U.S. Department of Interior
Bureau of Land Management
Roseburg District, Oregon

Environmental Assessment for the Swiftwater Field Office

Green Thunder Regeneration and Commercial Thinning Harvest

EA No. OR - 104 - 99 - 04

The Swiftwater Field Office proposes to do a regeneration, commercial thinning, and density management harvest on approximately 140 acres of mature and/or old-growth forest and 200 acres of second-growth located in the Little River and Middle North Umpqua Watersheds located in Sections 30, 31 and 33; T26S R2W, and Section 25, T26S R3W;W.M. This project is within the Matrix, Riparian Reserve, and Little River Adaptive Management Land Use Allocations and is designed to help meet the Roseburg District's annual harvest commitment. This assessment supersedes the previous assessment dated September 2, 2004.

Acronyms Used:

ACS	-	Aquatic Conservation Strategy
AMA	-	Adaptive Management Area
BLM	-	Bureau of Land Management
EA	-	Environmental Assessment
GFMA	-	General Forest Management Area
ID Team (IDT)	-	Interdisciplinary Team
NEPA	-	National Environmental Protection Act
NFP or NWFP	-	Northwest Forest Plan
PDC	-	Project Design Criteria
RMP	-	Resources Management Plan
ROD	-	Record Of Decision
S&G	-	Standards & Guidelines
T&E	-	Threatened or Endangered

Definitions:

Coarse Woody Debris (CWD): Portions of trees that have fallen or been cut and left in the woods at least 20" in diameter (RMP, pg. 102). Generally refers to wood in the uplands.

Co-dominant Tree: Trees with crowns forming the general level of the crown canopy and receiving full light from above but comparatively little from the sides.

Dominant Tree: Trees with crowns extending above the general level of the crown canopy and receiving full light from above and partly from the side.

Large Woody Debris (LWD): Large woody debris is fallen trees within the riparian areas that are at least 2 feet (0.6m) in diameter and 33 feet (10m) in length (ODFW, Methods for Stream Habitat Surveys).

Large Organic Debris (LOD): Woody debris within the riparian areas at least 4 inches in diameter and 39 inches in length.

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INTRODUCTION

This Environmental Assessment (EA) has been prepared for the Swiftwater Field Office's proposed **GREEN THUNDER REGENERATION AND COMMERCIAL THINNING HARVEST**. An EA is an analysis of potential environmental impacts that could occur as the result of the implementation of a federal action. The EA assists the Agency in project planning, ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from analyzed actions. "Significance" as defined by NEPA is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a "Finding of No Significant Impact" (FONSI). The FONSI is a document that briefly presents the reasons why implementation of the proposed action will not result in "significant" environmental impacts (effects) beyond those already addressed in the Roseburg District's *Proposed Resource Management Plan / Environmental Impact Statement* (PRMP/EIS, October 1994). After the FONSI is signed, a Decision Document would be completed, however, Forest Management Regulation 43 CFR 5003.2 states that "[w]hen a decision is made to conduct an advertised timber sale; the notice of such sale shall constitute the decision document." This notice would be placed in *The News Review*, a daily newspaper of general circulation in Roseburg, Oregon and constitutes a decision document with authority to implement the proposed action.

I. PURPOSE OF AND NEED FOR ACTION

This section provides a general overview of the proposed action. Included are: the need for the action, purpose of the action, a general description and objectives of the proposal, and conformance with existing land use plans. The issues that were identified as pertinent to this project are analyzed in Appendix D.

A. Need for Action

The *Roseburg District Record of Decision and Resources Management Plan* (RMP, June 1995) guides and directs management on BLM lands. It "responds to dual needs: the need for forest habitat and the need for forest products".

The **need for forest products** can be met by providing ". . . a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies . . . on a predictable and long-term basis" (RMP, pg. 15). The sale of timber on BLM lands on a scheduled and sustainable basis (i.e., management of the timber resource that results in a continuous level of harvest) necessitates final (regeneration) harvest of timber within late-successional forests in the Matrix Land Use Allocation. The BLM also needs to offer for sale commercial thinnings ". . . after developing stands reach a combination of stem diameter and surplus volume to permit an entry that is economical" (RMP, pg. 149). Silvicultural stand exams indicate that the stands are overly dense with decreasing growth rates and would benefit from a thinning at this time to improve growth potential.

The **need for a healthy forest ecosystem** "is . . . for a healthy forest ecosystem with habitat that will support populations of native species and includes protection for riparian areas and waters." (RMP, pg. 15). Silvicultural practices are needed to reintroduce complexity and accelerate mature forest characteristics within the Riparian Reserve in order to ". . . acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy [ACS] objectives" (RMP, pg. 25) as well as actions to reduce road related hydrological impacts as a source of sedimentation to streams.

B. Purpose of Action

The purpose of the action described in this EA is to offer the **Green Thunder Regeneration and Commercial Thinning Harvest** for auction in fiscal year 2005 or later. This proposal would help meet the Roseburg District's annual harvest commitment. It is also the purpose of this project to accelerate the development of mature forest characteristics (large trees, down woody debris and snags) within the Riparian Reserve areas through density management as well as conduct certain actions to restore watershed conditions.

The following objectives would be accomplished by the proposed action:

1. **Timber Production and Management:**
   a. "Produce a sustainable supply of timber and other forest products" (RMP, pg. 60).
   b. Manage developing stands ". . . to promote tree survival and growth and to achieve a balance between wood volume production, quality of wood, and timber value at harvest" (RMP, pg. 60).
   c. Improve stand health within mid-seral stands by reducing the excess stocking in the forest stand to increase the growth and vigor of the remaining individual trees (RMP, pg. 149).

2. **Ecosystem Management:**
   a. "Restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them . . ." (Aquatic Conservation Strategy) (RMP pg. 19).
   b. "Provide connectivity . . . between Late-Successional Reserves" and "Provide habitat for a variety of organisms associated with both late successional and younger forests." (RMP pg. 33).
   c. Maintain "ecologically valuable structural components such as down logs, snags and large trees" (RMP pg. 33).
   d. Improve and/or maintain soil productivity (RMP pg. 35).
   e. "Maintain or enhance the fisheries potential of the streams . . . " (RMP pg. 40).
   f. Protect, manage and conserve all Special Status Species and Supplemental EIS Special Attention Species and their habitat (RMP pg. 41).
   g. "Improve existing culverts, bridges, and other stream crossings determined to pose a substantial risk to riparian conditions" (RMP, pg. 73).

3. **Adaptive Management Area (AMA)**:
   a. "Adaptive Management Areas are expected to produce timber as part of their program of activities consistent with their specific direction under these standards and guidelines" (NFP S&G's, pg. D-8).
   b. "Protect riparian areas in a manner comparable to . . .other federal land areas" (RMP, pg. 32).

C. Description of the Proposal

The Swiftwater Field Office of the Bureau of Land Management (BLM) proposes to harvest timber in the Little River and Middle North Umpqua Watersheds located in Sections 30, 31 and 33; T26S R2W, and Section 25, T26S R3W;W.M. (see maps, Appendix A through C). The proposed project area is approximately 11 road miles east of Glide and 19 air miles south northeast of Roseburg, Oregon. Approximately 540 acres are analyzed for potential harvest activities and log hauling on the associated haul route. New road construction and renovation or improvement of existing roads would also occur. Section II (pg. 5) of this EA provides a more detailed description of the Proposed Action Alternative.

D. Conformance with Existing Land Use Plans

The Proposed Action was developed to be in conformance with the *Final - Roseburg District Proposed Resource Management Plan / Environmental Impact Statement* (PRMP/EIS) dated October 1994 and its associated *Roseburg District Record of Decision and Resources Management Plan* (RMP) dated June 2, 1995. The RMP was written to be consistent with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl* (FSEIS); dated Feb. 1994 and its associated *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD) and *Standards and Guidelines for Management of Habitat for Late-Successional and Old Growth Related Species Within the Range of the Northern Spotted Owl* (S&G's) dated April 13, 1994; generally referred to as the "Northwest Forest Plan" (NFP). All treatment of noxious weeds would be in compliance with the *Roseburg District Noxious Weed EA*.

The Northwest Forest Plan (ROD, pg. 6) divides the federal landbase into seven land use allocations or categories. This project is predominantly in the "Little River Adaptive Management Area (AMA)" land use allocation. The Little River AMA is designed to integrate ". . . intensive timber production with restoration and maintenance of high quality riparian habitat" (S&G's, pg. D-14). This project is also in the "Matrix" land use allocations (Unit 25B). "Stands in the matrix can be managed for timber and other commodity production, and to perform an important role in maintaining biodiversity" (S&G, pg. B-6) by providing for biological legacies (snags, large woody debris and retention trees) that bridge past and future forests. The RMP further classifies the Matrix into two categories: the "General Forest Management Area" (GFMA); which are lands available for timber harvest and "Connectivity / Diversity Blocks" which are lands that are available for timber harvest and also provide connectivity between Late-Successional Reserves (RMP, pg. 33). This project is within Connectivity / Diversity. Portions of this project are also within the "Riparian Reserve" land use allocation. The "Riparian Reserves are areas along all streams, wetlands, ponds, lakes, and unstable or potentially unstable areas where the conservation of aquatic and riparian-dependent terrestrial resources receives primary emphasis" (ROD, pg. 7) and "provide habitat for special status . . . and other terrestrial species" (RMP, pg. 23).

II. ALTERNATIVES INCLUDING THE PROPOSED ALTERNATIVE

This section describes the No Action and Proposed Action alternatives, and alternatives considered but eliminated from detailed analysis. These alternatives represent a range of reasonable potential actions that would meet the Purpose and Need. This section also discusses specific design features that would be implemented under the action alternative.

A. The No Action Alternative (Alternative A)

The No Action Alternative is required by NEPA and provides a baseline for the comparison of the alternatives. This alternative represents the existing condition. If this alternative were selected there would be no harvesting of timber within the bounds of the project area. Harvest would, however, occur at another location under separate NEPA analysis within Matrix lands in order to meet harvest commitments identified in the RMP (pg. 7 and 60). Selection of this alternative would not constitute a decision to reallocate these lands to non-commodity uses. Future harvesting in this area would not be precluded and could be analyzed under a subsequent EA. There would be no entry into the Riparian Reserve for the purpose of enhancing conditions of late-successional forest and aquatic ecosystems and applying silvicultural practices to contribute towards meeting ACS objectives in the watershed at this time. Road maintenance would be on a sporadic as needed basis for the primary purpose of keeping roads open to traffic. There would be no decommissioning or improvement of roads to reduce road related impacts.

B. The Proposed Action Alternative (Alternative B)

Implementation of the Proposed Action Alternative would result in the harvest of approximately 6.7 MMBF (million board feet) of the Roseburg District's annual harvest commitment of 45 MMBF. Approximately 0.2 MMBF would be harvested from the Riparian Reserve but is not chargeable towards the harvest commitment. A small amount of additional timber could potentially be included as a modification to this project. These additions would be limited to removal of individual trees or small groups of trees that are blown down, injured from logging, are a safety hazard, or trees needed to facilitate the Proposed Action (ex. guyline and tailhold trees, cable yarding corridor trees, or trees within the road construction prism). Historically this addition has been less than 10% of the estimated sale quantity. Other activities would include: temporary and permanent road construction, road renovation and improvement, subsoiling of previously compacted skid trails, road decommissioning, excavator and hand piling of slash, site preparation with fire (slash burning) and replanting with young seedlings.

Roads – Construction of **temporary road** (roads built, used and decommissioned after use) and **permanent road** would occur on BLM land. **Road improvement** (improving the road beyond its original design) would occur on BLM and private roads on the timber haul route. This would consist of installing or maintaining drainage structures (culverts and ditches), brushing road shoulders, installing splash pads for culvert outlets, reshaping the road surface and resurfacing with crushed rock where absent or deficient. **Full road decommissioning** (roads determined through an interdisciplinary process to have no future need) and **decommissioning** (closing and leaving in an erosion-resistant condition) would occur on BLM roads (USDI, OSO; 1996, pg. 18).

Timber Harvest - Practices would consist of a combination of regeneration, commercial thinning and density management harvest. **Regeneration harvest** removes the forest canopy to allow the re-establishment of a new forest stand (RMP, pg. 110). The silvicultural technique of modified even aged management (RMP, pg. 150) would be employed. A modified irregular shelterwood system would be used in the Connectivity / Diversity Block (RMP, pg. 146). This technique modifies the traditional silvicultural shelterwood systems in order to retain a biological legacy that would carry over into the future stand. This legacy consists of retaining a remnant of older aged, large (>20") green trees and snags (reserve trees), and coarse woody debris (CWD). CWD consists of trees, or portions of trees, that have fallen or have been cut and left in the unit for present and future wildlife habitat components (RMP, pg. 146) and to maintain site productivity. The silvicultural technique of **clearcut harvest** would occur within road right-of-ways. **Commercial thinning** is designed to reduce the density of the forest stand in order to maintain stand vigor and increase wood quality, to promote increased growth on the remaining trees and recover wood fiber that would ordinarily be lost through natural mortality (RMP, pg. 149). **Density management harvest** (in the Riparian Reserve) is designed to accelerate the attainment of mature forest characteristics by encouraging the development of larger trees more quickly through reducing the stocking of the forest stand around selected trees in order to accelerate the growth of the remaining trees. Other trees would be left quite dense to promote mortality for stand diversity (RMP, pg. 103).

TABLE 1. Proposed Action Summary

Activity	Total
Timber Harvest	Regeneration Harvest - 134 ac. (six units) Commercial Thinning Harvest - 170 ac. (one unit) Density Management Harvest - 36 ac. Road ROW Clearcut - 7 ac.
Logging	Cable - 250 ac. Ground based - 97 ac.
Fuel Treatment	Broadcast Burning - 40 ac. Machine Pile and Burn - 64 ac. Hand Pile and Burn - 31 ac. Gross Yarding of Hardwoods - 28 ac.
Road Construction	Permanent - 0.1 mi. (one spur) Temporary - 1.6 mi. (ten spurs) Total - 1.7 mi.
Road Maintenance	Improvement - 12.4 mi.
Road Decommissioning	Decommissioning - 0.4 mi. Full Decommissioning - 0.2 mi.
Habitat Restoration	Riparian Reserve Treatment - 36 ac.

The proposed action would require a mix of skyline cable logging (approximately 70%), and ground based (tractor and shovel) logging and right-of-way clearing (approximately 30%). Additional isolated, minor ground based logging may be necessary (ex. removal of guyline anchor trees, isolated portions of units, etc.) and is included in Table 1 as cable logging. Up to ten acres were assumed in the analysis. **Firewood cutting and salvaging** of logging debris (slash) could occur in landing cull decks.

Other Actions - Subsoiling would occur on certain old existing haul roads and skid trails (including some used under this action) as well as some new roads and trails created. **Fire trails** would be constructed by hand or tractor around the perimeters of the units to be broadcast burned prior to ignition. The **prescribed burning of slash** (burning under the direction of a written site specific prescription or "Burn Plan") would occur in the proposed units to prepare the site for tree planting by providing plantable spots for seedlings (i.e. clearing away the slash), removing or temporarily retarding competing vegetation as well as reducing the fuel loading hazard. Approximately 139 acres would be burned. Burning would be by a combination of broadcast burning and machine or hand pile and burn. Gross yarding (removal of all woody material of specified size to a landing) would be required on two units (see Appendix C). In the thinning area (Unit 31A) landing debris piles would be burned and the powerline ROW clearcut would be machine piled and burned.

C. Project Design Criteria and Management Practices as part of the Action Alternative

This section describes measures designed to avoid, minimize or rectify impacts on resources and are included as part of the action alternative. Project Design Criteria (PDC's) are site specific measures, restrictions, requirements or physical structures included in the design of a project in order to reduce adverse environmental impacts. Additionally, the RMP (Appendix D, pg. 129) lists "Best Management Practices" (BMP's) and the ROD lists "Standards and Guidelines" (S&G's). BMP's are measures designed to protect water quality and soil productivity. S&G's are ". . . the rules and limits governing actions, and the principles specifying the environmental conditions or levels to be achieved and maintained" (S&G, pg. A-6).

1. **To meet the objectives of the "Aquatic Conservation Strategy (ACS)" (RMP, pg. 19):**
   The objectives of ACS are to be met at the fifth-field watershed scale and over the long-term (decades). The following describes how the project level PDC's assist in contributing toward attainment of these broader objectives:

   a. **Riparian Reserves (ACS Component #1)** were established. Riparian Reserves consist of (1) lands incorporating permanently flowing (perennial) and seasonally flowing (intermittent) streams, (2) the extent of unstable and potentially unstable areas that may directly impact streams, and (3) wetlands, ponds, and reservoirs greater than an acre. The RMP (pg. 24) specifies Riparian Reserve widths equal to the height of two site potential trees on each side of fish-bearing streams; and a site-potential tree on each side of perennial or intermittent non-fish bearing streams, wetlands greater than an acre, and constructed ponds and reservoirs. Data has been analyzed from District inventory plots and the height of a site-potential tree for the affected watersheds has been determined to be the equivalent of 180 ft. There are no fish-bearing streams in the project area; therefore the Riparian Reserve boundaries would be approximately 180 ft slope distance from the edge of non-fish bearing streams within the project area (Roseburg District Memo, Jan. 18, 1995). Two wetlands less than an acre were found in Unit 31A and would be single-tree buffered around the feature.

1). Streambank stability and water quality would be maintained by establishing a variable width streamside no-harvest buffer along all streams adjacent to Unit 31A. This buffer consists of a strip generally 40 ft wide along intermittent and perennial non-fish bearing streams and 100 ft. wide along fish-bearing streams. The buffer width would be expanded to include areas of instability, wide areas of riparian vegetation, sensitive areas identified during site review, or additional area needed to maintain stream temperature. Likewise, the buffer could decrease along some non-fish bearing streams when the previously mentioned features are lacking or absent. At the very minimum, one-tree crown width would be maintained on each stream bank allowing for the soil-root network closest to the stream to be maintained for bank stability. Minimum buffers would be used primarily on ephemeral or intermittent streams, which lack riparian vegetation, and where riparian habitat components and potential impacts to downstream fisheries are also absent. No density management would occur within the no-harvest buffer. The RMP prescribed Riparian Reserve width (180 ft) would be maintained along all streams in Units 25A, 25B, 25C, 33A, 33B, and 33C. Some portions of the Riparian Reserve in Unit 31A would have the cutting of trees along the powerline right-of-way in order to reduce the possibility of nearby trees striking the powerline (see pg. 13 and Appendix D). The strips of trees to be cut extend into the Riparian Reserve of one intermittent stream and the outer portions of a small length of a perennial stream for one to two acres (see map, Exhibit C). Trees cut would be chosen so as to not reduce bank stability and to not increase the stream temperature of the perennial stream.

2). Riparian habitat would be protected by establishing the Riparian Reserve as described above for streams adjacent to regeneration units; or a no-cut buffer for streams within the thinning unit. This would maintain stream shading, streambank stability and a source of existing and future recruitment of woody debris. The integrity of the riparian habitat would be protected from logging damage by directionally felling trees away from or parallel to the no-cut buffer or Riparian Reserve (BMP I B2; RMP, pg. 130) and yarding logs away from or parallel to the streams (i.e. logs would not be yarded across streams, streambanks, or the inner gorge unless fully suspended (BMP II B5; RMP, pg. 130). No road building would take place within the Riparian Reserves.

3). Density management would be applied within the Riparian Reserve of Unit 31A "to control stocking . . . and acquire vegetation characteristics needed to attain Aquatic Conservation Strategy objectives" (RMP pg. 25). The objective is to develop late-seral forest structure and enhance existing diversity by accelerating tree growth to promote larger trees and canopies, and provide a future source of large woody debris for stream structure. This would result in a change from about 200 dominant and co-dominant trees per acre before thinning to about 100 to 120 trees per acre (130 ft^2 BA/ac) after thinning.

4). The riparian vegetation of wetlands less than one acre (Unit 31A) would be protected by reserving the trees around the edge of the wetland and not permitting logging through the wetland. NOTE: There is a wetland less than an acre in close proximity to the powerline in Unit 31A that would not receive this protection due to safety considerations (see para. 10 below). Trees designated for harvest, within 100 ft of the wetland, would be felled and yarded away from the wetland to protect this habitat (BMP IV E; RMP, pg. 143).

5). One acre of unstable ground (Unit 33B) met the Timber Production Capability Classification criterion for removal from the timber base and was removed from the project and included in the Riparian Reserve (BMP I A2; RMP, pg. 129).

b. **Key Watersheds (ACS Component #2)** were established "as refugia . . . for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species [RMP, pg. 20]." This project is not in a Key Watershed.

c. **Watershed Analysis (ACS Component #3)** for the Little River and Middle North Umpqua Watersheds were used in this analysis and are available for public review at the Roseburg District office.

d. **Watershed Restoration (ACS Component #4)** would be accomplished primarily through timber sale related projects. This would include road decommissioning to reduce road related impacts, road improvements to reduce sources of sedimentation, and density management within the Riparian Reserve to restore diversity to second growth stands. This particular project includes the full decommissioning of the unnumbered spur road to the east of Unit 25C for a total of 0.2 miles (0.15 miles within the Riparian Reserve), the decommissioning of 0.4 miles of the 26-2-25.2 road, and the repair of sources erosion on over 12 miles of existing road. Full decommissioning would consist of "closing and stabilizing . . . to eliminate potential storm damage and the need for maintenance" (ROD, pg. B-31).

2. **To minimize soil erosion as a source of sedimentation to streams and to minimize soil productivity loss from soil compaction, loss of slope stability or loss of soil duff layer:**
a. **Measures to limit soil erosion and sedimentation from roads** would be implemented: (1) Maintaining or improving existing roads (Road No. 26-2-31.0A, 31.1A and A1, 31.5A, 31.6A, A1 and B, 31.10, 33.0A and A1, 33.1, 33.2, 34.2A1, B and C2, 26-3-25.2, 25.3A1, 25.4A1; 27-2-5.1, 5.2A and B, and 9.0 [see Appendix B]) to fix drainage and erosion problems. This would consist of maintaining existing culverts, installing additional culverts, buttressing stream crossing culvert inlets, and replenishing road surface with crushed rock where deficient (BMP II H; RMP, pg. 137). Approximately 33 additional cross drains would be installed to reduce the effective stream extensions due to ditchline. Four nonfish-bearing stream culverts would be replaced. (2) Accomplishing in-stream work (i.e. culvert replacement and fill removal) during periods of low flow (between July 1 and September 15) (BMP II F20; RMP, pg. 136). (3) Locating new spur roads out of Riparian Reserves (BMP II B1; RMP, pg. 132) and locating spurs on ridge tops and stable (0 - 30 percent slope) locations (BMP II B2; RMP, pg. 132). (4) Restricting road maintenance, decommissioning, and log hauling on unsurfaced roads to the dry season (normally May 15 to Oct. 15). If unacceptable resource damage could occur, operations during the dry season could be suspended during periods of heavy precipitation. This season could be adjusted if unseasonable conditions occur (e.g. an extended dry season beyond October 15 or wet season beyond May 15). (5) Prior to any wet season haul on surfaced roads, sediment reducing measures (ex., placement of straw bales and/or silt fences) would be placed near stream crossings, if needed. (6) Not over-wintering bare erodible spur roads. This would be done by building, using and winterizing (installing necessary drainage features, blocking and seeding and mulching bare cut and fill surfaces with native species, or a sterile hybrid mix if native seed is unavailable) all temporary roads at the end of the operating season. (7) Decommissioning all temporary new construction the same dry season as logging, i.e. the roadbed would be subsoiled, water barred, cut slopes and fills seeded with native species, or a sterile hybrid mix if native seed is unavailable, and access blocked (BMP II I; RMP, pg. 138).

b. **Measures to limit soil erosion and sedimentation from logging** would consist of: (1) Use of cable logging systems that limits ground disturbance. This would include the use of partial suspension (BMP I C1a; RMP, pg. 130) (i.e., lifting or suspending the front end of the log during in-haul to the landing, thereby lessening the "plowing" action that disturbs the soil). (2) In some limited, isolated areas partial suspension may not be physically possible due to terrain or lateral yarding. In such cases excessive soil furrowing would be hand waterbarred (BMP I C1e; RMP, pg. 130) and filled with limbs or other organic debris. (3) Dry season logging (BMP I C1c; RMP, pg. 130) in portions of Units 25C, 31A, and 33A due to unsurfaced road surfaces and 33B due to potentially unstable slopes.

c. **Measures to limit soil compaction** (RMP, pg. 37) would consist of: (1) limiting ground based logging, machine piling for site preparation and subsoiling (portions of Units 25A, 25B, 25C, 31A and 33A) to the dry season (May 15 to Oct. 15) when soils are least compactable (BMP I C2d; RMP, pg. 130). This season could also be adjusted as described on the previous page. (2) Limiting machines in size and track width on skid trails to reduce compaction and trail width (BMP I C2j; RMP, pg. 131). (3) Using old trails to the greatest extent practical and limiting new trails to slopes less than 35 percent (BMP I C2b; RMP, pg. 131). Tractor activities would be confined to designated skid trails (BMP I C2c; RMP, pg. 131) as identified in an approved logging plan. Tractor skidtrails would be spaced at an average spacing of at least 150 feet apart where topography allows. If harvester/forwarder is used in Unit 31A, the harvester would be required to delimb trees in front of the machine tracks or tires in order to reduce compaction. The forwarder would operate on the branch and limb covered areas traversed by the harvester. Where shovel yarders and machine slash pilers are used, they would walk over as much slash as can safely be negotiated, avoiding as much as possible more than one pass in swinging logs and piling slash. (4) All main skid trails (any trail that has more than 50 percent exposed mineral soil) would be ameliorated after completion of current entry or would be documented with a plan for deferred amelioration at final harvest (*Roseburg District Annual Program Summary and Monitoring Report Fiscal Year 2001*, pg. 70). Amelioration would only be deferred if unacceptable damage to residual trees would occur. Secondary trails (any trail that has less than 50 percent exposed mineral soil) would be handled in the same manner as main trails if field evaluation shows that compaction is extensive, otherwise they would not need to be ameliorated. Amelioration would include subsoiling and returning organic debris to the subsoiled surface. Subsoiling is a practice that shatters soil compaction, thereby reducing the effects to soil productivity and improving water infiltration. This is accomplished by a device known as a winged subsoiler which is a pulled by or attached to a crawler tractor (subsoiling of roads), or mounted to an excavator arm (in-unit subsoiling of trails, see para.7d below). The excavator would place organic debris back over the trails. Existing accessible skid trails and haul roads not considered as part of the current transportation would also be subsoiled when evaluation indicates excessive compaction and where practical (e.g., subsoiling skid trails which are moisture saturated, have very rocky soils, or with advanced reproduction would not benefit soil productivity and therefore would not be practical). (5) Decommissioned roads and temporary spur roads would be subsoiled with a winged subsoiler provided that subsoiling would not contribute to additional sedimentation to streams.

d. **Measures to protect the duff and surface soil layer** (RMP, pg. 36) would consist of: (1) burning of slash during the mid-fall to mid-spring season when the soil and duff layer (soil surface layer consisting of fine organic material) moisture levels are high (BMP III D1b, pg. 140) and the large down logs have not dried out. This practice would protect the soil duff layer and the down logs from being totally consumed by fire and the surface layer from being negatively altered. (2) Handpiling and burning two units (25A [below the 31.6 road] and 33B) with major components of Category 1 soils (soils that are highly sensitive to broadcast burning). (3) Protective measures (RMP, pg. 37; BMP's III BC2c, pg. 139; and RMP plan maintenance) covering soil productivity during ground-based operations would include restricting use to suitable soil types and slopes less than 35 percent, avoid placing duff and topsoil in windrows, minimize piling of large and fine woody material (i.e., primarily 3 to 8 inch diameter woody debris), exposing no more than five percent of the machine piled area to mineral soil and limiting machine use to one round trip over the same area. NOTE: The CWD reserved according to RMP guidelines as well as tree tops and limbs would also be a source of organic material that can become incorporated into the soil structure (See para. 3b, below).

e. **Measures to protect slope stability** would consist of: (1) Removing from harvest consideration (withdrawing) those areas (Unit 33B) classified as unstable (see pg. 7, para. 1a5) (BMP I A2; RMP, pg. 129) and that could ultimately impact aquatic values such as fisheries (see Appendix D). (2) Placing retention trees (see para. 3a below) in two swale bottoms in Unit 25A, and in the moisture accumulation zone of a small swale head scarp in Unit 33A (BMP I A(4); RMP, pg. 129). (3) Locating new roads in stable locations (BMP II B2; RMP, pg. 132) and with proper drainage structures (BMP II D; RMP, pg. 133). (4) Avoiding broadcast burning on steep slopes (BMP III D; RMP, pg. 140) to reduce conditions that could contribute to slope instability (Units 25A and 33B). NOTE: Dry season yarding with one-end suspension and waterbarring yarding trails that can channel water (Units 33A and 33B) listed in paragraph b above would also reduce the risk of slope failure as well as limiting erosion.

3. **To retain biological legacies (RMP, pg. 146) for present and future wildlife components:**
a. Green retention trees would be reserved to provide a legacy of mature trees in the early successional stands. These trees provide present and future wildlife habitat components such as future snag and down wood recruitment. Six to eight large (greater than 20") green conifer trees per acre in the GMFA units (Units 25A, 25B [part], 33A, B and C) (RMP Appendix E, pg. 150) and twelve to eighteen trees per acre in the Connectivity/Diversity Block (Units 25B [part] and 25C) and occasional hardwoods as a biological legacy (RMP Appendix E, pg. 152). Trees would be retained in a scattered arrangement of individual trees as well as occasional clumps of two or more trees (RMP, pg. 38 and 64). Some large "wolf" trees (large, full crowned, limby trees) would be retained for non-vascular plant (mosses and lichens) legacy attributes. Trees remaining would approximate the pre-harvest relative proportions of species size and composition (RMP, pg. 150). Remnant mature and old-growth (RMP, pg. 112) trees remaining from the previous stand within Unit 31A would be retained to the greatest extent possible as well as occasional defective (diseased) and deformed trees (trees with broken or multiple tops, and trees with ramicorn branches (large branch clusters)) that could provide future snags and nesting habitat.

b. Existing hard or soft snags at least 20" inches in diameter and 15 ft in height (PRMP/EIS, Appendices 226) would be reserved within the regeneration units by reserving existing snags in sufficient numbers to meet the population needs of 40% of potential population (RMP pg. 64). This has been determined to be 1.2 snags per acre. Where this quantity is lacking, additional green trees would be reserved for future snag recruitment. Any snag deemed as hazardous to worker safety could be felled. Such trees would be reserved and left in place as CWD. Experience indicates that less than five percent of snags need to be felled for this reason. An interim source of snags would be provided by reserving snags that do not meet the size described previously. Snags would be protected from logging damage by clumping trees around them where possible and directionally falling trees away from the snags.

c. Existing down wood (120 linear feet of down wood per acre at least 16 inches in diameter and 16 ft in length) would be reserved (RMP, pg. 38). Where down wood is lacking in the above quantities, extra green trees would be reserved for future recruitment (RMP pg. 65). Most existing down wood (at least 16" in diameter and 16 ft. in length) would be reserved in Unit 31A (RMP, pg. 38). This has been created by blowdown trees and logs remaining from previous logging. Some recent blowdown trees may be removed to facilitate logging.

4. **To protect air quality:**
   All slash burning would have an approved "Burn Plan" and be conducted under the requirements of the Oregon Smoke Management Plan and done in a manner consistent with the requirements of the Clean Air Act (Oregon DEQ, 1992).

5. **To prevent and report accidental spills of petroleum products or other hazardous material and provide for work site cleanup:**
   During operations described in this proposal, the operator would comply with all applicable State and Federal laws and regulations concerning the storage, use and disposal of industrial chemicals and other hazardous materials. All equipment planned for instream work would be inspected beforehand for leaks. Accidental spills or discovery of the dumping of any hazardous materials would be reported to the Sale Administrator and the procedures outlined in the "Roseburg District Hazardous Materials (HAZMAT) Emergency Response Contingency Plan" would be followed. Hazardous materials (particularly petroleum products) would be stored in durable containers and located so that any accidental spill would be contained and would not drain into watercourses. All landing trash and logging or construction materials would be removed from the project area.

6. **To prevent and/or control the spread of noxious weeds:**
   Logging equipment would be cleaned prior to entry on BLM lands (BLM Manual 9015 - Integrated Weed Management).

7. **To protect the residual stand and promote stand health (Unit 31A):**
   a. Trees would be selected for retention in accordance with the silvicultural prescription (Appendix F) to promote stand health, provide a future source of logs, future large green trees, and future large snags and down logs. The stands in the Matrix would be thinned from below (i.e. removal of the smallest diameter trees first) and the Riparian Reserves would be thinned proportionally across all diameter classes.

b. Felling and yarding would be done in a manner to protect the residual stand. No falling and yarding would be permitted from April 15 through July 15 when the sap is up in the trees and damage due to bark slippage could occur. This date could be adjusted based on field review of local conditions (e.g. earlier or later than normal loose bark period).

c. Yarding systems would be designed to match yarder and cable size to the size of the timber in order to minimize damage from an overly large yarding system. Cable yarding of logs would be done under the canopy to avoid damage to tree crowns.

d. Subsoiling of skid trails would be done using a subsoiler attached to the arm of an excavator in order to minimize damage to the boles and roots of conifers.

8. **To protect Special Status and SEIS Special Attention Plants and Animals:**
a. If, during implementation of the proposed action, any Special Status (Threatened or Endangered, proposed Threatened or Endangered, Candidate, State listed, Bureau Sensitive, Bureau Assessment, or Special Provision) species are found that were not discovered during pre-disturbance surveys; operations would be suspended and appropriate protective measures would be implemented before operations would be resumed.

b. Seasonal restrictions to prohibit logging during the nesting season of the northern spotted owl (NSO) would be applied to Unit 31A (March 1 to June 30) if surveys indicate that a NSO is nesting within 65 yards (USDI, 2004) and to Units 25A, 25B, 25C, 33A, 33B, and 33C (March 1 to September 30) if surveys indicate that a NSO is nesting within a quarter mile. A red-tailed hawk was found in Unit 33A. The nest tree and one acre buffer was removed from the unit. Seasonal restrictions to prohibit logging during the nesting season (March 1 to July 15) within a quarter mile of the nest tree would be applied if surveys indicate that the red-tailed hawk is nesting.

9. **To protect cultural resources:**
One unevaluated site was excluded from the project area. If any objects of cultural value (e.g. historic or prehistoric ruins, graves, fossils or artifacts) are found during the implementation of the proposed action that were not found during pre-harvest surveys, operations would be suspended until the site has been evaluated for implementation of appropriate mitigation.

10. **To prevent trees from falling across the Pacific Power transmission lines:**
Any trees that could fall across the powerline would be cut.

11. **To reduce the threat of increased fire hazard from slash generated from harvest:**
Prescribed burning operations would be conducted in the regeneration harvest units to reduce fuel loadings, favorably alter the fuel profile, and lessen the threat of future catastrophic wildfire.

D. Alternatives Considered but Eliminated

Umpqua Watersheds, Inc. advocated a "Restoration Only" alternative (letter, November 19, 1998) that would treat the Riparian Reserve but not have commercial removal. Umpqua Watersheds believes that yarding would cause unacceptable soil disturbance which in turn would lead to increased sedimentation. They also suggest that the increase in log truck traffic due to the additional harvest would result in an incremental increase in dust and risk of vehicular accidents spilling fuel. They believe that these activities would have adverse impacts on water quality. This alternate was considered by the IDT (Meeting #6, March 10, 1999) but not considered viable for the following reasons:

1. The RMP directs harvest in the Riparian Reserve in order to meet ACS objectives (RMP, pg. 25). Cutting and leaving trees would result in a large unmitigated fuel hazard.

2. PDC's (partial suspension, waterbarring yarding corridors were gouging occurs; RMP, pg. 130) would mitigate concerns over soil disturbance and water quality.

3. The risk of vehicular accidents spilling fuel is highly speculative and uncertain. The incremental increase in dust from the additional hauling would be impossible to quantify and not significant.

III. AFFECTED ENVIRONMENT

This section describes the existing environment and forms a baseline for comparison of the effects created by the alternatives under consideration. This section does not attempt to describe in detail every resource within the proposed project area that could be affected but only those resources which could be substantially impacted. Appendix F (Analysis File) contains data and additional supporting information used by the interdisciplinary team (IDT) to describe the affected environment.

This project lies within the Oregon Western Cascades Physiographic Province. The FSEIS describes the affected environment for this province on page 3&4-19. The Roseburg District Proposed Resource Management Plan/Environmental Impact Statement (PRMP/EIS, pp. 3-3 through 3-71) provides a detailed description of BLM administered lands on the Roseburg District. This EA is tiered to these two documents. A further description can also be found in the Little River and Middle North Umpqua Watershed Analyses which is incorporated by reference.

A. General Setting

Site Description - This project is located predominately within the Little River Fifth-Field Watershed (approximately 254 acres or 73% of the project), and also the Middle North Umpqua Fifth-Field Watershed (approximately 93 acres or 27% of the project). Current landscape patterns include natural stands that are the result of fire, managed stands established following timber harvest, and non-forested agricultural and pasture lands. This project is located in lands that the RMP (pg. 53) classifies as Visual Resource Management Class IV ("No specific visual management constraints"). This project is within 20 miles of the Roseburg Designated Area for attainment of federal Clean Air standards.

Stand Description - Fire and to a lesser extent, wind events have had a major role in stand development (Little River Watershed Analysis, Terrestrial - 26). The Little River Watershed Analysis documents that stand replacing fire events burned 21% of the Little River Watershed within a 200 year period ending in 1946 (Terrestrial - 28). Not all the fires were severe, but varied in intensity, leaving a patchy mosaic of forest age classes. The plant association (Atzet, 1990) is most like a Western hemlock-Douglas-fir/salal. The predominant conifer species is Douglas-fir, which acts as a pioneer after a significant disturbance event such as fire. Conifer species in association include incense-cedar, western hemlock, western red cedar, white fir, sugar pine, ponderosa pine and Pacific yew. Hardwoods including madrone, chinkapin, and maple are common and act as pioneers after disturbance. Salal, Oregon grape and sword fern are common on the forest floor. Rings on stumps suggest that a stand replacing fire killed most of the dominant trees about 130 to 150 years ago. The second-growth stand is approximately 50 years of age and averages eight inches DBH. All previously harvested areas have been successfully regenerated on BLM managed lands. Plantations are mostly uniform in structure and composition with Douglas-fir being the predominant species planted. The Silvicultural Prescription (Appendix F) provides a more detailed stand description.

Existing natural fuel loading in these stands before harvest can range from approximately 15 tons/acre up to and exceeding 75 tons/acre (PNW Technical Report PNW-105, pg 51-57, 1980). This natural fuel loading varies by stand and depends on the condition of the stand, past salvage logging, and previous disturbance events. Field reviews indicate low to medium levels of natural fuels are present based on current estimates of 15-25 tons/acres. Commonly up to 80% or more of this natural fuel is in large diameter wood, greater than nine inches in diameter.

B. Affected Resources

The RMP (pg. 41) requires that all proposed actions be reviewed ". . . to determine whether or not special status species occupy or use the affected area or if the habitat for such species is affected." Special Status Species are those listed or proposed for listing as **threatened or endangered** (T&E), under the under the Endangered Species Act (ESA) of 1973, as amended; or species designated as Bureau Sensitive or Bureau Assessment. **Bureau Sensitive** species are species eligible for federal or state listing or candidate status and **Bureau Assessment** species are species not presently eligible for listing or candidate status under the ESA but are of State concern and may require protection or mitigation in the application of BLM management activities. The affected area was surveyed for the resources listed below according to established protocols:

Botany - There are no BLM special status plant or State listed species in the project area. The Project area was surveyed under past and current survey protocols. A summary of results are located in Appendix F. There are some localized infestations of the noxious weed, Scotch broom, in the project area which is being treated under the District Noxious weed program.

Cultural Resources - Six prehistoric archaeological sites and one prehistoric isolate (an area not qualifying as a site) were found in the project area as the result of surveys. Five sites were evaluated and found to not be significant. The sixth site was not evaluated and excluded from the project area (see pg. 12).

Hydrology – The proposed project is located in the Engles Creek Drainage (Lower Little River Subwatershed), the Bob Creek Drainage (Susan Facial Subwatershed of the Middle North Umpqua Watershed), and the Bond Creek, Greenman Creek, and Shivigny Creek Drainages (Middle Little River Subwatershed). In the hierarchy of watershed scales, drainages are the smallest with several drainages making up as subwatershed and several subwatersheds making up a watershed (REO, 1995, pg. 5). Unit 31A contains unnamed perennial and intermittent streams which are in the Bob Creek, Bond Creek, and Greenman Creek Drainages as well as two wetlands less than an acre. There are no existing streams in Units 25A, 25B, 25C, 33A, 33B, and 33C of the Engles Creek, Bob Creek, Bond Creek and Shivigny Creek Drainages. Beneficial uses of water in the project area primarily consist of benefits to aquatic life and wildlife. Beneficial uses of water downstream of the project area primarily consist of livestock watering, domestic water supply, irrigation, and fish and aquatic life. There are no waterbodies in the project area on the Oregon Department of Environmental Quality's 2002 303(d) List of Water Quality Limited Waterbodies (ODEQ, 2003 (b)). The North Umpqua River is listed below the project area for (1) excessive spring/summer temperature which impairs salmonid rearing and (2) excessive arsenic (ODEQ, 2003 (a) and (b)). A Water Quality Management Plan and Total Maximum Daily Load for temperature in the Little River Watershed were approved by the U.S. Environmental Protection Agency in January 2002. These documents include the allowed temperature loading and a management plan to decrease the temperature in streams previously on the 303(d) list in the watershed. Average annual precipitation in the project area ranges from 54 to 64 inches occurring primarily between October and March. Consequently, most of the annual streamflow occurs during this period (Harr, et. al., 1979). Elevations range from 1980 to 3330 feet. Precipitation occurs primarily as rain at lower elevations (< 2,000 feet) and only under unusual climatic conditions does snow accumulate below 2,000 feet. The Transient Snow Zone (TSZ) is defined as areas between 2,000 to 5,000 foot elevation that may alternately receive snow or rain. Nearly all (99%) of the project area is within the TSZ. If a large acreage of timber harvest or burned area is within the TSZ, there may be increased peak flows (Christner and Harr, 1982, pg.15; Moody and Martin, 2001, pg. 2990). This TSZ effect is caused by warm rain-on-melting snow event in openings created within the TSZ where there is less vegetation to transpire water. To assess the present risk of increased peak flows due to current conditions, the project drainages were evaluated using a model developed for the Oregon Watershed Assessment Manual (Watershed Professional Network, 1999, pg. IV-11) and summarized in Table 2 below. A small portion of land in the TSZ combined with a small portion of land in the TSZ with <30% canopy closure would result in a low risk of increased peak flow. Table 2 describes the present condition and predicted risk for peak flow enhancement within the project drainages. The risk of peak flows increasing given the current condition of the project area is low.

Table 2: Risk of Increased Peak Flows in Project Drainages

Analytical Hydrologic Unit (AHU)[1]	Acres	Percent AHU in TSZ	% TSZ with <30% Crown Closure	Risk of Peak Flow Increase[2]
Bob Creek AHU	2153	78	7.4	Low
Bond Creek	929	47	11.6	Low
Engles Creek	1060	54	10.8	Low
Greenman Creek	1817	73	0	Low
Shivigny Creek AHU	1037	63	19.0	Low

[1] AHU's are hydrologic units analyzed for peak flow increases.
[2] Low risk of peak flow increase are increases less than 8 to 10% which represents the lower boundary of detectability (Watershed Professional Network, 1999, pg. IV-11).

Compacted road surfaces reduce infiltration and reroute excess water to ditchlines and culverts resulting in water being transported to streams quicker than what would naturally occur, thus altering the timing of the storm hydrograph (Harr, et. al., 1975).

Past timber harvest (vegetation removal) can result in increases in water yield due to a decrease in evapotranspiration and interception (Satturlund and Adams, 1992). The stands in the project area are greater than 35 years of age, therefore are expected to have hydrologic recovery (water yield increases have disappeared) from the last harvest (Harr, 1983, pg. 385). Since the project area includes ridges and small streams with virtually their entire catchments (except less than 10 acres at the ridgeline), all of the catchment area would be in a state of full hydrologic recovery. Therefore, the existing water yield and base flow in the project areas is expected to be in a natural state for forested conditions.

Soils - The topography of the general project area is characterized by a stair stepping of gently to moderately sloping ground (10 to 60 percent) and steep to very steep mountain slopes (60 to 90 percent). This stair-stepping pattern can be attributed in part to large, ancient slump-earthflow events. The soils vary from loamy and very shallow in depth (less than 10 inches) over hard bedrock to clayey and very deep in depth (greater than 60 inches) over deeply weathered tuffaceous-bedrock. Areas of instability often occur where the tuffaceous bedrock is deeply weathered. The soils are typically well-drained although tiny, wet patches are present in Unit 31A.

About four acres in Unit 33B and about one acre in 25A are fragile due to slope gradient but suitable for forest management with mitigation (classified under the Timber Production Capability Classifications as FGR). They are considered potentially unstable (can become unstable with changing site conditions) on slopes 70 percent or greater. The classification is in part based on the soil properties, the shape of the conifers growing on these slopes and on the debris avalanches that occurred in a clearcut adjacent to Unit 33B that has similar slopes and soils. These debris avalanches were 0.05 to 0.12 acre in size. Large components of Unit 31A and Unit 33A below the proposed spur are classified as fragile due to potential of deep-seated slump/earth flow movements but suitable for timber management with mitigation (classified under the Timber Production Capability Classifications as FPR). These sites are on hummocky terrain occasionally broken by short, steep scarps. Slopes are mostly 30 to 60 percent. Two earth flows occurred in a clearcut adjacent to Unit 33C (one in the late 1980's and the other in the late 1990's). The largest one was 0.9 acre and initiated on a 35 percent slope at a seep.

Units 25A, 25C, and 31A have a dense network of skid trails and old natural surfaced roads from previous harvesting with various degrees of soil displacement and residual compaction. Approximately 30 acres (between 20 and 40 acres) of this area has moderate to heavy compaction and exposed subsoil. A 0.2 mile road adjacent to Unit 25C that is no longer needed has very little vegetation growing in its bed due compaction and exposed soft bedrock.

About eighteen acres of the project area have soils that are highly sensitive to burning (Category 1 soils) due to shallow soils and slopes greater than 70 percent. They are almost entirely in Units 25A and 33B.

Fisheries - Both affected fifth-field watersheds support five species of anadromous salmonids. A complete listing of fish species present in the watershed can be found in the Little River WA (page Aquatic-1) and the Middle North Umpqua WA (pg. 110). There are no fish-bearing streams within the project area (harvest units and timber haul route). The streams adjacent to the harvest units are intermittent, high gradient, non-fish bearing streams with large amounts of large organic debris (LOD). LOD is important feature for dissipating stream energy for erosion and sediment transport and also provides for substantial in-stream sediment storage.

The distance of units to fish-bearing streams and fisheries habitat ranges from Unit 31A which is adjacent to a non-fish bearing portion of the West Fork Greenman Creek approximately one stream mile above fisheries habitat to Unit 33A which is adjacent to a non-fish bearing tributary to Little River approximately 4.4 stream miles above fisheries habitat. Timber hauling would follow two routes, Greenman Creek for the west portion of the project area and Thunder Mountain for the eastern portion. The Greenman Creek haul route totals approximately nine miles of unpaved road surface and would service Units 25 A, B, C and 31A. The Thunder Mountain haul route totals approximately five miles of unpaved road surface and would service Units 33A, B and C. The timber haul route does not have any fish-bearing stream crossings and is greater than 0.2 mile from fisheries habitat. There are 19 highly interrupted, intermittent, high gradient non-fish bearing first-order stream crossings located on the Greenman Creek haul route and 12 on the Thunder Mountain haul route.

The Oregon Department of Fish and Wildlife (ODFW, 1994) has conducted aquatic habitat surveys in the Little River Watershed (lower Engles Creek, Bond Creek, and Greenman Creek). These streams are characterized as being high gradient and moderately constrained, valley type channels. Stream habitats are dominated by rapids, substrate consists of sands and gravels, and banks are well shaded by young conifers. A lack of large woody debris (LWD) was noted along most of the surveyed stream reaches. Survey data specific to the streams within the project area are unavailable, but field review by BLM personnel (Summer 2003) confirm the streams within the headwaters to be similar to the ODFW reaches. Essential Fish Habitat (EFH) is considered habitat that is currently or was historically available to Oregon Coast coho and chinook salmon. This habitat was designated by the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Federal Register 2002 Vol. 67, No. 12). There is no EFH adjacent to any of the proposed timber sale units or along the timber hauling route. The nearest EFH is located approximately 2.6 miles from Unit 31.

Wildlife -

Federally Threatened and Endangered (T&E) Species known to occur in the Roseburg District include the northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), and bald eagle (*Haliaeetus leucocephalus*). The nearest **Northern spotted owl** site (Green Thunder) is approximately 0.22 miles from the commercial thinning unit (31A). Four spotted owl sites (Engles Creek, Greenman Creek, Green Thunder, and Lookout Canyon) are within 1.2 miles (provincial home range) of the project area. All four of these spotted owl sites are protected with a 100 acre Activity Center (area of concentrated activity of either a pair or territorial single owl; S&G, C-10). This project does not occur within Northern spotted owl designated Critical Habitat (a specific geographical area specified by the US Fish and Wildlife Service as containing habitat essential for the conservation of a Threatened and Endangered species). The project occurs more than 50 miles from the Coast; therefore, there is no **marbled murrelet** habitat or concern for the species. The nearest known bald eagle site (Huntley Creek) is more than seven miles away. There have been no bald eagle sightings within the project area.

Bureau Sensitive & Assessment Species - Although there are no known sites, the fringed myotis (*Myotis thysanodes*), northern goshawk (*Accipter gentilis*), northwestern pond turtle (*Clemmys marmorata marmorata*), and Townsend's big-eared bat (*Corynorhinus townsendii*) may occur within the project area since suitable habitat features are present and are within the known range of the species. There are currently no known purple martin (*Progne subis*) sites within the project area. The nearest known purple martin colony is approximately 10 miles away. Purple martins nest in colonies within snag cavities located in forest openings, meadows, and other open areas. Currently, the project area does contain snags but these are not located in an open area typical of purple martin colonies. The Oregon vesper sparrow (*Pooecetes gramineus affinis*) is a ground nesting bird that makes its nest in a depression of loose grasses and forbs in open areas such as grasslands, farmlands, and recent clearcuts. Vesper sparrows also forage in open habitats. There is no suitable habitat currently within the proposed project but vesper sparrows may be present in adjacent, recent clearcuts. The remaining Bureau Sensitive or Bureau Assessment species are not suspected to occur within the project area because either there are no suitable habitat features within the project area or the project area is beyond the known range of the species (refer to Table 3; Bureau Sensitive, Assessment, & Tracking Species; Appendix F for more information).

The **fringed myotis** and **Townsend's big-eared bat** can roost in snags and/or trees with deeply furrowed bark, loose bark, cavities, or with similar structures; typically in late-successional conifers. Potential bat roosting trees occur in the dominant and co-dominant canopy trees in the regeneration units (Units 25A, 25B, 25C, 33A, 33B, and 33C) that possess the deeply furrowed bark and deformities that make them suitable bat roosts. Remnant trees present in Unit 31A would also function as potential bat roosting habitat. It is unknown if the Townsend's big-eared bat or the fringed myotis is present within the project area because surveys are not practical since potential bat roosts are in the canopy. No caves were found within the project during field reviews. Nesting habitat for **Northern goshawks** is typically open stands of mature and late-seral conifers such as those found in the regeneration units. There is no suitable breeding and pond habitat for the **northwestern pond turtle** within the project area (Pers. Obs., McGraw, 2004). Northwestern pond turtles typically nest in south facing deposits of sand or silt within 90 meters (295 feet) of the water's edge, although they have been documented to nest further (Brown *et al.*, 1995). The sandy substrate that pond turtles use for nesting is absent from the project area (Pers. Obs., McGraw, 2004). Northwestern pond turtles would use the stands as over-wintering habitat. Northwestern pond turtles can migrate up to 480m (1,573ft) into upland habitat where they burrow into the duff and litter layers; these sites may or may not have tree cover (NatureServe, 2004).

Species Protected under Other Provisions – There is suitable nesting habitat for **red-tailed hawks** (*Buteo jamaicensis*) in Units 25A, 25B, 25C, 33A, 33B, and 33C with an active nest site near Unit 33C.

IV. ENVIRONMENTAL CONSEQUENCES

This section provides the analytical basis for the comparisons of the alternatives. The reasonably foreseeable environmental consequences (impacts, effects) to the human environment that each alternative would have on selected resources are described. Impacts can be beneficial or detrimental. This section is organized by the alternatives and the effects on key issues or resources. For the sake of this analysis, the key resources that could be potentially impacted are: changes to the **forest stands**, affects to **wildlife habitat** as the result of the manipulation of these stands; and changes to **soil**, **water quality and hydrologic processes**, and **fisheries habitat** as the result of management activity. Resources other than these (e.g., air quality, botany, cultural resources, etc.) could also be potentially affected but are not discussed here. These are briefly presented in Appendix E.

Analysis considers the direct impacts (effects caused by the action and occurring at the same place and time), indirect impacts (effects caused by the action but occurring later in time and farther removed in distance but are reasonably foreseeable) and cumulative impacts (effects of the action when added to other past, present and reasonably foreseeable future actions). The temporal scale used in this analysis may vary depending on the subject matter. Short-term is assumed to be from the time of implementation up to ten years (RMP, pg. 112). Long-term is assumed to be ten years up to 100 years after implementation (RMP, pg. 106). Analysis of effects is considered to be in this context unless otherwise noted. When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: Is this information "essential to a reasoned choice among the alternatives"? (40 CFR 1502.22(a)). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely reverse or nullify understood relationships. Although new information would be welcome, no missing information was determined as essential for the decision maker to make a reasoned choice among the alternatives.

The Roseburg PRMP/EIS, to which this EA is tiered, analyzes the environmental consequences in a broader context. This EA does not attempt to reanalyze impacts that have already been analyzed in these documents but rather to identify the particular site specific impacts that could reasonably occur.

A. No Action Alternative

This alternative would not meet the Purpose and Need (objective) of the EA (pg. 2) of producing a sustainable supply of timber and other forest commodities that would contribute to the local economy. Restoration of past disturbance would not occur. Road densities and conditions would remain unchanged. Only normal programmed maintenance would be performed. There would be no entry into the Riparian Reserves for the purpose of enhancing conditions of late-successional forest ecosystems and applying silvicultural practices to meet ACS objectives.

Stands - The natural Douglas-fir mixed conifer forest is a fire dependant ecosystem (Agee 1993 pg. 286, Agee 2002 pg. 19, PNW 2003 pg. 3; Franklin 2002 pg. 405, Barret 1962 pg. 521). The area has been classified as a Moderate/Mixed-Severity Fire Regime (Agee 1993 pg. 293). Fire suppression will continue because the federal lands are interspersed with private production forests. Without fire, understory plants, dead wood, and shade tolerant conifers increase (Agee 1993 pg. 317). Fire suppression becomes more difficult when fuel loads and fuel ladders increase, and fires that burn under these conditions are more intense and destructive (Agee, 1993, pg. 388, Waring 1985 pg. 215).

The trees in the younger managed stands are competing for growing space (sunlight, nutrients, and water). These stands continue to change in time through growth and mortality. A stand exam was conducted and the data was input to the ORGANON growth and yield model (Hann 1995). ORGANON output indicates that trees are under varying degrees of competitive stress at this time. Trees that develop over long periods of competitive stress are more likely to be killed by insects and disease (Waring 1985 pg. 238, Smith 1962 pg. 55). Stands left in this condition are slow to respond to improved growing conditions and never attain potential growth rates (Smith 1962 pg. 95). The predicted average diameter in twenty years would be 11 inches in the Riparian Reserve and 17 inches in the uplands without thinning. When this process occurs in managed stands of Douglas-fir the dead wood on the forest floor and snags come from the smaller trees. Accumulations of dead wood consisting of small trees increases fire intensity and rate of spread and the risk of stand damage from fire (Waring 1985 pg. 215). The silviculture prescription in Appendix F contains more information.

Wildlife Habitat –

Threatened and Endangered Species - Approximately 140 acres of suitable **Northern spotted owl** habitat would remain suitable for the foreseeable future. Two-hundred and six acres of Northern spotted owl dispersal habitat would eventually mature and develop into suitable nesting, roosting, and foraging habitat in approximately 40-50 years. There would be no foreseeable disturbance effects to spotted owls. The opportunities for establishment of new spotted owl sites would continue to increase as the dispersal habitat continues to develop into suitable nesting habitat.

Bureau Sensitive & Assessment Species - Approximately 140 acres of suitable nesting habitat for the **northern goshawk** would remain suitable for the foreseeable future. If northern goshawks occur within the project area, then there would be no foreseeable disturbance effects to the species. The 206 acres of mid-seral stands in the project area would mature and eventually develop into additional suitable goshawk nesting habitat in 40-50 years. **Purple martins** and **Oregon vesper sparrows** would not colonize stands within the project area, barring a stand-replacing event. The project area does not have the open areas typical of purple martin colonies even though there are snags; and the Oregon vesper sparrow would not colonize the project area since it does not nest in closed canopy forests. Without a stand-replacing event, large openings that would foster the colonization and dispersal of purple martins or vesper sparrows would not be created within project area. The 140 acres of late-seral habitat containing potential live, green trees that have the characteristics which make them suitable roosts for **Townsend's big-eared bat** and the **fringed myotis** would remain intact for the foreseeable future. Remnant trees that have suitable features for bat roosts on the 206 acres of mid-seral habitat would remain suitable and additional trees would develop the deeply furrowed bark, cavities, and other deformities typically of bat roosts. It is unknown how many (if any) of these suitable bat roost trees are actually occupied by bats due to the limitations in surveys discussed previously.

Existing snag habitat for **cavity nesters** would gradually continue to decay and additional snag habitat would be created through tree mortality and other stochastic events. The project area would continue to function as over-wintering habitat for **northwestern pond turtles** for the foreseeable future.

Other Species - Approximately 140 acres of suitable nesting habitat for the **red-tailed hawk** would remain suitable for the foreseeable future. There would be no foreseeable disturbance effects to the known red-tailed hawk nest in Unit 33C. The 206 acres of mid-seral stands in the project area would mature and eventually develop into additional suitable red-tail hawk nesting habitat in 40-50 years.

Soil Productivity "Long-term soil productivity is the capability of soil to sustain inherent, natural growth potential of plants and plant communities over time" (PRMP/EIS, pg. 4-12). It can be evaluated in the following general areas: landslides, compaction and soil displacement, and soil changes due to fire. These three areas are used to organize the analysis for soil productivity.

Landslides - The probability of landslides would be low (1 to 10 percent) on the soils classified as fragile due to slope gradient in Units 25A, 31A, 33A and 33B (see pg. 16). The risk of landslides in Units 31A and 33A would be confined to a few scattered scarps with slopes greater than 50 percent. This assessment is based on: 1) the low level of recent landslide activity under mid-seral and old growth canopies within the proposed units (aerial photo history and field observations; and geotechnical analysis [Broda, 1999]). 2) The Oregon Department of Forestry 1996 storm impacts and landslide study (Oregon Department of Forestry, 1999, pg. 64) which indicates that failures are least likely in stands in the 31 to 100 year class, most likely in the 0 to 9 year age class and intermediate in the 100+ year class; and 3) indicators of potential instability seen in the field. The likely size of any landslide occurring inside the proposed units under the no action alternative would be small (less than 0.1 acres) based on recent landslide activity (see pg. 16). Substantial deep-seated earth flow activity on the fragile classified slopes in Units 31A and 33A could result from a prolonged climatic wet period where years with above average precipitation dominate. The stand of trees and understory vegetation would have little if any influence on the occurrence of these deep-seated earth flows since their slip planes would be below root zones and the evapo-transpiration influence of the trees and understory would not lessen the overwhelming effects of the prolonged wet periods (Broda). When this analysis was done in 1999, the precipitation trend was strongly pointing to a long-term wet period. Near normal precipitation has since been the dominant condition lessening the prospects of mass movement.

Compaction and soil displacement - The approximate 30 acres of moderate to heavily compacted soils including those with exposed subsoils in Units 25A, 25C and 31A would continue to very slowly develop more favorable soil characteristics for vegetative growth through natural processes (Froehlich, 1983). The unneeded road adjacent to Unit 25C would maintain its current nonproductive state.

Soils Related to Fire - Fire frequencies usually range from 20 to 100 years (Little River Watershed Analysis, pg. Terrestrial-29). Depending on intensity, a fire event would reduce soil productivity within the project area. The 18 acres of Category 1 soils would be most at risk for lost productivity in the event of an intense fire.

Water Quality and Hydrologic Processes - There would be no impact to water quality or hydrologic processes. Trees within the Riparian Reserve (Unit 31A) would continue to compete for space and stands would persist in an overdense condition and not attain potential growth rates (see Stands section above). This slow development would result in a smaller size of potential wood for long-term recruitment and slower canopy development. Since the root mass of the tree is roughly proportional to its diameter (Pirone, 1972, pg. 63), as a tree grows and the canopy size increases, it would also increase the soil-root network and hence stream bank stability. If growth development is slower, then the increased bank stability would be slower as well. Additionally, as tree crowns expand and height increases, the tree will provide more shade to the stream; if tree growth rates are slow, then the increased shade will be slower to develop as well.

Stand density would remain high in Unit 31A with a greater risk of a stand replacing wildfire or bark beetle epidemic. Should such an event occur it would result in an increase in water yield due to a reduction in evapotranspiration from the loss of vegetation. This effect is greatest in the headwater streams, such as those in the project area, which tend to burn more thoroughly than in larger streams (Minshall, *et al.*, 1989, pg. 707). In terms of stream temperature, the short-term benefit of increased summer flows by increased volume of water compared to the surface area receiving solar radiation would be offset by reduction in stream shade increasing solar-radiation to the stream.

Road renovation, improvement, and decommissioning would not repair existing **sedimentation** sources. Eroding natural surface roads such as the 26-2-31.1 road would result in continued sedimentation to streams. Some road stream crossings and drainage features are in poor condition and have an increasing likelihood of failure over time with introduction of substantial levels of sediment into streams. The amount of sediment would vary depending on the condition of the road and the size of the storm event; the poorer the road condition and the larger the storm event (ex. 100-year event) could result in the loss of the entire road at the crossing. Road density would remain the same since decommissioning of road would not occur. The likelihood of any landslide reaching a stream would be low since almost all slopes of potential instability are situated above gentle to moderate slopes away from any streams. Landslides most likely to occur would be small and impact low order streams. It would result in a short-term increase in sedimentation until the material is dispersed downstream and potential for a short and long-term increase in large wood. Effects of sediment in the stream bed from small landslides would have a low probability of being detected more than a few hundred feet downstream from the landslide (during normal flow conditions) since small streams have low capacity for carrying sediment due to their small size and low flows.

There are only a few streams in the project area that have the capacity to impact downstream spring/summer **stream temperature** (see discussion below). Over time, the riparian vegetation would continue to grow at a slow rate, increasing the shade and therefore slightly decreasing the temperature over time. In the absence of a stand replacing event, there would be no change to **water chemistry** or to the Beneficial Uses of Water, and no change to **water yield or peak flows** resulting from the no action alternative. The risk of peak flow increases would remain low as described in Table 2.

Fisheries Habitat - Current temperature, sediment inputs, woody debris and hydrologic processes would continue to function at existing rates and levels since the proposed action would not occur. The impacts associated with the proposed action (new road construction, timber

harvest, and site preparation) would not occur at this time. Vegetation would continue developing over the long-term to provide stable aquatic habitats. Activities designed to restore degraded aquatic habitats, such as improvements to the existing road and drainage networks would not be completed at this time. Density Management within the Riparian Reserve proposed to improve stand conditions and aquatic habitats would also not be completed at this time.

B. Proposed Action Alternative

Stands - Regeneration harvest would result in an immediate increase in fuel loadings (slash) in the range of 20 to 45 tons per acre. Approximately 25% of this slash would be in the fine fuel category (dead vegetative material three inches in diameter or less). These fuels represent the component of the fuel profile that most influence fire rate of spread (USDA, 1976, pg. 38). Left untreated the fine fuels would decompose to background levels, within three to ten years; however, the untreated slash would pose a substantial hazardous fuel risk until decomposition has occurred. Slash-burning should consume 90% of the fine fuels and substantially reduce the risk of damage to the residual stand from wildfire. Harvesting of the thinning areas would result in adding 10-15 tons of slash per acre. Approximately 30-40% of this debris would be limb wood (flashy fuels). This slash would fall to background levels in three to ten years, and would add nutrients to the soil (USDA, May 1980, pg. 2).

In the regeneration areas slash and vegetation left after logging would be reduced by prescribed burning to create planting spots, and planted with about 550 trees per acre. Natural regeneration from seed shed by retention trees and the adjacent mature forest is expected based on regeneration survey records (Micro*Storms database). In the thinning areas trees would be removed from below leaving about 70 trees per acre greater than 12 inches DBH, and 100 to 200 trees per acre that are seedling and saplings. In the Riparian Reserve, density management trees would be removed proportionally leaving about 150 trees per acre greater than eight inches DBH, and about 140 trees per acre that are seedlings and saplings. The higher level of retention in the Riparian Reserve would lead to additional snags and CWD in the future (ORGANON growth and yield model using stand exam data). There are enough large green trees retained to provide for both the large green tree component and large snags and CWD in the future. The trees that are to be harvested in the Riparian Reserve are surplus to these needs. If the surplus trees are felled and left instead of being harvested an unnaturally heavy fuel load would be created (see Fuels Specialist report, Appendix F). The predicted average diameter in twenty years by thinning in the Riparian Reserve would be 14 inches (three inches greater than without thinning) and 23 inches in the uplands (six inches greater than without thinning. The stand would still be overly dense; therefore, mortality would be expected in trees up to 26 inches in diameter (ORGANON growth model).

Wildlife Habitat -

Threatened and Endangered Species - Impacts due to harvest activities would include the removal of 140 acres of suitable nesting, roosting, and foraging **Northern spotted owl** habitat and four acres of Northern spotted owl dispersal habitat. The loss of suitable habitat would not affect the ability of the four existing spotted owl sites within 1.2 miles of the project area to function. The Engles Creek, Greenman Creek, Green Thunder, and Lookout Canyon owl sites are protected with a 100 acre Activity Center. Harvest would not reduce the integrity of these

Activity Centers. However, the removal of suitable habitat would limit the opportunities for juvenile owls to disperse across the project area and prevents the establishment of a new spotted owl site within the project area until the stands re-develop into suitable habitat in 80+ years. Harvest activities would also include modification of 205 acres of Northern spotted owl dispersal habitat and six acres of suitable Northern spotted owl habitat. Although dispersal habitat would be modified it would continue to function as dispersal habitat, but in a slightly degraded condition. As canopy cover recovers and understory vegetation layers develop, functionality of the modified dispersal habitat would improve for the spotted owl in 10 to 15 years. NOTE: US Fish and Wildlife Service's T&E consultation opinion is stated on page 35.

Northern spotted owls do not typically exhibit a negative response (e.g. flushing from nest/perch, aborted feeding attempts, nest abandonment) to a noise/visual disturbance if that disturbance is sufficiently far away. Chainsaws and heavy equipment would be the source of the noise/visual disturbance. The distance at which spotted owls do not typically exhibit a disturbance response to heavy equipment and chainsaws is 65 yards (USDI, 2004). Removal of suitable habitat within 0.25 miles of known spotted owl sites is also considered a disturbance (USDI, 2003). Since there are no known spotted owls sites within 0.25 miles of the regeneration harvest units nor within 65 yards of the commercial thinning/density management unit (31A), there would be no disturbance effects to spotted owls.

Bureau Sensitive & Assessment Species - The regeneration harvest units proposed in this project would remove 140 acres of habitat suitable for the **northern goshawk**. The proposed action would likely disrupt normal nesting behaviors of northern goshawks (if they occur in the project area) so that the adults may abandon the nest or the young may not survive. If surveys determine that a northern goshawk is present, then seasonal restrictions would be applied within 0.25 mile of the nest site from March 1st through July 30th (or until the young have dispersed) and a 30 acre core area would be established around the active and alternate nest sites. These mitigations to a northern goshawk nest site (if any are discovered) would alleviate disruption of the birds' nesting behavior and maintain the physical integrity of the nest site. Thinning on 206 acres of mid-seral habitat would promote the use of the stands by the northern goshawk, purple martin, and the Oregon vesper sparrow by increasing the amount of foraging and roosting habitat available. Regeneration harvest of 140 acres would provide open habitat suitable for establishment (potentially) of new **purple martin** colonies and new **Oregon vesper sparrow** sites. Snags would be retained in both the commercial thinning and regeneration harvest units due to the protection afforded by the PDC's. Purple martin habitat would therefore be created through the regeneration harvest units since they use snags in open areas. Regeneration harvest would provide suitable habitat for the colonization by Oregon vesper sparrows as the grass and forb layers develop. Regeneration harvest would remove or modify live, green trees that have the characteristics which make them suitable roosts for **Townsend's big-eared bat** and the **fringed myotis**. It is unknown how many (if any) of these suitable bat roost trees are actually occupied by bats due to the limitations in surveys discussed previously. Green retention trees reserved in the proposed units would serve as legacy structures for future bat habitat. Commercial thinning and density management would not remove or modify trees with potential bat roosting features.

Snag habitat for **cavity nesters** would be retained in the commercial thinning, density management, and regeneration harvest units due to the protection afforded them in the PDC's (see paragraph II.C.3.a.). PDC's included to minimize soil compaction and retain duff layers (see paragraph II.C.2) would help the project area retain its capability to function as over-wintering habitat for **northwestern pond turtles**.

Other Species - The regeneration harvest would convert 140 acres of suitable nesting habitat for **red-tailed hawks** into 140 acres of foraging habitat. There would be no disturbance effects (e.g. nest abandonment) to the known red-tailed hawk nest adjacent to Unit 33C since activities would not occur within a quarter mile of the nest site during the nesting season (March 1st – July 15th). Commercial thinning and density management is expected to promote the use of the stands by the red-tailed hawks by increasing the amount of foraging and roosting habitat available. The red-tailed hawks known to occur in the project area would reasonably be expected to persist since: the integrity of the nest site is protected with a five acre nest core, seasonal restrictions would alleviate disturbance effects, and there is additional foraging and roosting habitat available.

Soil Productivity -

Landslides - New spur construction would not increase the probability of landslides because these spurs would be located at or near ridge tops on stable, gentle to moderate slopes and would have good drainage features. The action alternative would result in a slight short-term increase in the probability of very small harvest-related movements (less than 0.03 acres/90 cubic yards) in the earth-flow terrain of Unit 31A where there are some scarps with slopes exceeding 50 percent (small inclusions) (see geotechnical review, 1999). This would be due to a temporary decrease in root strength and canopy interception of precipitation. The high post-thin density of trees in Unit 31A and the design feature of dry season yarding with at least one-end suspension would help keep the risk low with minor effects to soil productivity. Harvesting the trees in the earth-flow terrain of Units 31A and 33A would have little, if any effect on the larger, deep-seated earth-flows that could occur during a prolonged climatic wet period (Broda, 1999).

The risk of debris avalanches would increase from low (less than 10 percent) to the low end of the moderate range (10 to 20 percent) for some sites in the five acres of FGR slopes in the regeneration units 25A and 33B with the incorporation of project design features (retaining trees in swale bottoms, dry season yarding with at least one-end suspension, hand waterbarring any skyline yarding trail that can channel water to locations susceptible to failure and no broadcast burning). The likely size of any debris avalanche would be less than 0.2 acres (based on site conditions, landslides which occurred in adjacent clearcut and management practices to be applied). Thinning harvest in Unit 31A and regeneration harvest in Unit 33A would have minimal effects to slope stability on soils classified as fragile due to potential of deep-seated slump/earth flow movements (see pg. 16) for the following reasons: 1) There would be a slight increase in risk (still in the low range) of small landslides on the widely scattered scarps with slopes greater than 50 percent. 2) Harvesting the trees would have little, if any effect on the larger, deep-seated earth-flows that could occur during a prolonged climatic wet period.

Compaction and Soil Displacement - About 1.1 mile of existing trail and old natural surfaced road with moderate to heavy compaction would be reopened as spurs for this action. Vegetation would be removed from the travel surfaces and heavy compaction would be reestablished over the entire length. About 0.5 mile of new road would be constructed where there's no existing trail or road. New spur construction, including widening of trails, would cover about two acres of which 0.4 acre of this new disturbance for permanent road (26-3-25.5) would be considered an irretrievable loss to soil productivity. Small, inconsequential levels of erosion would occur during the first season flush following construction and would then decrease thereafter. Two acres of compacted temporary spur bed would be subsoiled shattering about 80 percent of the compaction (Froehlich, 1983; pg. 180) and restoring most of the lost productivity in the long-term.

Between 70 and 80 acres would be ground-based yarded (including incidental). At least 90 percent of the ground-based yarding would utilize the swing shovel method. Shovel swing yarding would cover about 15 to 25 percent of the surface in trails; however, the amount of area in main skid trails (as defined in plan maintenance [FY2001 Roseburg District Annual Program Summary and Monitoring Report, pg 70]), log decks, and landings would be well below the plan maintenance threshold of ten percent. With low soil moisture conditions (less than 10 percent) swing yarding compaction would be light overall (Hutchison; Off Little River effectiveness monitoring) with very little soil displacement. Any incidental ground-based yarding would likely be accomplished using the swing shovel method or tractor yarding.

Designated skid trails from any incidental tractor yarding would cover about six percent of the tractor-yarded ground (less than an acre). Some of this trail coverage would overlap old existing trails with residual compaction. New tractor yarding compaction would be substantial enough (moderate to heavy over most of the trail lengths) to negatively affect the growth of adjacent trees (about 10 percent growth loss of adjacent trees [Adams, 2003 presentation]).

Subsoiling would be applied to trail segments with substantial compaction shattering about 80 percent of the compaction and restoring most of the lost productivity in the long-term. The pulling of woody debris back onto the subsoiled segments would improve long-term soil productivity by leaving a nutrient reservoir and a medium for growth of organisms beneficial to the soil.

Cable yarding in thinning Unit 31A would produce light, superficial compaction covering about two percent of the surface with very little soil displacement (Sampson Butte, Coon Creek and Hello Folley, field observations). Compaction and soil displacement due to skyline yarding in the regeneration units would be greater with dominantly moderate soil compaction (field monitoring by Swiftwater soil scientist) covering up to three percent of the surface (Adams, Oregon BLM Soil Scientist Annual Meeting, 2003). There might also be some shallow chutes and gouging created where soils are moist or one end-suspension was not achieved. The yarding compaction would be confined largely to the topsoil and would eventually heal satisfactorily without mitigation (Soil Scientist personal observations, Galagher project).

Soils Related to Fire - Broadcast burning would be light in intensity and minimally reduce soil productivity because it would occur under moist, spring-like conditions, and would mostly avoid Category 1 soils (see pg 16). About one acre of Category 1 soils in Units 25C and 33A would be broadcast burned since it would be impractical to avoid. However this acreage is minimal in the context of the 340 acre project area. Because of the handpiling and burning of about 17 acres of Category 1 soils in Units 25A and 33B, the loss of soil productivity would be minimized.

Surface Erosion - The effects of in-unit surface erosion to soil productivity due to soil disturbance would be negligible because of the high soil infiltration, the cover provided by duff, woody debris and residual vegetation, and the waterbarring of any yarding trail (skyline or tractor) that can channel water.

Water Quality and Hydrologic Processes - Sediment input due to yarding or harvest in regeneration units would not occur due to the buffering effect of the Riparian Reserve along existing streams. An inconsequential amount of sediment may reach streams from thinned stands in Unit 31A, however the no-harvest buffer would act as a filter strip (Sampson Butte, Hello Folley, and Coon Creek monitoring observations). Some direct pathways for short-term soil displacement and potential **sediment delivery** may occur as a result of localized soil

disturbance from cable yarding and ground-based equipment operations. Skid trails would be subsoiled to improve infiltration and the trails that could pose sedimentation risks would be waterbarred and covered with slash. A no-harvest buffer would be sufficient to maintain bank stability on streams. In general, a 40 ft no-harvest buffer would be sufficient since half a tree crown diameter is an estimate of the extent to which root systems affect soil stability (FEMAT, 1993; pg. V-26). Minor, intermittent, non-fish bearing streams that only flow in response to storm events would have a smaller no-harvest buffer since they have minimal concerns for sedimentation risks given the project design criteria. At the very minimum, one-tree crown width would be maintained on each stream bank allowing for the soil-root network closest to the stream to be maintained for bank stability, since after cutting the tree root system begins to decay and the soil-root network weakens (Ziemer, 1981a, pg. 307). The contribution of root strength to maintaining streambank integrity declines at distances greater than one-half a crown diameter (FEMAT, 1993, V-26). In the long-term, large wood contributed to the Riparian Reserve as a result of density management in Unit 31A has the potential to create additional capacity for sediment storage due to sediment capture by larger wood in streams. Broadcast burning would be outside Riparian Reserves and burning of slash piles would be limited to landings and the outer portions of Riparian Reserves along the powerline; any sediment associated with the burning would be filtered into the forest floor and would not reach the streams. There is spring flow above Unit 33C that is currently being diverted down a roadside ditch. The proposed action would restore the flow to its natural channel. Given the volume of flow present in the spring, after the natural drainage pattern is restored, a defined channel with scour and deposition would be carved through the old stream channel in Unit 33C. This restored stream would have a 35 ft. no harvest buffer in order to maintain bank stability. Due to the distance to fish-bearing streams and the small amount of sediment produced, any sediment from restoring the natural drainage pattern would be undetectable from baseline at fish-bearing streams downstream.

The probability of harvest-related landslides occurring and then reaching streams is low. Those that might occur on the scarps in the FPR portions of Units 31A and 33A (low probability events) would come to rest on gentler slopes below and not affect streams. Debris avalanches that might occur on the FGR slopes in Unit 25A and 33B (moderate probability events) would be at least 1100 feet upslope from the nearest stream. The probability is low that these debris avalanches would develop into debris flows capable of reaching a stream given the swale and soil characteristics and the project design used. If any harvest-related landslides were to reach a stream, they would result in a short-term increase in sedimentation until the material is dispersed downstream. The effect of sediment from the landslides has a very low probability of being detectable in the stream beds more than a few hundred feet from the point source and would not affect the identified fish-bearing streams downstream.

About 0.4 mile of new road would be constructed over natural ground where there's no existing trail or road. Locating new construction outside Riparian Reserves and at stable locations on gentle to moderate slopes (10 to 40 percent) would minimize erosion and sedimentation. Maintenance of existing roads would be accomplished with project design criteria to reduce the input of sediment in the short and long-term from continued degradation of roads and potential blowouts during large storm events (ex. 100 year events). There is potential for a small amount of sediment delivery to the streams from culvert replacement; however, the effects are minimal, short-term and would not extend to the fish-bearing streams downstream due to the small amount of sediment and the distance to fish-bearing streams. Replacements of these culverts would reduce the potential for future culvert failure and input of large amounts of sediment (see No Action effects). Decommissioning portions of the 26-2-31.1 road would result in reduced sediment delivery to streams in the short and long-term since the erosion down the 31.1 road is

currently reaching an intermittent stream. Sediment in the spur east of Unit 25C is filtering through the forest floor before reaching the stream. Restoring natural drainage pattern of the two streams in 31A and 33C would reduce sediment in the long term by removing the flow from highly erodible surfaces.

In summary there would be a slight short-term increase in sediment input and transport (primarily due to culvert replacement), however in the long-term there would be a possible decrease.

Regeneration harvest would be outside Riparian Reserves and therefore would not alter **stream temperature**. Only perennial streams and those flowing in the hottest days of summer from late June to early September (summer flow) have the potential to increase stream temperature downstream since they are the only streams that contain water during the summer. During the summer months, solar radiation levels are greatly increased due to higher sun angles, longer days, and clearer skies. The stream discharge is low and shading effects of the forest canopy increase and stream temperatures are at their highest (Beschta, et.al., 1987, pg. 193-195). The stream in Unit 33C that is being rerouted to its natural flow is intermittent; therefore timber harvest near it would not alter stream temperature during the summer, the critical time of the year. Providing 50-60 foot of no-harvest buffer on summer flow, non-fish bearing streams in Unit 31A would leave an intact primary shade zone (zone providing shade from 10 a.m. to 2 p.m.) on streams that have the potential to contribute to downstream temperatures during critical times of the year (USDA and USDI, 2004, pg. 20). Thinning in the secondary shade zone (zone providing shade from 6 a.m. to 6 p.m.) would have no measurable increase in stream temperature since the thinning would not reduce current canopy closure below 50 percent of the current condition (USDA and USDI, 2004, pg. 20). Clearcutting along the powerline in 31A would be outside the secondary shade zone of the perennial stream and therefore would have no affect on stream temperature.

Water chemistry would not be altered by this project. Burning would occur outside the Riparian Reserves in the regeneration harvest units and on landings in the thinning unit. Any chemicals in the ashes would be filtered into the forest floor. There should be no impact to the **Beneficial Uses of Water** as a result of this alternative because the project design (see pg. 10, para. e; and discussion, pg. 25) and Riparian Reserves would eliminate any effects.

The impact of vegetation removal during regeneration harvest and density management could result in short and long-term increases in **water yield and peak flows** due to a decrease in evapotranspiration and interception. Removal of trees tends to increase soil moisture and base streamflow in summer when rates of evapotranspiration are high; these summertime effects only last a few years (Ziemer and Lisle, 1998). Slight increases in summer flow would benefit riparian areas, which are often moisture limited during the summer. With the onset of the rainy season in the fall, the soil becomes recharged with moisture. Several studies have shown that the first storms of the fall have the most increase in peak flow from pre-logging conditions (Rothacher, 1973, pg. 7; Harr, et al. 1975, pg. 441; Harr, et al. 1979, pg. 11; Ziemer, 1981b, pg. 916). These fall storms are usually small and geomorphically inconsequential (Ziemer, 1981b, pg. 916). Large peaks flows occur mid-winter after soil moisture deficits are satisfied in both logged and unlogged watersheds (Ziemer and Lisle, 1998, pg. 60). Increases in peak or storm flows in winter and spring can alter channel morphology by flushing smaller substrate, causing the channel to downcut and increase stream bank failures. Studies on increased peak flows are varied in their findings on how much increase in flow would result from a given amount of timber harvest. Most studies agree that the effects of harvest treatment decreases as the flow

event size increases (Rothacher, 1971, pg. 51; Rothacher 1973, pg. 10; Wright et al., 1990) and is not detectable for flows with a two year return interval or greater (Harr, et al., 1975, pg. 443; Ziemer, 1981b, pg. 915; Thomas and Megahan, 1998, pg. 3402; Thomas and Megahan, 2001, pg. 181). At the project level, there may be short and long-term increases in peak flows of smaller storm events; this effect would decrease over time. Roads and landings may modify storm flow peaks by reducing infiltration on compacted surfaces, allowing rapid surface runoff, or by intercepting subsurface flow and surface runoff, and channeling it more directly into streams (Ziemer, 1981b, pg. 915). However, effects from peak flows have been shown to increase significantly only when roads occupy at least 12 percent of the watershed (Harr, et al. 1975, pg. 443), which is not the case in this watershed. This phenomenon is due to the increased speed of delivery of water from road surfaces, ditches, and culverts (Harr, et al., 1975, pg. 441), thus changing the timing of the storm hydrograph. Road maintenance, improvements, and decommissioning would decrease the effects of roads on changing the timing of the storm hydrograph.

Proposed road decommissioning and restoring the natural flow to the stream along the 26-2-31.1 road and the stream along the 27-2-5.2 road (in Unit 33C) would result in a small decrease in the existing stream network density which would increase infiltration and decrease peak flows on these streams. Since 99 percent of the project is in TSZ, an analysis was conducted to determine if increased harvest would increase the risk of peak flow enhancement. The results from the TSZ model (described on pg. 15) indicate that there is no change in risk level from pre-harvest levels as described in Table 3. Therefore, the risk of peak flows increasing from the proposed action is low.

Table 3: Risk of Increased Peak Flows in Project Drainages from Proposed Action

Analytical Hydrologic Unit (AHU)[1]	Percent AHU in TSZ	% TSZ with <30% Crown Closure Present	% TSZ with <30% Crown Closure Post Harvest	Risk of Peak Flow Increase[2] Post Harvest
Bob Creek AHU	78	7.4	10.1	Low
Bond Creek	47	11.6	17.8	Low
Engles Creek	54	10.8	14.8	Low
Greenman Creek	73	0	0	Low
Shivigny Creek AHU	63	19.0	24.7	Low

[1] AHU's are hydrologic units analyzed for peak flow increases.
[2] Low risk of peak flow increase are increases less than 8 to 10% which represents the lower boundary of detectability (Watershed Professional Network, 1999, pg. IV-11).

Fisheries Habitat - Timber sale units are all located high in the watershed with potential to only direct influence being to the non-fish bearing headwaters of these streams. The nearest unit to fisheries habitat would be greater than one mile. The six units of regeneration harvest would retain full Riparian Reserve buffers; therefore no impacts are expected to the associated stream channels. Approximately 35 acres of the Riparian Reserve adjacent to the commercial thinning unit would be thinned for density management. Density management is specifically prescribed to enhance the development of late-successional conditions (increase in course woody debris, litter fall, root strength, shading and associated microclimate conditions) within the Riparian Reserve. No-harvest buffers would be prescribed to protect stream bank stability, provide stream shading, and prevent harvest related sedimentation. The stream channels adjacent to the harvest units contain large amounts of **large organic debris** (LOD). LOD helps form a stepped profile in streams, in which the stream is composed of a series of long; low-gradient reaches separated

by short, steep falls and cascades. The result is a decrease in the energy available for erosion, decreased sediment transport capabilities, slower routing of detritus and greater habitat diversity than in channels with less gradients. LOD also provides for significant in-stream sediment storage over long periods of time. This high sediment storage capacity serves as a buffer, reducing the effects of sedimentation on downstream areas during periods of high sediment input (McDade, 1987, pgs. 4, 5 and 7). There would be no reduction in **large woody debris** (LWD) within the riparian areas adjacent to the regeneration units since full Riparian Reserve would be retained. Although density management harvest would occur near streams in Unit 31A there would not be a reduction in LWD since the closest fisheries habitat is greater than one mile from the harvest units. The existing and future recruitment of LOD to streams located adjacent to the harvest units would not be impacted as a result of the no-harvest buffers and the retention of 200 trees per acre in the Riparian Reserve (Unit 31A).

Based on the specific PDC's described below, and the proximity of the transportation network from fisheries habitat, impact of **sedimentation** on fisheries habitat would not be measurable in streams and above existing background levels for the following reasons: 1) All segments of naturally surfaced roads (both existing and newly constructed) would have dry season haul with seeding and mulching, waterbarring and blocking to traffic during the same dry season as logging. There are not any stream crossings associated with the natural surface roads, therefore any sediment from these segments would filter onto the forest floor and not reach streams. 2) Overall, rock quality is good on the rocked surface roads and ditch lines are adequately vegetated to filter sediment and prevent ditch erosion on the haul roads. Drainage would be improved through the repair or replacement of 33 cross drains and four non-fish bearing stream crossing culverts. Some segments deficient in the amount or quality of rock (approximately 12 inches or less) would receive an additional lift of rock to handle winter haul. One study (Burroughs, 1993) stated that ten inches of 1.5 inch minus gravel reduces the impacts of forest-road sedimentation by 99 percent. A study by Luce and Black in the Oregon Coast Range (soils similar to those of the affected environment) showed substantial reductions in sediment delivery (about 80 percent) where well-vegetated or armored (covered with rock fragments) ditch lines of rocked roads were left ungraded. 3) For the wet season haul portion, all culvert crossings would be inspected prior to haul for implementation of PDC's that would lessen sedimentation concerns (i.e., use of hay bales, sediment curtains, etc.). 4) All of the stream crossings within the haul routes would cross first or second order streams which have sediment filtering capacity (e.g.; interrupted stream channel, large amounts of organic debris, and step-pool systems). 5) Dry season haul of the project area would be required for all natural surfaced roads and ground based yarding operations. Dry season haul on rocked roads generates considerably less sediment than wet season haul. 6) Research has shown that the greatest amount of fine sediment from timber haul comes from roads within 200 feet of streams (WDNR, 1995). Beyond this distance there is very little sediment impact to streams from hauling. The increased level of sediment production would be a temporary condition that would return to pre-hauling levels within the first wet season after hauling has been completed. Approximately 3.2 miles of the timber haul route is located within 200 feet of first or second order non-fish bearing streams. The vast majority of this mileage is within the headwaters consisting of, first order intermittent/ephemeral streams. The remainder of the mileage is on non-fish bearing stream crossings.

Long-term benefits from road decommissioning and improvements would result in restored natural hydrologic functions and reduced sedimentation. An unquantifiable but small amount of additional sediment may be transported to the streams from harvest and yarding actions within the Riparian Reserve during high volume precipitation events within the first wet season after completion of the proposed project. However, due to the distance of the harvest units from fish-

bearing streams (greater than one mile) there is no potential of sediment impacts from the harvest units to the fisheries habitat.

No impact from harvest related landslides are expected to occur due to PDC's (pg. 10) in place to protect slope stability (see previous discussion, pg. 25). Impacts from harvest related landslides are not reasonably certain to occur, due to: 1) the low probability of occurrence (less than 10 percent), 2) size of potential landslide would likely be less than 0.2 acre (see page 23) and; 3) harvest units located greater than approximately one mile from fish-bearing waters.

Irreversible and Irretrievable Commitment of Resources - An irreversible commitment is a commitment that cannot be reversed whereas an irretrievable commitment is a commitment that is lost for a period of time. An irreversible commitment of petroleum fuels for road building, logging and timber hauling as well as the loss of rock (approximately 15,000 cubic yards) from the Thunder Mountain quarry for crushed rock used in the renovation of the road system would result from the proposed action. The construction of new roads would result in long-term loss to soil productivity (less than an acre) and modification of hydrologic function (0.1 mile) and is considered an irretrievable commitment. The irretrievable loss of approximately 140 acres of mature or old-growth forest would occur since portions of the project area would be subject to regeneration harvest and be managed on an 80 to 150 year rotation.

C. Cumulative Impacts Analysis

Cumulative impacts are impacts on the environment which results from incremental impact of the action when added to other past, present and reasonably foreseeable future actions (40 CFR 1508.7). The following discussion shows that the proposed action has environmental impacts on certain resources that do not extend beyond the project area or are so insignificant that they cannot be reasonably measured beyond the project area. In these instances, there is no incremental increase to past, present or future actions regardless of other actions, therefore it is unnecessary to provide a catalog of those other actions.

Harvest Activity Impacts on Wildlife Habitat - Range-wide the northern spotted owl population experienced an average decline of 3.7% per year from 1985-2003 (pg. 14; USFWS, 2004b). Within the Tyee, Klamath, and South Cascades study areas in southwestern Oregon, the spotted owl populations appear to be stable from 1985-2003 (pg. 13-14; USFWS, 2004b). Habitat loss due to timber harvest was identified as the paramount threat in 1990 (pg. 54; USFWS, 2004b).

The rate of suitable habitat loss due to timber harvest on private, state, and federal forest lands declined between the late 1980's and the early 1990's (pg. 24; USFWS, 2004b). The harvest rates of suitable habitat on BLM lands in Oregon was three percent per year (22,000 acres) in 1990 and dropped to 0.52 percent per year (4,911 acres) by 2003 (pg. 28; USFWS, 2004b). During this period of declining rates of habitat loss, the spotted owl populations in southwestern Oregon appeared to be stable. The rate of habitat loss due to timber harvest on federal lands is expected to be less than four percent per decade (pg. 111; USDA, USDI, 2004b). Since the harvest rate on federal lands in Oregon is expected to remain low for the foreseeable future, it is reasonable to expect that the northern spotted owl population would remain stable in southwestern Oregon. The harvest of 140 acres of suitable habitat and the short-term degradation of 206 acres of dispersal habitat associated with the proposed project are included as

part of the BLM timber harvest program in southwestern Oregon. In addition, it is estimated that within the Northwest Forest Plan area that habitat ingrowth is occurring at approximately eight percent per decade (600,000 acres per decade) over the baseline condition established in the Northwest Forest Plan (pg. 26; USFWS, 2004b).

Within approximately 70 years, almost all forest stands within the federal reserve network will mature and develop into suitable spotted owl habitat. Private forest lands and federal, non-reserved matrix lands will not develop into suitable spotted owl habitat given the management objectives for those lands. Approximately 80 percent of federal land within the Northwest Forest Plan area is reserved from regeneration timber harvest (pg. 111; USDA, USDI, 2004b) and will develop into suitable owl habitat. Managed, mid-seral stands on federal, non-reserved matrix and on private lands would offer dispersal quality habitat to spotted owls that may be used as connectivity between blocks of late-seral habitat contained within the federal reserves. In the fifth-field watersheds (Middle North Umpqua and Little River), within which the proposed project occurs, 67 percent (62,988/94,114 acres) of habitat currently suitable for spotted owls is reserved and an additional 37,837 acres of reserved land will develop into suitable habitat within 70 years (Table 4). Upon maturation of the reserves, 56 percent (100,825/180,128 acres) of federal forest land will be suitable owl habitat that is reserved (Table 4).

The emergence of barred owls as invasive competitors, West Nile virus, and sudden oak death as new threats to spotted owls suggests an increase in risk to the species since 1990. These newly identified threats are poorly understood, are likely to be pervasive, and will be difficult to alleviate. However, the increased risk from these new threats was not sufficient to change the status of the spotted owl (pg. 55, USFWS, 2004b).

Therefore, the proposed project would not incrementally affect the stability of the northern spotted owl population in southwestern Oregon since the rate of habitat loss is substantially reduced, there is substantial ingrowth of habitat, and newly identified threats are independent to the proposed action.

Table 4. Forest Habitat within the Middle North Umpqua and Little River Fifth Field Watersheds.[1]

Forest Habitat	**Private Lands** (acres)	**Federal Lands: Available** (acres)	**Federal Lands: Reserved** (acres)	***Total*** (acres)
Late-Seral Forest (QMD ≥ 20")	4,602	31,126	62,988	*98,716*
Mid-Seral Forest (10" ≤ QMD < 20")	12,930	28,441	20,269	*61,640*
Early-Seral Forest (QMD < 10")	28,823	19,736	17,568	*66,127*
Non-Forest Lands	15,242	13,725	13,200	*42,167*
Total	*61,597*	*93,028*	*114,025*	*268,650*

[1] 1997 Interagency Vegetation Management Project (IVMP) dataset.

Impacts to Soil Productivity - Soil productivity would be maintained at the watershed level on federal lands as the proposed action and other federal actions are implemented. This is based on the following reasons:

Landslides - The area impacted by landslides caused by the proposed action would likely be small and have little impact on soil productivity at the project level due to best management practices such as placing landslide prone areas in Riparian Reserves, new road locations in stable areas, avoiding broadcast burning on steep slopes, one-end suspension of logs during yarding, waterbarring yarding trails and dry season yarding. At the larger scale, an in-depth landslide assessment in the Middle North Umpqua Watershed Analysis (BLM, 2001) showed a downward trend in landslide frequencies over the last 50 years due to federal and private best management practices. It stated, "Correction of some stability and drainage problems in old roads and the better road construction and maintenance practices of today have reduced the risks [of landslides] substantially in comparison to the sixties and seventies" (pg 72). Since the area impacted by landslides as a result of the proposed action would have little impact at the project level and would not extend beyond the project area, there would be no incremental addition to past, present and reasonably foreseeable future actions. Therefore, the cumulative substantial reduction of landslide risk in the watershed since the sixties and seventies would not be reversed or slowed because of the proposed action.

Compaction and Soil Displacement - There would likely be no adverse incremental addition to other past, present and future compaction and soil displacement at the project level since old road beds, 78 percent of the newly constructed roadbeds, and some of the old and new ground-based yarding compaction would be subsoiled. In addition to the subsoiling, there would be the ongoing natural healing of compaction and soil displacement on BLM surface inside the Little River and Middle North Umpqua watersheds where past ground-based operations extensively occurred on slopes less than 40 percent. Even though this natural process is very slow, it and the subsoiling amelioration combined insure that soil productivity at the watershed level would be at least maintained on BLM surface.

Impacts to Aquatics/Water Quality and Aquatic Species – The proposed action would cause no incremental increase to past, present and reasonably foreseeable future actions on stream temperature, water chemistry, fish habitat and aquatic species beyond the limits of the project area because of the following reasons:

Stream Temperature – Riparian Reserve prescriptions, including no harvest buffers, provide shade needed to prevent any measurable change in stream temperature.

Water Chemistry – Chemical changes caused by prescribed burning would not occur because no burning would occur in the Riparian Reserves and chemicals in the ashes from prescribed fire outside the riparian reserve would be filtered through the forest floor of the unit and the riparian reserves.

Sediment – Due to the buffering effect of the Riparian Reserves, sediment input from yarding or harvest in regeneration units would not occur and would be inconsequential in the thinning unit. Culvert replacement may result in a small amount of short-term sediment delivery to the streams. The probability of project-related landslides occurring and then reaching streams is low because of mitigating measures put into place with the proposed action. The effects of all of the potential sources of sediment would be dissipated before the edge of the project area or within a few hundred feet outside the project area due to the

minimal, short-term nature of the effects and due to the limited potential of these streams to carry sediment. Therefore the effects of sediment would not reach the fish-bearing streams downstream.

Peak Flows and Water Yield – There is no risk of increased peak flows to the drainages from this action. If harvest on private occurs in the same drainages in the near future, peak flows may be slightly increased as a result of combined reduced stand densities on private and BLM administered lands. This could result in a short and long-term increase in peak flows for small storms with less than a two year return interval. However, the limited size and spatial scattering of treatment areas on BLM lands, road drainage improvements, and Oregon Forest Practices Act regulations on size of harvest units on private land would help mitigate these potential effects.

If a large portion of a watershed is less than 30 years of age, there is risk of increased water yield. The Equivalent Clearcut Area (ECA) method (Galbraith, 1975) is used as a means to assess for the risk of increased water yield in watersheds dominated by rain-on-snow events as is the case with much of the Middle North Umpqua and Little River Watersheds. The ECA analysis accounts for acres of created forest openings and uses partial recovery coefficients for regrowth of young forest stands that have been either harvested or burned. In this analysis, ECA was coupled with an Aggregate Recovery Percentage (ARP) which also accounts for other open areas in the watershed (Christner, 1981) such as burned areas, agricultural land, urban areas and roads. An increasing percentage value indicates a risk of increased annual water yield. The calculated ECA index value for the Middle North Umpqua Watershed is currently 9% and would remain 9% after harvest. The calculated ECA index value for the Little River Watershed is 13% and would remain 13% after harvest (data for calculations from Healey et al, 2003). NOAA Fisheries, et al. (2003, pg. 20) consider an ECA index above 15% to be not properly functioning. This baseline is low compared to other research. After reviewing 94 watershed experiments from around the world, including 15% from the Pacific Northwest, Bosch and Hewlett (1982, pg. 16) concluded that water yield increases are usually only detectable when at least 20% of the forest cover has been removed. Stednick (1996, pg. 88) evaluated twelve studies in the Pacific Coast hydrologic region and determined there is no measurable annual water yield increase until at least 25% of the watershed is harvested. The existing condition is below all of these published thresholds and the proposed action would not raise the ECA above these thresholds. Therefore, any change in water yield as a result of the proposed action would be so small as to be undetectable at the watershed level.

Fish Habitat and Aquatic Species – Sediment regime, stream temperature, water chemistry, peak flows, and water yield together influence fish habitat and aquatic species. Since stream temperature and water chemistry would not be influenced by the proposed action; and changes in sediment would be of small magnitude and would not extend to the fish-bearing streams downstream, fish habitat and aquatic species would not be affected. Since changes in peak flows and water yield from the project do not have the capacity to alter channel morphology and effects would be indistinguishable from background levels at fish-bearing streams downstream; fish habitat and aquatic species populations would not be affected by the proposed action at the project level nor would they add to the cumulative effects.

Therefore, there would be no incremental addition to other past, present and future actions that would add to a collective impact on these at a larger scale including the Little River and Middle North Umpqua watersheds.

V. CONTACTS, CONSULTATIONS, AND PREPARERS

A. Agencies, Organizations, and Persons Consulted

The Agency is required by law to consult with certain federal and state agencies (40 CFR 1502.25).

1. **Threatened and Endangered (T&E) Species Section 7 Consultation -** The Endangered Species Act of 1973 (ESA) requires consultation to ensure that any action that an Agency authorizes, funds or carries out is not likely to jeopardize the existence of any listed species or destroy or adversely modify critical habitat.

a. The Roseburg District's consultation for T&E wildlife species is covered under the **US Fish and Wildlife Service** (FWS) *Formal Consultation and Written Concurrence on FY 2003-2008 Management Activities (Ref. # 1-15-03-F-160)* (Feb. 21, 2003). The Biological Opinion (pg. 29) concluded that the project was ". . . not likely to jeopardize the continued existence of the spotted owl, murrelet and bald eagle, and are not likely to adversely modify spotted owl or murrelet critical habitat . . ." and an "Incidental Take Statement" was issued. Incidental Take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency. The FWS has stipulated terms and conditions for the Incidental Take having to do with seasonal restrictions for the northern spotted owl.

b. The Roseburg District's Biological Assessment (BA) for candidate T&E fish species conferencing was submitted to the **National Oceanic and Atmospheric Administration** (NOAA **-** fisheries) on July 21, 2004. The BA made the determination that this project would result in a "may effect, not likely to adversely affect " for the Oregon Coast coho salmon. Federal agencies are required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to consult with NOAA Fisheries regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). Activities associated with the proposed project would not adversely affect EFH for coho and chinook salmon therefore consultation is not required.

2. **Cultural Resources Section 106 Consultation -** Consultation as required under Section 106 of the National Historic Preservation Act has been completed for five of six found sites. The significance of five evaluated prehistoric archaeological sites was reviewed by the **State Historical Preservation Office** (SHPO). The SHPO concurred that none of the sites were eligible for inclusion on the National Register of Historical Places. A sixth site was not evaluated because it was contained within an S&M reserved area.

B. Public Notification

1. Notification was provided to affected **Tribal Governments** (Confederated Tribes of the Coos, Lower Umpqua and Siuslaw; Grande Ronde; Siletz; and the Cow Creek Band of Umpqua Indians). No comments were received.

2. Four letters were sent to **adjacent landowners**. No comments were received (see Appendix G - Public Contact).

3. The **general public** was notified via the Roseburg District Planning Update (Spring 1998 and subsequent issues) going to approximately 150 addressees. These addressees consist of members of the public that have expressed an interest in Roseburg District BLM projects. Comments were received from Francis Eatherington representing Umpqua Watersheds, Inc. (see Appendix D - Issue Identification Summary).

4. Notification will also be provided to certain **State, County and local government** offices (see Appendix G - Public Contact).

5. A 30-day **public comment period** was provided for the previous version of this assessment. An additional 15-day comment period will be provided for this version. All comments that were received for the previous EA will also be included in the final decision. A Notice Of Availability will be published in *The News-Review*. This EA and its associated documents will be sent to all parties who request them. If the decision is made to implement this project, a notice will be published in *The News-Review*.

C. List of Preparers

Core Team

Chip Clough	Fisheries
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Craig Holt	Layout Forester
Judy Hyde	Engineer
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Ron Wickline	Botany

Expanded Team (Consulted)

Isaac Barner	Cultural Resources
Karel Broda	Geotechnical Specialist
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Dan Couch	Watershed Analysis
Fred Larew	Lands
Ron Murphy	Recreation / VRM

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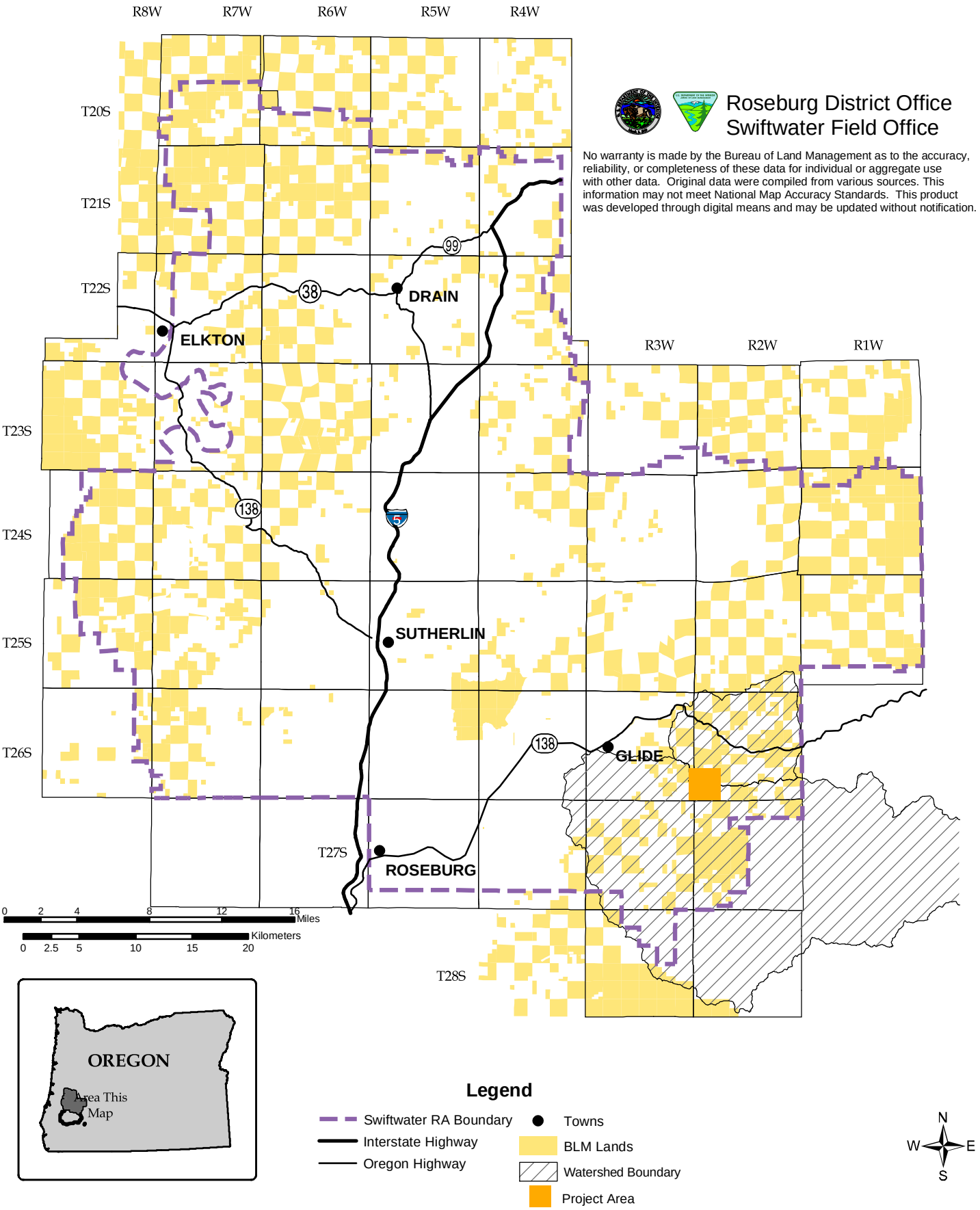
Other references are cited in the individual Specialist's Reports (Appendix F - Analysis File).

Appendix A
Vicinity Map

Green Thunder Timber Sale

EA No. OR-104-99-04



Roseburg District Office
Swiftwater Field Office

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Appendix B

Project Location Map

Roseburg District Office
Swiftwater Field Office

Green Thunder Timber Sale

EA No. OR-104-99-04

N
W E
S

Legend

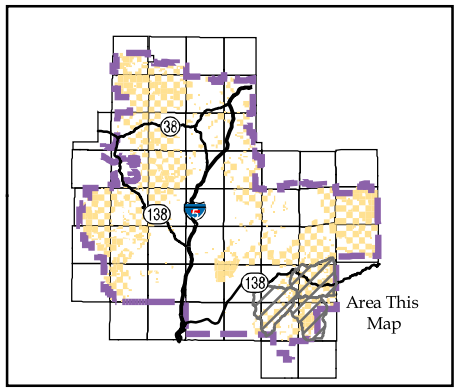
- Green Thunder Timber Sale
- Swiftwater Resource Area Boundary
- Watershed Boundary

Road Control

- BLM
- PVT
- County Road
- Haul Route

Ownership

- BLM
- Private



R 03 W

R 02 W

T 26 S

T 27 S

LOWER LITTLE RIVER

SUSAN FACIAL

MIDDLE LITTLE RIVER

26-3-34.2

26-2-31.1

27-2-5.1

27-2-5.2

27-2-9

25A

25B

25C

26-3-25

26-3

31A

31B

31C

33A

33B

33C

Kilometers

APPENDIX C

INDIVIDUAL UNIT DESCRIPTION

Project Summary Table

EA Unit	Sale Unit	Acres	Yarding System (ac.)			Fuel Treat.	Remarks
			Aerial	Cable	Ground		
25A	1	19		OES (13)	SL (6)	HP&B MP&B	AMA Cat 1 Soils
25B	2	40		OES (24)	ROW (<1) SL (15)	BB MP&B	GFMA-Connectivity Perm. spur
25C	3	38			ROW (2) SL (36)	MP&B	AMA Dry Season Log/ Temp. spur Subsoil old skid trails
31A	4	210		OES (176)	ROW (4) SL (30)	P&BL MP&B	AMA (Commercial Thin) Temp. spurs Within NSO Disturb. Zone
33A	5	21		OES (18)	ROW (<1ac.) SL (3)	GYH BB MP&B	AMA Temp. spurs Dry Season Logging
33B	6	12		OES (12)		HP&B	AMA Cat 1 Soils
33C	7	7		OES (7)		GYH HP&B	AMA
Total		347		250	97		

Yarding System
OES = Cable Yard, One End Suspension Required
SL = Ground Based, Shovel
ROW = Ground Based, Yarding of Road Right of Way Timber

Fuel Treatment
P&BL = Pile and Burn Landings
HP&B = Hand Pile and Burn
MP&B = Machine Pile and Burn
BB = Broadcast Burn
GYH = Gross Yard Hardwoods

Directions to the Project Area

Follow State Highway 138 (Diamond Lake Blvd. / North Umpqua Highway) east out of Roseburg approximately 17 miles to County Road 17A (Little River Road) at Glide. Proceed south on County Road 17A 1.1 miles to County Road 17.

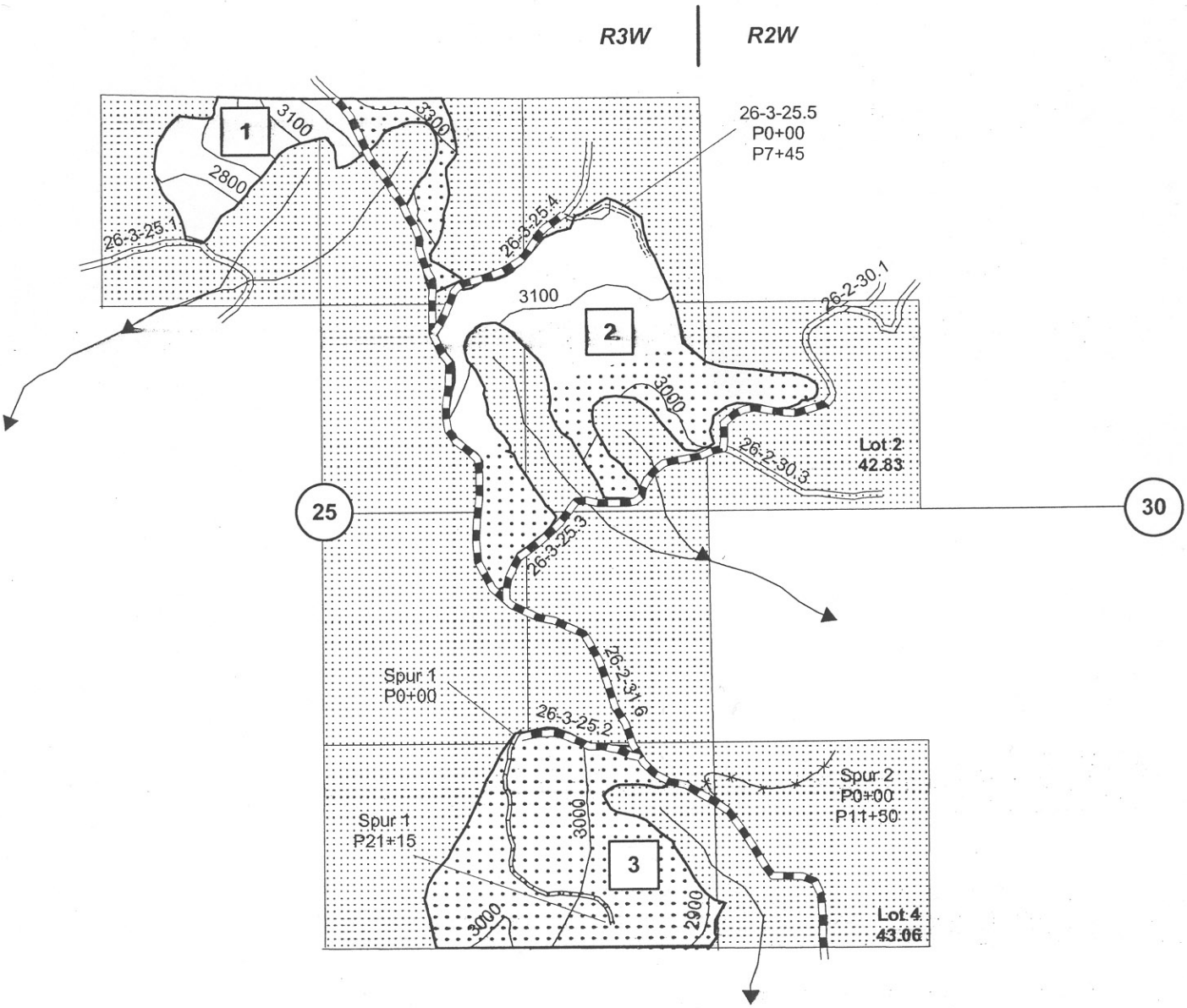
For Units 25A through 31A

Proceed east (left) on County Road 17 about 5.4 miles to BLM Road # 26-3-34.2 (Thunder Mountain Road). Travel east approximately five miles to Section 25 and 31 (see Appendix B map).

For Units 33A through 33C

Proceed east (left) on County Road 17 about 12.1 miles to BLM Road # 27-2-9.0 (Greenman Creek Road) which is just short of the Wolf Creek Job Corps campus. Refer to Appendix B map and follow the 9.0 Road north to the project area.

Units are marked with boundary posters and blazed and orange painted trees and proposed roads are flagged with orange ribbon.

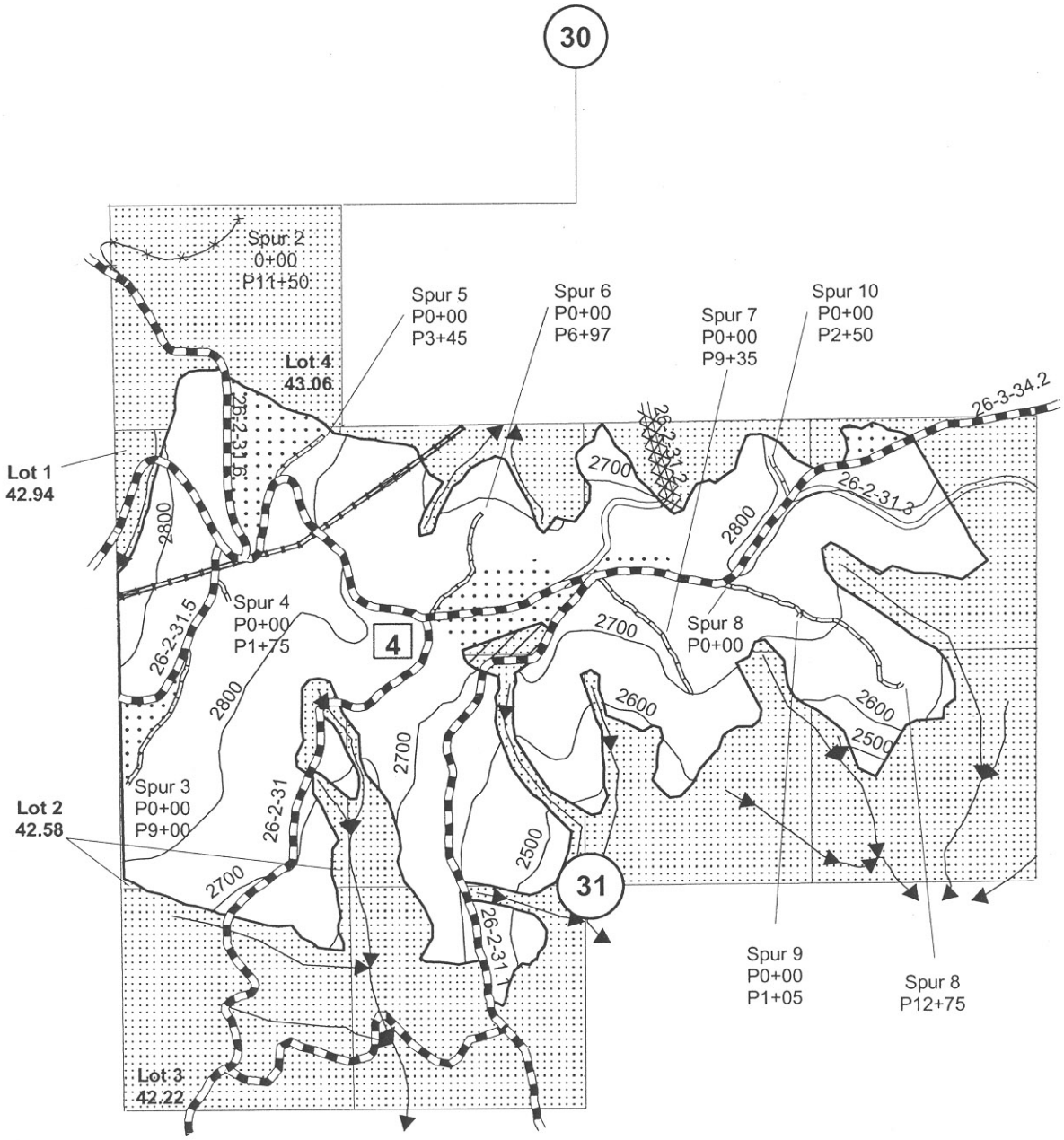


LEGEND

- Harvest Area - Cable Yarding
- Harvest Area - Ground-Based Yarding
- Reserve Area
- Archeological Site
- Boundary of Timber Harvest Units
- Stream
- 100 Foot Contour Lines
- Existing Road
- Existing Road To Be Improved
- Road To Be Constructed
- Road To Be Decommissioned
- Temporary Spur To Be Constructed
- Power Line Right-of-Way
- Trees Marked for Harvest in the Reserve

N W E S

Scale: 1 Inch = 1000 Feet



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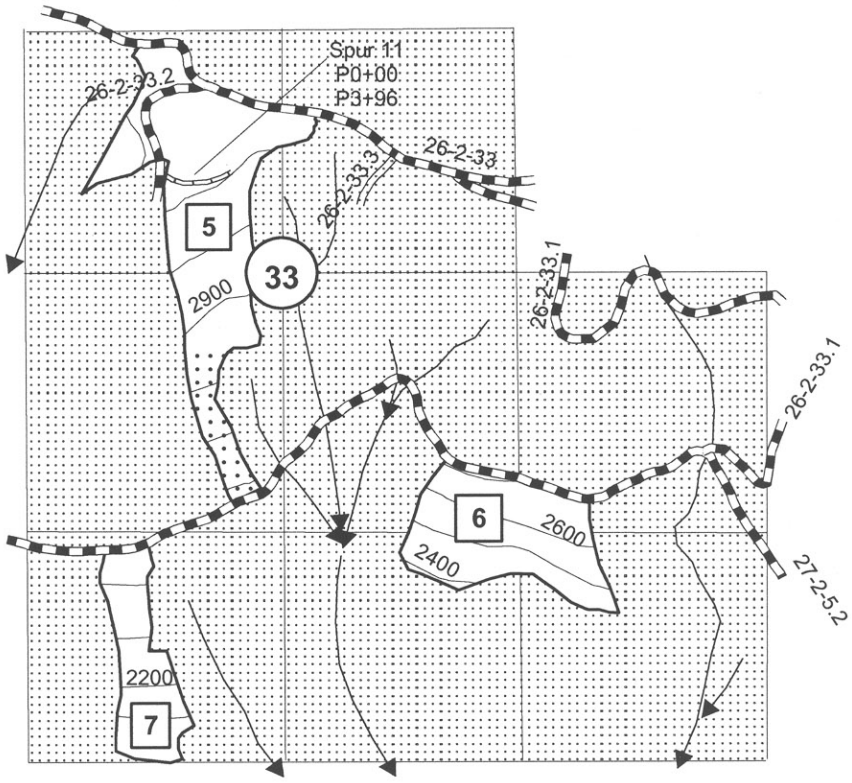

LEGEND

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N
W E
S

Scale: 1 Inch = 1000 Feet

APPENDIX D

ISSUE IDENTIFICATION SUMMARY

This appendix summarizes the issues that were identified pertinent to this project. No further analysis was deemed necessary in that the mitigations specified below are considered adequate to remove the issue from needing to be analyzed in the main body of the EA. These issues arose from Specialist input as well as public comments that were received. A given issue can be eliminated from further analysis for one or more of the following reasons: (1) it is beyond the scope of this analysis, (2) the impacts were anticipated and analyzed in the FEIS to which this assessment is tiered, and (3) Project Design Criteria (PDC) were included as part of the proposed action to mitigate the anticipated environmental impacts of specific activities. Section II, paragraph C (pg. 5) provides a list of specific PDC incorporated into the preferred alternative to deal with these issues.

A. Issues Identified By the ID Team During Project Design

Concern: The need for interim down wood in the Riparian Reserve.

Discussion: Field review indicates that the riparian areas are deficient in large down wood; however, the trees that could provide interim DWD are very small (<12") and wouldn't contribute to this need. This project design would not be practical for this project at this time.

B. Issues Identified from Public Comments:

Comments were received from several individuals or organizations. The main focus of these issues is summarized as follows:

Concern #1: Lack of interior forest habitat. The Little River Watershed Analysis recommends "Protect remaining current late seral habitat within these areas . . .". The remaining interior old-growth forests in Green Thunder should be left intact. (Little River Committee letter, 8/17/99).

Response: The Little River Watershed Analysis (Sept. 1995, Recommendations - pg. 6) recommended conserving late-seral/old growth (LSOG) habitat within five identified treatment areas within the watershed. Interior Habitat was defined in Appendix E (pg. 1) of the watershed analysis as late-seral habitat ($\geq$ 100 years old) that was 180m (590ft) from the edge of the patch. Treatment areas in the watershed analysis were determined by the intersection of (1) moist/warm, moist/cool, and wet-dry/warm land units with (2) gentle slopes with (3) low fire occurrence. The ID Team does not feel that this recommendation applies to Green Thunder for the following reasons: (1) The project area is not within any of the five areas of priority identified in the watershed analysis. (2) Based on the data used in the Little River watershed analysis, the interior habitat blocks potentially affected by the proposed project are generally of the same land unit class as the criteria used to identify the treatment areas but have slightly steeper slopes and the blocks in Section 33 have a higher acres to edge habitat is not expected to have an effect to spotted owls beyond what was consulted upon in the 2003-2008 biological assessment (see analysis, Appendix F).

Concern #2: "BLM is doing a regeneration harvest on unit 31C before it is allowed by the Resource Management Plan which states that "Regeneration harvests will not be programmed for stands under 60 years of age . . ."." (Umpqua Watersheds letter, 8/6/99).

Response: BLM originally planned this unit for regeneration harvest as part of the objective of AMA's to "Develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives" (RMP, pg.32). BLM wanted to test the idea of deriving economic amenities from stands that are below minimum harvest age and more practical to regeneration harvest rather than to commercially thin (e.g., fan-shaped settings that do not lend well to thinning). The ID Team came to the conclusion that although this concept would be a good test of a new management approach it would violate the RMP therefore the unit was remarked for commercial thinning.

Concern #3: "The Green Thunder . . . sale will be taking place adjacent to a Pacific Power transmission right-of-way. . . . This is one of two transmission lines that supply much of the electrical demand for our customers throughout Douglas County. Since this transmission line . . . run[s] through densely forested areas . . . there is a risk of fire ignition in the summer if trees come in contact with this line. . . . In the winter . . . storms may cause trees adjacent to the powerline to fail disrupting the flow of electricity. . . . We are requesting that all trees within striking distance of our right-of-way be removed as part of the sale . . ." (Pacific Power Letter, 4/5/04).

Response: Trees along the powerline outside the right-of-way (Unit 31A) would be cut to reduce the threat of fire from boundary trees falling on the powerline. Trees chosen for cutting were marked based on proximity to the powerline, tree height, topography, and prevailing winds. This would result in removal of the larger (dominant and co-dominant) trees in a band along the powerline. The smaller trees would be left.

Concern #4: "This project was proposed once before and was withdrawn to comply with survey and manage requirements. What were the results of the surveys? If the BLM did surveys and has data it should be disclosed in the EA, not hidden from the public . . ." (ONRC Letter 10/6/04, pg. 2).

Response: Survey and Management species were surveyed for in 1997-8 and a report is in the Analysis File (Appendix F). As a result of the *Record of Decision To Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl*, dated March 2004, the Standards and Guidelines for Survey and Manage species has been eliminated which changed the status of previous S&M species to either no status or to one of the categories under the Endangered Species Act.

Concern #5: "This project occurs in designated critical habitat. . . . In the absence of a recovery plan, the agency must retain all options for species recovery and avoid taking actions that will limit options for recovery." (ONRC Letter 10/6/04, pg. 21).

Response: All portions of the project in critical habitat were removed (seven acres).

Concern #6: "New information on the Threatened northern spotted owl indicates that there are significant new uncertainties for the owl that have not been fully considered . . ." (ONRC Letter 10/6/04, pg. 22).

Response: This new information was considered in *The Five-Year Status review for the Northern Spotted* Owl (USFWS 2004) which was released in November 2004. The final determination of the review was to keep the status of the northern spotted owl as 'threatened'. The following items effectively summarize the findings [Quotes from pages 55-56, in: USFWS. 2004. Northern Spotted Owl Five-Year Review: Summary and Evaluation. Portland, OR. pp. 73]:

(1) "The rate of habitat loss on Federal lands has been substantially reduced, and projection models have been used to estimate a potential ingrowth of about 600,000 acres of late-successional habitat some of which will have the structural characteristics to support spotted owls."

(2) "Demographic data collected over 15 years document declining populations across the species range with the most pronounced declines in British Columbia, Washington, and northern Oregon. However, populations are still relatively numerous over most of the species historic range, suggesting the threat of extinction is not imminent, and the subspecies is not "endangered" even in the northern part of the range where the demographic results are least promising."

(3) "The nature, magnitude, and extent of barred owl effects on northern spotted owls remain uncertain. Consequently, there was general agreement amongst managers that barred owl effects across the range must be weighted carefully, given uncertainty about how the species interact and potential time-lags in detecting effects. Likewise, the new threats of West Nile virus and Sudden Oak Death were perceived as both potentially severe and imminent, but substantial uncertainty about their effects mediated against placing too much weight on these factors."

"In summary, for every risk factor that has declined since listing (e.g., the current rate of habitat loss due to timber harvest, the threat of predation), another factor was identified that counterbalanced risks (e.g., habitat removal due to uncharacteristic wildfires, West Nile virus, barred owls). The net change in loss of habitat is positive, and although spotted owl populations continue to decline, that response was expected." Based on the findings in the status review and in discussion with the U.S. Fish and Wildlife Service we do not believe that this constitutes significant new information in regards to reinitiating consultation.

C. Issues Specified by Regulation

"Critical Elements of the Human Environment" is a list of elements specified in BLM Handbook H-1790-1 that must be considered in all EA's. These are elements of the human environment subject to requirements specified in statute, regulation, or Executive Order. These elements are as follows:

1. Air Quality
2. Areas of Critical Environmental Concern (ACEC)
3. Cultural Resources
4. Environmental Justice
5. Farm Lands (prime or unique)
6. Floodplains
7. Invasive, Nonnative Species
8. Native American Religious Concerns
9. Threatened or Endangered Species
10. Wastes, Hazardous or Solid
11. Water Quality, Drinking / Ground
12. Wetlands / Riparian Zones
13. Wild and Scenic Rivers
14. Wilderness

These resources or values (except item #9) were not identified as issues to be analyzed in detail because: (1) the resource or value does not exist in the analysis area, or (2) no site specific impacts were identified, or (3) the impacts were considered sufficiently mitigated through adherence to the NFP S&G's and RMP Management Actions/Direction therefore eliminating the element as an issue of concern. These issues are also briefly discussed in Appendix E ("Critical Elements of the Human Environment"). Item #9 is previously addressed in this EA and the Biological Assessment which is prepared for consultation required by the Endangered Species Act (Appendix F).

The following items are not considered a Critical Element but have been cited by regulation or executive order as an item warranting consideration in NEPA documents:

Healthy Lands Initiative - This project would be consistent with the Healthy Lands Initiative. This project would be in compliance with the RMP which has been determined to be consistent with the standards and guidelines for healthy lands (43 CFR 4180.1) at the land use plan scale and associated time lines.

National Energy Policy - Executive Order 13212 provides that all decisions made by the Bureau of Land Management will take into consideration adverse impacts on the President's National Energy Policy. This project would not have a direct or indirect adverse impact on energy development, production, supply, and/or distribution and therefore would not adversely affect the President's National Energy Policy.

D. Considerations Specified by Planning Documents and Watershed Analysis

Issue: Retention of Late-Successional Forests in Matrix.

Discussion: The RMP (pg. 34) requires that late-successional forests be retained in watersheds that comprise 15% or less late-successional forests on federal lands in fifth-field watersheds, i.e., watersheds between 20 and 200 square miles (S&G, pg. C-44). Any timber stands greater than approximately 80 years of age are considered late-successional habitat (S&G, pg. B-2).

Consideration: Both watersheds have greater than 15% late-successional forest. For the Little River Watershed, analysis of current forest inventories shows that of the 82,865 acres of federal ownership (63% of the watershed), approximately 48,855 acres (59%) are late-successional forests (BLM GIS data). The project as proposed would remove approximately 100 acres (0.2%) of these stands from within this watershed. For the Middle North Umpqua Watershed analysis of current forest inventories shows that of the 111,385 acres of federal ownership (90% of the watershed), approximately 60,900 acres (55%) are late-successional forests (pg. 2, Middle North Umpqua Watershed Analysis). The project as proposed would remove approximately 40 acres (0.06%) of these stands from within this watershed.

Issue: Retention of 25-30 % of Connectivity/Diversity Blocks in Late-Successional Forests.

Discussion: The RMP (pg. 34) requires that 25-30% of each Connectivity/Diversity block be maintained in late-successional forest.

Consideration: This Connectivity/Diversity block is within the Middle North Umpqua fifth-field watershed. A portion of Green Thunder (Units 25B and 25C) is within designated connectivity block #108. This block is 514 acres in size and approximately 413 acres (80% of the block) is currently in late-successional forest. This project would harvest 45 acres of late-successional forest from this block leaving 368 acres of late-successional forest (72% of the block) post-harvest. This block would continue to remain well above the RMP standard of 25-30% late-successional forest.

Issue: Regeneration harvest will be at a rate of 1/15 of the available acres in the Connectivity/Diversity Block land use allocation per decade.

Discussion: The RMP (pg. 34) requires that the Connectivity/Diversity Block Land Use Allocation be managed on a 150 year area control rotation with "up to 15-16 different ten year age classes" (RMP, pg. 153). The ROD (p. 8) allocated 26,900 acres as Connectivity/Diversity Blocks on the entire Roseburg District. On a decadal basis, approximately 1,790 acres are available for regeneration harvest (1/15 of the entire land use allocation).

Consideration: The ROD/RMP was approved and implemented in 1995, establishing the Connectivity/Diversity Block Land Use Allocation and the baseline against which all activities and accomplishments are measured. Therefore 1995 is the beginning of the "decade" for the purpose of measuring compliance with decadal harvest limitations. Project accomplishment implemented under the Roseburg District ROD/RMP are reported annually in the *Roseburg District Annual Program Summary* (APS) *and Monitoring Report* (USDI, BLM; 2003). The 2003 APS (Table 18, pg. 33) reports sale volume and acres for the period of FY1995 through FY 2003. The 2003 APS summarized that 463 acres of regeneration harvest have been harvested or authorized in the entire Connectivity/Diversity Block land use allocation. (NOTE: Table 18 contains a typographic error and reported the FY99 figures as 36 acres instead of the actual 63 acres. As a result, the nine year total was reported as 463 acres rather than the actual 490 acres). Of the 490 acres sold, 222 acres have been harvested and 268 are unawarded pending the resolution of administrative appeals or other legal challenges, or enjoined from harvest by court order. No timber sales were sold in Connectivity/Diversity in FY2004. Therefore, in the first decade of the ROD/RMP 490 acres out of 1790 acres allowable (27% of potential decadal harvest) and 490 acres out of 26,900 acres (1.8% of the total land use allocation) has been charged against this commitment falling far short of the ROD/RMP anticipated harvest. The Roseburg District has a planned regeneration harvest of 421 acres in the Connectivity / Diversity Block land use allocation for FY05 (beginning of second decadal commitment) which includes 39 acres in the Green Thunder sale.

Issue: Consideration of Recommendations within Applicable Watershed Analyses.

Discussion: The Little River Watershed Analysis (September 1995) and the Middle North Umpqua Watershed analysis were used in this analysis and reviewed for issues to be considered in the design of projects. The IDT (November 4, 1998) identified the following recommendations in the Little River Watershed Analysis (WA) as applicable for this project: restore riparian function by thinning, maintain late-successional forest proportion, reduce potential for mass failures, and improve water quality. The Middle North Umpqua Watershed analysis recommends commercial thinning, control of noxious weeds, and road risk reduction.

Consideration: The ID Team incorporated these recommendations into the analysis (See public comment #1, page 1).

APPENDIX E

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

Element	Relevant Authority	Environmental Effect
Air Quality	The Clean Air Act (as amended)	**Minimal** - Temporary smoke intrusion into populated areas is possible but not likely. Dust particles may be released into airshed as a result of road construction /renovation and timber hauling.
Areas of Critical Environmental Concern	Federal Land Policy and Management Act of 1976 (FLPMA)	**None** - Project area is not within or near a designated or candidate ACEC
Cultural Resources	National Historic Preservation Act (as amended)	**"No Effect"** - See Cultural Report 7/19/99
Environmental Justice	E.O. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	**None** - Minority and low-Income populations would not be adversely or disproportionably effected by this action.
Farm Lands (prime or unique)	Surface Mining Control and Reclamation Act of 1977	**None** - "No discernable effects are anticipated" (PRMP pg. 1-7)
Floodplains	E.O. 11988, as amended, Floodplain Management, 5/24/77	**None** - Project is not within 100 yr. floodplain.
Native American Religious Concerns	American Indian Religious Freedom Act of 1978	**None** - No concerns were noted as the result of public contact
Threatened or Endangered Species	Endangered Species Act of 1973 (as amended) The Pacific Coast Recovery Plan for the American Peregrine Falcon, 1982 Columbian White-tailed Deer Recovery Plan, 1983 Recovery Plan for the Pacific Bald Eagle, 1986 Recovery Plan for the Marbled Murrelet, 1997	**None** **(Botanical)** - No T&E species noted (Specialist Report 3/4/99). **(Animals)** - See Specialist Report 7/16/99 (wildlife) and 6/15/99 (fisheries). T&E species not specifically mentioned do not exist in the analysis area.

Element	Relevant Authority	Environmental Effect
Wastes, Hazardous or Solid	Resource Conservation and Recovery Act of 1976 Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended	**None** - Applicable HazMat policies would be in effect.
Water Quality, Drinking / Ground	Safe Drinking Water Act as amended Clean Water Act of 1977	**None** - Project is not in a municipal watershed or near a domestic water source.
Wetlands/Riparian Zones	E.O. 11990, Protection of Wetlands, 5/24/77	**None** - "The selected alternative [of the FEIS] complies with [E.O. 11990]..."(ROD p. 51, para.7)
Wild and Scenic Rivers	Wild and Scenic Rivers Act (as amended) The North Umpqua Wild and Scenic River Plan (July 1992)	**None** - Project is not within the North Umpqua Scenic River corridor.
Wilderness	Federal Land Policy and Management Act of 1976 Wilderness Act of 1964	**None** - "There are no lands in the Roseburg District which are eligible as Wilderness Study Areas." (RMP pg. 54)

OTHER RESOURCES CONSIDERED

Resource	Environmental Effect / Concerns
Land Use (Leases, Grazing etc.)	**None** - Project has no conflicting land uses (Specialist's Report 11/18/98). Roads are encumbered under Right-of-Way Agreement # R-913 (Seneca Jones).
Minerals	**None** - Project has no mining claims (Specialist's Report 11/18/98).
Recreation	**Minimal short-term impacts** -(Specialist's Report 12/01/98).
Visual	**None** - “All of the sections where the proposed units are located are classified as VRM IV” (least restrictive category) which “allows for major modification of the landscape.” (Specialist Report 12/01/98)
Other (Adjacent Landowners)	**None -** No small adjacent landowners are in the vicinity of this sale. No registered domestic water use within one mile of the project.