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.

Acronyms Used:

ACS	-	Aquatic Conservation Strategy
AMA	-	Adaptive Management Area
BLM	-	Bureau of Land Management
CWD	-	Coarse Woody Debris
EA	-	Environmental Assessment
GFMA	-	General Forest Management Area
ID Team (IDT)	-	Interdisciplinary Team
LWD	-	Large Woody Debris
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, Large Woody Debris: Those portions of trees that have fallen to the ground at least 20" in diameter within the uplands. Large woody debris is fallen trees within the riparian areas.

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.

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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 a site specific 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 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.

The *Little River Watershed Analysis* (Recommendations-8) and the *Middle North Umpqua Watershed Analysis* (Chapter 6) identifies management opportunities for vegetative treatments for commercial and watershed purposes. The need for the proposed action is based in part on the need as described in this document.

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" (pg. 60).
   c. Improve stand health 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 (for the AMA portion)**:
   "Provision of well distributed late-successional habitat outside reserves; retention of key structural elements of late-successional forests …; restoration and protection of riparian zones; and provision of a stable timber supply" (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 AMA is designed to "Develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives" (RMP, pg. 32). 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 both of these categories. Portions of this project are 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).

II. ALTERNATIVES INCLUDING THE PROPOSED ALTERNATIVE

This section describes the No Action and Proposed Action alternatives, and any 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 alternatives.

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. 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. An undetermined number of trees would need to be felled prior to the signing of a Decision Document for sampling purposes. This is considered a separate action and was analyzed under the *3-P Fall, Buck and Scale Sampling* EA (EA# OR-100-00-06) and would be in compliance with the Settlement Agreement (January 31, 2003).

Roads – Construction of **temporary road** (roads built, used and decommissioned after use) and **permanent road** would occur on government land. **Road renovation** (restoring the road back to its original design) and **road improvement** (improving the road beyond its original design) would occur on BLM and private road 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 (TMO, pg. 18).

Timber Harvest - Practices would consist of a combination of regeneration, commercial thinning and density management harvest. **Regeneration harvest** is designed to open 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 reserve seed tree harvest (RMP, pg. 146) would be used in the GFMA areas and modified irregular shelterwood system in the Connectivity / Diversity Block (RMP, pg. 146). This technique modifies the traditional silvicultural seed tree and shelterwood systems in order to retain a biological legacy that would carry over into the next 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 in a strip along the powerline right-of-way and in 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).

The proposed action would require a mix of skyline cable logging (approximately 77%), and ground based (tractor and shovel) logging and right-of-way clearing (approximately 23%). The Authorized Officer (Contract Administrator) may determine that additional isolated minor ground based logging would be necessary (ex. removal of guyline anchor trees, isolated portions of units, etc.) that was considered in Table 1 below 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 of hardwoods 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.

TABLE 1. Proposed Action Summary

Activity	Total
Timber Harvest	Regeneration Harvest - 140 ac. (six units) Commercial Thinning Harvest - 167 ac. (one unit) Density Management Harvest - 35 ac. Road & Powerline ROW Clearcut - 15 ac.
Logging	Cable - 271 ac. Ground based - 81 ac.
Fuel Treatment	Broadcast Burning - 42 ac. Machine Pile and Burn - 64 ac. Hand Pile and Burn - 32 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 Renovation and Improvement	Renovation - 12.0 mi. Improvement - 1.0 mi.
Road Decommissioning	Decommissioning - 0.4 mi. Full Decommissioning - 0.2 mi.
Habitat Restoration	Riparian Reserve Treatment - 35 ac.

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; 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. Therefore the Riparian Reserve boundaries would be approximately 180 ft slope distance from the edge of non-fish bearing streams and 360 ft from fish-bearing streams in the project area (Roseburg District Memo, Jan. 18, 1995). There are no fish-bearing streams in the project area. Two wetlands less than an acre were found within the project area (Unit 31A).

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 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 maintaining the RMP prescribed Riparian Reserve along streams adjacent to or within the regeneration units as described above. Harvest would not occur within this zone. Habitat would be protected from logging damage by directionally felling trees that are within 100 ft of the buffer or Riparian Reserve away from or parallel to the 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). Streams adjacent to or within the commercial thinning unit would be protected by a variable width no-harvest buffer. 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 a single tree buffer around the edge and not permitting logging through the wetland. There is a wetland less than an acre in close proximity to the powerline in Unit 31A. The risk that leaving trees within striking distance of the powerline is greater than the risk of damage to the wetland from harvest, therefore the trees around this wetland would be cut. 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, the decommissioning of 0.4 miles of the 26-2-25.2 road, and the repair of sources erosion on 13 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 and 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, the stream crossings along the haul route would be evaluated for the need for turbidity reducing measures (ex., placement of straw bales and/or silt fences). If needed, these structures would be put in place prior to haul. (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 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) requiring skyline yarding where cable logging is specified. This method limits ground disturbance by requiring at least partial suspension (BMP I C1a; RMP, pg. 130) during yarding (i.e., the use of a logging system that "suspends" the front end of the log during in-haul to the landing, thereby lessening the "plowing" action that disturbs the soil). Intermediate supports would be used where necessary. In some limited, isolated areas partial suspension may not be physically possible due to terrain or lateral yarding. Excessive soil furrowing would be hand waterbarred and filled with limbs or other organic debris. Dry season cable logging (BMP I C1c; RMP, pg. 130) would be required in portions of Unit 25C, 31A, 33A and Unit 33B. (2) Ground-based logging would be limited to the dry season as described above (BMP I C2d; RMP, pg. 131).

c. **Measures to limit soil compaction** (RMP, pg. 37) would consist of: (1) limiting ground based logging, machine piling for site preparation and subsoiling (on 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); however, this season could be adjusted if unseasonable conditions occur (e.g., an extended dry season or wet season). Also, operations would be suspended during periods of heavy precipitation if resource damage would occur. (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). Ground based 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 in the regeneration units, 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. They would only pivot their turrets to reach logs. (4) Evaluating newly created trails as well as old trails used under this entry for the need for amelioration by the Soil Scientist after completion of ground-based operations in accordance with RMP plan maintenance criteria (*Roseburg District Annual Program Summary and Monitoring Report Fiscal Year 2001*, pg. 70). 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. 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. 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, or mounted to an excavator arm. Any in-unit subsoiling of trails would be done with a winged subsoiler mounted to the arm of a small excavator. 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). The remaining subsoiling needs would be documented and deferred to final harvest. (5) Decommissioned roads and temporary spur roads would be subsoiled with a winged subsoiler, either pulled by or mounted on a crawler tractor or mounted to an excavator arm, provided that subsoiling would not contribute to additional sedimentation to streams.

d. **Measures to protect the duff and surface soil layer** (RMP, pg. 37) would consist of: (1) burning of slash during the late fall to mid-spring season when the soil and duff layer (soil surface layer of fine organic material) moisture levels are high and the large CWD has not dried. (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) Grouping retention trees in the moisture accumulation zone of a small swale head scarp in Unit 33A and above a headwall in Unit 33B and where there are wet soil conditions; (2) retaining trees in two swale bottoms in Units 25A. (3) Avoiding broadcast burning on steep slopes to reduce conditions that could contribute to slope instability (Units 25A and 33B). (4) Locating new roads in stable locations (BMP II B2; RMP, pg. 132) and with proper drainage structures (BMP II D; RMP, pg. 133). (5) Withdrawing unstable soils from the timber base (Unit 33B). (6) Dry season yarding with one-end suspension and waterbarring yarding trails that can channel water would be done in Units 33A and 33B.

3. **To provide wildlife habitat components:**

a. Nesting and roosting habitat for cavity dwellers would be provided within the thinning unit by reserving existing hard or soft snags at least 20" inches in diameter and 15 ft in height (PRMP/EIS, Appendices 226) and remnant mature or old-growth trees remaining from the previous stand where possible. An interim source of snags would be provided by reserving snags that do not meet the size described. This habitat would be provided 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 at the discretion of the operator and the Sales Administrator. Such trees would be reserved and left in place as CWD. Past experience has been that less than five percent of snags need to be felled for this reason.

b. Biological diversity, and future snag and down wood recruitment for wildlife would be provided through the retention of 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). At least 120 linear feet of CWD per acre (at least 16 inches in diameter and 16 ft in length) would be reserved (RMP, pg. 38). Where CWD is lacking in the above quantities, extra green trees would be reserved for future CWD recruitment (RMP pg. 65).

c. Most existing CWD (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.

5. **To protect and enhance stand diversity:**

a. Retention trees would be reserved to provide a legacy of mature trees in the early successional stands. 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 legacy attributes. Occasional hardwoods would also be retained. Trees remaining would approximate the pre-harvest relative proportions of species composition. Mature and old-growth (RMP, pg. 112) remnant trees 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. Snags and CWD would be reserved as described in paragraph three above. Snags would be protected from logging damage by clumping trees around them and directionally falling trees away from the snags.

6. **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.

7. **To prevent and/or control the spread of noxious weeds:**
   Stipulations would be incorporated into the logging contract to prevent and/or control the spread of noxious weeds. This would include the cleaning of logging equipment prior to entry on BLM lands (BLM Manual 9015 - Integrated Weed Management) as well as roadside brushing and/or herbicide application prior to the start of management activities in the proposed project.

8. **To protect the residual stand and promote stand health (Unit 31A):**
   a. As much as possible, trees that would most likely survive logging and overall improve the stand condition and health would be selected for retention. The stand would be thinned from below (i.e. removal of the smallest diameter trees first) which would remove mostly suppressed trees and smaller trees that would result in less stand damage during falling.

   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 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. Corridors for yarding would be pre-designated and approved by the Sale Administrator. 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.

9. **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 determined 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 0.25 mile. Seasonal restrictions to prohibit logging during the nesting season of the red-tailed hawk would be applied to Units 33A (March 1 to July 15) if surveys indicate that a red-tailed hawk is nesting within a quarter mile of the nest tree.

10. **To protect cultural resources:**
One unevaluated site would be excluded from the project area. Stipulations would be placed in the contract to halt operations and evaluate the appropriate type of mitigation needed to provide adequate protection; 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 project evaluation.

11. **To reduce the threat of trees falling across the Pacific Power transmission lines:**
Any trees that could fall across the powerline would be cut. Trees to be chosen for cutting would be based on proximity to the powerline, tree height, topography, and prevailing winds.

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

E. 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 any commercial removal. The issues they cite for considering this alternative is the belief that yarding would cause unacceptable soil disturbance which in turn would lead to increased sedimentation. Another concern (was 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. These would have adverse impacts on water quality. The IDT considered this alternate but concluded that this issue would not require an additional alternative for the following reasons:

1. The RMP directs harvest in the Riparian Reserve in order to meet ACS objectives (RMP, pg. 25).
2. PDC's would mitigate all the concerns noted concerning soils and water quality.
3. The Silvicultural Prescription would leave additional trees standing for future LWD and snags.

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. A further description can also be found in the Little River and Middle North Umpqua Watershed Analyses.

A. General Setting

Site Description - This project is located predominately within the Little River Fifth-Field Watershed (approximately 257 acres or 73% of the project), and also the Middle North Umpqua Fifth-Field Watershed (approximately 96 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 within 20 miles of the Roseburg Designated Area for attainment of federal Clean Air standards. Elevations range from 1980 feet in Unit 33C to 3330 feet in Unit 25A.

Stand Description - Fire had a major role in stand development. 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. 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 9 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 found to not be significant and the sixth site was outside the project and unevaluated (see pg. 14).

Hydrology – The proposed project is located within 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). 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 domestic water supply, irrigation, livestock watering, 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. Elevation ranges from 1850 to 3350 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). 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.

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 Enhancement
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 the 7th field Drainages for Bond, Engles, and Greenman Creek Drainages which are true dendritic catchments. Since Bob and Shivigny Creek Drainages are frontal systems, the AHU is a dendritic catchment within the Drainage.

The stands in the project area are greater than 35 years of age, therefore are expected to have hydrologic recovery 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 within the range of natural variability.

Soils and Geology - The **geology** is of the Little Butte volcanic series which consists of thick beds of ash-flow tuff in complex with lesser amounts of lava flow rock. This complex geology resulted in the development of varied topography and soils. The topography of the general 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. The soil textures are generally moderately erodible under bare soil conditions.

The in-unit **Timber Production Capability Classifications** (TPCC) influenced by the above properties are: 1) **FGR** (fragile due to slope gradient but suitable for forest management with mitigation): FGR areas cover about four acres in Unit 33B and about one acre in 25A and contain sites that 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 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. 2) **FPR** (fragile due to potential of deep-seated slump/earth flow movements but suitable for timber management with mitigation): These sites are on hummocky terrain occasionally broken by short, steep scarps. Slopes are mostly 30 to 60 percent. Large components of FPR are in 31A and in 33A below the proposed spur. Two earth flows occurred in a clearcut adjacent to Unit 33C. The largest one was 0.9 acre and initiated on a 35 percent

slope at a seep. 3) **FSR** (fragile due to moisture deficiencies caused by soil physical properties but suitable for timber management with mitigation): About nine acres in Units 25A and 33B have shallow soil depths and high gravel contents on south facing slopes that could make proper planting difficult and could adversely affect seedling survival. About eighteen acres of the regeneration units have soils that are highly sensitive to broadcast burning (**Category 1 soils**) due to shallow soils and slopes greater than 70 percent. They are almost entirely in Units 25A and 33B. There is a dense network of skid trails and old natural surfaced roads with various degrees of soil displacement and residual compaction in Units 25A, 25C, and 31A.

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 beginning on page Aquatic-1. 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). 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 consists of approximately nine miles and would service Units 25 A, B, C and 31A. The Thunder Mountain haul route consists of approximately five miles and would service Units 33A, B and C. The timber haul route does not have any fish-bearing stream crossings. 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 in-stream wood was noted along most of the surveyed stream reaches. Survey data specific to the streams within the project area are unavailable, but personal observation confirm the streams within the headwaters to be similar to the ODFW reaches.

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 designated habitat that is currently or was historically available to Oregon Coast coho and chinook salmon (Federal Register 2002 Vol. 67, No. 12) as **Essential Fish Habitat** (EFH). 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. This site is protected with a 100 acre Residual Habitat Area (or Core Area). 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. Critical Habitat is a specific geographical area specified by the US Fish and Wildlife Service (FWS) in Recovery Plans as containing habitat essential for the conservation of a Threatened and Endangered species. The Green Thunder project (in part) occurs within Northern spotted owl designated Critical Habitat (CHU-OR-27). 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. As of this date, there have been no bald eagle sightings within the project area.

Bureau Sensitive & Assessment Species - Although there are no known sites, the black salamander (*Aneides flavipunctatus*), fringed myotis (*Myotis thysanodes*), northern goshawk (*Accipter gentilis*), northwestern pond turtle (*Clemmys marmorata marmorata*), painted turtle (*Chrysemys picta*), and Townsend's big-eared bat (*Corynorhinus townsendii*) may occur within the project area. Black salamanders are terrestrial salamanders that appear to be associated with forests, open woodlands, moist talus, and streamside areas with coarse woody debris or rocky debris. The one nest that has been documented in the literature was in a subterranean cavity in the soil. Black salamanders may also be found under surface debris during wet weather. 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. An unknown number of potential bat roosting trees are expected to occur in Units 25A, 25B, 25C, 33A, 33B, and 33C. Occasional, remnant trees present in Unit 31A may also function as potential bat roosting habitat. Nesting habitat for Northern goshawks is typically open stands of mature and late-seral conifers such as those found in Units 25A, 25B, 25C, 33A, 33B, and 33C. There is no suitable breeding and pond habitat for the northwestern pond turtle or the painted turtle within the project area. 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. Similarly, painted turtles nest in sandy or grassy areas near ponds. The sandy substrates that these turtles use for nesting are absent from the project area. Northwestern pond turtles may use the stands in Green Thunder as over-wintering habitat. Northwestern pond turtles can migrate up to 1,639ft (500m) into upland habitat where they burrow into the duff and litter layers; these sites may or may not have tree cover. Painted turtles are expected to have similar overwintering requirements to northwestern pond turtles. Impacts to other Bureau Sensitive or Bureau Assessment species suspected to occur within the project area are not anticipated.

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 in 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 any key issue identified in Appendix D, as well as the selected resources. 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 assumed in this analysis may vary depending on the subject matter. Generally, short-term refers to the time of the action up to the first year after the action but may be as long as ten years. Long-term may be a year or more but generally more than ten years and up to 200 years.

The Roseburg RMP/EIS 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. Environmental effects to the "Critical Elements of the Human Environment" are analyzed in Appendix D and E.
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.

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 - All of the old natural stands would continue to slowly develop towards the western hemlock, western red cedar climax until a natural disturbance event creates conditions favorable for Douglas-fir regeneration. If fire is excluded, Douglas-fir would probably become less predominant in these stands. The timber production potential of these lands would not be attained and the economic benefits derived from harvest would not occur at this time. The stand where thinning is prescribed would continue to differentiate in time through self thinning. There would be a loss in volume production due to mortality and unevenly spaced crop trees. Much of the stand currently has space occupied by small trees surrounded by larger trees and is over dense. This condition might persist for 20 years as an over dense pole stand. The predicted average diameter in twenty years would be 11 inches in the Riparian Reserve and 17 inches in the uplands without thinning. As the stands age, natural mortality in the form of additional snags

and large log biomass would increase. Fuels that are more resistant to control would accumulate leading to a greater chance of a stand replacing fire event. The Silvicultural Prescription (Appendix F) provides a more detailed stand description.

Wildlife Habitat - The direct impacts of habitat loss or modification and noise disturbance associated with the proposed action would not occur. Wildlife populations and diversity would be expected to remain static. The wildlife habitat would continue to mature (indirect impact) and develop as described in the "stands" discussion above. It is expected that the early to mid-seral habitat that is now present would continue to function in its current capacity and the diversity of wildlife species and populations currently utilizing the stands would continue. As the stands mature, structural features (i.e., snow breaks, forked tops, decay, etc.) would be maintained, fostering the creation of nesting habitat for the late-successional dependent species, including the northern spotted owl. The nesting habitat for the northern goshawk would continue to increase in quality as the stand matures. As the stands in the project area mature, the structural diversity on the forest floor (e.g. downed wood) would continue to accumulate which should benefit species such as the fisher for example.

Soil Productivity - "Long-term soil productivity is the capability of soil to sustain inherent, natural growth potential of plants and plant communities over time" (RMP/EIS, pg. 4-12). Road construction and harvest-related impacts to the soil would not occur. The opportunity to improve the productivity of soil degraded by extensive soil compaction and displacement from past ground-based operations (Units 25A, 25C and 31A) with subsoiling would not occur. These units would continue to heal very slowly by natural processes. Decommissioning of road to improve soil productivity would also not occur at this time.

The probability of landslides would be low (1 to 10 percent) on the potentially unstable FGR and FPR sites of Units 25A, 31A, 33A and 33B (see pg. 16). The risk of landslides on the FPR areas (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) 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. Substantial deep-seated earth flow activity on the FPR slopes (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.

Water Quality and Hydrologic Processes - There would be no direct impacts to water quality or hydrologic processes. Vegetation within the Riparian Reserve would continue to slowly develop over time to provide increased shade and bank stability. This slow development would

result in a smaller size of potential wood for long-term recruitment. 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 water yield would be offset by reduction in stream shade. 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 and introduction of substantial levels of sediment into streams. 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. Small landslides in low order streams 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. The small streams in the project area have low capacities for carrying sediment. Effects of sediment in the stream bed from small landslides have a low probability of being detected more than a few hundred feet downstream from the landslide during normal flow conditions.

There are only a few streams in the project area that have the capacity to impact downstream spring/summer **stream temperature**. Over time, the riparian vegetation would continue to grow at a slow rate, increasing the shade and therefore slightly decreasing the temperature over time. There would be no direct or indirect change to **water chemistry** or to the Beneficial Uses of Water, and no direct change to **water yield or peak flows** resulting from the no action alternative.

Fisheries Habitat - Current temperature, sediment inputs, woody debris and hydrologic processes would continue to function at existing rates and levels. There is no fisheries habitat associated with the project area, therefore, fish species and populations would remain relatively unchanged from current tends. Impacts associated with 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. Without road improvements additional sediment would continue to enter the streams during storm events. Density Management within the Riparian Reserve proposed to improve stand conditions and aquatic habitats would also not be completed.

B. Proposed Action Alternative

Stands - Harvesting the regeneration areas 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. Left untreated the fine fuels would decompose to background levels, within three to ten years; however, uncontrolled fire during this time period could seriously damage the residual stand. 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 produce a direct impact of 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. 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 total number of trees and diameter distribution may be more like a natural stand under this alternative. The stand would still be overly dense, therefore mortality would be expected in trees up to 26 inches in diameter.

Wildlife Habitat - Direct Impacts to **T&E species** due to harvest activities would include the removal of 144 acres of suitable Northern spotted owl habitat and four acres of Northern spotted owl dispersal habitat. Harvest activities would include modification of 210 acres of Northern spotted owl dispersal habitat and 11 acres of suitable Northern spotted owl habitat. Approximately 11 acres of Critical Habitat would be affected by the project, including the removal of seven acres of suitable habitat and modification of four acres of dispersal habitat. Project Design Criteria included in this analysis (see paragraph II.C.9.c) are expected to mitigate potential disturbance effects to nesting spotted owls (if they occur) within 0.25 miles of the proposed regeneration harvest units (25A, 25B, 25C, 33A, 33B, and 33C; USDI, 2003) or within 65 yards of the proposed commercial thinning unit (31A; USDI, 2004). Thinned stands would continue to function as dispersal habitat, but in a slightly degraded condition (Indirect Impact). 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. Regenerating stands would progress through the seral stages as they develop into dispersal quality habitat (approximately 40 years) and eventually into suitable nesting habitat (approximately 80 years) for spotted owls.

Commercial thinning and density management on 212 acres of mid-seral habitat would modify the existing habitat (direct impact) for **Bureau Sensitive and Bureau Assessment Species** (northern goshawks). The regeneration harvest units proposed in this project is expected to remove 140 acres of habitat suitable for the northern goshawk. The proposed action may create a disturbance to nesting northern goshawks if they occur in the project area or within 0.25 miles. 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. Indirect impacts - Thinning is expected to promote the use of the stands by the northern goshawk, purple martin (*Progne subis*), and the Oregon vesper sparrow (*Pooecetes gramineus affinis*) by increasing the amount of foraging and roosting habitat available. Regeneration harvest of 140 acres is expected to provide open habitat suitable for establishment (potentially) of new purple martin colonies and new Oregon vesper sparrow sites. Regeneration harvest of 140 acres is expected to remove or modify an undetermined number of potential live, green trees that have the characteristics which may make them suitable roosts for Townsend's big-eared bat and the fringed myotis. Green retention trees reserved in the proposed units would serve as legacy structures for future recruitment as bat habitat. Commercial thinning and density management of 211 acres is not expected to remove or modify trees with potential roosting features. Snag habitat for cavity nesters is expected to 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.). The regeneration harvest of 140 acres in the proposed project may limit the ability of black salamanders to move and disperse across the vicinity of the project

area during hot, dry weather. However, the riparian reserves included in this project are expected to help mitigate potential barrier effects by serving as movement corridors since black salamanders appear to be associated with riparian, stream-side habitats. The commercial thinning and density management of 211 acres is not expected to limit the ability of black salamanders to disperse through these stands since adequate canopy cover and shelter (i.e. CWD) would be maintained. PDCs included in the Green Thunder project (see paragraph II.C.2) to minimize soil compaction and retain duff layers are also expected to help the project area retain its capability to function as over-wintering habitat for northwestern pond turtles and painted turtles.

The regeneration harvest (direct Impact) would remove 140 acres of suitable nesting habitat for red-tailed hawks (protected under the Migratory Bird Treaty). Seasonal restrictions would be applied within 0.25 mile of the red-tailed hawk nest site from March 1st through July 15th and a five acre nest core would be established around the nest site in suitable habitat. Commercial thinning and density management of 212 acres in the project area is expected to promote the use of the stands by the red-tailed hawks. Indirect Impact by increasing the amount of foraging and roosting habitat available.

Soil Productivity - The most common impacts to soil productivity from management activities include: 1) losses due to displacement/compaction, 2) erosion, either surface erosion or mass wasting and 3) alteration of soil nutrients (PRMP/EIS, pg. 4-14). According to the SEIS (pg. 3&4-112) implementation of appropriate management prescriptions and best management practices should prevent unacceptable degradation of the soil resource and related long-term productivity.

The Direct impacts of **soil compaction/displacement** would result from road building and logging activities. About 1.1 mile of existing trail and old natural surfaced road with varying degrees of vegetative recovery and healing from 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 0.4 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. Some level of erosion would occur during the first season flush and would then decrease thereafter. About 0.4 acres of new disturbance for permanent road (26-3-25.5) would be considered an irretrievable loss to soil productivity. Two acres of compacted temporary spur bed would be subsoiled recovering up to 80 percent of lost productivity.

Yarding impacts to the surface would be within acceptable limits. About 80 acres could be ground-based yarded. At least 90 percent of the ground-based yarding would utilize the swing shovel method. Cable yarding in thinning Unit 31A would produce light, superficial compaction that covers less than one 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 light to 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). 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, log decks, and landings would be well below the plan maintenance threshold of ten percent. With low soil moisture conditions (less than 10 percent) and good operator technique, swing yarding compaction would be light overall (Hutchison; Off Little River monitoring) with very little soil displacement. Any incidental ground-based yarding would likely be accomplished using the swing shovel method or tractor yarding. Swing yarding using good technique adds very little compaction to the soil (Off Little River monitoring). Incidental tractor yarding might also be used in some small portions of units. Designated skid trails 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, an indirect effect – Adams, 2003 presentation). Subsoiling would be applied to trail segments with substantial compaction recovering up to 80 percent of the lost productivity. The pulling of woody debris back onto the subsoiled segments would benefit long-term soil productivity by leaving a nutrient reservoir and a medium for growth of organisms beneficial to the soil.

The indirect impact of **landslides** due to new spur construction would not occur since 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 (ten years) increase in the low 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). The effects of thinning harvest in Unit 31A and regeneration harvest in Unit 33A on slope stability where the TPCC is classified as FPR (see pg. 16) is minimal. There would be a slight increase in risk (in the low range) of small landslides on the widely scattered scarps with slopes greater than 50 percent. 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. The likely consequence of harvest-related landslides to soil productivity is overall small.

Broadcast burning would likely be light in intensity and minimally impact soil productivity since it would occur under moist, spring-like conditions and would not occur on Category 1 soils (except for small inclusions in Unit 25C and 33A totaling about two acres). Category 1 shallow soils and soils on slopes steeper than 70 percent would be handpiled resulting in fewer impacts than broadcast burning (about 17 acres in Units 25A and 33B). Broadcast burns on slopes steeper than 70 percent often are intense resulting in unacceptable loss of organic matter and

nutrients and in degrading the soil structure at the surface. The shallow soils can not sustain as big of productivity losses as deeper soils.

In-unit **surface erosion** due to soil disturbance would be negligible due to 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 - Effects from management activities that could potentially impact the water quality and hydrologic processes include: 1) increase in stream sedimentation, transport, and storage from timber felling, yarding, and hauling; 2) increase in water temperature from forest canopy reduction; 3) change in water chemistry from slash burning; and 4) increase in water yield and increase in peak flows and change in timing of peak flows from timber harvest and road construction.

Sediment input due to yarding or harvest in regeneration units would not occur due to maintaining the full Riparian Reserve buffer along existing streams. Virtually no sediment would reach streams from thinned stands in Unit 31A due to the no-harvest buffer acting 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 used 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, non-fish bearing streams would have a smaller buffer since they have minimal concerns for sedimentation risks given the project design criteria. 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. 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 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 outside the project area and would not affect the identified fish-bearing streams downstream; however, this process would also contribute needed cobbles, gravels and LWD structure to the stream system.

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. 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. Replacements of these culverts would reduce the potential for future culvert failure and input of large amounts of sediment. 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. Sediment storage in the long-term would have a slight increase due to recruitment of large down wood in these non-fish bearing streams of the project area.

Timber harvest in the regeneration units 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. 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 critical times 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 DOI, 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 (USDA and DOI, 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.

Indirect impacts of vegetation removal during regeneration harvest and density management could result in short-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, 1981, pg. 916). These fall storms are small and geomorphically inconsequential. 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, 1981, 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, 1981, 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). 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. 16) indicate that there is no change in risk level from pre-harvest levels as described in Table 3.

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 Enhancement
Bob Creek AHU	78	7.4	7.9	Low
Bond Creek	47	11.6	14.2	Low
Engles Creek	54	10.8	12.7	Low
Greenman Creek	73	0	0	Low
Shivigny Creek AHU	63	19.0	22.0	Low

[1] AHU's are the 7th field Drainages for Bond, Engles, and Greenman Creek Drainages which are true dendritic catchments. Since Bob and Shivigny Creek Drainages are frontal systems, the AHU is a dendritic catchment within the Drainage.

Fisheries Habitat - Effects from management activities that could potentially affect fisheries habitat include: 1) altering amounts of large woody debris within the riparian areas (PRMP/EIS, pg. 4-48), 2) changes in the water temperature regime, and 3) stream sedimentation (FEMAT, pg. V-19). The timber sale units are all located high in the watershed. The only potential direct influence would be 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 direct or indirect impacts are expected to the associated stream channels.
Approximately 35 acres of the Riparian Reserve would be thinned for density management adjacent to the commercial thinning unit. 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 and adjacent aquatic environment. There would be no-harvest buffers prescribed to protect stream bank stability, provide stream shading, and prevent harvest related sedimentation.

No direct impacts from a reduction in **large woody debris** (LWD) would occur within the regeneration units since full Riparian Reserve buffers would be retained. There would not be a reduction in LWD from harvest of trees in the density management prescription to the downstream fisheries habitat since the closest fisheries habitat is greater than one mile from Unit 31. Stream surveys of the project area determined that there are sufficient amounts of existing large organic debris (LOD) within the intermittent stream channels. The existing and future recruitment of LOD would not be impacted as a result of the no-harvest buffers and the retention of 200 trees per acre in the Riparian Reserve. Indirect impacts to non-fish bearing stream channels would occur mainly by altering large woody material inputs in the areas proposed for thinning within the Riparian Reserves. Large wood recruitment would be delayed within the thinning portion until the trees are larger and have more potential to benefit fisheries species and habitat. The short-term impacts on wood recruitment into the stream within the Riparian Reserves would be inconsequential whereas the long-term impacts would enhance the Riparian Resources within the project area.

Harvest of trees and the direct impact on **stream temperature** was discussed previously (see pg. 26).

The proximity of the harvest activities and transportation network to fisheries habitat (greater than 0.2 mile) would preclude the potential impact of **sedimentation** on fisheries habitat. Research has shown that road networks "are the most important source of . . . delivery of sediment to anadromous fish habitats" (FEMAT, 1993; pg. V-16); however, in-stream sedimentation from road construction, maintenance of existing roads, and timber haul is not expected to be measurable in streams and would not be 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 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. 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 direct impacts from harvest related landslides are expected to occur due to PDC's in place to protect slope stability (pg. 10). Indirect 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 from quarries 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 and modification of hydrologic function and is considered an irretrievable commitment. The irretrievable loss 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

The following paragraphs discuss the cumulative impacts of the action. These impacts are described for federal lands in the FSEIS beginning on page 3&4-4 and throughout the chapter based on the resource affected. The Little River Watershed Analysis and the Middle North Umpqua Watershed Analysis provides baseline information with which to assess potential future cumulative impacts. Unless otherwise noted, these effects are described in the context of the fifth-field watershed scale.

Harvest Activity Impacts on Wildlife Habitat - Private landowners control about 37 percent of the Little River and ten percent of the Middle North Umpqua Watersheds. Of this about 86

percent are industrial forestlands with the remainder managed by private landowners with varying agricultural and forestry objectives. Private forestlands managed for timber production are normally harvested in accordance with state forest practice standards between 40 and 60 years of age. As these areas are replanted they will maintain a mosaic pattern of forest stand ages across the landscape. The majority of private lands will maintain early and mid-seral forest type characteristics on a 40 to 60 year rotation. The following describes expected impacts to key wildlife and their habitat resulting from these activities.

1. **Wildlife Habitat – Late-Successional Forests -** About 17,000 acres of the forested lands within the two watersheds in 2004 were in a late-successional condition. Approximately 5,000 acres (28% of BLM late-successional forest) is in some type of reserve (Roseburg BLM GIS data base). Based on current projections, the late-successional forests on private lands are expected to be harvested within the next 20 years. These forest lands most likely will be replanted and managed for timber production on a 40 and 60 year rotation. BLM has about 68 acres of sold-unawarded regeneration timber sales (E-Mile) that could be harvested within the next five to ten years. Approximately 1400 acres in Connectivity/Diversity Blocks, 4,400 acres in General Forest Management Areas, and 6100 acres in the Adaptive Management Area has potential for regeneration harvest. This represents approximately 71 percent of existing late-successional forests in the watershed. Of these potential harvest acres, approximately 1100 acres of regeneration harvest are planned to be sold in the next five years which includes 140 acres identified in this EA.

2. **Wildlife Habitat – Mid and Early-Seral Forests -** BLM manages approximately 6,200 acres of mid and early-seral types. In the Little River watershed, Roseburg BLM has about 30 acres of sold-unawarded commercial thinning timber sales (E-Mile) that could be harvested within the next five to ten years. Roseburg BLM GIS data base identifies approximately 6,200 acres of potential commercial thinning over the next 10 years. Of this about 3,900 acres would be harvested toward the objective of a sustainable supply of commercial timber and the other 2,300 acres would be thinned in Late-successional and Riparian Reserves for the purpose of creating future late-successional habitat. Of these potential harvest acres, approximately 400 acres are planned to be sold in the next five years of which 212 acres are identified in this EA. On private lands, some of these types of forests may commercially be thinned but the majority is expected to be clearcut within the next 30 years.

Across the Little River and Middle North Umpqua Watersheds the 8,000 acres of early-seral forest stands will grow into mid-seral forests in the next 30 years. Because the objectives are different for each private landowner, the timing of harvest will vary throughout the watershed. Forestlands will maintain a mosaic pattern of age classes in the watershed as different forest stands are harvested and replanted. The majority of private lands will maintain early and mid-seral forest type characteristics. Mid-seral forest stands on private lands will add to foraging and dispersal spotted owl habitat, as well as provide habitat for early seral-dependent wildlife species within the watershed.

3. **Wildlife Habitat Long-term Changes -** Within the next 10 years, BLM's regeneration harvest would convert at the most seven percent of the total BLM ownership in these two watersheds into early-seral forests. Harvesting of late-successional forests on private lands would reduce this forest type within the next 20 years. Consultation with USFWS under the 2003-2008 Biological Opinion Programmatic Assessments for these types of activities

concluded that actions on BLM lands were "not likely to jeopardize" spotted owl or bald eagle. Some known spotted owl sites within these two watersheds are located on state or private land. Under state regulation, spotted owl nest sites are protected for at least three years following the last year of occupation. Known spotted owl sites would be protected with 70-acre core areas on private lands. Except for these core areas, private forestlands are not expected to provide spotted owl nesting, roosting and foraging habitat or murrelet nesting habitat (FWS Programmatic Biological Opinion, February 21, 2003).

Impacts to Soil Productivity - Past forest management on BLM and private lands has reduced soil productivity by taking lands out of production for roads, landslides/mass wasting, and compaction/topsoil displacement during ground-based operations, and hot broadcast burning. On balance, soil productivity on BLM lands are expected to be maintained or improved as the natural healing process slowly progresses and best management practices are applied to project areas.

Impacts to Aquatics/Water Quality - The following describes the expected cumulative impacts due to harvest and management activities.

1. **Sediment from Landslides Related to Harvesting and Roads -** Landslides have naturally occurred on the landscape, however past human caused activities had substantially increased their frequency. Landslide activities above natural levels generally have been decreasing as best management practices for road construction and forest practices have been implemented. Because mid-seral forest canopies would be maintained and because best management practices would be applied to help maintain stable slopes, occurrence of management related landslides on BLM lands would be low relative to historical levels, possibly within natural variation. Private forest practices are regulated under the Oregon Forest Practices Act, which provide protection to riparian and aquatic habitat. Landslide frequencies and effects from private clearcutting would be lower than the average levels experienced on similar ground over the past 50 years. Based on the projected trends, landslide rates from new and existing roads would decline due to management practices regulated under the Oregon Forest Practices Act and BLM best management practices. This downward trend includes periods of increased landslide activities during high intensity storm events (Recent upward spikes in landslide levels associated with intense storms appear to be lower than during comparable storms in the nineteen fifties through early eighties). Though this projects contribution to landslide potential is small, the cumulative effect of landslides occurring throughout the watershed over time would contribute to the ongoing process of storage of landslide materials in the streams and floodplains. During extremely high flow events (such as 100 year events), these materials would be carried downstream resulting in a short-term increase in sediment and turbidity, a long-term increase in large wood downstream, and a long-term increase in gravels due to the high gravel content of the soils in the area. Though this project's contribution to landslide potential would be small, the cumulative effect of landslides occurring throughout the watershed over time would contribute to the ongoing process of movement and storage of landslide materials in the streams and floodplains. During more normal precipitation years the bulk of the landslide activity is usually caused by timber harvest and roads. Large landslides, debris flows and earth flows are widely scattered. Most of the silts and clays from these landslides are carried rapidly through the system. The other materials are static or move slowly. During extremely high flow events (such as 100 year events), the remaining materials would be carried downstream resulting in a short-term increase in sediment and turbidity, a short and long term increase in large wood downstream, and a long-term increase in gravels due to the high

gravel content of the soils in the area. Concurrent with these high flow events are a much wider distribution of large landslides, debris flows and earth flows that also initiate in mid-seral and older stands and deliver much larger volumes of material (both fine and coarse) than during the more normal years.

2. **Sediment Related to Agriculture and Hauling Activities -** Agricultural practices in the watershed are expected to remain the same in the short-term. As a result, fine sediment inputs into streams are expected to remain the same as the past. In the short-term, as shown in this EA, fine sediment input to streams due to BLM harvesting and roads could increase slightly. The duration of this input would likely be very short, occurring during the season of wet weather haul or briefly following larger rain events. Upon cessation of haul or a return to drier weather, sediment inputs would likely return to background levels. At the watershed scale it would be indistinguishable from background levels and would be within the range of natural variation. Over the long-term (next 100 years), fine sediment delivery due to BLM and private roads would decrease because of road improvements and renovations throughout the watershed. Any sediment added to the streams as a result of the proposed action cumulatively would be indistinguishable from background levels. Therefore sedimentation would have very little cumulative impacts at the watershed scale and would be within the range of natural variation. As a result, associated embedment from fine sediment within the stream substrate would likely decrease resulting in improved spawning habitat and substrate quality.

3. **Hydrologic Processes (Peak Flows) -** There is no risk of increased peak flows to the watershed from this action. If harvest on private occurs in the same drainages in the near future, peak flows may be increased as a result of reduced stand densities on private and BLM administered lands. 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 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. 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. 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. 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 there is low risk of increased water yield at the fifth-field level resulting from the proposed action.

Aquatic Habitat - The long-term cumulative effects of Riparian Reserve treatments under this and other future federal projects in the Little River and Middle North Umpqua Watersheds would promote late-successional characteristics through density management activities. As late-successional characteristics are attained, there would be improvements in forest health, riparian vegetation, instream wood amounts, small channel capacity to store water and sediment, summer low flows, and stream temperature. The long-term cumulative effects of these types of current and future federal activities would promote aquatic habitat complexity in these areas. The Cavitt Creek EA (2001) identified 16 culverts for replacement and 6.4 miles of roads with erosional problems to be improved or decommissioned in the coming years. Over the long-term the quality and quantity of aquatic habitat would improve compared to current conditions. The reasons for this conclusion are: a) Sedimentation rates will be reduced on public and private lands through road improvements and decommissioning, b) Best management would continue to be applied to BLM and private harvest practices, c) aquatic habitat and access would be improved through fish barrier culvert replacements and instream restoration targeted in the highest priority areas in the watershed, and d) forests on previously harvested Riparian Reserves on federally managed land will continue to grow, providing increased stream shading and large wood over time.

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** will be established for review of this EA. 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
Dan Cressy	Soils
Denise Dammann	Hydrology
Craig Holt	Layout Forester
Judy Hyde	Engineer
Al James	Silviculture
Jim Luse	Environmental Coordinator / EA Preparer
Rex McGraw	Wildlife
Ron Wickline	Botany

Expanded Team (Consulted)

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

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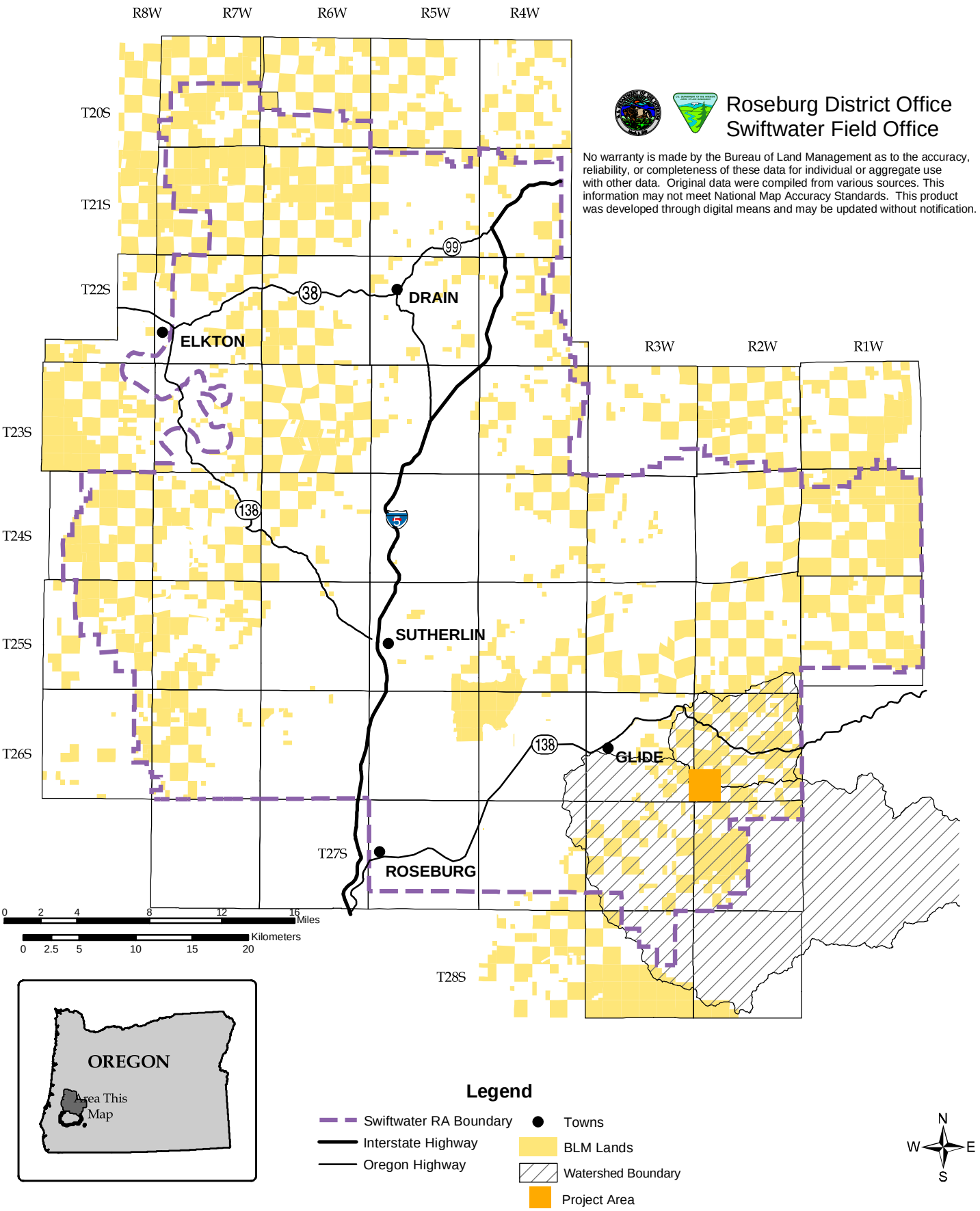
Other references as cited in the individual Specialist's Reports (Appendix F - Analysis File).

Appendix A
Vicinity Map

Green Thunder Timber Sale

EA No. OR-104-99-04



Roseburg District Office
Swiftwater Field Office

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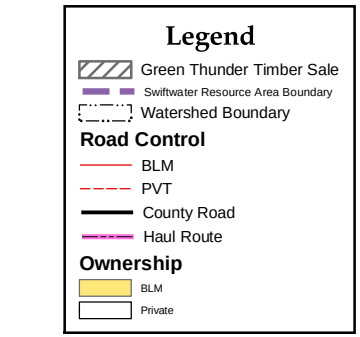
Appendix B

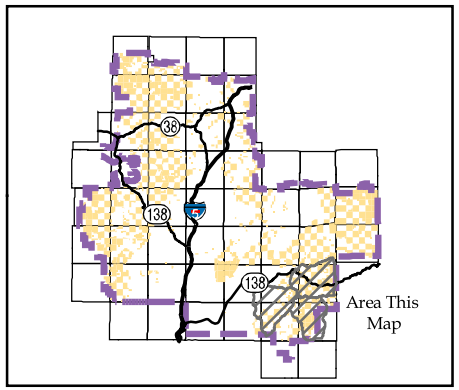
Project Location Map

Roseburg District Office
Swiftwater Field Office

Green Thunder Timber Sale

EA No. OR-104-99-04



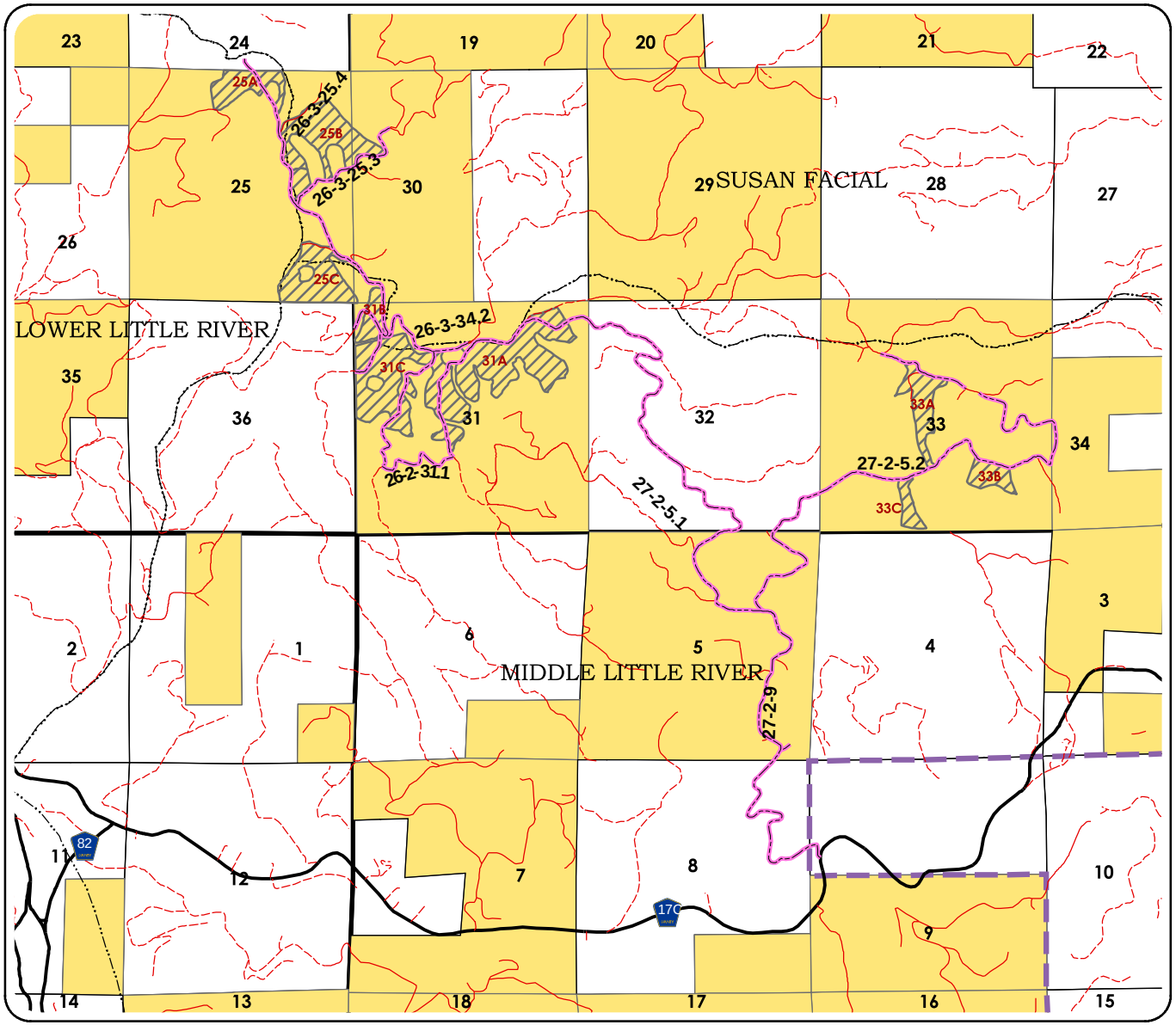


R 03 W

R 02 W

T 26 S

T 27 S



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	Connectivity Cat 1 Soils
25B	2	43		OES (24)	ROW (<1) SL (19)	BB MP&B	GFMA (5 ac.) CONN (38 ac.) Perm. spur
25C	3	38			ROW (1) SL (37)	MP&B	Connectivity Dry Season Log/ Temp. spur Subsoil old skid trails
31A	4	212		OES (197)	ROW (3) SL (12)	P&BL MP&B	Commercial Thin / AMA 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		352		271	81		

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.

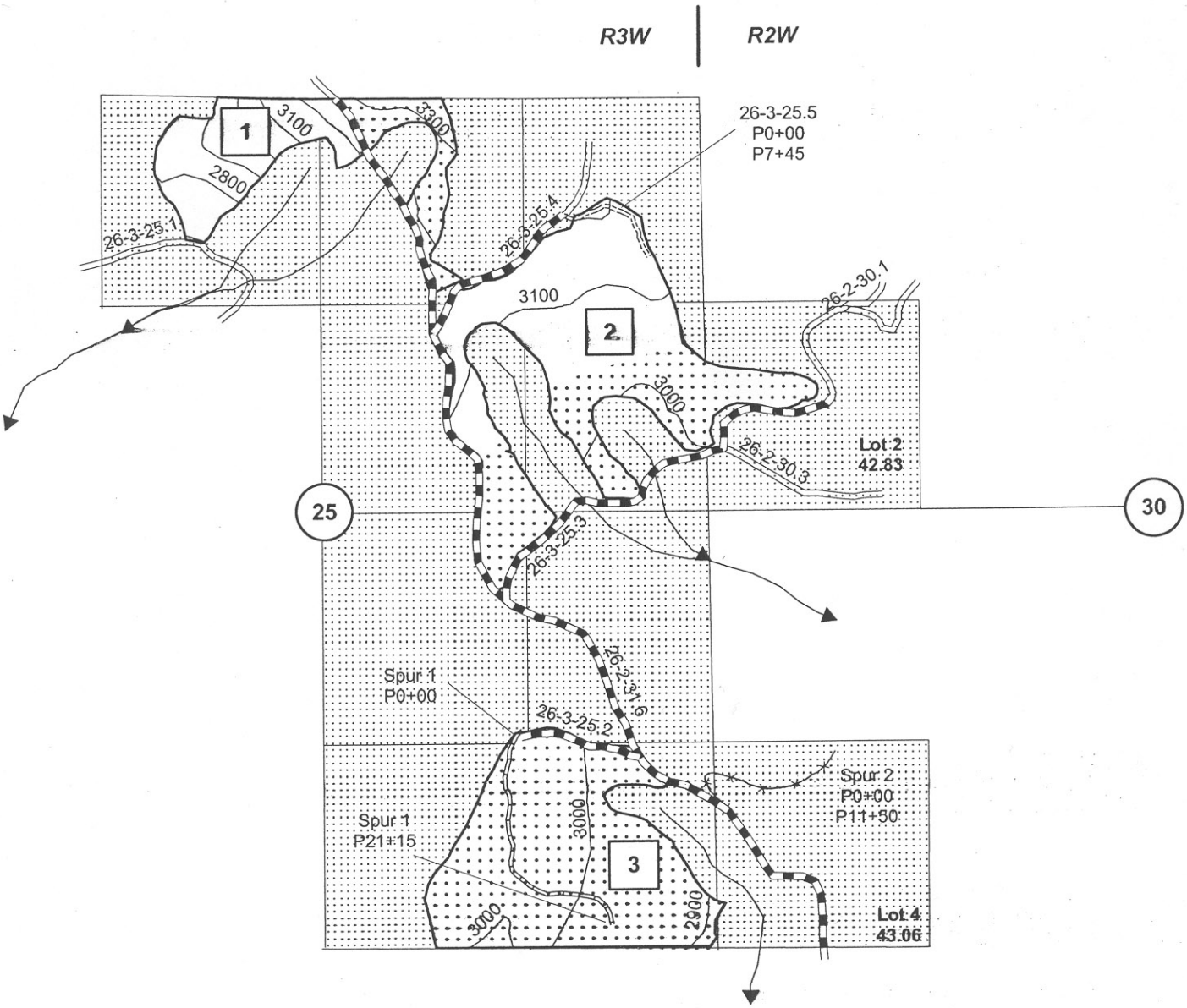
For Units 25A through 31A

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.

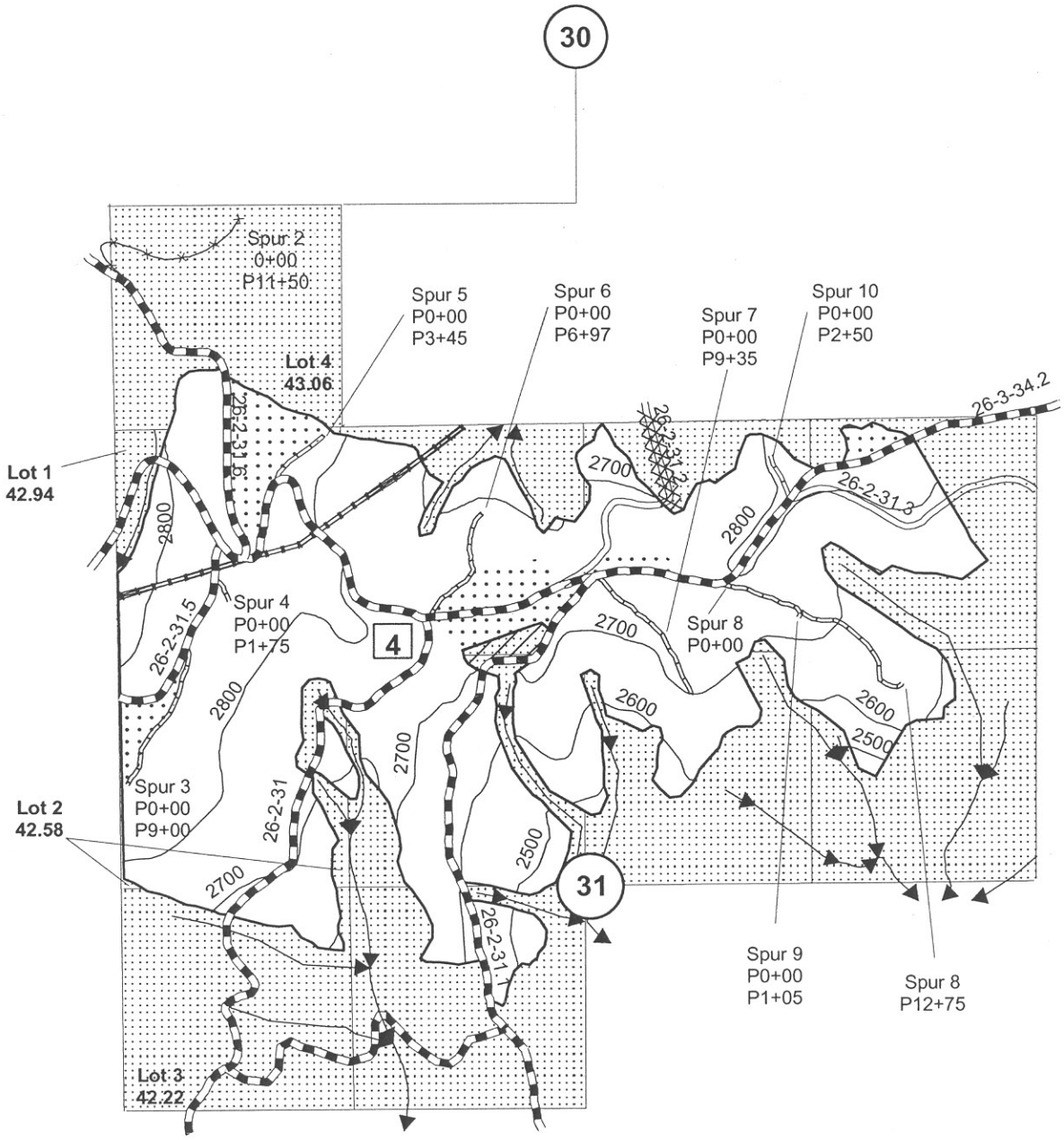


LEGEND

- 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

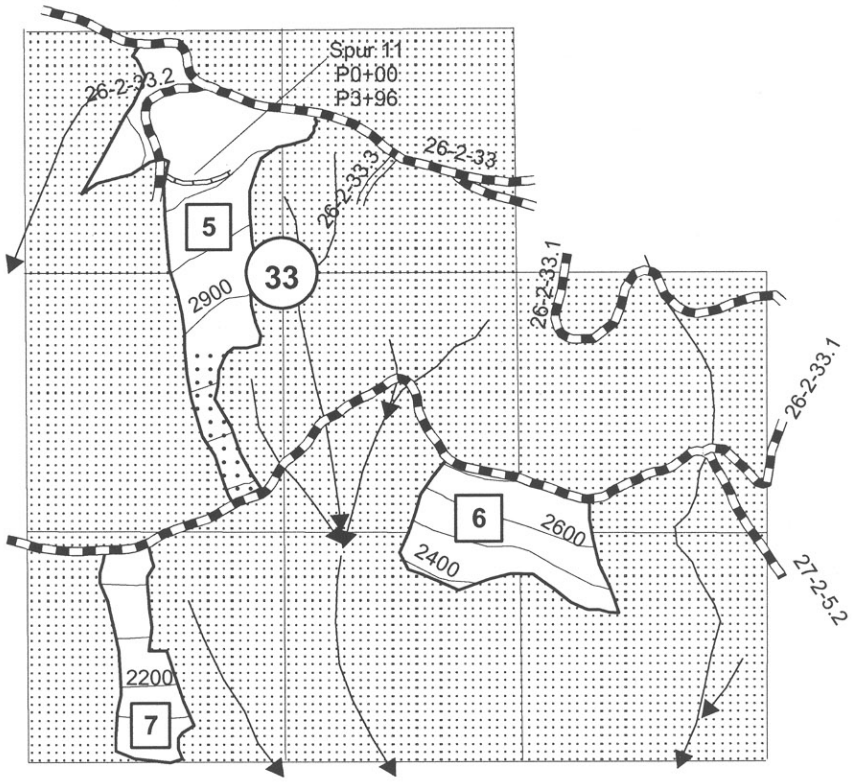


LEGEND

- 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



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

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.

A. Issues Identified During Project Design

The following issues were identified during project design. 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, (3) Project Design Criteria (PDC) included in the preferred alternative would be adopted to mitigate the anticipated environmental impacts of specific activities, and (4) the issue does not meet the objectives and purpose of the project. Section II, paragraph C (pg. 5) provides a list of specific PDC incorporated into the preferred alternative to deal with these issues.

Concern #1: 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 LRWA 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 fire return, and (3) The removal of 36 acres of interior habitat and the conversion of 122 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 option of deriving economic amenities from below harvest aged stands that makes silvicultural sense and thereby relieve the need to harvest mature stands. The ID Team came to the conclusion that this would indeed violate the RMP and the unit was reconfigured as a 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 easement (In Unit 31A) would be cut to reduce the threat of fire from boundary trees falling on the powerline. Trees would be chosen for cutting would be based on proximity to the powerline, tree height, topography, and prevailing winds. This would result in clearcutting a band of trees along the powerline.

B. 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 not violate 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.

C. Issues to be Analyzed

The Interdisciplinary Team did not identify any issues as having sufficient potential affect that would warrant detailed analysis as a key issue to be addressed in Section IV, "Environmental Consequences".

D. Watershed Analysis and Retention of Late-Successional Forests

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). 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. The project as proposed would remove approximately 140 acres of these stands from within the Little River Watershed.

The Little River Watershed Analysis (September 1995) was used in this analysis and reviewed for issues to be considered in the design of projects. The IDT (November 4, 1998) identified the following issues identified in the Little River Watershed Analysis (WA) as applicable for this project: riparian quality, late-successional forest proportion, slope stability (landslides), water quality and listed species.

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.