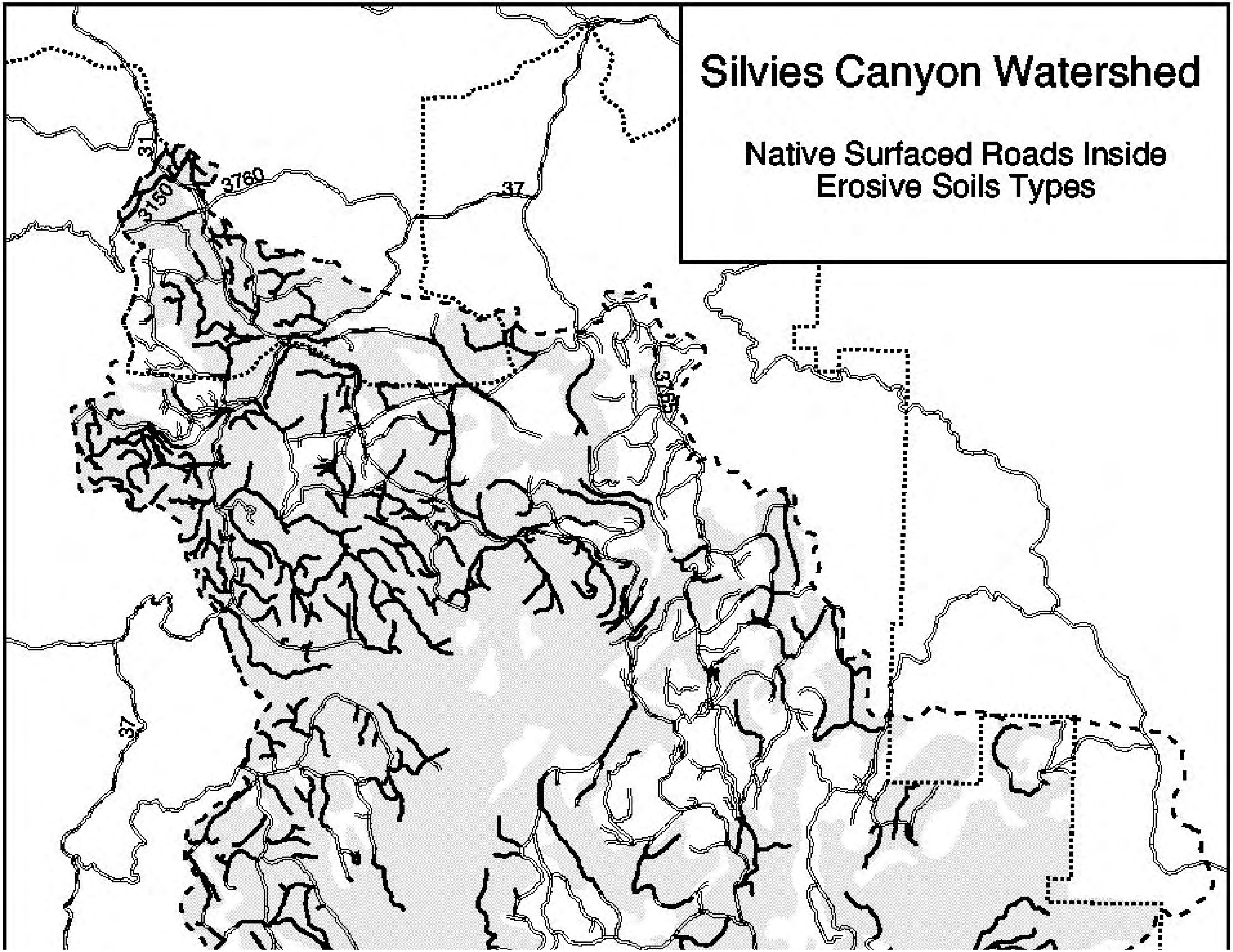
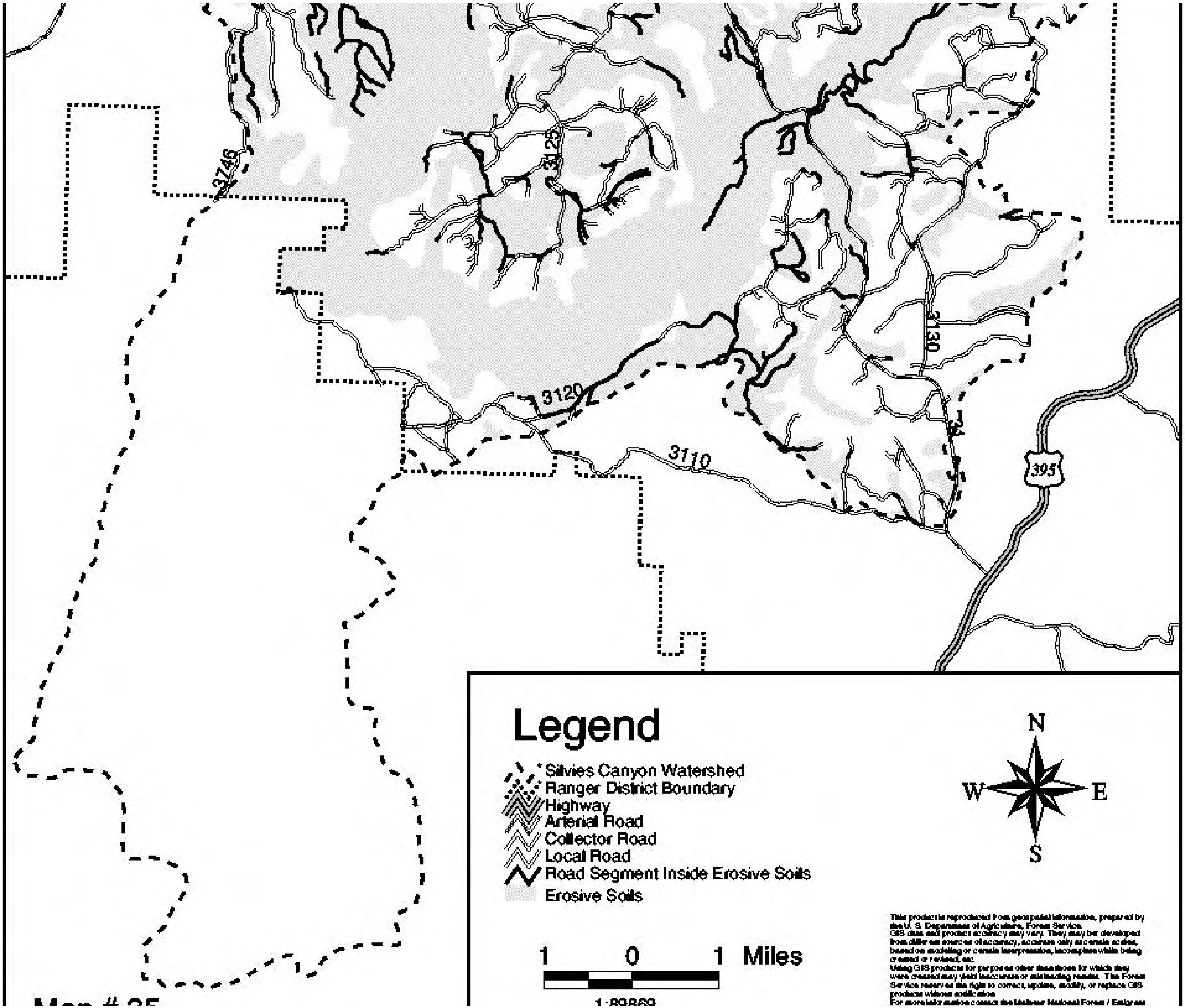
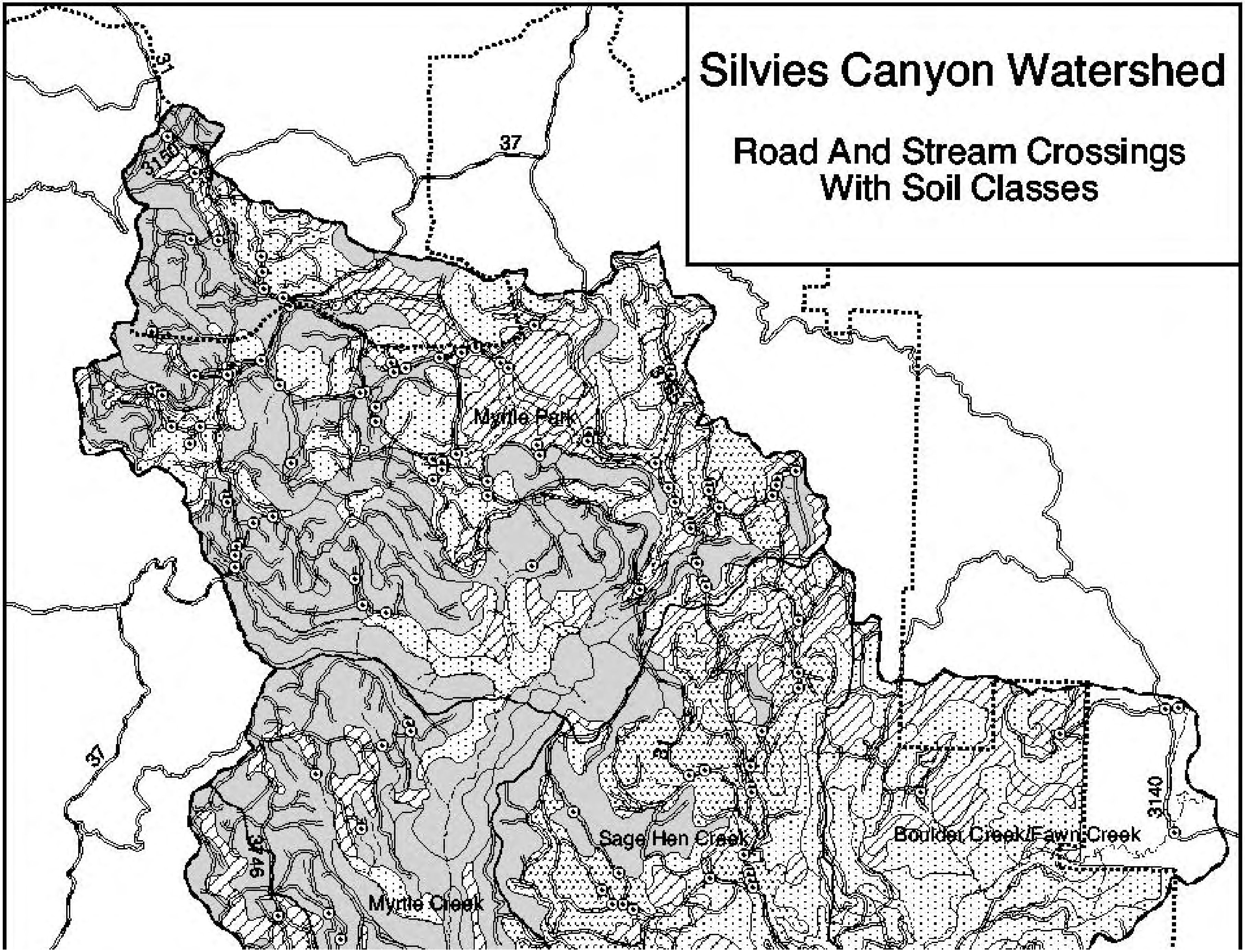
June 24, 2007

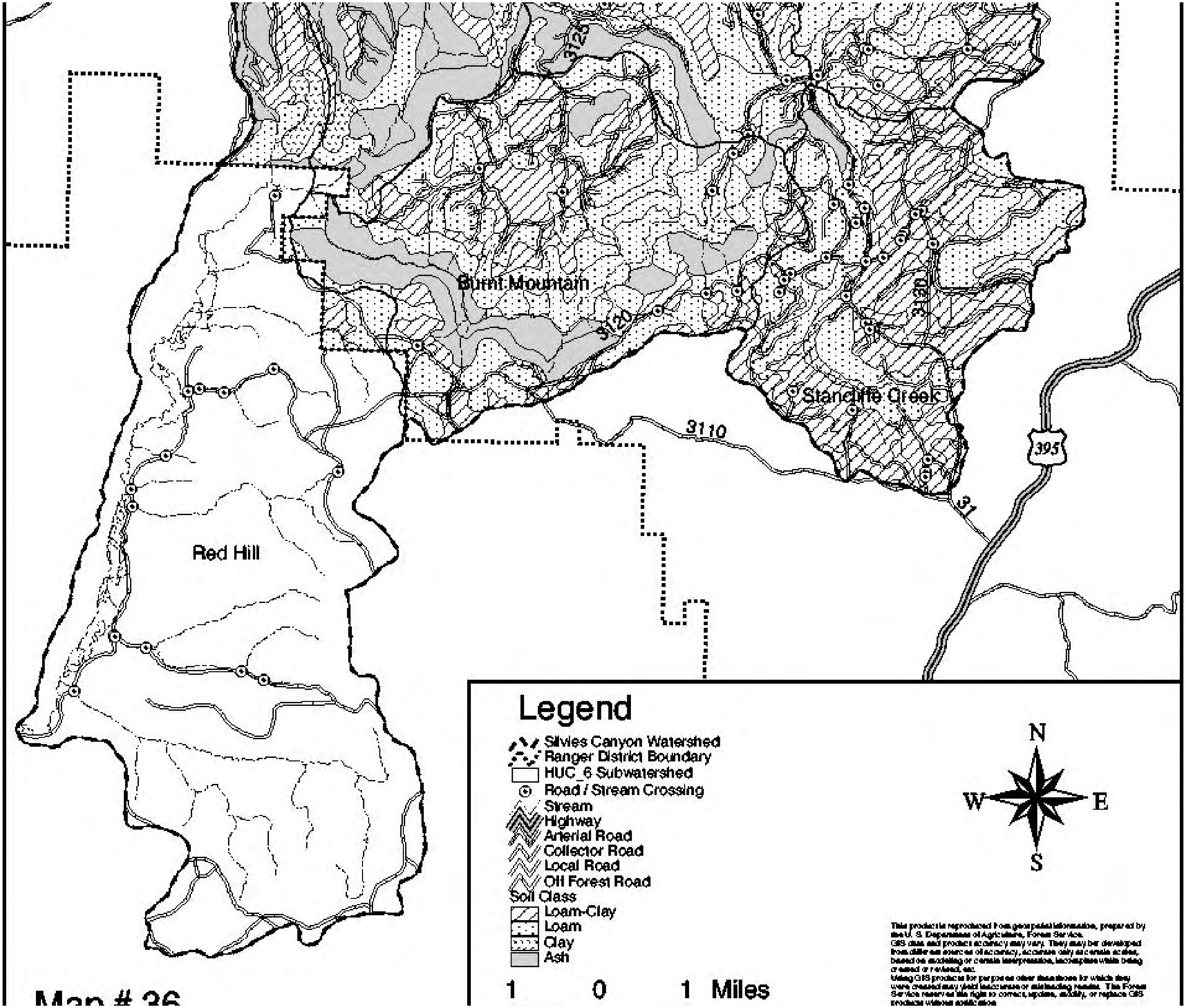

Silvies Canyon Watershed
Native Surfaced Roads Inside
Erosive Soils Types
31
3150
3760
37
37


3746
3125
3120
3110
3130
395
Legend
Silvies Canyon Watershed
Ranger District Boundary
Highway
Arterial Road
Collector Road
Local Road
Road Segment Inside Erosive Soils
Erosive Soils
N
W
E
S
1 0 1 Miles

Map # 35

Creek Ranger District GIS Department (541) 575-4300.
June 24, 2003


Silvies Canyon Watershed
Road And Stream Crossings
With Soil Classes
31
3150
37
Myrtle Park
37
3746
Myrtle Creek
Sage Hen Creek
Boulder Creek/Fawn Creek
3140


3125
Burnt Mountain
3120
3110
3130
Standliffe Creek
395
31
Red Hill
Legend
Silvies Canyon Watershed
Ranger District Boundary
HUC_6 Subwatershed
Road / Stream Crossing
Stream
Highway
Arterial Road
Collector Road
Local Road
Off Forest Road
Soil Class
Loam-Clay
Loam
Clay
Ash
1 0 1 Miles
N
W
E
S

Map # 36

1:89869

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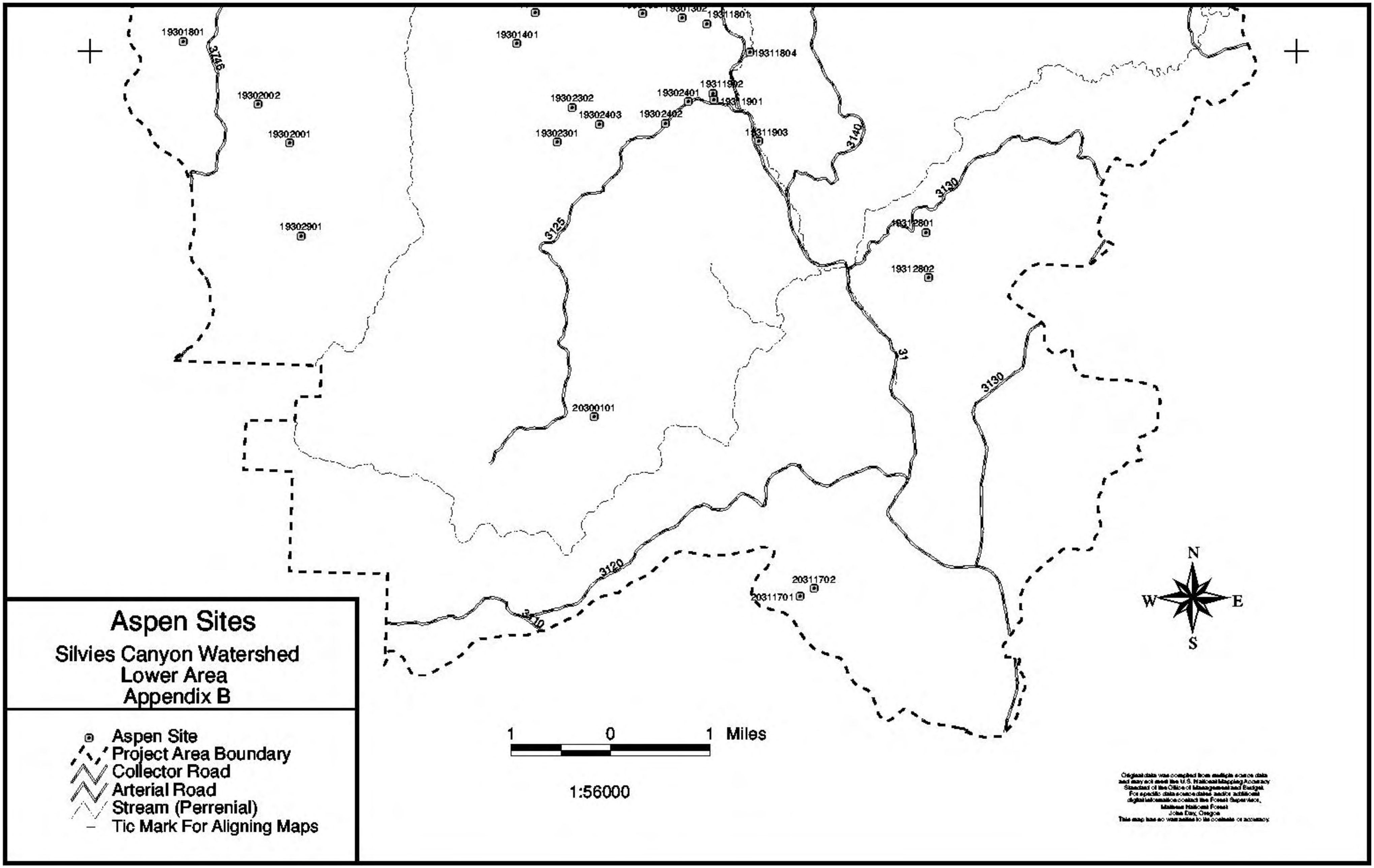
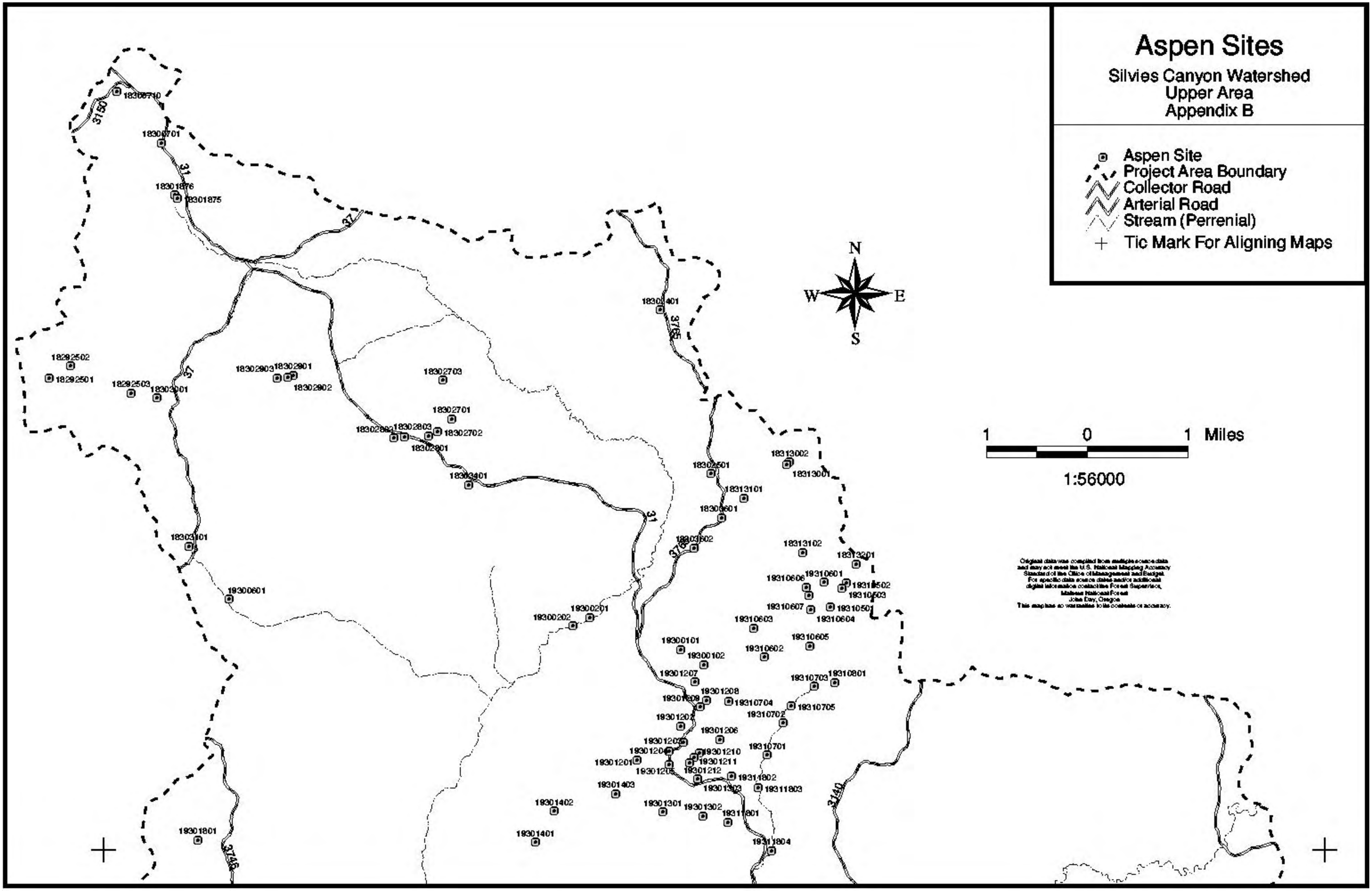
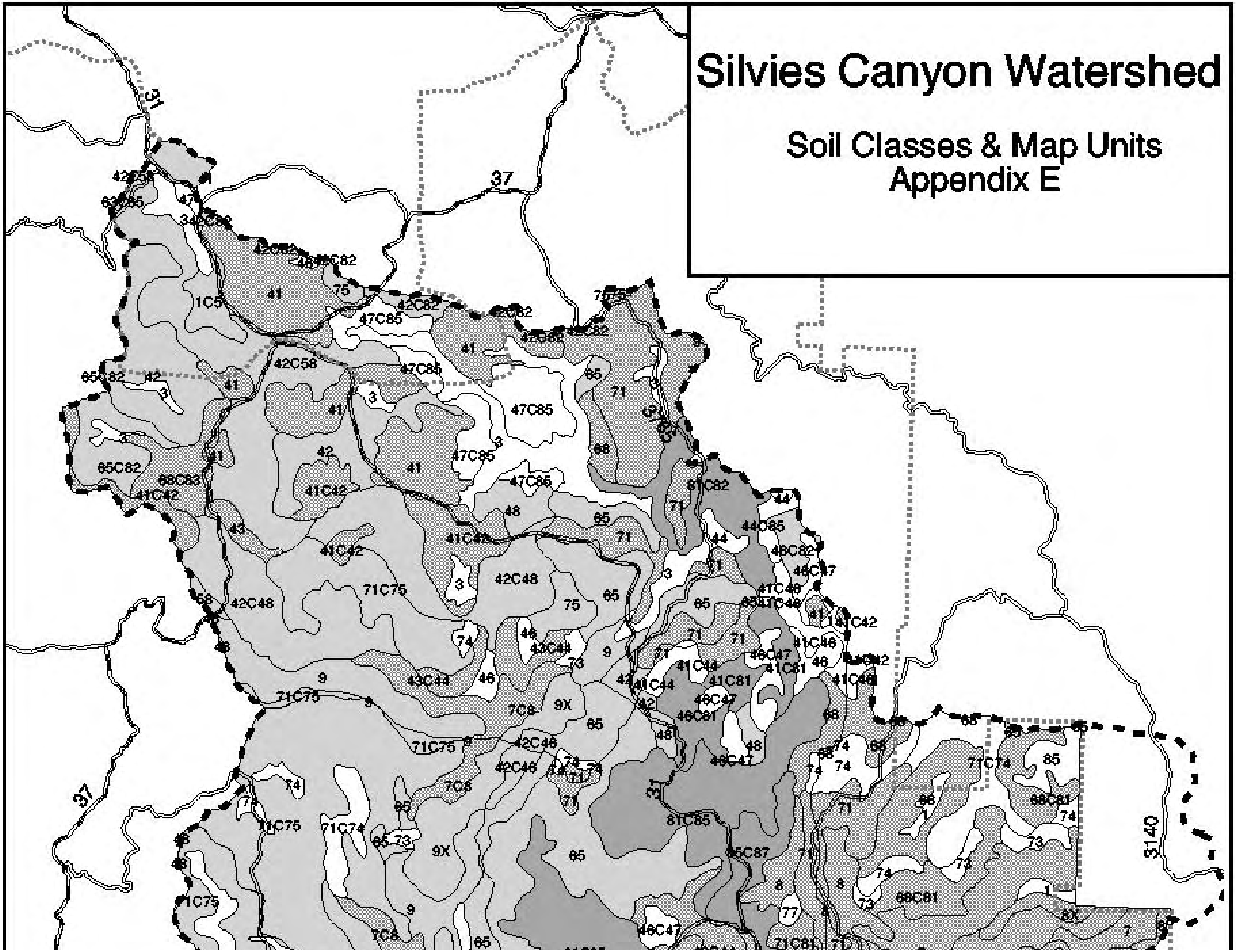
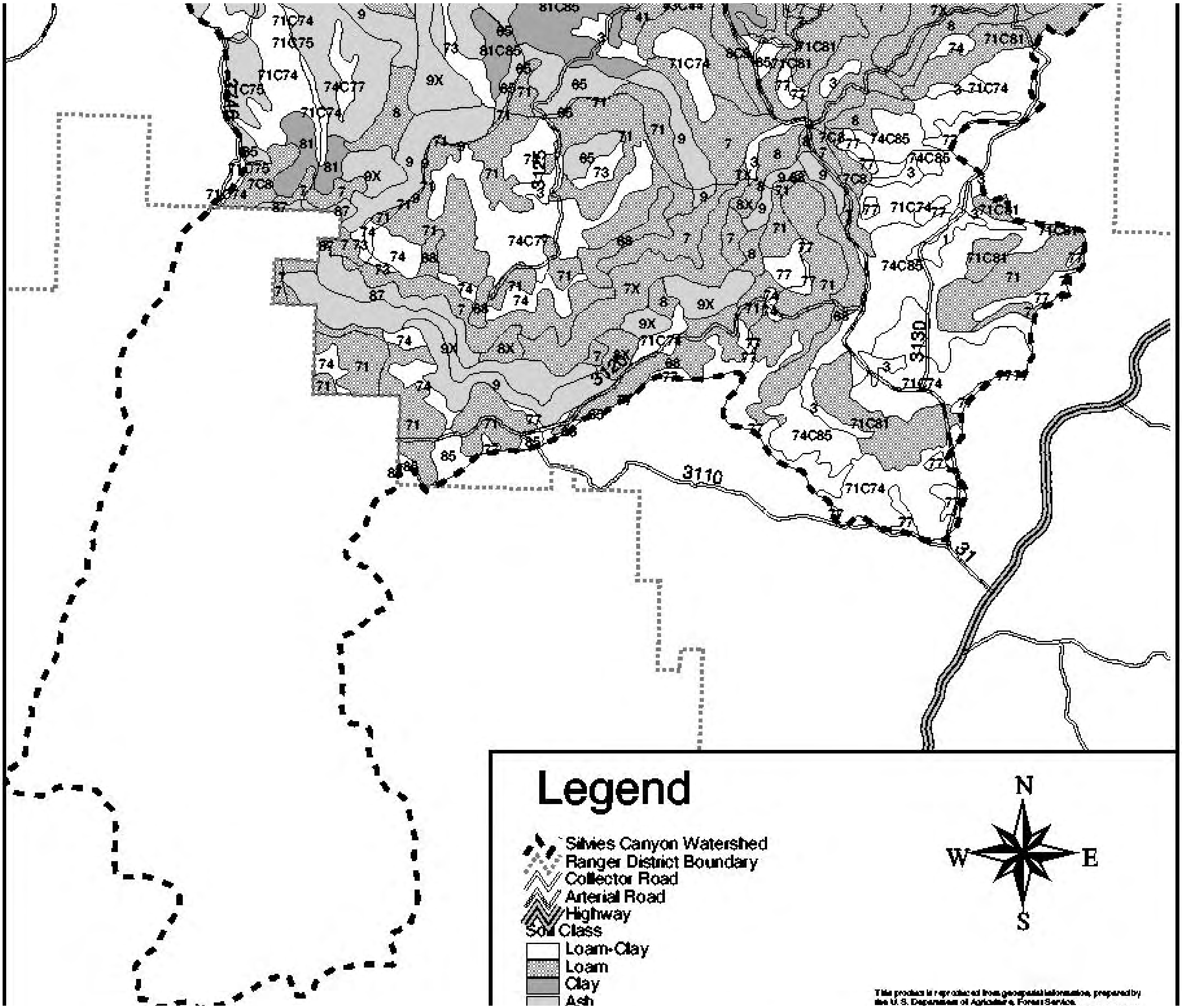
June 24, 2000


19301801
3746
19302002
19302001
19302901
19301401
19302302
19302403
19302301
19302401
19302402
19311902
19311901
19311801
19311804
19311903
3140
3125
3130
19312801
19312802
31
3130
20300101
3120
3110
20311702
20311701
N
W
E
S
Aspen Sites
Silvies Canyon Watershed
Lower Area
Appendix B
Aspen Site
Project Area Boundary
Collector Road
Arterial Road
Stream (Perrenial)
Tic Mark For Aligning Maps
1 0 1 Miles
1:56000


Aspen Sites
Silvies Canyon Watershed
Upper Area
Appendix B
Aspen Site
Project Area Boundary
Collector Road
Arterial Road
Stream (Perrenial)
Tic Mark For Aligning Maps
N
W
E
S
1 0 1 Miles
1:56000
3150
31
37
3765
3140
3745


Silvies Canyon Watershed
Soil Classes & Map Units
Appendix E


Legend
Silvies Canyon Watershed
Ranger District Boundary
Collector Road
Arterial Road
Highway
Soil Class
Loam-Clay
Loam
Clay
Ash
N
S
W
E
3110
3130
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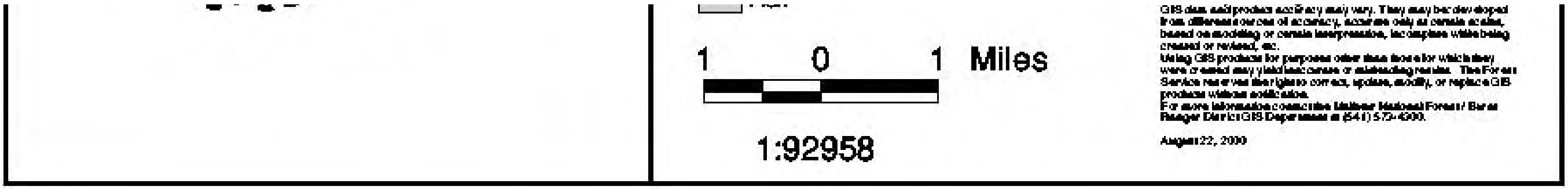
1 0 1 Miles
1:92958
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August 22, 2000