South Scappoose Creek Project

Environmental Assessment and
Finding of No Significant Impact

Environmental Assessment Number DOI-BLM-OR-S060-2011-0007-EA
September 13, 2011

Salem District
Columbia and Washington Counties, Oregon

T. 3 N, R. 2 W sections 7, 9, 19, 29 and
T. 3N, R.3 W sections 1, 11, 13 (W.M.)

Responsible Agency:	USDI - Bureau of Land Management
Responsible Official:	Stephen M. Small, Field Manager Tillamook Resource Area 4610 Third Street Tillamook, OR 97141 (503) 815-1100
For further information, contact:	Steve Bahe, Project Leader Tillamook Resource Area 4610 Third Street Tillamook, OR 97141 (503) 815-1123

BLM
Salem District

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FINDING OF NO SIGNIFICANT IMPACT

Introduction

The Bureau of Land Management (BLM) has conducted an environmental analysis for a forest management proposal to commercially thin approximately 1540 acres and regeneration harvest approximately 100 acres located on BLM lands within the Tillamook Resource Area of the Salem District in Columbia and Washington Counties, Oregon. The *South Scappoose Creek Project Environmental Assessment* (Environmental Assessment Number DOI-BLM-OR-S060-2011-0007-EA) documents the environmental analysis of the proposed forest management project. The EA is attached to and incorporated by reference in this Finding of No Significant Impact determination (FONSI).

The Salem District initiated planning and design for this project to conform and be consistent with the Salem District's 1995 ROD/RMP. Following the March 31, 2011 decision by the United States District Court for the District of Columbia in Douglas Timber Operators et al. v. Salazar, which vacated and remanded the administrative withdrawal of the Salem District's 2008 ROD and RMP, we evaluated this project for consistency with both the 1995 ROD/RMP and the 2008 ROD and RMP. Based upon this review, we have determined that the project is consistent with the Salem District's 1995 ROD/RMP and the 2008 ROD and RMP. Although the project contains some design features not mentioned specifically in the 2008 ROD and RMP, these design features are consistent with the ROD and RMP.

The project area includes BLM-managed lands within sections 7, 9, 19 and 29 of Township 3 North, Range 2 West; and sections 1, 11 and 13 of Township 3 North, Range 3 West, Willamette Meridian (WM) in Columbia and Washington Counties, Oregon. The proposed action is to commercially thin approximately 1540 acres and to regeneration harvest approximately 100 acres. Approximately 1169 of these acres are in the Matrix land use allocation (LUA), and 479 are in the Riparian Reserve LUA. The stands proposed for management currently range in age from 49 to 73 years old.

The EA and FONSI will be made available for public review from ***September 21, 2011 to October 21, 2011*** on the Salem District internet site (http://www.blm.gov/or/districts/salem/plans/index.php). The notice for public comment will also be published in the legal notices by *The South County Spotlight* newspaper of Scappoose Oregon. Comments received by the Tillamook Resource Area of the Salem District Office, 4610 Third Street, Tillamook, Oregon, 97141, on or before ***October 21, 2011*** will be considered in making the final decision for this project.

Finding of No Significant Impact

Based upon review of the South Scappoose Creek Project EA and supporting Project Record, I have determined that this project is not a major federal action and would not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27. There are no site specific impacts that would require supplemental/additional information to the analysis done in the *Salem District Proposed Resource Management Plan/Final*

Environmental Impact Statement, September 1994 (RMP/FEIS) (USDI – BLM 1994). Therefore, an environmental impact statement is not needed. This finding is based on the following discussion:

Context. The proposed project is a site-specific action directly involving a total of approximately 1640 acres of BLM administered land, along with actions occurring on various roads in and near the project area. These actions by themselves do not have international, national, region-wide, or state-wide importance.

The discussion of the significance criteria that follows applies to the intended actions and is within the context of local importance. The EA details the effects of the action alternative; none of the effects identified, including direct, indirect and cumulative effects, are considered to be significant and do not exceed those effects described in the RMP/FEIS.

Intensity. The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27. The discussions below apply to the project contained within the South Scappoose Creek Project Environmental Assessment.

1. **Impacts may be both beneficial and adverse.** Due to the proposed projects' design features, the most noteworthy predicted effects include: (1) increased growth rates of residual trees in thinning areas; (2) consistency with the ACS (Aquatic Conservation Strategy) objectives; (3) no loss in population viability of special status or special attention species (also see significance criteria #9 below); (4) slight, short-term increases in sediment are anticipated from road construction, road renovation, culvert replacement and removal, timber harvest, and log haul; (5) no impacts to water temperature, or streamflow; (6) slight, short-term impacts to stream channel stability are expected at the two sites that will have culverts upgraded and one site that the culvert will be installed and then removed after logging; (7) degrading and removing spotted owl dispersal habitat in an area which currently does not contain an adequate amount of habitat in a condition to facilitate owl dispersal; and (8) social and economic benefits to the local communities through the supply of timber to local mills.

The environmental effects disclosed above and discussed in detail in *EA section 3* are not considered significant, nor do the effects exceed those described in the RMP/FEIS.

2. **The degree to which the selected alternative will affect public health or safety.** Public health and safety was not identified as an issue. The proposed project is comparable to other commercial timber sales which have occurred within the Salem District with no unusual health or safety concerns.

3. **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wild and scenic rivers, or ecologically critical areas**. There are no prime farm lands, park lands or wilderness areas located within the project area (*EA section 3.12*). No cultural resource sites have been identified within the project area. There are no federally designated Wild and Scenic Rivers within the project area. Under the design features for the commercial thinning treatment, all identified wetland and riparian areas would be buffered to protect resource values. There are no Areas of Critical Environmental Concern or other known ecologically critical areas within or adjacent to the project area.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** Extensive scoping of the proposed project resulted in only nine project-specific comment letters and three phone calls. The disposition of public comments is contained in *EA section 1.4* and *Appendix 1).*

The effects of the proposed project on the quality of the human environment were adequately understood by the interdisciplinary team to provide an environmental analysis. A complete disclosure of the predicted effects of the proposed project is contained within *EA section 3*.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** The proposed project is not unique or unusual. The BLM has experience implementing similar projects in similar areas and have found effects to be reasonably predictable. The environmental effects to the human environment are fully analyzed in the EA. There are no predicted effects on the human environment which are considered to be highly uncertain or involve unique or unknown risks.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** The proposed project does not set a precedent for future actions that may have significant effects, nor does it represent a decision in principle about a future consideration. Any future projects will be evaluated through the NEPA (National Environmental Policy Act) process and will stand on their own as to environmental effects.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** The interdisciplinary team evaluated the proposed project in context of past, present and reasonably foreseeable actions. Minor cumulative effects to spotted owl dispersal habitat have been identified. A complete disclosure of the effects of the action alternative is contained in *EA section 3*.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.** The proposed project will not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor will the proposed project cause loss or destruction of significant scientific, cultural, or historical resources (*EA section 3.12*).

9. **The degree to which the action may adversely affect an endangered or threatened species or its designated critical habitat under the Endangered Species Act of 1973.** The spotted owl would be affected by this project only through the modification of dispersal habitat. This modification includes degrading 1540 acres of dispersal habitat through thinning (these acres would continue to function in the same capacity after treatment as before) and the removal of 100 acres of dispersal habitat through regeneration harvest. Additionally, there is a very minor potential for disturbance to marbled murrelets resulting from noise generation activities within 300 feet of potential nesting habitat during the murrelet breeding season. Due to the impacts to spotted owl dispersal habitat and the minor potential for disturbance to murrelets, informal consultation with the U.S. Fish and Wildlife Service is warranted and would be completed programmatically within the appropriate year's (year of sale if the proposed action is selected) Biological Assessment under the categories of "Light to Moderate Thinning" and "Regeneration Harvest".

Consultation with the National Marine Fisheries Service on the potential effects of the proposed action on Lower Columbia River coho salmon will be completed with project-specific consultation (Section 7 Streamlined Consultation) or one of the programmatic consultation processes available at the time of implementation for actions that require consultation. Required consultation for Magnuson-Stevens Fisheries Conservation and Management Act Essential Fish Habitat for the proposed action is included in *EA section 3.3*. If required, Section 7 Endangered Species Act Consultation would be completed prior to the Field Manager authorizing an action.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment**. The proposed project does not violate any known Federal, State, or local law or requirement imposed for the protection of the environment. The EA and supporting Project Record contain discussions pertaining to the Endangered Species Act, National Historic Preservation Act, Clean Water Act, Clean Air Act, Coastal Zone Manage Act, Migratory Bird Treaty Act, Magnuson-Stevens Fisheries Conservation and Management Act, Executive Order 12898 (Environmental Justice), Oregon Scenic Waterways Act, and Executive Order 13212 (Adverse Energy Impact). State, local, and tribal interests were given the opportunity to participate in the environmental analysis process. Furthermore, the proposed project is consistent with applicable land management plans, policies, and programs.

Approved by: _____ _____

Stephen M. Small Date

Tillamook Resource Area Field Manager

THE SOUTH SCAPPOOSE CREEK PROJECT ENVIRONMENTAL ASSESSMENT

1. INTRODUCTION

This EA will analyze the impacts of the proposed forest management project and connected actions on the human environment. The EA will provide the decision maker, the Tillamook Resource Area Field Manager, with current information to aid in the decision-making process. It will also determine if there are significant impacts not already analyzed in the Environmental Impact Statement for the Salem District's Resource Management Plan (RMP) (USDI-BLM 1995) and whether a supplement to that Environmental Impact Statement is needed or if a Finding of No Significant Impact is appropriate. Section 1 of this EA for the proposed South Scappoose Creek Project provides a context for what will be analyzed in the EA, describes the kinds of actions we will be considering, defines the project area, describes what the proposed action needs to accomplish, and identifies the criteria that we will use for choosing the alternative that will best meet the purpose and need for this proposal.

1.1 Proposed Action

The Tillamook Resource Area, Salem District Bureau of Land Management (BLM), proposes to implement forest management activities within the Scappoose Creek and Dairy Creek 5th-field watersheds. The proposed action is to commercially thin approximately 1540 acres and to regeneration harvest approximately 100 acres. Connected actions include such activities as the replacement and/or removal of undersized and failing culverts; constructing, renovating and decommissioning roads; and installing one gate to control illegal garbage dumping (*EA section 2.4)*.

1.1.1 Project Area[1] Location and Vicinity

The South Scappoose Creek Project area is located approximately six miles west of the town of Scappoose, Oregon (see Figure 1). It is in the Upper East Fork Dairy Creek and the Upper McKay Creek subwatersheds of the Dairy Creek 5th field watershed and the South Scappoose Creek subwatershed of the Scappoose Creek-Frontal Columbia River 5th field watershed (Table 1). The project area includes BLM-managed lands within sections 7, 9, 19 and 29 of Township 3 North, Range 2 West; and sections 1, 11 and 13 of Township 3 North, Range 3 West, Willamette Meridian (WM).

[1] Project Area is defined as that area that is directly affected by project operations (e.g. forest management treatment units, area cleared for landings, roads and rights-of-way). The area around the Project Area, especially BLM managed lands in the same contiguous block of ownership, is referred to as the project area vicinity or similar term.

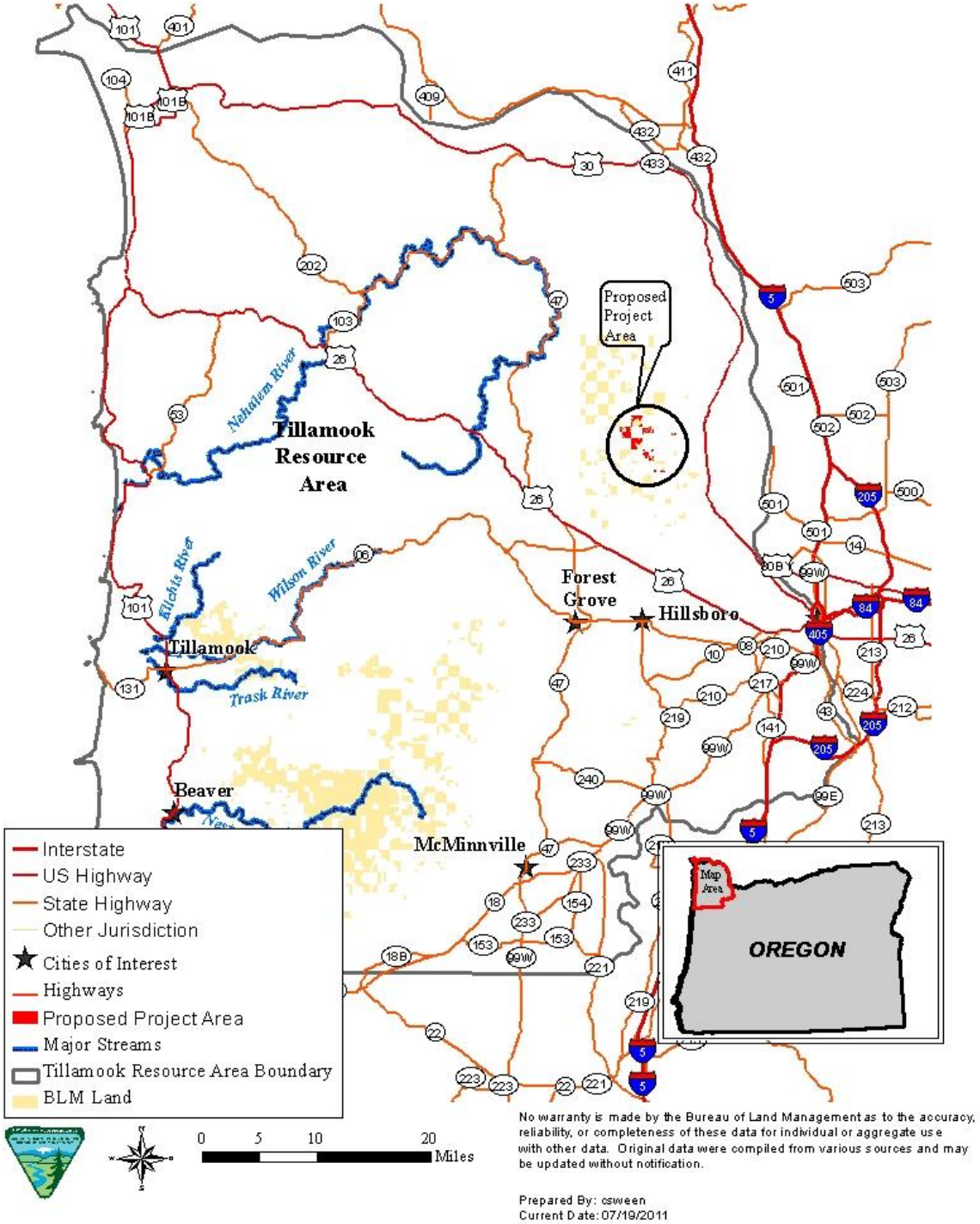
The proposed project areas are located on revested Oregon and California Railroad Lands (O & C Lands) within the Matrix and Riparian Reserve (RR) Land-Use Allocations (LUAs). The Matrix LUA is divided into two subcategories - General Forest Management Area (GFMA) and Connectivity/Diversity Blocks (CON); the South Scappoose Creek Project would be located within both of these subcategories of the Matrix LUA. The BLM-administered lands are intermixed with timberlands that are primarily owned by industrial timber companies, creating an assortment of checkerboard ownership patterns.

Table 1: Watershed and Proposed Treatment Acres*

5th Field Watershed Name	5th Field Watershed (Acres)	6th Field Subwatershed Name	6th Field Subwatershed (Acres)	Proposed Thinning in Subwatershed (Acres)	Proposed Regeneration Harvest in Subwatershed (Acres)
Scappoose Creek-Frontal Columbia River	123,107	South Scappoose Creek	17,374	1,384	71
Dairy Creek	147,796	Upper East Fork Dairy	20,707	126	--
		Upper McKay Creek	23,733	30	29
Total				1,540	100

*Approximate values based on GIS data

Figure 1. Project Location



1.2 Purpose of and Need for Action

1.2.1 Need for the Action

Data analysis and field examinations by BLM staff have identified specific stands in which density management would be beneficial in maintaining healthy vigorous stands and regeneration harvest would be appropriate in starting new stands for future timber production consistent with a regulated forest while providing a supply of timber for local mills.

1.2.2 Purpose (Objectives) of the Project

This project has been designed under the Salem District Record of Decision and Resource Management Plan, May 1995 (ROD/RMP) (USDI-BLM 1995) and related documents which direct and provide the legal framework for management of BLM lands within the Salem District (see *EA section 1.3*).

The South Scappoose Creek project area is within the Matrix (General Forest Management Area (GFMA) and Connectivity/Diversity Blocks (CON)) and Riparian Reserve land use allocations (ROD/RMP p. 5; NWFP pp. A-4, A-5; *EA section 1.3*) (USDA FS and USDI BLM. 1994). The following RMP and NWFP objectives would be applied to achieve the purpose of this project.

Within the Matrix (GFMA and CON) Land Use Allocations:

1. Manage developing stands on available lands to promote tree survival and growth and to achieve a balance between wood volume production, quality of wood, and timber value at harvest; (ROD/RMP p. 46) and increase the proportion of merchantable volume in the stand, to produce larger, more valuable logs, to anticipate mortality of small trees as the stand develops, to maintain good crown ratios and stable, wind-firm trees (ROD/RMP p. D-2) by applying commercial thinning treatments.
2. Supply a sustainable source of forest commodities from the Matrix land use allocation to provide jobs and contribute to community stability (ROD/RMP pp. 1, 46-48); and select logging systems based on the suitability and economic efficiency of each system for the successful implementation of the silvicultural prescription, for protection of soil and water quality, and for meeting other land use objectives (ROD/RMP p. 47) by developing timber sales that can be successfully offered to the market place.
3. Provide habitat for a variety of organisms associated with both late-successional and younger forests (ROD/RMP p. 20).
4. In the CON LUA, manage available forest land on a 150-year rotation (ROD/RMP p. 21).
5. Plan harvest of marketable hardwood stands in the same manner as conifer stands, if the land is not otherwise constrained from timber management (ROD/RMP p. 47).

Within the Riparian Reserve Land Use Allocation:

6. Maintain water quality standards (ROD/RMP p.2) and improve stream conditions by:

- Maintaining effective shade for streams pursuant to BLM's TMDL agreement with the State of Oregon.
- Removing or replacing stream crossing culverts that restrict stream flows or pose a threat of future failure.
- Providing habitat for special status, SEIS special attention and other terrestrial species (ROD/RMP p. 9).
- Meeting all Aquatic Conservation Strategy (ACS) Objectives (ROD/RMP pp. 5-6).

7. Develop large conifers and future large coarse woody debris, large snag habitat and in-stream large wood. Develop long-term structural and spatial diversity, and other elements of late-successional forest habitat, to control stocking (stand density), to acquire desired vegetation characteristics and improve diversity of species composition within the RR LUA. These objectives would be accomplished by applying commercial thinning treatments within the RR LUA concurrent with treatments in the adjacent Matrix LUA, removing merchantable material only when it is consistent with the purposes for which the RR were established (ROD/RMP pp. 9-15, D-6, NWFP p. B-31).

Within all Land Use Allocations:

8. Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and Bureau special status species policies (ROD/RMP p. 28).
9. Maintain and develop a safe, efficient and environmentally sound road system (ROD/RMP p. 62) and reduce environmental effects associated with identified existing roads within the project area (ROD/RMP p. 11) by:
   - Providing appropriate access for timber harvest, silvicultural practices, and fire protection vehicles needed to meet the objectives above;
   - Perform road maintenance to prevent road deterioration or failure and to prevent road generated sedimentation that exceeds ODEQ standards.

1.2.3 Decision Factors

In choosing the alternative that best meets the purpose and need, the Tillamook Resource Area Field Manager will consider the extent to which each alternative would:

1. Provide timber resources and revenue to the government from the sale of those resources (objectives 1 and 2);
2. Reduce the short-term and long-term costs of managing the lands in the project areas (objectives 1 and 2);
3. Provide safe, cost-effective access for logging operations, fuels management and fire suppression (objectives 2 and 8);
4. Reduce competition-related mortality and increase tree vigor and growth (objective 1);
5. Provide for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris (objectives 3, 6, 7 and 8);

6. In the CON LUA, manage available forest land on a 150-year rotation;
7. Manage hardwood stands located on lands that are not otherwise constrained from timber management (objective 5);
8. Promote the development of healthy late-successional characteristics in the Riparian Reserve land use allocation (objectives 6, 7 and 8);
9. Minimize erosion and subsequent sedimentation into streams from roads (objective 9).

1.3 Conformance with Land Use Plan, Statutes, Regulations, and other Plans

The following documents direct and provide the legal framework for management of BLM lands within the Salem District and for this project:

1. *Salem District Record of Decision and Resource Management Plan***,** May 1995 (ROD/RMP): The ROD/RMP has been reviewed and it has been determined that the proposed timber harvest activities conform to the land use plan terms and conditions (e.g. complies with management goals, objectives, direction, standards and guidelines) as required by 43 CFR 1610.5 (BLM Handbook H1790-1). Implementing the ROD/RMP is the reason for doing these activities (ROD/RMP p.1-3).

The Salem District initiated planning and design for this project to conform and be consistent with the Salem District's 1995 ROD/RMP. Following the March 31, 2011 decision by the United States District Court for the District of Columbia in Douglas Timber Operators et al. v. Salazar, which vacated and remanded the administrative withdrawal of the Salem District's 2008 ROD and RMP, we evaluated this project for consistency with both the 1995 ROD/RMP and the 2008 ROD and RMP. Based upon this review, we have determined that the project is consistent with the Salem District's 1995 ROD/RMP and the 2008 ROD and RMP. Although the project contains some design features not mentioned specifically in the 2008 ROD and RMP, these design features are consistent with the ROD and RMP.

2. *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl,* April 1994 (the Northwest Forest Plan, or NWFP);

Land Use Allocations: The area proposed for treatment falls within the following Land Use Allocations (LUA) as defined in the previously described Salem District ROD/RMP and Northwest Forest Plan:

Matrix (Matrix LUA) - The management objectives for this land use allocation include: to produce a sustainable supply of timber, provide connectivity between Late Successional Reserves, provide habitat associated with all age classes, and

provide structural components such as down logs, snags and large trees (ROD/RMP p. 20). The Matrix LUA is divided into two subcategories - General Forest Management Area (GFMA) and Connectivity/Diversity Blocks (CON). The Matrix lands in this project are within both the GFMA (sections 7, 9, 11, 19 and 29) and CON (sections 1 and 13). See *EA section 1.2.2* for management objectives associated with these land use allocations.

Riparian Reserves (RR LUA) - The primary management focus for the RR LUA is to meet the Aquatic Conservation Strategy Objectives described in the ROD/RMP (pp. 5-6) "to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands." This includes terrestrial habitat, water quality and quantity, and aquatic habitat. See *EA section 1.2.2* for management objectives associated with this land use allocation. For the South Scappoose Creek Project, the RR LUA includes the stream and the area extending from the edges of the stream channel (each side) to a distance equal to:

- For fish-bearing streams and all lakes and natural ponds – a slope distance equal to the height of two site potential trees. For this project this is 480 feet each side of the stream channel.
- For non-fish-bearing streams and all constructed ponds, and wetlands larger than one acre - a slope distance equal to the height of one site potential tree. For this project this is 240 feet each side of the stream channel.

In addition, the NWFP (p. B-31) also states that "Active silvicultural programs will be necessary to restore large conifers in Riparian Reserves ". The NWFP (p. C-32) and the ROD/RMP (p. 11) direct the BLM to apply silvicultural practices for RR to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives. The ROD/RMP (p. D-6) states that merchantable logs may be removed "where such action would not be detrimental to the purposes for which the RRs were established". *EA section 3.13* describes the project's compliance with the Aquatic Conservation Strategy, including the nine ACS objectives.

3. Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, January 2001.

The analysis in the South Scappoose Creek Project EA is site-specific, and supplements and tiers to analyses found in the *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement*, September 1994 (RMP/FEIS). The RMP/FEIS includes the analysis from 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*, February 1994 (NWFP/FSEIS). The RMP/FEIS is amended by the *Final*

Supplemental Environmental Impact Statement for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, November 2000.

Information from the *Scappoose Creek Watershed Analysis* (USDI - BLM. 1996a) and the *Dairy-McKay Watershed Analysis* (USDI - BLM. March 1999) has been incorporated into the development of the proposed forest management activities and into the description of the South Scappoose Creek Project EA's affected environment and environmental effects (*EA section 3.0*) and is incorporated by reference.

The above documents are available for review in the Tillamook Resource Area Office.

1.3.1 Survey and Manage Species Review

The South Scappoose Creek Project applies a 2006 Exemption from a stipulation entered by the court in litigation regarding Survey and Manage species and the 2004 Record of Decision related to Survey and Manage Mitigation Measure in *Northwest Ecosystem Alliance v. Rey*, No. 04-844-MJP (W.D. Wash., Oct. 10, 2006). Previously, in 2006, the District Court (Judge Pechman) invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain categories of activities from the Survey and Manage standards and guidelines, including both pre-disturbance surveys and known site management. Also known as the Pechman Exemptions, the Court's Order from October 11, 2006 directs:

"Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applied unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:

a. Thinning projects in stands younger than 80 years old:
b. Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;
c. Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement large wood, channel and floodplain reconstruction, or removal of channel diversions; and
d. The portions of project involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph."

Per the 2011 Settlement Agreement, the 2006 Pechman Exemptions remain in force:

"The provisions stipulated to by the parties and ordered by the court in Northwest Ecosystem Alliance v. Rey, No. 04-844-MJP (W.D. Wash. Oct. 10, 2006), shall remain in force. None of the following terms or conditions in this Settlement Agreement modifies in any way the

October 2006 provisions stipulated to by the parties and ordered by the court in Northwest Ecosystem Alliance v. Rey, No. 04-844-MJP (W.D. Wash. Oct. 10, 2006)."

The commercial thinning portion of the South Scappoose Creek Project meets Exemption A because it entails no regeneration harvest and entails thinning only in stands less than 80 years old. The regeneration harvest portion of the South Scappoose Creek Project does not meet a Pechman Exemption and therefore will be surveyed to protocol prior to release of a Decision for the Project.

1.3.2 Relevant Statutes/Authorities

This section contains a summary of the relevant statutes/authorities that apply to this project. Additional authorities and management direction are described in Table 24.

1. **Oregon and California Act** (O&C) 1937 – Requires the BLM to manage O&C lands for permanent forest production, in accord with sustained-yield principles. Management of O&C lands must also protect watersheds, regulate streamflow, provide for recreational facilities, and contribute to the economic stability of local communities and industries.
2. **Federal Land Policy and Management Act** (FLPMA) 1976 – Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.
3. **National Environmental Policy Act** (NEPA) 1969 – Requires the preparation of EAs or EISs on federal actions. These documents describe the environmental effects of these actions and determine whether the actions have a significant effect on the human environment.
4. **Endangered Species Act** (ESA) 1973 – Directs Federal agencies to ensure their actions do not jeopardize threatened and endangered species.
5. **Clean Air Act** (CAA) 1990 – Provides the principal framework for national, state, and local efforts to protect air quality.
6. **Archaeological Resources Protection Act** (ARPA) 1979 – Protects archeological resources and sites on federally-administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.
7. **Clean Water Act** (CWA) 1987 – Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.
8. **Magnuson-Stevens Fishery Conservation and Management Act of 1996**, (P.L. 94-265) as amended and reauthorized by (P.L. 109-479), (2007)
9. **Healthy Forest Restoration Act of 2003** (HFRA)(P.L. 108-148), The main thrusts of the law are to thin overstocked stands, clear away vegetation and trees to create shaded fuel breaks, provide funding and guidance to reduce or eliminate hazardous fuels, improve forest fire fighting, and research new methods to halt destructive insects.
10. **The Migratory Bird Treaty Act** (MBTA), Executive Order 13186, and Migratory Bird Treaty Reform Act of 2004.
11. **National Fire Plan (August, 2000)**
12. **Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities and the Environment (May, 2002)**

1.4 Scoping

External scoping (seeking input from people outside of the BLM) was conducted by means of a scoping letter for the South Scappoose Creek Project sent out to a total of 21 county, state and federal government agencies, organizations, associations, and interested parties on the Tillamook Resource Area mailing list on February 17, 2011 (Project Record Document 7). This scoping letter was also posted to the BLM's Salem District website. A Notice for Public Comment was published in *The South County Spotlight* newspaper of Scappoose Oregon on February 23, 2011. Finally, a description of the proposal was included in the Salem District, Bureau of Land Management Project Updates for the spring and summer of 2011 which were mailed to more than 1000 individuals, organizations and agencies.

As a result of this scoping effort, nine letters providing comments were received (Project Record Documents 15, 16, 17, 18, 19, 20, 21, 22 and 24). In addition to the letters, three phone calls were received by individuals requesting additional information or wishing to provide comment (Project Record Documents 12, 13 and 23). A summary of the public comments received and BLM responses is in Appendix 1. The scoping comment letters are available for review at the Tillamook Resource Area Office, 4610 Third Street, Tillamook, Oregon.

1.5 Decisions to be Made

The following decisions will be made through this analysis:

- To determine if a Supplemental Environmental Impact Statement (SEIS) should be prepared based on whether the proposed action would result in significant impacts to the human environment not already analyzed in the EIS prepared for the Salem District ROD/RMP and its amendments.

- If there are any such additional impacts that are significant, we will determine whether the project proposals could be modified to mitigate the impacts so an SEIS would not be necessary. If we determine there is no need to prepare an SEIS, we will document this determination in a Finding of No Significant Impacts (FONSI).

- To determine at what level, where, and how to harvest trees on BLM-administered lands allocated to the programmed timber harvest base within the project area.

2. ALTERNATIVES

2.1 Alternative Development

Pursuant to Section 102 (2) (E) of the National Environmental Policy Act (NEPA) of 1969, as amended, Federal agencies shall "…study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning

alternative uses of available resources." There were no unresolved conflicts concerning alternative uses of available resources, therefore, this EA will analyze the effects of the current "Proposed Action" and "No Action" alternatives.

The final version of the South Scappoose Creek Project as proposed in this EA differs slightly from that described in the scoping letter dated February 17, 2011. The difference between the proposal within the EA and the scoping letter is tied to regeneration harvests. The scoping letter stated that regeneration harvests would occur in hardwood stands and not exceed ten acres in size. In the EA, proposed regeneration units are primarily in hardwood stands but also include some conifer stands and are as large as 20 acres. These changes are the result of new information being obtained after the scoping letter was sent (stand exam data) and to also meet a wider range of objectives in the ROD/RMP and the Scappoose Creek Watershed Analysis (USDI-BLM 1996a). As a result of an evaluation of new information on timber stand conditions in the project areas, additional management opportunities were identified (in addition to the previously identified proposed treatment) which meet the purpose and need of the project.

Per the *Scappoose Creek Watershed Analysis* (USDI-BLM 1996a), general priorities for selecting stands for regeneration harvest included the following:

1. Douglas-fir stands where more than 25% of the area is infected with laminated root rot.

2. Hardwood or mixed hardwood-conifer stands growing on conifer sites where soil compaction is no longer a threat to conifer growth.

3. Overstocked conifer stands no longer suitable for commercial thinning.

4. Conifer stands that have reached or are beyond their peak volume production (culmination of mean annual increment).

2.2 Planning and Implementation Process

The BLM would require the timber sale operators to accomplish the following actions as required in the timber sale contract(s) written by the BLM. The BLM would develop the timber sale contracts to implement the actions described below and the project design features (PDF) that follow (*EA section 2.4.2*). These actions and the PDF, taken together, form the Best Management Practices (BMPs) that the IDT (Interdisciplinary Team) developed. They are based on the principles of the most current BMPs as described in Volume III, Appendix I of the 2008 RMP/FEIS and the Salem District's Road BMPs for Western Oregon, which the IDT adapted to the site-specific conditions of the proposed South Scappoose Creek Project.

2.3 Alternative 1: No Action

The No Action alternative describes the baseline against which the effects of the proposed action can be compared, i.e. the existing conditions in the project area and the continuing trends in those conditions if the BLM does not implement the proposed project. Consideration of this alternative also answers the question: "What would it mean for the objectives to not be achieved?" The No Action alternative means that no timber management actions or connected actions would occur at this time. If this alternative were to be selected, the following items would not be done in the project area at this time: Commercial thinning or regeneration harvest; Coarse Woody Debris creation; road construction, renovation, maintenance or decommissioning; stream crossing projects such as culvert upgrades or removal; and gate installation.

Only normal administrative activities and other uses (e.g. road use, programmed road maintenance, harvest of special forest products) would continue on BLM lands within the project area.

On private and State lands adjacent to the project area, forest management and related activities would continue to occur. Selection of the No Action alternative would not constitute a decision to change the land use allocations of these lands. Selection of the No Action alternative would not set a precedent for consideration of future action proposals.

2.4 Alternative 2: The Proposed Action

2.4.1 Proposed Treatments

The proposed action is to commercially thin approximately 1540 acres and to regeneration harvest approximately 100 acres (see Figures 3 – 10 located in *EA section 8.1*).

The proposed action includes the application of a thinning prescription to approximately 1540 acres of 46- to 70-year-old, relatively dense, single-storied, even-aged, Douglas-fir-dominated stands (Table 2). Treatments include thinning the Douglas-fir stand component, generally retaining conifers other than Douglas-fir. Treatments would be designed to retain legacy trees, trees with structural deformities, existing down wood and snags, and a component of trees in the suppressed and intermediate crown classes.

Specifically, the proposed action in the CON and GFMA LUAs is to proportionally thin the units to various densities. Proportional thinning involves thinning across all tree size classes and would be a different management approach from the more common "thinning from below" strategy. This would result in a degree of variation in trees per acre and canopy layers. Proportionally thinning these stands would be designed to capture some of the suppressed trees while still leaving some for future competition mortality. The intermediate, co-dominant and dominant trees would also be thinned. This would result in these stands having approximately the same diameter distribution as they do now and at the same time accelerate growth throughout

the stand. The co-dominant and intermediate trees would be expected to be released and continue putting on volume for a future regeneration harvest. Some of the suppressed trees would be expected to release and start growing vigorously while others would be expected to fall out of the stand over time and therefore provide continued snag and down wood recruitment. Relatively open areas and landings in the thinning units would be evaluated for planting with shade-tolerant conifers.

The proposed action in the RR LUA includes thinning from below to varying basal area retentions. Thinning from below would result in the largest trees within the stand being retained. The retained trees would be expected to develop under accelerated growth rates and become larger trees faster. Over time, some of the large trees would die or be blown down and thus contribute to snags and down wood habitat, and/or stream structure. In the thinning from below prescription, the hardwoods would be thinned through but would be favored for retention. Retaining the hardwoods would promote a multi-layered canopy and habitat diversity. The hardwoods would be expected to die sooner than the conifers resulting in various sized openings in the canopy that may, over time, help promote the development of an understory.

Various-sized, naturally occurring open areas, the result of infection with *Phellinus weirii*, would be managed by thinning the highly susceptible species (Douglas-fir and grand fir) at a very wide spacing, retention of existing hardwoods and less-susceptible conifers, and underplanting with disease-resistant western redcedar and hardwoods.

Existing down wood and snags would be retained as coarse wood debris. Approximately 48% (1,526 acres) of the area originally considered in the South Scappoose Creek planning area for thinning would be left unthinned. These unthinned areas consist of portions of stands dropped from harvest consideration for a variety of reasons and areas that are within the streamside no-harvest buffers.

The proposal also includes a total of 100 acres of regeneration harvest. Areas proposed for regeneration harvest are 52- to 73-year-old stands comprised of hardwood-dominated stands, mixed hardwood/conifer stands, and dense single-story Douglas-fir stands. All of the stands selected for regeneration harvest have reached culmination of mean annual increment (CMAI). The definition of CMAI is: *the age in the growth cycle of a tree or stand at which the mean annual increment for volume is at a maximum* (Helms 1998). Many of the stands proposed for regeneration harvest are the result of old clearcut harvest operations that were never replanted. Although the BLM refers to these treatments as regeneration harvests, they are not the traditional regeneration harvests that are commonly implemented by most private landowners. The proposed regeneration harvests would be retaining 14 to 30 trees per acre (in GFMA and CON, respectively) as opposed to traditional regeneration harvests, commonly used by private landowners that generally retain up to 2 trees per acre. The leave trees would be a mix of the species present in the stand but would favor some of the largest trees in the stand, western redcedar and trees with characteristics desirable to wildlife with the expectation that a portion of the retained trees would be windthrown to provide down wood habitat. Existing down wood and snags would be retained as coarse woody debris. The treatment areas would be replanted with a

mixture of native species. Three of the stands proposed for regeneration harvest would also have the adjacent riparian reserves thinned (Table 2).

Table 2 shows there being nine treatment units proposed for regeneration harvest. However, individual areas proposed for regeneration harvest have been lumped or split to form these nine similarly stocked "units" for the purposes of display, modeling, development of the silvicultural prescription and unit numbering. As an example, unit 21 is displayed on Table 2 as being 20 acres in size – on the ground these acres are actually distributed across four separate treatment areas throughout section 19 that share similar stand characteristics. Based on the proposal to treat these similar stands with the same prescription, they have been lumped to form a single unit on Table 2. On the ground, the 100 acres proposed for regeneration harvest are configured into 12 non-contiguous treatment areas averaging approximately 8.3 acres in size; sizes range from approximately 1 to 20 acres with five of these 12 treatment areas being approximately three acres or less in size.

Connected Actions

Road Work

A summary of the anticipated road work is in Tables 3, 4 and 5. Overall, there would be a net reduction in road mileage in the project area of approximately 3.05 miles as a result of implementing the proposed action. Proposed road locations are mapped on Figures 4 to 10 located in *EA section 8.1*.

In order to give potential timber sale purchasers more flexibility in the work windows available for logging and hauling of timber from this project, all the skyline yarding treatment areas accessed by road segments P-1, P-2, P-3, P-31, P-32, P-33, P-37, and P-38 (in sections 1, 13, and 19) would be available for year-around skyline yarding and log haul (see figures 8, 10 and 6). To accommodate that, any new road construction or existing road reconstruction that accesses skyline yarding units from these road segments are being analyzed as though they would be rock-surfaced and stabilized afterwards (see figure 11). BLM would require the timber sale purchasers to rock any of these roads at their own expense, so it is possible that all of these roads would be natural-surface with their use restricted to the dry season, however the analysis of effects for the proposed action treats them as though they would be rocked. Public vehicle access to road 3N-2-29.3 would be limited to control illegal garbage dumping through the installation of new gate. Approximately the first 150 feet of P-31 would be relocated to provide better grade and truck access to an existing road. A temporary gate may be needed at the beginning of P-31 to eliminate public access to the BPA (Bonneville Power Administration) road. After the sale activities have been completed on P-31, the road would be relocated to its current position and utilize the existing gate to control public access. Barricades may need to be installed (as directed by BPA) to protect transmission lines from being damaged. All rock is to be either purchased from a commercial source or crushed from RMK Timberland Group rock pit in Section 2, T3N, R3W. The timber sale purchasers would pay rock royalties to RMK Timberland Group and crush the desired quantities if this option is chosen. Additionally, the

stockpile of rock currently located in Section 13 may be used for spot rock or culvert bedding material.

Table 2: Land Use Allocations, Treatment Summaries and Logging Systems for Proposed Harvest Units.

Unit Number	*Matrix Treatment Acres*		*Riparian Reserve Treatment Acres*	*Acres of Thinning*	*Acres of Regen. Harvest*	*Logging Systems (acres)*		*Total Unit Acres*
	GFMA Acres	*Connectivity Acres*				*Ground-Based*	*Skyline*	
1	0	149	71	220	0	53	167	220
2	0	33	6	39	0	38	1	39
3	87	0	92	179	0	130	49	179
4	9	0	17	26	0	24	2	26
5	12	0	7	19	0	0	19	19
6	32	0	5	37	0	32	5	37
8	318	0	57	375	0	243	132	375
9	0	263	85	348	0	177	171	348
10	0	48	12	60	0	35	25	60
11	5	0	15	20	0	10	10	20
12	39	0	30	69	0	8	61	69
13	49	0	27	76	0	25	51	76
14	17	0	23	40	0	40	0	40
16	0	13	0	0	13	7	6	13
17	3	0	16	16	3	3	16	19
18	1	0	8	8	1	9	0	9
20	7	0	0	0	7	7	0	7
21	20	0	0	0	20	20	0	20
22	13	0	0	0	13	13	0	13
23	20	0	8	8	20	28	0	28
24	12	0	0	0	12	12	0	12
25	11	0	0	0	11	11	0	11
Total	**655**	**506**	**479**	**1540**	**100**	**925**	**715**	**1640**

Table 3: Summary of Road Work for the Proposed Action

Type of Road Work	*Approximate Length (miles)*	*Net Change in Road Length (miles)*
New Natural-surface Road Construction and Decommission	4.16	0
New Rock-surface Road Construction and Stabilization	1.37	+1.37
Renovation and Decommission of Natural-Surface Road	4.42	-4.42
Renovation and Stabilization of Rock-Surface Road	0.31	0
Renovation of Existing Rock-surface Road	2.45	0
Maintenance of Existing Rock-surface Road	22.30	0
Total	**35.01**	**-3.05**

Road Construction

Approximately 5.53 miles of new road construction would occur. Of this, approximately 1.37 miles would be rock-surface and 4.16 miles would be natural-surface (no rock would be added). Approximately 4.79 miles of this new road construction would be on lands within the Matrix LUA and 0.87 miles would be within the Riparian Reserve LUA. All new road construction within the Riparian Reserves would be temporary. New natural-surface roads and landings would be decommissioned and new rock-surface roads would be stabilized following timber harvest and site preparation activities. Amount of treatment area accessed by each new segment of road construction is shown in Table 4, and the proposed culvert work is shown in Table 5.

Table 4: New Road Construction: Length of New Road, Length of New Road within 1st and 2nd Site Potential Tree, and Proposed Treatment Acres Accessed by Each Newly Constructed Road Segment

Road Number	*Surface Type*	*Length of New Road (feet)*	*Length of New Road within Riparian Reserve Second SPT** (feet)*	*Length of New Road within Riparian Reserve First SPT** (feet)*	*Approximate Area Accessed (acres)**
P1	Rock	721	0	0	20
P2	Rock	2,198	338	0	106
P3	Rock	1,428	0	0	58
P5	Natural	149	0	160	5
P8	Natural	2,118	423	1,229	48
P9	Natural	656	35	167	39
P10	Natural	1,093	0	54	20
P11	Natural	1,480	0	226	33
P12	Natural	1,421	0	569	60
P13	Natural	2,415	0	400	44
P15	Natural	157	0	164	4
P16	Natural	383	0	133	27
P18	Natural	1,446	0	0	47
P19	Natural	641	0	0	15
P20	Natural	1,695	0	0	28
P21	Natural	175	0	0	12
P22	Natural	1,390	0	0	81
P23	Natural	1,213	0	0	27
P24	Natural	822	0	0	9
P25	Natural	365	0	0	20
P27	Natural	407	0	298	11
P28	Natural	413	0	0	33
P29	Natural	497	0	0	31
P30	Rock	762	0	0	39
P31	Rock	872	0	0	19
P32	Rock	602	0	0	18
P33	Rock	611	0	0	23

Road Number	*Surface Type*	*Length of New Road (feet)*	*Length of New Road within Riparian Reserve Second SPT** (feet)*	*Length of New Road within Riparian Reserve First SPT** (feet)*	*Approximate Area Accessed (acres)**
P38	Rock	810	0	18	16
P41	Natural	1,760	285	0	34
P42	Natural	498	81	0	37
Total		**29,198**	**1,162**	**3,418**	**964**

* Road lengths and treatment acres are derived from GIS data and are approximate.

****** SPT = Site Potential Tree (The average maximum height of the tallest dominant trees (200 years or older) for a given site class.

Road Renovation

Approximately 7.18 miles of existing roads would be renovated as necessary. This would include brushing, clearing and grubbing, blading, drainage structure improvement or replacement, and rocking where needed. Of the roads to be renovated, 4.42 miles are natural-surface and 2.76 miles are rocked. Of the roads to be renovated, all the natural-surface roads would be decommissioned following timber harvest and site preparation activities. Approximately 0.31 miles of renovated rocked road would be stabilized as well.

Road Maintenance

Approximately 22.30 miles of roads would have maintenance performed prior to log hauling or rock hauling from private source in T3N, R3W section 2. All the roads to be maintained are gravel-surfaced. Maintenance would consist of cutting vegetation from the roadbed, ditches and adjacent to the road; blading and shaping the roadbed and ditches; repairing small slides and slumps; maintaining, repairing, adding cross drainage; replacing undersized stream-crossing culverts; replacing damaged cross drain culverts; and adding rock to replace depleted rock surfaces.

Table 5: Culvert Work for the Proposed Action

Section	*Road Number*	*Proposed Activity*
7	P-8	Install New Temporary Culvert
11	3N-3-13.0	Install 4 New Cross Drains; Replace Existing Log Fill with Culvert
11	3N-3-11.0	Install 4 New Cross Drains
10, 11, 14	3N-3-14.0	Install 1 New Temporary Cross Drain
11	3N-3-13.1	Install New 1 New Cross Drain
13,14	3N-3-13.4	Install 2 New Temporary and 1 New Permanent Cross Drain, and Replace 1 Temporary Cross Drain.
19	3N-3-13.5	Replace 1 Permanent Culvert
20	P-37	Install 3 New Cross Drains and Replace 1 Culvert

Road Decommissioning/Stabilization

All new, natural-surface road construction, and approximately 4.42 miles of renovated existing natural-surface roads would be decommissioned. Decommissioning would consist of removing stream-crossing culverts, decompacting, water barring, seeding or planting with native species on natural-surfaced roads, and restricting OHV use.

All new road construction being analyzed as rocked roads would be stabilized. Stabilization of rocked roads would consist of removing stream-crossing culverts, water barring, and restricting OHV use. Restricting OHV use may include the strategic placement of boulders, logs, root wads, or other types of earthen barriers. If roads that are analyzed as being rocked are used as natural-surfaced instead, these roads would be decommissioned instead of stabilized following timber harvest and site preparation activities.

Fuels Treatments

Fuel treatment strategies would be implemented on portions of the project areas to reduce both the intensity and severity of potential wildfires in the long term (after fuels reduction has occurred) and for site preparation in regeneration harvest units, density management harvest units, or in gaps created within density management harvest units. Post-harvest fuels hazard surveys would be conducted and site-specific treatments would be recommended. A variety of fuels prescriptions may be implemented including slashing brush, lopping slash and brush, lopping and scattering of slash, pullback of slash from property lines and roadsides, hand or

machine piling and burning, swamper burning, landing piling and burning, or selling the material as firewood. These treatments may occur along roads or property lines, on landings, within regeneration and commercial thinning harvest units, or other areas within the harvest units such as heavily thinned "gap" areas where the fuel load is determined to be hazardous, or where underplanting of trees is recommended. Table 6 shows the approximate number of acres, or the approximate number of piles that would be treated.

Table 6: Alternative 2 Fuel Treatments

Unit Number & Harvest Type	Unit Acres	Site Preparation Slashing / Lopping Acres	Hand Pile Total Acres	Machine Pile Total	Landing Pile Total	Slash Pullback Acres Roads	Slash Pullback Acres Property Lines
1-Thin	220	20	20	5	4	0	1
2-Thin	39	3	3	2	1	0	.25
3-Thin	179	1	1	2	5	.5	.5
4-Thin	26	0	0	1	1	0	.25
5-Thin	19	1	1	0	2	0	.25
6-Thin	37	0	0	3	1	0	.5
8-Thin	375	0	0	10	5	0	2
9-Thin	348	20	20	10	5	0	2
10-Thin	60	0	0	4	1	0	.75
11-Thin	20	1	1	2	1	.5	0
12-Thin	69	3	3	0	5	.25	.5
13-Thin	76	20	20	1	1	.25	.25
14-Thin	38	1	1	3	1	1	.25
16-Regen	13	13	13	0	2	0	.25
17-Thin	16	0	0	0	2	0	0
17-Regen	3	3	3	0	1	0	0
18-Thin	8	0	0	0	0	0	.25
18-Regen	1	1	1	0	1	0	0
20-Regen	7	7	7	1	1	0	0
21-Regen	20	20	20	1	2	0	0
22-Regen	13	13	13	1	2	0	0
23-Thin	8	0	0	1	0	0	0
23-Regen	20	20	20	1	1	0	0
24-Regen	12	12	12	1	2	.25	0
25-Regen	11	11	11	1	1	.25	0
TOTAL	**1640**	**170**	**170**	**50**	**48**	**3**	**9**

2.4.2 Project Design Features

The following is a summary of the Project Design Features (PDFs) that reduces the risks of adverse effects to the affected elements of the environment. The proposed action would be implemented consistent with the Best Management Practices (BMPs) contained within Volume III, Appendix I of the 2008 RMP/FEIS (with the exclusion of roads) and the Salem District's Road BMPs for Western Oregon.

The Project Design Features are organized below by the benefiting resource or type of operation.

Desirable Stand Features, Diversity, and Protection

- In CON and GFMA LUA, thinning would be proportional, favoring the healthiest trees within all size classes to retain.
- In the Riparian Reserve LUA, thinning would be from below, favoring the largest healthiest trees to retain. Leave trees would primarily consist of dominant and co-dominant trees.
- In thinning units in the CON and GFMA LUA, in addition to some dominant trees, leave trees would include damaged trees and suppressed and intermediate crown class trees. The prescription would specify leaving damaged, suppressed or intermediate crown class trees - enough to comprise approximately 35% - 45% of the leave trees per acre where possible.
- In regeneration units leave trees would generally be the largest healthiest trees in the stand while allowing for trees with defect and other desirable wildlife structures to be left. Leave trees would be left individually and in groups based on the location of desirable leave trees.
- Douglas-fir, western hemlock, and red alder would be the primary species cut; all other species would generally be reserved to preserve species diversity, except in regeneration units, road rights-of-way, landings or yarding corridors.
- All legacy Douglas-fir (old-growth) would be retained, none would be cut for corridors or landings. Legacy trees would be protected from damage during harvest by leaving a ring of the closest trees or more if necessary, to ensure trees that pose a risk of damaging the legacy tree's canopy are left uncut.
- Approximately 81 acres of heavy thinning treatment would be implemented through designated *Phellinus weirii* areas. The size of these patches would be approximately 1 to 7 acres. Treatment of the designated *Phellinus weirii* areas would be as follows:
  - An average of 20 trees per acre would be retained favoring hardwoods and western redcedar in the designated *Phellinus weirii* areas. All Douglas-fir and grand fir less than 30 inches dbh, inside the designated area and within 30 feet of the flagged boundary would be harvested to reduce the potential for disease to spread through root contact. These designated *Phellinus weirii* areas would not be placed within 240 feet of streams or marbled murrelet potential habitat.
  - The treatment areas would be planted with disease-resistant tree species, primarily western redcedar and red alder.
  - When small *Phellinus weirii* areas are encountered outside of designated areas, disease tolerant trees (western redcedar and hardwoods) would be left, even if they are smaller in

diameter than the Douglas-fir. If there are only Douglas-fir or grand fir trees, Douglas-fir and grand fir would be removed within 30 feet of symptomatic live trees, or infected stumps, stubs, or dead-standing trees or the edge of the brushy openings associated with disease centers.

- Site preparation for planting the heavily thinned areas and regeneration areas would include brush cutting and treatment of logging slash to the extent needed to plant the areas. Piling and burning piles may be necessary where slash loads limit planting spots. Slash would be piled away from leave trees.
- Survival and growth of planted seedlings would be promoted by protecting them, as appropriate, with tubes and manual (usually chainsaw) brush release.
- Following harvest, the units would be examined to determine if there are other planting opportunities in brushy areas with relatively few trees in the overstory, generally over 2 acres in size, where site preparation for planting could be accomplished without cutting any additional trees. Site preparation and subsequent planting and maintenance would be the same as described for the heavily thinned areas.
- Log lengths would be limited to 40 feet plus trim in thinning units.
- Stand densities of harvest areas within one site-potential tree height (240 ft.) of streams would be maintained at a Curtis Relative Density (RD) of 30 or higher
- In commercial thinning treatment units, felling and yarding operations may be suspended if excessive damage is occurring to the residual trees.

Coarse Woody Debris (Snags and Down Wood)

- In all LUAs, retain existing green trees with defects that are desirable to wildlife such as cavities or dead, forked or broken tops, etc..
- During harvest, all coarse woody debris would be retained and protected to the extent practicable. Where necessary for safety or operational reasons, snags may be felled, but must be left on site. Snags that are greater than 18" dbh and 20' in height, or snags being actively used by wildlife would be surrounded with two or more leave trees to help protect them from logging damage.
- In thinning units, down wood should reflect the timing of stand development. This would be achieved in the GFMA LUA by leaving an additional 1 green tree per acre for down wood and 1 green tree per acre for future snag recruitment and in the CON LUA by leaving 2 green trees per acre for down wood and 2 green trees per acre for future snag recruitment.
- In regeneration harvest units, leave 240 linear feet of logs per acre, averaged over the area. The 240 linear feet would be comprised of existing down wood in decay classes I and II and the remaining deficit would be made up by reserving additional green leave trees. In the GFMA, 6 to 8 trees per acre need to be left plus the amount needed to support species of cavity nesting birds at 40% of potential population levels and meet the 240 linear feet of down wood. This would result in leave trees ranging from 14 to 20 per acre. In the CON, 12 to 18 trees per acre need to be left plus the amount needed to support species of cavity nesting birds at 40% of potential population levels and meet the 240 linear feet of down wood. This would result in approximately 30 leave trees per acre.

- The harvest units would be monitored for 2 to 4 years following harvest to evaluate the amount of blow down and mortality post-harvest to determine if additional treatments are needed to meet habitat requirements.

Seasonal Restrictions (See Table 7 for a summary of seasonal restrictions)

- All road construction, renovation, and decommissioning, landing construction, and timber hauling on natural surface roads and landings would be restricted to the dry season (generally June 1 through October 15). In addition, road maintenance activities that could generate high amounts of sediment including machine cleaning of ditches and blading and shaping roads would generally be restricted to the dry season (BMPs R61, R71, and R95).
- All non-emergency work required in live stream channels (culvert replacement or removal) would be limited to the ODFW in-stream work window (July 15 to August 31 for Scappoose Creek watershed and July 1 to September 30 for Dairy Creek watershed) (BMPs R46 and R87).
- The skyline yarding areas in sections 1, 13, 19, and 29 that are accessed by road segments P-1, P-2, P-3, P-17, P-31, P-32, P-33, P-35, P-37, P-38, and 3N-2-29.3 would be available for year-around yarding. Roads accessing these areas would be rocked, and log haul would be permitted year-around, with the restrictions identified elsewhere in this section (BMPs R71, R94, and R99).
- All ground-based yarding and all other skyline yarding areas as described above would be restricted to periods of low soil moisture, generally June 1 through October 15. Log haul from these areas would also be restricted to the June 1 through October 15 time period. This could be adjusted if unseasonable conditions occur (e.g., an extended dry or wet season) (BMP TH12).
- All hauling and road maintenance work done during the "wet season" (generally outside of the period between June 1 and October 15) would be subject to the following stipulations to reduce the potential delivery of sediment to streams:
    - Hauling, decommissioning, and maintenance activities would be suspended when conditions exist that could generate excessive turbidity or fine sediment inputs to streams, such as times of intense or prolonged rainfall where water in ditches is flowing, or streamflow, as measured above and below the effects of the road, becomes discolored. In addition, suspension would occur if a road surface shows signs of serious deterioration such as excessive rutting or pumping of fines from the sub-grade. The BLM would maintain authority to suspend yarding activities that would affect resources such as water quality or ESA-listed fish or their habitat (BMPs R65, R81, and R96).
    - Prior to the wet season, all roads designated for winter use hauling would be surfaced with an approved lift of durable rock (BMPs R71, R87, R94, and R99).

Roads and Landings

- New roads and landings would generally be located outside of wetlands and Riparian Reserves, including across stream crossings. Landings generally would not be located within 240 feet of streams (BMPs R2, R3, and R42).
- Roads, landings, and excavated disposal material would be located on stable slopes that minimize sediment delivery to streams (BMPs R1and R41).
- Where necessary, temporary sediment containment structures such as straw bales, silt fences and bark bags or additional road surface rock would be installed at stream crossings and in ditch lines. The structures would receive frequent maintenance and be removed when no longer needed. (BMPs R32, R80, R81, R45, R91, and R100).
- Natural-surface roads would be storm-proofed at the end of each operating season by water barring and blocking the roads to vehicle traffic (BMPs R42, R80, and R91).
- All of the natural-surfaced roads and landings used during the harvesting activities would be decommissioned. Decommissioning would consist of removing culverts, de-compacting, water barring, seeding or planting with native species, and restricting OHV use. Restricting OHV use may include the strategic placement of boulders, logs, root wads, or other types of earthen barriers (BMPs R50, R80, and R83).
- Large stumps created by road building or yarding activities would be retained and stockpiled to be used later to block skid trails and roads in areas that could easily be accessed by OHVs (BMP R42 and R80).

All Timber Harvest Operations

- At least one-end suspension of logs would be required in all skyline and ground-based logging operations (BMPs TH5 and TH11).
- To protect water quality, trees would be felled away from all no-harvest buffers within the harvest area. If a cut tree falls into a no-harvest buffer, the portion of the tree within the buffer would remain in place.

Skyline Yarding Operations

- Logs would be yarded using full suspension on areas identified as FGR1 or on slopes 70 percent or greater (TH5).
- Where skyline yarding corridors are needed to cross stream channels or wetlands, full log suspension would be required within the no-harvest buffers (BMP TH3).
- Riparian no-harvest buffers may have yarding corridors cut through them if necessary, however any trees cut within the no-harvest buffers would be left on site to minimize ground disturbance (BMP TH7).
- Skyline yarding would be designed to limit canopy loss in Riparian Reserves and to meet shade targets. Techniques include limiting the number and widths of corridors (widths generally not to exceed 12 feet and corridors generally located at least 150 feet apart at one

end) and locating corridors that are as perpendicular to streams as possible (BMPs TH2 and TH4).

Ground-based Logging Operations

- Designated skid trails would be used to limit the extent of skid trails and landings to less than 10% of each harvest unit. Skid trail and landing cutting limits would be kept to the narrowest width and size necessary to reasonably harvest the unit (for analysis purposes, assume 12-foot-wide skid trails spaced on average 150 feet apart and a 50-foot diameter impact area for landings). (BMP TH9)
- Existing skid trails and landings would be used to the extent possible (BMPs TH9 and T16).
- Skid trails would generally be located outside of Riparian Reserves.
- Limit the amount of ground disturbance to the minimum area needed for safe and efficient operations.
- In all ground-based regeneration harvest units, all primary skid trails and landings would be decompacted.
- Ground-based yarding would be restricted to periods of low soil moisture. Yarding logs or construction of skid trails through depressions with very moist, poorly drained soils would be avoided where practical. These wet areas may or may not be identified on the ground prior to logging operations (BMPs TH7, TH12 and TH16).
- Ground-based equipment would be restricted to tracked equipment only and generally be limited to slopes less than 35% (BMPs TH12 and TH14).
- In the ground-based yarding areas within Riparian Reserves, equipment would be restricted to existing skid trails or roads, unless a mechanized cut-to-length system with the restrictions described above is used (BMPs TH6, TH7, TH16, TH18).
- The purchaser may elect to use mechanized, cut-to-length systems provided that the following measures are met:
- Harvesters, feller-bunchers, and or log processors would be boom-mounted with a minimum operating radius of 20 feet. The equipment would have a ground pressure rating of 8 psi (pounds per square inch) or less. Log harvesting equipment trails would be spaced 40 to 50 feet apart and be no more than 15 feet in width. No more than two passes over the same ground would be permitted.
- Forwarding or skidding equipment would be restricted to designated trails approved by BLM prior to felling and yarding operations.
- Harvesters would be required to place slash in front of the machine tracks in order to reduce compaction. Forwarders or skidders would operate on a nearly continuous layer of slash that is at least 6 inches thick.
- All equipment would be excluded from all riparian no-harvest buffers (TH7).

Surface Source Water for Drinking Water

- Project operations would be conducted in such a manner as to prevent the discharge of contaminants including hazardous materials such as petroleum products, into water or air or onto ground (BMP SP5).
- Self-contained sanitary facilities would be located and made easily accessible to all employees working in the surface source water watersheds for drinking water (BMP SW1).

Special Status Wildlife Species

- No potentially suitable murrelet or northern spotted owl nest trees would be felled for any purpose.
- There are a few individual trees with potentially suitable murrelet nesting platforms within near a few of the proposed treatment units (SE of section 29 and section 9). All habitat modifications that occur within a distance equal to one site-potential tree height of these trees would be designed to protect and improve future murrelet habitat conditions. Design features around these potentially suitable murrelet nest trees would include a no-cut buffer of at least 60 feet around each tree (or group of trees) to assure protection of the roots and crown, and no openings would be created within one tree length surrounding a potential murrelet nest tree.
- Any newly discovered marbled murrelet sites (as per the Pacific Seabird Group Marbled Murrelet Technical Committee protocol) would be protected by a 0.5-mile radius buffer on all contiguous existing and recruitment federal habitat.
- Prior to the Decision, S&M mollusk surveys would be completed in all treatment units where they are required – approximately 100 acres of regeneration harvest. As required, any newly discovered S&M mollusk site(s) within a treatment area where surveys are required would be appropriately protected and/or managed.

Special Status Plant Species

- Prior to the Decision, S&M plant surveys would be completed in all treatment units where they are required – approximately 100 acres of regeneration harvest. As required, any newly discovered S&M plant site(s) within a treatment area where surveys are required would be appropriately protected and/or managed.
- Prior to the Decision, Special Status plant surveys would be completed in all treatment units and a recommendation to appropriately protected and/or manage all known sites will be considered.

Invasive / Non-Native Plants

- Prior to entering the sale area each work season, or before returning to the watershed after leaving it, any heavy machinery (with the exception of log trucks and pickup trucks used for

daily personnel travel) would have all dirt and adhering vegetation removed by power-washing.
- Post-treatment ground disturbance (i.e. yarding corridors, decommissioned roads, landing margins, etc.), would be evaluated to determine the need to seed or plant native vegetation to mitigate invasive/non-native plant introduction.
- Monitoring to identify increased or new populations of invasive non-native plant species would occur for three years after the completion of each project area.

Cultural Resources

- Survey techniques for cultural resources are based on those described in the *Protocol for Managing Cultural Resources of Lands Administered by the Bureau of Land Management in Oregon* (USDI - BLM, 1998). A post-project survey would be conducted according to standards based on slope defined in the Protocol appendix. If cultural material is discovered during project implementation, work would be suspended until an archaeologist can assess the significance of the discovery.

Recreation and Public Access

- The Timber Management project areas would be posted as "Closed" to OHV use during harvest and log hauling activities.
- A gate would be installed on existing spur road 3N-2-29.3 in section 29 to aid in the control of illegal dumping.

Air Quality, Fire Risk, and Fuels Management

- A Prescribed Fire Burn Plan would be initiated and signed by the Authorized Officer prior to any prescribed burning activity.
- Burning would be conducted in accordance with the ROD/ RMP, *Oregon State Implementation Plan* and *Oregon Smoke Management Plan* as administered by the Oregon Department of Forestry, and would comply with the provisions of the Clean Air Act. It would be conducted under good atmospheric mixing conditions to lessen the impact on air quality in Smoke Sensitive Receptor Areas.
- Swamper burning, or hand, machine, and landing pile construction and burning may be used individually or in combination in areas where fuel loading is heavy, the fire risk is determined to be high, or site preparation is required to help facilitate tree planting in *Phellinus weirii* areas.
- Large woody debris would not be piled.
- Hand piles and machine piles would be located at least ten (10) feet from green trees to minimize damage, or on top of Bigleaf maple stumps to help prevent re-sprouting.
- Landing piles would be located as far as possible from reserved trees to minimize damage.
- Hand, machine, and landing piles would be covered with polyethylene plastic to help facilitate the consumption of fuels during the high moisture fall/winter burning periods.

- Lopping and scattering of fuels would be incorporated in areas where fuel loading is relatively heavy but not heavy enough to warrant burning.
- Pullback of fuels would be incorporated in areas where fuel loading is relatively light (especially along roads and property lines) and not heavy enough to warrant burning.
- Utilization of small diameter slash for firewood would be incorporated where appropriate
- The timber management project areas would be posted as "Closed" to OHV use during harvest and log hauling activities.

Design Features Specific to RR Land Use Allocation

Water, Fisheries and Soil Resources

- For areas within one mile of ESA-listed fish or designated Critical Habitat, 100-foot or greater no-harvest buffers on either side of fish-bearing streams and perennial non-fish bearing streams would be maintained.
- For areas more than one mile from ESA-listed fish, 100-foot or greater no-harvest buffers on both sides of fish-bearing streams and 60-foot no-harvest buffers on perennial non-fish bearing streams would be maintained.
- A 60-foot or greater no-harvest buffer on both sides of intermittent non-fish bearing streams would be maintained.
- A 100-foot or greater no-harvest buffer on the outer edge of ponds, and wetlands larger than one acre would be maintained.
- A one tree wide or greater no-harvest buffer around the outer edge of wetlands less than one acre would be maintained. This requirement may be achieved by leaving reserve trees along the edge of the wetlands; these areas would not be excluded from the treatment units.
- Maintain hardwood and cedar components within thinned areas.

2.5 Alternatives Considered But Not Analyzed In Detail

None

Table 7: Seasonal Restrictions Incorporated into the South Scappoose Creek Project

Activity	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Felling and Bucking	No Restrictions																							
Ground-Based Yarding																								
Skyline Yarding – All areas not covered by Skyline Yarding Timeline below																								
Skyline Yarding – Areas accessed from roads P-1,2,3,17,31,32, 33,35,37,38, and 3N-2-29.3	No Restrictions																							
Road construction, renovation, stabilizing, and decommissioning																								
Log Haul – rock-surface roads P-1,2,3,17,31,32,33, 35,37,38 and 3N-2-29.3	No Restrictions																							
Log Haul – all natural-surface roads and all other rocked road segments																								

*All dates are dependent on actual weather conditions
**Restricted times are shaded

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

This section of the EA describes the current condition and trend of the affected resources and the environmental effects of the alternatives on those resources. The interdisciplinary team of resource specialists (IDT) reviewed the elements of the human environment, required by law, regulation, Executive Order and policy, to determine if they would be affected by the proposed action (BLM Handbook H-1790-1: p. 137), [40 CFR 1508.27(b)(3)], [40 CFR 1508.27(b)(8)] (*EA section 3.13*), as well as the issues raised in scoping (EA *section 1.4 and Appendix 1*).

The resources potentially affected by the proposed thinning activities are described in the following sections: Vegetation and Forest Stand Characteristics; Water Resources; Threatened or Endangered Fish Species or Habitat, Magnuson Stevens Act –Essential Fish Habitat and Species with Bureau Status, Magnuson Stevens Act-Essential Fish Habitat, and Species with Bureau Status; Fish Species with Bureau Status, Essential Fish Habitat and Other Fish; Soils; Threatened or Endangered Wildlife Species, Habitat and/or Critical Habitat; Special Status (BLM 6840 Policy), SEIS Special Attention (ROD/RMP), and Migratory Bird Treaty Act Wildlife Species and Habitat; Recreation and Visual Resources Management; Invasive, Nonnative Species (Executive Order 13112); Special Status and SEIS Special Attention Plant Species and Habitat; Air Quality, Fire Risk and Fuels Management; and Carbon Storage, Carbon Emissions and Climate Change.

3.1 Vegetation and Forest Stand Characteristics

3.1.1 Affected Environment

The South Scappoose Creek project is located in an area where Federal lands are distributed in a scattered, non-contiguous or "checkerboard" fashion intermingled with non-Federal forestlands primarily owned by industrial timber companies and managed for timber production on relatively short rotations. Management practices on these non-federal timberlands tend to dominate the character of the forested landscape. The majority of the Federal lands in the South Scappoose planning area, comprised of the South Scappoose Creek Activity Planning Unit,[2] are forested with 50- to 70-year old stands (USDI BLM 2010). The uplands are primarily forested by Douglas-fir and western hemlock, with small areas of hardwood and western redcedar. The riparian areas tend to be dominated by hardwood species with some intermixed conifers.

[2] One of the first steps in the BLM Tillamook Resource Area's internal planning processes is referred to as "Activity Planning". During this process, an "Activity Planning Unit" (APU), generally a subwatershed basin (6th field) with minor adjustments is identified. South Scappoose planning area refers to the South Scappoose Creek APU. Activity Planning was completed in this APU in 2010 (USDI-BLM 2010).

The South Scappoose Creek planning area is comprised of 3,166 acres of BLM managed land. Of this, 2,074 acres are forested with conifer dominated stands, 975 acres are comprised of mixed hardwood and conifer stands, and 81 acres are hardwood dominated stands. The treatments proposed in this project would treat approximately 1,346 acres of conifer dominated stands, 269 acres of mixed hardwood and conifer stands, and 13 acres of hardwood stands. This would leave approximately 35% of conifer stands, 72% of mixed hardwood and conifer stands, and 84% of hardwood dominated stands untreated by this project within the BLM managed land in the South Scappoose Creek planning area.

The majority of the stands within the area were naturally regenerated and/or planted after the old-growth was logged out in the 1920s and 1930's. In addition to the logging, BLM managed lands in the western half of Section 1, and almost all of Sections 11, 13, and 7 were burned during the Columbia County Fire of August 1939, and 1951 saw 40 acres in the N1/2 of the SW quarter of Section 13 burned. The sections experienced a varied burn pattern with areas that were severely impacted to areas where only the underbrush was burned with very few trees killed. Fire salvage logging operations took place in these sections during the 1940's and 1950's, and harvested dead standing trees. Many of the BLM contracts of the time included snag falling stipulations to remove smaller diameter dead trees that were not merchantable. Clearcut harvesting occurred in small sale areas from the 1960's through the early 1990's within the analysis area. Commercial thinning also occurred into the 1990's with the BLM McLafferty Creek timber sale.

The stands proposed for treatment include most of the stands between 50 and 70 years old within the South Scappoose Creek planning area. Units planned for thinning range in age from about 46 to 73 years; the weighted average age is 63 years (Table 8). The stands are essentially single-storied stands dominated by Douglas-fir($\geq$50% by basal area). For the most part, the portions of stands proposed for thinning are currently overstocked as indicated by Curtis Relative Densities (RD^3) above 55, the approximate density level where competition-related mortality in Douglas-fir stands begins.

Approximately 5% of the Federal land within the Scappoose Creek 5th field watershed is 80-years-old or older. None of the areas proposed for treatment by the Scappoose Creek Project are located within late-successional forests specifically identified within the 15% Analysis

[3] Relative density (RD) is a measure of crowding in a stand of trees, expressed as a percentage of density (based on number and size of trees) relative to a theoretical maximum density. Curtis Relative Density (RD) is calculated by dividing the basal area per acre by the square root of the quadratic mean diameter. Although not expressed as a percentage, Curtis Relative Density can be interpreted approximately as the percentage of the maximum possible Curtis Relative Density (RD 100). Other common ways of communicating density in a forest stand include trees/acre, basal area/acre, average spacing and crown or canopy closure.

Documentation (as updated 11/15/99) that was completed to assure conformance with the 15 percent Retention Standard and Guideline (Salem District ROD/RMP - pg. 48).

Phellinus weirii is present throughout the project area. *Phellinus weirii* is a native root pathogen that is a natural part of many forest ecosystems (Thies 1984). *Phellinus weirii* causes laminated root rot disease. Disease centers occur throughout the units in well-defined discrete pockets as well as in a diffuse pattern where groups of one to several trees are affected throughout the infested area. Douglas-fir and grand fir are highly susceptible to *Phellinus weirii*, (they are readily infected and killed by it); western hemlock is intermediately susceptible; western redcedar is tolerant or resistant; and all hardwoods are immune (Hadfield et al. 1986). Because the disease decays their root systems, it kills trees directly by depriving them of water and nutrients, or makes them prone to windthrow by undermining their structural integrity (Thies 1984). The disease spreads through root contacts with infected trees or stumps. Disease centers are believed to expand radially at the rate of about one foot per year (Nelson and Hartman 1975), and the number of trees impacted by the disease can generally be expected to double about every 15 years (Hadfield 1985; Nelson et al. 1981). *Phellinus weirii* attacks susceptible hosts regardless of tree size, age, or vigor.

The most abundant understory species are sword fern, dwarf Oregon grape, salal and vine maple. Understory density varies inversely with the amount of overstory canopy closure. The understory is often well developed where openings occur. Openings related to *Phellinus weirii* are typically dominated by vine maple. Where the dense overstory canopy consists of relatively young, short trees, the understory is rather sparse. The sites can be characterized as warm and dry sites. Western Hemlock occurs to some degree in most of the units and is the second most common conifer next to Douglas-fir. Red alder is the most common hardwood species in these stands.

Table 8: Current Stand Parameters from Stand Exam Data

Unit	Year of origin	Site Index[1]	Trees per Ac. ≥7 in. (dbh)	Basal Area[4] (sq. ft.)	Quadratic Mean Diameter[3] (QMD) (in.)	Curtis RD	Ave. Ht. (ft.)	Crown Cover (%)	Species composition based on trees per acre [2]
1	1951	122	217	245	14.4	65	116	74	DF 85%, WH 8%, WRC 4%, RA 3%
2	1947	135	145	264	18.3	62	133	73	DF 92%, WRC 4%, WH 2%, RA 2%
3	1946	141	148	254	17.7	60	139	78	DF 83%, BLM 9%, RA 6%, WRC 1%, WH 1%
4	1949	135	168	268	17.1	65	119	84	RA 51%, DF 30%, BLM 17%, WRC 2%
5	1950	139	139	260	18.6	60	141	80	DF 98%, RA 2%
6	1950	139	185	243	15.5	62	131	82	DF 45%, RA 35%, WH 12%, WRC 8%

Unit	Year of origin	Site Index[1]	Trees per Ac. ≥7 in. (dbh)	Basal Area[4] (sq. ft.)	Quadratic Mean Diameter[3] (QMD) (in.)	Curtis RD	Ave. Ht. (ft.)	Crown Cover (%)	Species composition based on trees per acre [2]
8	1947	132	161	258	17.1	62	129	71	DF 91%, WH 5%, RA 3%, WRC 1%
9	1946	143	162	265	17.3	64	140	78	DF 73%, WRC 14%, RA 10%, WH 2%, BLM 1%
10	1954	140	260	244	13.1	67	102	73	DF 54%, RA 44%, WRC 2%
11	1945	142	123	228	18.4	53	136	75	DF 79%, RA 17%, BLM 4%
12	1944	138	152	242	17.1	59	128	77	RA 49%, DF 40%, WH 5%, BLM 5%, WRC 1%
13	1946	140	173	258	16.5	63	137	72	DF 95%, RA 4%, WH 1%
14	1943	140	165	302	18.3	71	139	76	RA 38%, DF 34%, WH 18%, WRC 5%, BLM 5%
16	1950	143	190	329	17.8	78	131	80	DF 68%, RA 27%, WH 5%
17	1946	134	163	273	17.5	65	132	84	DF 71%, RA 14%, BLM 8%, WRC 7%
18	1950	136	175	293	17.5	70	131	79	DF 94%, RA 6%
20	1945	134	150	273	18.3	64	136	80	RA 68%, DF 32%
21	1944	136	132	220	17.5	53	130	77	RA 48%, DF 42%,WH 4%, BLM 4%, WRC 2%
22	1959	130	195	219	14.3	58	99	84	RA 54%, DF 18%, WH 16%, BLM 11%, WRC 1%
23	1944	134	161	280	17.9	66	125	86	RA 63%, DF 36%, WRC 1%
24	1958	140	159	206	15.4	52	110	74	RA 89%, DF 11%
25	1938	152	151	327	19.9	73	157	80	DF 44%, WH 42%, BLM 14%

[1]DF King (1966), unless noted
[2]DF = Douglas-fir, WH = western hemlock, RA = red alder, BLM = bigleaf maple, WRC = western redcedar
[3]Diameter of the tree with average basal area at breast height, includes all tree species in the stand.
[4]Basal area (BA) in square feet; cross-sectional area occupied by tree boles on each acre - a measure of density.

Existing Coarse Woody Debris (CWD)

There is considerable variation in the amount of down wood, snags, and total coarse wood volume among the units. The weighted average (by acres) of snags per acre and down wood linear feet per acre in all decay classes among the proposed treatment units is 5 and 160 feet respectively. There are 5 snags and 32 linear feet per acre in decay classes I and II. The 5 conifer snags per acre average approximately 11 inches dbh and approximately 45 feet in height. The current amount of down wood is below the minimum standard required following

regeneration harvests (240' linear feet per acre in decay classes I and II). The down wood data was collected for pieces that meet the minimum dimensions of 20 inches diameter on the large end diameter and 20 feet long. Because of these measurement standards, the amount of total coarse wood on the ground is probably a low estimate. The snag data includes only snags ≥10 inches dbh and ≥10 feet in height. About 96% of the current snags are in decay classes 1 and 2 and about 4% are in decay classes 3, 4 and 5. About 30% of the linear down feet are in decay classes 1 and 2 and about 70% are in decay classes 3, 4 and 5. The source of the more recent decay class down wood seems to be smaller trees that have died as a result of suppression or have been windthrown as a result of *Phellinus weirii*.

The affected environment for forest vegetation is described in further detail in the silvicultural prescription for the South Scappoose Creek project area (Project Record Document 33).

3.1.2 Environmental Effects Alternative 1: No Action

Under this alternative, no density management or CWD creation would take place at this time. In the absence of thinning or some other form of canopy disturbance, projections are for the density levels of the stands to generally increase to fairly high levels over the next 25 years (Table 9). Stands are expected to become increasingly dense and uniform. As the level of competition among the trees remains high, crown development (live crown ratio, crown expansion, and branch growth) would decrease, diameter growth rate can be expected to decline, and competition-related mortality would increase, resulting in coarse wood additions mainly from the smaller-diameter trees that slowly die from suppression. The difference in trees per acre currently (Table 8) and in 25 years (Table 9) reflects competition mortality as predicted by ORGANON (Hann et al. 2006). The increase in density is reflected in the Curtis RD numbers in Table 9. Competition mortality in Douglas-fir stands generally accelerates at RD's above 50, and occurs at a relatively even spatial distribution, maintaining uniformity of the affected stands. See Table 11 for a summary of parameters describing the predicted tree mortality. Understory development would also be limited because of stand densities as well as a general lack of shade tolerant species in the overstory. Any conifers which may exist in the understory (i.e. saplings and seedlings) of some stands can be expected to decline in vigor and exhibit a very slow growth rate, with some possibly falling out of the stands because they are no longer able to survive under the increasingly dense overstory shade. Due to the preponderance of Douglas-fir in the overstory of these stands, very little development of a second canopy layer, composed of shade-tolerant conifers, would be expected even if disturbances create openings. A declining trend in the hardwood component can be expected in the future as they are out-competed (overtopped) by the conifers. In addition, the trees are expected to become less stable, as expressed by the height/diameter ratio, and therefore, more likely to experience windthrow or break off in severe winter storms.

In *Phellinus weirii* areas where tree species that are less-susceptible to this disease (species other than Douglas-fir and grand fir) are not filling in as trees are killed by the disease, centers are expected to expand resulting in further decreases in conifer stocking and enlargement of the shrub-dominated openings. The developmental trajectory for the majority of these root disease

infection centers appears to be vine maple or bigleaf maple dominated openings containing short-term snags (because they blow over) and down logs. The shrub density in many of these disease centers precludes establishment and growth of understory trees. Therefore, these disease centers, while contributing to the overall diversity of the stands, do not appear to be developing older-forest characteristics and have a greatly diminishing timber production capability as well.

Cumulative Effects

There would not be any cumulative effects to forest vegetation associated with selecting the "No Action" alternative.

Table 9: Estimated stand conditions 25 years after implementing Alternative 1 (No Action Alternative) as projected by ORGANON

Unit	Trees/Ac.	BA (sq. ft.)	QMD[1] (in.)	Curtis RD
1	174	326	18.6	76
2	129	325	21.5	70
3	133	322	21.0	70
4	127	300	20.8	66
5	121	329	22.3	70
6	149	307	19.5	70
8	144	322	20.2	72
9	151	345	20.5	76
10	173	303	17.9	72
11	99	279	22.7	59
12	108	276	21.7	59
13	142	332	20.7	73
14	125	336	22.2	71
16	152	259	17.7	62
17	132	305	20.6	67
18	156	333	19.8	75
20	109	285	21.9	61
21	168	359	19.8	81
22	154	226	16.4	56
23	108	311	22.9	65
24	102	211	19.5	48
25	143	368	21.8	79

[1]The QMD is for all tree species in the stand.

3.1.3 Environmental Effects Alternative 2: The Proposed Action

Table 10 displays the predicted harvest unit conditions immediately after harvest. The various unit parameters presented in the table represent the prescriptions for regeneration harvest and thinning outside of designated *Phellinus weirii* areas. The stands in the CON and GFMA LUAs would be proportionally thinned (thinning trees in all size classes) modified to favor conifer species other than Douglas-fir and to retain trees with significant defect. Stands in the RR LUA are recommended to be thinned from below also retaining trees with defect as well as an alder component. Emphasis on retaining species other than Douglas-fir would increase the relative diversity of species, maintain a seed source for understory trees and improve the general resiliency of the stands to insects, disease and other disturbances. Because of the large numbers of Douglas-fir currently in the stands, it is expected that it would remain the major species. Leaving trees with significant defect such as cavities, broken tops, etc. would conserve trees beneficial to wildlife. Thinning across the diameter ranges would open the stand up to accelerated growth while maintaining the current stand diameter distribution. The objective of this entry is to thin the stands to capture natural mortality and keep the stands growing vigorously. By design, the prescription would not capture all of the natural mortality. Some of the suppressed trees left in the stand would likely grow for several years but begin to fall out as the canopy closes. They would also create a lower canopy layer where they are present. By leaving some of these suppressed trees, natural mortality would continue as the stand grows. Most of the intermediate trees would be expected to accelerate growth and become co-dominant trees over time. A few of the intermediate trees would likely stay as intermediate trees and initially create a lower canopy layer and potentially die from competition in the future and become snags. The co-dominant and dominant trees would continue to grow into the future. These trees would be expected to be the largest at the time of a future regeneration harvest and thus provide volume and quality leave trees. Implementing guidelines for treating *Phellinus weirii,* including the planting of large openings with seedlings immune or resistant to the disease, would result in a reduced spread of the disease and further contribute to species diversity. It is anticipated that in 15 to 25 years the thinned stands in the Matrix LUA would be evaluated for possible regeneration harvest.

The stands selected for regeneration harvest would be at or past CMAI at the time of harvest. The objective of the regeneration harvests would be to initiate new stands for future harvest. In the regeneration units the largest trees, most western redcedar and trees with significant defect would be favored to leave. Western redcedar would be favored to leave where it occurs. Regeneration harvest units would be planted with a mix of Douglas-fir, western redcedar, grand fir, and western hemlock. It is expected that these new stands will be needed to provide thinning opportunities in the future. The GFMA is supposed to provide a sustained yield of timber so it is essential that some stands are regeneration harvested in order to keep young stands that will provide future thinning opportunities on the landscape.

The Riparian Reserves would be thinned from below. The Riparian Reserves would be thinned in this manner under the assumption that they will not be considered for regeneration harvest in

the future. The thinning from below prescription would accelerate growth in the dominant and co-dominant trees. When the upland stands are considered for regeneration harvest in the future it is presumed that the Riparian Reserve areas would not be treated in that entry and thus continue on a track to meet long range goals for Riparian Reserve forest structures. The immediate effects of implementing this prescription in the Riparian Reserves would result in promoting accelerated tree growth.

Thinning "captures" much of the snag recruitment that results from inter-tree competition and very little density mortality (5 trees per acre) is expected to occur for 25 years after treatment (Table 11). The density mortality per acre will be approximately the same for both the proportional thinning and thin from below prescriptions. The primary difference in density mortality in the two prescriptions would be in tree size. The trees that would die in the next 25 years in the proportional thinning areas would tend to be smaller suppressed trees. Thinning from below removes the smaller trees so the trees that would be expected to die under this prescription would be larger when compared to the proportional thinning. Approximately 35% to 45% of the leave trees would be in the suppressed and intermediate tree classes, somewhat ameliorating the loss of trees likely to die from competition, although thinning would tend to keep these trees alive for a longer period of time. Approximately 48% of the Forest Operations Inventory (FOI) units acreage considered for harvest would be left untreated during this entry because of logging difficulties, poor stocking, slope stability, stream buffers, and thinning within the last 15 years (191 acres). Subtracting out previously thinned units, 45% of the stand acreage proposed for thinning would remain in an unthinned condition. Leaving variable-sized areas unthinned would provide places where mortality would continue at current rates.

Phellinus weirii treatment

Phellinus weirii is present throughout most of the treatment areas. *Phellinus weirii* areas occurring in harvest units outside of riparian reserves would be treated to slow or stop the spread of the disease. The size of these areas ranges from approximately 1 to 7 acres. Identified *Phellinus weirii* areas would be treated by cutting most or all of the Douglas-fir, retaining an average of 20 trees per acre. The favored leave trees would be hardwoods and western redcedar. All Douglas-fir and grand fir inside the designated area and within 30 feet of the flagged boundary would be harvested to reduce the potential for disease to spread through root contact. In the event that there are not enough hardwoods and western redcedar to reach 20 trees per acre, the healthiest looking Douglas-fir trees would be left to reach the 20 tree per acre total.

Table 10: Estimated stand conditions immediately following harvest as projected by ORGANON

Unit[1]	Trees/Ac.[2]	BA (sq. ft.)	QMD [3] (in.)	Curtis RD	Est. % Canopy Cover [4]
1	138	150	14.1	40	69
1 RR	88	150	17.7	36	64
2	90	150	17.5	36	63
2 RR	60	160	22.0	34	61
3	93	150	17.2	36	64
3 RR	71	160	20.4	35	62
4	55	140	21.6	30	63
4 RR	52	150	22.9	31	62
5	80	150	18.6	35	60
5 RR	62	180	23.0	38	62
6	114	140	15.0	36	60
6 RR	107	160	16.5	39	62
8	100	140	16.0	35	63
8 RR	68	150	20.1	33	61
9	120	150	15.1	39	64
9 RR	93	150	17.2	36	60
10	123	135	14.2	36	64
10 RR	92	150	17.3	36	63
11	82	150	18.4	35	60
11 RR	64	180	22.8	38	62
12	69	140	19.2	32	58
12 RR	61	160	21.9	34	61
13	96	140	16.4	35	61
13 RR	70	160	20.4	35	62
14	72	155	19.9	35	61
14 RR	79	160	19.2	37	64
16	28 to 34	~80	21.9	17	37
17	15 to 18	~70	28.0	13	30
17 RR	64	160	21.5	35	63
18	14 to 16	~60	27.2	12	25
18 RR	67	170	21.5	37	62
20	14 to 16	~60	27.2	12	25
21	16 to 19	~75	28.9	14	29

22	18 to 22	~30	17.0	8	21
23	14 to 18	~74	30.7	14	30
23 RR	58	180	23.8	37	62
24	16 to 17	70	28.3	13	29
25	13 to 14	65	29.4	12	24

[1] The units with the designation of RR are in the Riparian Reserve LUA adjacent to upland stands also proposed for treatment. These riparian reserves would be thinned to the parameters shown above.

[2] The units showing a range of trees per acre are regeneration harvest units. The number of leave trees necessary to be retained for down wood would be dependent upon the diameter of tree selected. The larger the trees selected, the fewer that are needed to be retained because each tree would contain more linear feet. (A 20" DBH tree contains 20 linear feet that can be counted towards the 240' linear feet target, versus a 27" DBH tree that would contain approximately 60 to 80 linear feet.)

[3] The QMD is for all tree species in the stand.

[4] The estimated canopy cover is based on the conditions immediately following harvest. In the regeneration units, the canopy closure would be expected to decrease over the following two to three years as some trees either blow over, are felled for down wood creation, or are topped to create snags.

CWD Management

Within the first few years following harvest, a pulse of coarse wood recruitment would be expected within the harvest units due to windthrow, damage and breakage during harvest operations, retention of logging debris and the design feature requiring the creation of CWD if needed. Inputs resulting from harvest consist of limbs and tops, breakage and cull and incidentally felled or topped trees that would be left on site. The harvest input would likely result in a gain of 200 cubic feet per acre of coarse woody debris in skyline yarding areas and about 100 cubic feet per acre in ground-based yarding areas. The harvest units would be monitored for 2 to 4 years following harvest to evaluate the amount of blow down and mortality post-harvest to determine if additional treatments are needed to meet CWD habitat objectives. If determined necessary, CWD treatments (either felling or snag creation) would focus on trees generally 20 to 30 inches dbh on those acres determined to be deficient in CWD. In the CON LUA, a combination of up to 2 snags and 2 downed trees per acre would result in an addition of approximately 330 ft^3 of decay class 1 material per acre. In the GFMA the combination of up to 1 snag and 1 downed tree per acre would result in an addition of approximately 150 ft^3 of decay class 1 material per acre. The numbers in Table 11 only reflect CWD resulting from suppression mortality and do not reflect CWD treatments or other expected CWD inputs such as logging slash. The proposed action is not designed to treat all of the *Phellinus weirii* areas within the harvest units, *Phellinus weirii*-related mortality is expected to continue across all tree sizes within the units. See Table 12 for predicted unit parameters 25 years after implementing Alternative 2.

Table 11: Estimated parameters for suppression mortality within the thinning units 25 years after implementing the South Scappoose Creek Proposed Action and No Action Alternatives as projected by ORGANON (Hann et al. 2006)

Estimated Weighted Average Suppression Mortality					
Alternative	**LUA**	**TPA[1]**	**BA[2]**	**QMD[3]**	**Volume per acre (cubic feet)**
Alternative 1 – No Action	All	32	22	11.2	916
Alternative 2 – Proposed Action	GFMA and CON	5	2	8.5	151
	Riparian Reserve	5	5	13.2	275

[1]Trees per acre ≥ 6" DBH
[2]Basal area in square feet; cross-sectional area occupied by tree boles on each acre - a measure of density.
[3]Quadratic Mean Diameter (diameter of the tree of average basal area), includes all tree species in the stand.

Table 12: Estimated unit conditions outside of designated *Phellinus weirii* areas, 25 years after implementing Alternative 2 as projected by ORGANON (Hann et al. 2006)

Unit[1]	Trees/Ac.	BA (sq. ft.)	QMD[2] (in.)	Curtis RD
1	120	232	18.9	53
1 RR	78	230	23.3	48
2	84	220	22.0	47
2 RR	58	226	26.8	44
3	89	230	21.8	49
3 RR	66	233	25.4	46
4	54	205	26.4	40
4 RR	48	203	27.9	38
5	76	229	23.5	47
5 RR	61	257	27.7	49
6	95	222	20.7	49
6 RR	82	223	22.3	47
8	91	222	21.2	48
8 RR	60	227	26.4	44
9	100	232	20.6	51

Unit[1]	Trees/Ac.	BA (sq. ft.)	QMD[2] (in.)	Curtis RD
9 RR	72	222	23.8	46
10	113	239	19.7	54
10 RR	79	228	23.0	48
11	73	228	24.0	47
11 RR	61	253	27.5	48
12	68	219	24.5	44
12 RR	54	216	27.1	41
13	89	229	21.8	49
13 RR	68	246	25.8	48
14	68	233	25.1	47
14 RR	71	224	24.1	46
16	31	125	27.4	24
17	17	106	33.6	18
17 RR	61	206	25.0	41
18	15	91	33.6	16
18 RR	64	220	25.1	44
20	15	91	33.6	16
21	17	125	37.0	21
22	20	57	22.9	12
23	14	124	39.8	20
23 RR	47	229	29.9	42
24	16	96	33.2	17
25	14	95	35.5	16

[1] The units with the designation of RR are the riparian reserve portions of stands being treated.
[2]The QMD is for all tree species in the stand.

Connectivity/Diversity LUA:
The expected short-term effects (0-25 years) of the proposed thinning and regeneration harvest include the following:

- Increased diameter growth rates and crown development to lessen the time it takes to develop the large trees, snags and logs characteristic of late-successional forests.
- On average, the recommended thinning treatments are expected to remove 39% of the trees per acre and 43% of the basal area. The resultant weighted average Curtis RD is estimated to be 39.
- The initiation of an understory canopy layer both through planting the created patches and natural regeneration occurring throughout the proposed harvest units.
- Increased horizontal diversity by creating openings in *Phellinus weirii* areas and planting them with *Phellinus*-resistant and shade-tolerant conifers.

- The regeneration harvest unit would introduce a new age class containing numerous legacy trees comprised of mature green trees, snags, and down wood to further diversify the stands in the connectivity block.
- Stands selected for regeneration harvest would be planted with Douglas-fir and a mix of other conifer species.
- Within thinning units, up to two snags per acre and two down trees would be created to augment CWD levels if monitoring determines additional treatments are needed to meet CWD habitat requirements.

It is expected that most of the units would require at least one more entry before age 110 years in order to place an emphasis on the development of horizontal and vertical diversity, maintaining live crown ratios and diameter growth, as well as to create some CWD within the units.

General Forest Management Area LUA:
The expected short-term effects (0-25 years) of the proposed thinning and regeneration harvest include the following:

- The stands would be proportionally thinned to a stocking level that would increase tree growth and maintain full site occupancy.
- The recommended levels of thinning should increase overstory tree diameter growth, increase crown development (increase crown length, crown width, and branch size), promote stand stability because of reduced height:diameter ratios, reduce competition-related mortality (decreased production of smaller-sized snags), and result in a greater level of understory development than would occur without thinning.
- On average, the recommended thinning treatments are expected to remove 46% of the trees per acre and 44% of the basal area. The resultant weighted average Curtis RD is estimated to be 35.
- Stands selected for regeneration harvest would be planted with Douglas-fir and a mix of other conifer species. The leave trees would continue to grow into future large snags while the young stand underneath would continue growing to provide fiber in the future.
- Identified *Phellinus weirii* areas in the regeneration harvest units would be planted with *Phellinus*-resistant species.
- Within thinning units, up to one snag per acre and one down tree would be created to augment CWD levels if monitoring determines additional treatments are needed to meet CWD habitat requirements.

Riparian Reserve LUA:
Effects of treatment in Riparian Reserves would be similar to adjacent thinning units that fall within the GFMA or CON except that they would be thinned from below and not thinned proportionally. In either situation, reserve trees would respond to the thinning by increased diameter growth and increased crown development. The only significant differences would be that designated *Phellinus weirii* areas would not be located within 240 feet of streams and the stands would be thinned from below. The expected short-term effects (0-25 years) of the

proposed thinning include the following:

- Increased diameter growth rates to lessen the time it takes to develop the large trees, snags and logs characteristic of late-successional forests.
- Increased crown ratios, crown widths, and limb development (branch size) of the residual trees.
- Decreased mortality of the smaller-sized trees over the next 25 years following treatment compared to the untreated stands.
- By retaining tree species other than Douglas-fir and grand fir and by planting disease-resistant conifers and hardwoods in areas infested with *Phellinus weirii*, the current and future impacts from this disease should be reduced, and the species diversity and structural complexity should be increased.
- The contrast between the harvest areas and untreated portions of stands would create diversity as would the creation of heavily thinned areas and reserve clumps near harvest units.
- On average, the recommended thinning treatments are expected to remove 45% of the trees per acre and 40% of the basal area. The resultant weighted average Curtis RD is estimated to be 35.
- The initiation of an understory canopy layer through planting of existing openings following harvest. Species planted would include shade-tolerant conifers which would become a seed source, over time, for increasing diversity throughout the stands.
- In the units with a component of shade-tolerant tree species in the overstory, thinning would stimulate natural regeneration of trees in the understory.
- The growth and vigor of understory shrubs and herbs would increase.
- CWD creation (both snags and down trees) would be the same as adjacent upland thinning units.

Project implementation is expected to set the stage for future treatments that could continue the progress of the stands towards developing more complex structures.

The environment effects for the Proposed Action on forest vegetation are described in further detail in the silvicultural prescription for the South Scappoose Creek Project (Project Record Document 33).

3.2 Water Resources

The following water resource issues will be addressed in the environmental effects section below:

1. What would be the effects of forest management activities on stream flows?

2. What would be the effects of forest management activities on stream character?
3. What would be the effects of forest management activities on water quality?

The potential water resources effects will be analyzed at the site-scale and at the subwatershed scale (6th field hydrologic unit) for stream flows, at the site-scale for channel morphology, and at the site-scale and the project drainage area for water temperature, sediment and turbidity.

3.2.1 Affected Environment

Physical Setting

The project area lies about 40 to 50 miles east of the Pacific Ocean on the northeast slope of the Oregon Coast Range. Approximately 89% of the proposed timber harvest and nearly all of the connected action is located in the South Scappoose Creek 6th-field subwatershed. The remaining portion of the proposed timber harvest is located in the Upper East Fork Dairy Creek (8%) and the Upper McKay Creek (3%) subwatersheds (Table 1, *EA section 1.1.1*).

The project action is not located in a Key Watershed as defined in the Northwest Forest Plan. There are over a dozen state recognized beneficial uses in the three affected subwatersheds (See Oregon Administrative Rules 340-41-340, Table 340A available at http://www.deq.state.or.us/wq/rules/div041tblsfigs.htm). The most sensitive beneficial uses which could potentially be affected by the proposed action are domestic and municipal drinking water, cold-water fisheries (including salmonid habitat), and other cold aquatic life. The City of Scappoose utilizes Gurley Creek, Lazy Creek, and South Scappoose Creek, as sources for drinking water and the project area is within the drinking water source area (PWS #4100792).

The landscape is dominated by rolling hills, topographic benches and rounded and low relief mountains. The bedrock geology consists of bedded sandstone and siltstone capped by basalt on mountain ridgetops and upper hilltops. Elevations within the proposed harvest units range from about 280 to 2,000 feet. The area receives a constant influx of oceanic air throughout the year bringing cloudy skies, mild dry summers and mild wet winters. Rain is the primary hydrologic flow generating process, averaging about 50 to 80 inches a year coming mainly during November through April. Fog drip is minimal and snow accumulation is rare. The rainfall intensity is low for the coast range, averaging approximately 2.5 to 3.0 inches in a 24-hour period (http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm).

Industrial wood product companies and private individuals own approximately 83% of the land in each of the two subwatersheds. These lands are managed for timber production, usually on 30 to 45 year rotations that culminate in clear-cut harvest. Private timber companies use most of the gravel-surfaced haul routes in the affected subwatersheds heavily throughout the year.

Lands managed by BLM are distributed in a checkerboard-like pattern comprising approximately 16% of the South Scappoose Creek and 3% of the Upper East Fork Dairy Creek subwatersheds.

These lands are managed for multiple uses including for timber production, wildlife habitat, water quality, fisheries, and recreation. The BLM has developed a number of riparian and in-stream restoration projects in the project area including culvert upgrades, road decommissioning, thinning young conifers, and large wood placement.

The vast majority of the affected subwatersheds are forested. Past timber harvesting, primarily in the 1920's and 1930's, eliminated most of the old growth stands. Currently, about 20 to 25% of the forest vegetation in the affected subwatersheds is in the early serial stage. (This is based upon Western Oregon Plan revision (WOPR) (USDI-BLM 2008) GIS data and an aerial photo review of the South Scappoose Creek subwatershed.)

The road network in the project area is composed mainly of a mixture of private and BLM gravel-surface roads built over the past 70 years for forest management activities. Private timber companies use the gravel-surfaced haul routes heavily year around. Road densities are relatively high compared to other areas in coast range (See Table 13).

Table 13: Amount of Roads in Affected Subwatersheds

Subwatershed Name	Length of Roads (miles*)	Road Density (miles/sq. mile*)	Percent Roaded Area**
South Scappoose Creek	172	6.32	3.0
East Fork Dairy Creek	184	5.69	2.7
Upper McKay Creek	166	4.48	2.1

* Approximate values based on GIS data
**Assumes an average road width of 25 feet

Approximately 0.87 miles of the new road construction would occur within Riparian Reserves. The Scappoose Creek IDT made every effort to minimize the amount of new road and avoiding unstable locations, stream crossings, and Riparian Reserves where practical to keep road impacts to a minimum. Most roads that would be utilized under this action already exist and are stable with few signs of sidecast failure or slumping. However, road surfacing on many of the roads is below optimum. Most drainage structures are slightly undersized and/or in fair condition. Many of the road segments have inadequately spaced cross drains.

Stream Character

Streams within the project area that are in the Upper East Fork Dairy Creek and Upper McKay Creek subwatersheds are headwater streams located very near the watershed boundary with South Scappoose Creek. Based on field observations these streams are considered to be similar in character to streams in the South Scappoose Creek subwatershed.

Stream channel data for the South Scappoose Creek subwatershed comes primarily from surveys conducted by Oregon Department of Fish and Wildlife (ODFW) 2008, 2009 and 2010 aquatic habitat inventories conducted on South Scappoose Creek, Alder Creek, Gourlay Creek, Lazy Creek, and Raymond Creek, downstream of the proposed project area. These streams are all second or third order streams. Data indicates these larger streams are constrained by hillslopes and high terraces; have low levels of large woody debris (LWD), and the predominant habitat type is rapids and riffles. This lack of LWD has resulted in reduced channel stability and has reduced the percent of stream channel in pools and pool frequency.

Based on field observations most riparian areas on BLM lands are nearly fully stocked with early to mid-seral stage conifers and hardwoods. Young conifers and hardwoods dominate most riparian areas on private lands. Based upon a limited number of field observations and knowledge of the area, most streams on BLM lands appear to be in functional condition. Streams on BLM land generally have adequate riparian vegetative cover, stable streambanks, and mostly intact floodplains, but lack desired numbers and volumes of large wood and probably have a higher percentage of fines in substrates and fewer numbers of quality pools than in reference conditions.

Largest order streams within the project area are South Scappoose Creek, McLafferty Creek, Lazy Creek, Dooly Creek, Gourlay Creek, Salt Creek and Mud Creek. All of these streams are fish bearing and are primarily Rosgen type B stream channels constrained by steep hillslopes or high terraces, with small width-to-depth ratios, and mostly steep gradients. These larger streams have sufficient fluvial power to form step pool channels and are able to transport larger material (gravel, cobbles, boulders, and large woody debris) downstream.

The majority of the streams in the project area are smaller first order streams, mainly A1 and A2 type stream channels (Rosgen, 1996). Many of these stream channels are perennial but do not have enough fluvial power to cut scour pools and move large wood. Flows commonly go subsurface if very large wood or large amounts of sediment are placed across them.

Stream Flows

The volume of stream flow closely parallels the precipitation pattern. The highest flows occur during the winter months of late November through March. Stream flow in the summer is a small fraction of winter levels.

The lack of adequate summer flow can reduce water quality and affect cold aquatic life. Low summer flows are a concern throughout the North Coast Basin, including for the Scappoose

Creek drainage. There are approximately 26 cfs in water allocations in Scappoose Creek as identified in the Scappoose Creek Watershed Analysis (USDI-BLM, 1996a).

Timber harvest may be having a minor effect on timing and quantity of annual water yields and base flows. Paired watershed catchment studies in the Pacific Northwest have documented increases in mean annual water yield of up to 26% following clear-cutting and patch-cutting. Most of these increases occurred during the wet fall and winter season (Moore and Wondzell, 2005). Most paired watershed catchment studies in the Pacific Northwest have also shown fewer extremely low flows for at least the first few years following timber harvest.

Peak flows can potentially reduce stream channel stability, alter natural flow patterns, and affect spawning and rearing habitat. The primary factors by which forest activities can affect peak flows are by reducing forest cover through timber harvest and altering the routing of water by compacting soil surfaces and increasing road-stream interactions. Road segments that will likely have the greatest impact on stream flows are mid-slope road segments because they can intercept subsurface flows and convert them to surface flows.

A preliminary analysis for the risk of increases in peak flow was performed using the Oregon Watershed Assessment Manual watershed analysis methods for forest hydrology (OWEB, 1999). The assessment assigns a low risk when 75% of any subwatershed is in the rain category and when the percent of forested area in roads is less than 4%. Based upon GIS data, all of the affected subwatersheds have 98% or more in the rain category and the amount of roaded area ranges between 2.1 and 3.0 percent. Based upon the OWEB assessment and the fact that there are relatively few mid-slope roads present in the affected subwatersheds and few flowing ditchlines were observed in the project area during winter storm events, the current risk for peak flow is predicted to at low.

Water Quality

High quality water is essential for maintaining sensitive beneficial uses such as cold-water fisheries and drinking water. The most common water quality parameters affected by forest management are stream temperature and sediment/turbidity. Forest management related increases in stream temperature are most often associated with vegetation removal (i.e., timber harvest). Forest management related increases in sedimentation/turbidity are most often associated with poorly designed or poorly maintained forest roads and timber haul.

Additional water quality parameters (e.g. nutrients, dissolved oxygen, pesticide and herbicide residues, etc.) are unlikely to be affected by the proposed project and were not reviewed for this analysis (US EPA, 1991). There are no water quality 303(d) listed streams within the affected subwatersheds (ODEQ, 2010).

Stream Temperature

The Oregon Department of Environmental Quality (ODEQ) has determined that various streams within the general area (Tualatin River and Lower Willamette River sub-basins) are failing to meet water quality standards for stream temperature. To protect beneficial uses, ODEQ

established nonpoint temperature load allocations, called Total Maximum Daily Load (TMDLs), for all perennial streams within the affected sub-basins. Essentially, the TMDLs require that land managers achieve 'system potential vegetation' along all perennial streams. System potential vegetation is defined as the riparian vegetation that can grow and reproduce on a given site. It is expected that "shade targets" would be achieved over time. Growing riparian vegetation may take from several years to several decades before "shade targets" are met.

Long-term temperature recorders deployed in 1998 by BLM indicate that summer temperatures exceed water quality standards in parts of the Scappoose Creek drainage. In order to validate current water conditions, BLM conducted a rapid shade model assessment on perennial streams located on BLM-administered lands. The analysis indicates that the existing shade level on BLM streams in the Scappoose Creek drainage is near system potential at 84.8% mean and 97.0% median with approximately 90% of BLM stream miles meeting or exceeding target shade (BLM, 2008). Average years to achieve system potential tree height through passive restoration are predicted to range from 41 to 50 years.

Sediment/Turbidity
None of the streams draining the project areas are listed for sediment or turbidity on the current 303d report. However, the heavy amount of logging and road activities that has occurred on private lands during the past few decades, observations of the road network in the proposed project, and data collected by the Oregon Department of Fish and Wildlife (ODFW) suggest that sediment/turbidity levels probably exceed reference conditions in at least some of the streams in the project area. According to the ODFW ocular data collected in aquatic habitat surveys, fine sediment content levels in riffle substrate type ranged from 4% to 15% in upper South Scappoose Creek (Reaches 7, 8, and 9), 7% to 12% in lower to middle Gourlay Creek (Reaches 1 and 2), and 40% in lower Lazy Creek (Reach 1). The ODEQ has defined excessive sedimentation when fines are 20% or more in rifles. In addition, the City of Scappoose has raised concerns about increased levels of sediment at their surface water diversions. There are three municipal water diversions downstream of the proposed timber harvest units and two diversions adjacent to roads that would be used to timber hauling.

3.2.1 Environmental Effects Alternative 1: No Action

Under the No Action Alternative, the current overall aquatic conditions and trends in the project area would continue as described in the affected environment, above.

Stream Character
The channel condition trend on BLM land is expected to be maintained in the short-term and to gradually improve in the long-term. In the short-term, riparian stands would become denser. Slowly at first and then increasing over time, larger trees would fall and be recruited into streams and capture sediment, organic matter, and bedload, and would aid in dissipating stream energy, increasing channel and habitat complexity.

The channel condition trend on private land is expected to be maintained in the short-term and long-term. Riparian stands along streams on private lands would continue to be dominated by small, young trees, producing few large trees. Stream channels would continue to contain low levels of large wood and the channel habitat and complexity would remain simplified.

Stream Flows

The current effects that BLM lands are having on stream flows, including timing and magnitude, would continue. The existing crown closure, area of compacted ground, amount of roads, or number of stream crossings on BLM managed lands and other lands in the project area would remain essentially unchanged.

Water Quality

Riparian vegetation on BLM lands would continue to grow, slightly increasing streamside shade in the long-term. However, stream temperatures would probably remain unchanged. The current sediment and turbidity condition on BLM land is expected to continue a gradual downward trend with more sediment delivery and higher turbidity due to a poorly maintained road system.

Any existing effects to water quality in the affected watersheds would continue to occur from the development and use of private and other agency lands.

3.2.2 Environmental Effects Alternative 2: The Proposed Action

Streamflow

Minimum Flows

The proposed timber harvest would reduce forest cover, which could result in a slight increase in annual water yields and base flows. The amount of increases, however, would likely be small because the vast majority (94%) of the treatment area would be thinned. Thinning would retain canopy closures of greater than 50% over the treatment area. Trees would grow and quickly increase transpiration and soil-moisture intake rates. Slight increases in water yields and base flows are unlikely to have noticeable effects on channel morphology of project area streams or beneficial uses of water.

Peak Flows

Currently there is a low risk for peak flow enhancement (see earlier discussion in the Affected Environment). The proposed timber harvest and connected road work is unlikely to increase the risk of peak flow. The project area is located in a rain dominated watershed that receives about 50 to 80 inches of rain annually and has a relatively low rainfall intensity, making it less prone to the effects of extreme, precipitation driven, flood events (i.e., rain-on snow type).

The construction of new and temporary roads is unlikely to alter peak flows because the new total would remain in the OWEB's low risk category with less than 4% roaded area. These roads would be located and designed to minimize damage to resources. Nearly all of these road segments would be built on ridgetops or gentle topography without direct stream drainage

network connections. Several new cross-drains would be installed in the road surfaces that would reduce the roads influence on hillslope hydrology. Upon project completion, road decommissioning would result in an overall reduction of approximately 3.05 miles of road.

The vast majority of the proposed timber harvest would be a thinning. The proposed thinning would retain an overall canopy closure of at least 50% in the treatment areas. There is little evidence that partial harvest, where 50% of the basal area is retained, contributes to peak flow effects in rain-dominated watersheds (Ziemer, 1981a). After thinning, the remaining vegetation would quickly use any newly available soil moisture (Troendle et al, 2006).

In summary, the proposed 1,540 acres of thinning and 100 acres of regeneration harvest, involving less than 1.5 percent of any of the affected subwatersheds, would not substantially increase the amount of forest openings in the affected subwatersheds. With about 20 to 25% of the forest vegetation in the affected subwatersheds in the early-seral stage, the potential risk of peak flow enhancement would remain well below OWEB threshold and below the level determined by Grant (2008). According to Grant et al, if less than 29 percent of a rain-dominated watershed is harvested, there are no data supporting a resultant increase in peak flow. In fact, the first detectable reported value occurs at 40 percent.

Stream Character

There are 479 acres of Riparian Reserve thinning proposed; 210 acres are proposed in the Riparian Reserves of larger fish bearing streams and 269 acres are proposed in Riparian Reserves of smaller non-fish bearing streams (see Table 16 in *EA section 3.3.3*). In addition, approximately 0.87 miles of new roads would be constructed within Riparian Reserves, including approximately 0.22 miles within the second site potential tree height and 0.65 miles within the first site potential tree. All new roads would be at least 100 feet away from any stream channels.

The proposed action is not expected to increase the risk of peak flow (see peak flow analysis above). Stream channels adjacent to the proposed harvest units are mainly Rosgen type "A" stream channels and are not sensitive to increases in streamflow. All streams in proximity to proposed units would be protected with at least a 60-foot no-harvest buffer. In the cable yarding areas no stream crossings are planned, however in the event a yarding corridor is needed, full suspension yarding would be required across no-harvest buffers and stream channels.

Proposed culvert work at three perennial stream crossings would result in minor channel adjustments at the site level. Affected streams are small (mostly less than 3-feet bank-full width) low gradient (less than 4%) and have stable channels. Culvert work would employ best management practices and occur when there would be very little water flowing, thereby minimizing potential adverse impacts. Channel alterations would be expected to be short-term (1 to 2 years). Alternations would be confined to the stream crossing and less than 25 feet) upstream and downstream of the crossing.

In the long-term, upgrading the two undersized culverts would improve channel function (passage for high stream flows, wood, and bedload transport) and reduce the potential for future culvert and road fill failures.

Water Quality

Temperature

The proposed action would maintain stream temperatures in their current range. The proposed action would implement the "temperature sufficiency analysis" which provides protection to stream primary and secondary shade zones. Very little effective shade would be lost from timber harvest or roadwork. With fast vegetative growth rates in this area, any loss in effective shade would quickly be recovered.

Streamside shading along most of the streams on public lands is currently near system potential (see discussion in Affected Environment). Most of the streams in the project area are small (<5 feet wide), confined headwater streams where topography often has more important influence on streamside shade.

The proposed construction of approximately 5.53 miles of new road, including approximately 0.87 mile of new road within Riparian Reserves, would not reduce streamside shading in sufficient magnitude to affect water temperature. The majority of new road would be located on ridge tops and benches and none of the new roads that would be constructed would be within 100 feet of any stream. The current vegetation in the primary shade zone and most of the current levels of shading in the secondary shade zone would be retained. Proposed culvert work and roadside brushings and tree removals may remove some existing vegetation at the crossings, but the overstory canopy would be maintained.

The proposed timber harvest would implement riparian no-harvest buffers of at least 60 feet on intermittent streams and at least 60 to 100 feet on perennial streams. No skyline corridors across streams are anticipated and at least 50% canopy closure in Riparian Reserves would be retained after treatment. In proposed regeneration units, no timber harvest would occur within Riparian Reserves.

Sediment and Turbidity

Sediment delivery rates and turbidity levels in the affected subwatersheds are likely to increase slightly over the short-term as a direct result of road maintenance, road decommissioning, and hauling and, through road renovation and maintenance, decrease in the long-term.

The proposed timber harvest is unlikely to measurably increase sedimentation and turbidity levels. Hillslopes in proposed timber harvest units are dominated by gentle to moderate slopes. All areas with potential for slope instability and mass wasting were identified during field work and were removed from the project. All yarding of the ground-based areas and the majority of the cable yarding areas would occur during the dry season. No skyline corridors across streams are anticipated. Most sediment produced from logging would travel a short distance before

being trapped by duff, woody materials or other obstructions. A recent Washington State study (Rashin et al, 2006) evaluating timber harvest best management practices found that a 10-meter (~33 feet) wide, no ground disturbance buffer along streams prevented 95% of harvest related sediment from being delivered to streams. The proposed action would use no-harvest buffers nearly double to triple that width.

The proposed roadwork, including approximately 5.53 miles of new road construction, approximately 7.18 miles of road renovation, approximately 22.30 miles of road maintenance, and decommission or stabilization on nearly all of these roads, would generate sediment and result in localized increases in stream sediment and turbidity.

Most roadwork would have little potential to affect sedimentation and turbidity levels because with the exception of three stream crossings, most roadwork would occur on gentle to moderate sloping stable ridgetops and benches and all road work, with the exception of culvert work, would be 100 feet or greater from stream channels. Project design features, as earlier described would be implemented to eliminate and/or minimize erosion generation and sediment delivery to streams. Most fine sediment generated by the roadwork would wash off roads and collect in roadside ditches or be filtered in the adjacent forest floor.

The highest potential for sediment delivery would be associated with proposed culvert work at three perennial stream crossings (one new temporary culvert in section 7 and two culvert upgrades in sections 19 and 20). The amount of sediment created by culvert work and delivered to stream is expected to be small, ranging from less than 0.25 yd^3 up to 0.75 yd^3 for each installation or removal. Affected streams are small (mostly less than 3-feet bank-full width) low gradient (less than 4%) stable channels. The crossings are shallow and culvert work would employ best management practices and occur when there would be very little water flowing, thereby minimizing potential adverse impacts. With low summer flows, increases in turbidity are expected to be short-term (less than a half-hour) and probably not be visible below 100 feet downstream. Most of the downstream movement of sediment would occur during subsequent winter freshets in the first year when background sediment and turbidity levels are normally at the highest. Over the long-term (beyond 3-5 years), the fine sediment inputs would decrease with improved road drainage conditions.

Timber Hauling

Access to the proposed units for timber hauling would come primarily from existing or renovated rock surfaced roads. Most timber hauling would occur during the dry season (generally June 1 through October 15) when there is usually no flowing water on road surfaces and ditches (see Figure 11 located in *EA section 8.1*). Dry season hauling would result in minimal sediment delivery to streams because there would be no mechanism to transport sediment to streams. Timber hauling would be permitted year-round on some rock-surfaced roads. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream sediment delivery and turbidity. Wet season hauling may result in some minor sedimentation. However, all of the wet season haul routes are located on ridgetop positions with few, mostly intermittent, headwater stream crossings. Project design features such as suspending haul during

prolonged rainfall events or if the road surface shows signs of excessive deterioration would be implemented. Based upon road and stream locations and the project design features that would be implemented, no negative impacts to water quality would be expected from the project action.

In summary, the proposed action, including timber harvest, roadwork, and timber hauling, would maintain water quality, protect the recognized beneficial uses, and comply with the TMDLs.

Cumulative Effects

The proposed project is unlikely to have any measurable direct or indirect effect on peak flows, channel morphology, and water quality. For peak flows, this assumes that the current timber harvest activity on private lands would continue about the same resulting in a crown cover of less than 30 percent. Current conditions and trends would likely be maintained under the proposed action.

3.3 Threatened or Endangered Fish Species or Habitat, Magnuson Stevens Act – Essential Fish Habitat and Species with Bureau Status.

3.3.1 Affected Environment

The fisheries analysis area for the South Scappoose Creek Project consists of the South Scappoose Creek subwatershed. The majority of the project area (89% of the proposed treatment acres) is within the South Scappoose Creek subwatershed, 7% of the project area is in the Upper East Fork Dairy Creek subwatershed, and 4% is in the Upper McKay Creek subwatershed. See Table 14 for number of acres per sixth field watershed and total treatment acres within the Riparian Reserve LUA.

Table 14: Acres of Treatment by Sixth Field Watershed

Sixth Field Watershed	Treatment Acres	Treatment in Riparian Reserves
South Scappoose Creek	1451	453
Upper East Fork Dairy Creek	126	6
Upper McKay Creek	58	16
Total	1635	475

The small portion of the project area within Upper East Fork Dairy Creek and Upper McKay Creek subwatersheds is near ridgetops, within about 0.5 miles of the South Scappoose Creek subwatershed boundary. The closest unit to Endangered Species Act (ESA) listed Upper

Willamette steelhead trout and coho salmon in Upper McKay Creek subwatershed is approximately 2.5 stream miles and the closest unit to ESA listed Upper Willamette steelhead trout and coho salmon in Upper East Fork Dairy Creek is approximately 3 stream miles at the closest point. All riparian reserve treatment in the Upper East Fork Dairy Creek and Upper McKay Creek subwatersheds is within the first site potential tree height and is adjacent to non-fish-bearing stream channels. All logs harvested would be hauled out roads in the South Scappoose Creek subwatershed, therefore there is no effect to fish species or fish habitat in either of these subwatersheds and they will not be considered in the analysis area. See Figure 2 for fish distribution in relation to project area in each of these three subwatersheds.

Fish Species Distribution and Status

The primary fish species found within the analysis area are coho salmon (*Oncorhynchus kisutch*), steelhead trout (*O. mykiss*) and cutthroat trout (*O. clarkii*). Coho salmon are listed as threatened under the ESA. The analysis area falls within the Lower Columbia Evolutionary Significant Unit (a distinct population segment) for coho salmon. See Figure 2 for fish distribution in relation to project area and subwatershed.

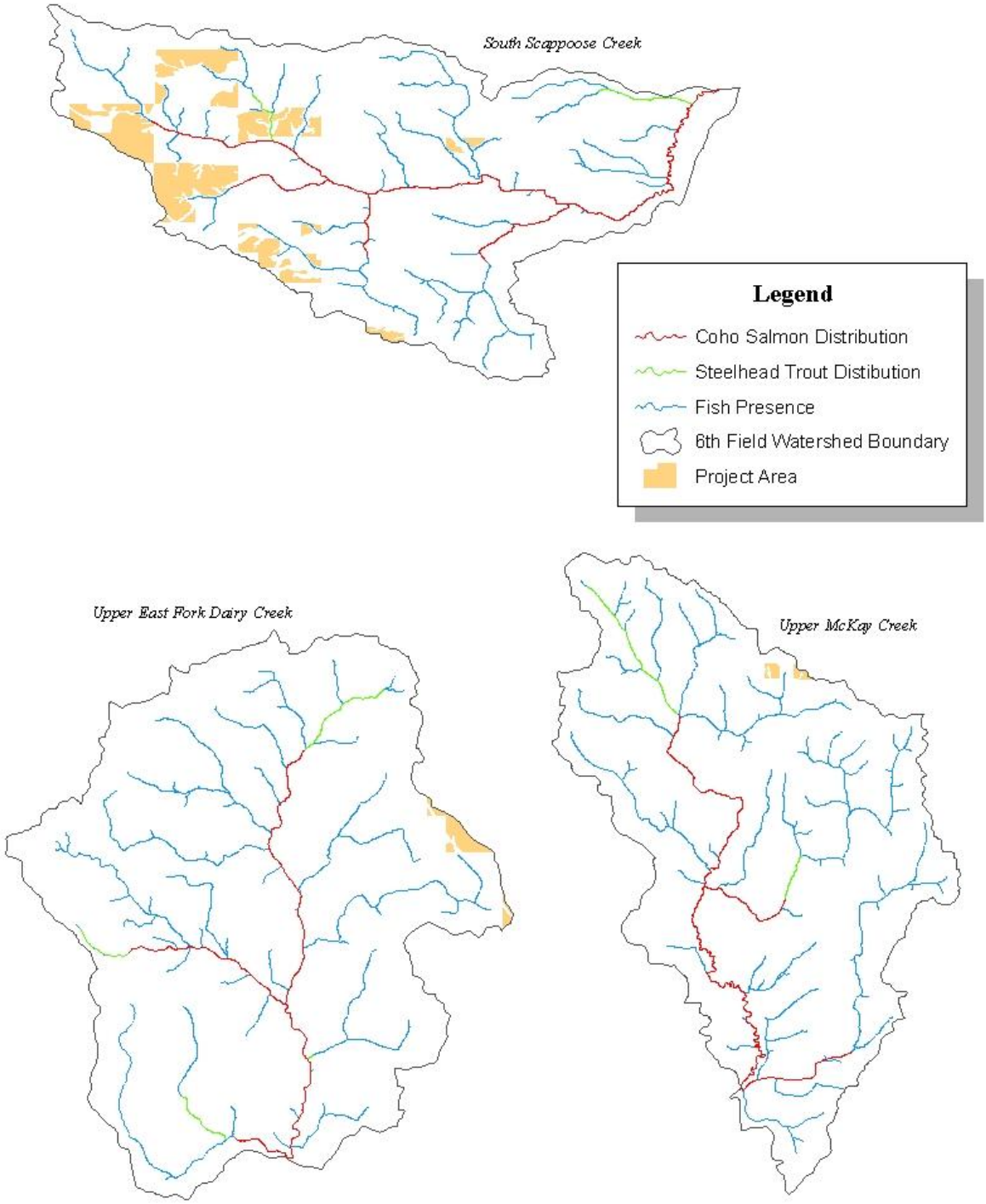
Also present in the analysis area are Lower Columbia steelhead trout and Lower Columbia River and Southwest Washington cutthroat trout, both are recognized as Bureau sensitive species (see Figure 2). Chinook salmon (*O. tshawytscha*) are listed as threatened under the ESA and are present downstream of the analysis area in the mainstem of Scappoose Creek. Because they are outside of the analysis area, more than six stream miles from the closest proposed project area and no haul routes are proposed proximal to their habitat. Chinook salmon would not be affected and will not be considered in this analysis.

Table 15 depicts the miles of fish habitat present in the South Scappoose Creek subwatershed. Cutthroat trout have the widest distribution followed by steelhead trout and finally coho salmon. The mileage displayed in Table 15 for each fish species are inclusive, for example cutthroat trout habitat mileage generally includes all the coho salmon and steelhead trout habitat and steelhead trout habitat generally includes all the coho salmon habitat, therefore values should not be added together to obtain total mileage.

Table 15: Miles of Fish Habitat in South Scappoose Creek

6th Field Watershed	*Miles of Fish Habitat*		
	Coho Salmon	*Steelhead Trout*	*Cutthroat Trout*
South Scappoose Creek	15	16	56

Figure 2. Fish Distribution by Sixth Field Watershed



Fish Habitat

Salmon and trout species need cool water temperatures, hiding cover, clean spawning gravels, rearing pools, adequate food supply, and unimpaired passage for good fish production. It can be assumed that prior to extensive timber harvest, log drives, road construction, and settlement, fish habitat was in better condition than it is today. Better habitat was most likely associated with large woody material entering stream channels creating complex habitat and pools desirable for fish production and survival. Historically fish passage was not affected by dams, culverts or water diversions and water quality was generally better.

Coho salmon, steelhead trout, and cutthroat trout vary in their seasonal habitat utilizations. In general, coho salmon occupy middle stream reaches while cutthroat trout and steelhead trout occupy upper stream reaches. During high flow periods associated with winter and spring, juvenile coho salmon, steelhead and cutthroat trout depend on the low velocity habitats provided by complex pools, backwaters, and off-channel alcoves.

Adult salmon and trout use pools and wood structure for shelter from predators and resting. During low flow periods juvenile steelhead and cutthroat trout inhabit higher velocity areas associated with riffles, while coho salmon continue to occupy pools. Two year and older steelhead and cutthroat trout generally prefer the deepest pool habitat. In Coast Range streams, large wood pieces and accumulations play a vital role in maintaining channel complexity and fish populations. Large woody debris (LWD) creates scour, recruits and maintains spawning gravel, creates rearing pools, and increases channel complexity.

Existing Habitat Conditions

Data obtained for South Scappoose Creek subwatershed comes from Oregon Department of Fish and Wildlife (ODFW) Aquatic Habitat Inventories conducted in 2008 and 2009. All streams were surveyed downstream of the project area primarily on private industrial timber and rural residential land.

South Scappoose Creek was surveyed from the confluence of Raymond Creek and continued upstream six miles; seven reaches were designated based on tributary contributions. Land use varies from rural residential to second growth timber production. The data indicates the reach channels are constrained by terraces and hillslopes within a broad valley. Silt and organic fines are in low proportion to the predominant substrate types of gravel and cobble. Riffles and rapids are the dominant habitat types. Large wood volume is low throughout all reaches surveyed. Three man-made potential barriers to fish movement were observed, a secondary channel with concrete, man-made steps about one meter high, a culvert with an approximate two meter drop, and a concrete fish ladder with four steps, each a half meter high.

Gourlay Creek was surveyed from the confluence with South Scappoose Creek upstream 1.4 miles to a tributary junction. Two reaches were designated based on geomorphology and tributary junction. Land uses were second growth timber and larger timber. Fine sediments, gravel and cobble were the principal substrates. Rapid and riffles were the predominant habitat types and large wood volume was low throughout both reaches.

Lazy Creek was surveyed from the confluence with South Scappoose Creek and extended upstream 0.7 miles; two reaches were designated by geomorphology and tributary contribution. Land uses were second-growth timber and large timber. Gravel and cobble were the dominant substrate types and rapids and cascades were the predominant habitat types. Large wood volume was low throughout both reaches.

Raymond Creek was surveyed from the South Scappoose Creek confluence and extended upstream 0.8 miles; the survey was comprised of one reach. The channel is hillslope constrained with high terraces within a broad valley. Land uses consisted of rural residential and agricultural. Riffles and scour pools were the dominant habitat types and gravel and cobble were the predominant substrate types. Large wood volume was low throughout the reach.

Based on field observations in the project area, trends and data for the streams surveyed by ODFW hold true for BLM-administered lands as well. The only major difference is riparian areas on BLM-administered land generally have more and larger conifers, with larger streams having a significant older hardwood component that is not present on private lands.

Habitat Trends

Since the implementation of the Northwest Forest Plan in 1994, timber harvest that has occurred on BLM-administered land has protected riparian reserves resulting in reduced erosion and stream sediment levels (USDI-BLM 2008). Most culverts allow fish passage and have been upgraded to handle 100-year flood events, resulting in less risk of major washouts and providing fish access to most available habitat. Riparian areas on BLM-administered land are improving throughout the South Scappoose Creek subwatershed. As a result, the younger stands are recovering and will provide increased shade levels and eventually increased LWD recruitment and instream LWD.

3.3.2 Environmental Effects Alternative 1: No Action

When the Magnuson-Stevens Act (MSA) of 1976 was re-authorized in 1996 it directed Regional Fishery Management Councils to identify Essential Fish Habitat (EFH) for commercial fish species of concern. Effects analyses contained here address potential effects to EFH. Essential Fish Habitat is defined as 'those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity' (16 U.S.C. 1802(10)).

Under Alternative 1 no treatment would be implemented. There would be no new roads or landings built or additional ground disturbance from forest management activities. Water quality, sediment input, and stream channel morphology would all continue to be influenced by the existing conditions in the subwatershed and past and ongoing disturbances.

Overstocked riparian reserves would not receive treatment to reduce densities and increase growth rate of remaining trees. Riparian reserves would not receive benefits of increasing growth rates which would ultimately increase LWD recruitment and the potential for instream LWD.

Cumulative Effects

Past actions including timber harvest and road construction have occurred on both public and private lands in the South Scappoose Creek subwatershed. Past actions have resulted in degraded fish habitat and riparian habitat through decreased LWD recruitment, decreased instream LWD, and increased fine sediment levels. Implementation of the no action alternative is not expected to contribute to cumulative effects.

3.3.3 Environmental Effects Alternative 2: The Proposed Action

This alternative would have no direct effects to fish or fish habitat. Indirect effects on fish and fish habitat from this alternative include potential to increase short-term sedimentation, decrease long-term stream sedimentation, and to increase LWD recruitment in riparian reserve thinning units.

Timber Yarding

Table 16 displays the acres of riparian reserves that are proposed for thinning in riparian reserves. There are a total of 479 acres proposed for thinning within riparian reserves, 269 are in riparian reserves associated with non-fish-bearing streams and 210 acres are in riparian reserves associated with fish-bearing streams.

Table 16: Acres of Proposed Treatment in Riparian Reserves

Harvest Method	Proposed Treatment Acres	
	1st Site Potential Tree Height	2nd Site Potential Tree Height
Skyline	113	127
Skyline (full suspension)	6	8
Ground based	150	75
Total	269	210

Any sediment that enters streams from yarding as a result of timber harvest is expected to have an immeasurable effect on fish and fish habitat for the following reasons; skid trails and ground-based yarding equipment would be allowed within the riparian reserves outside of no harvest buffers only on authorized skid trails or existing roads, no-harvest buffers (minimum 60 feet for non-fish bearing intermittent streams and minimum 100 feet for perennial and fish bearing streams) would be placed along both sides of streams, yarding is not expected to cross any streams, areas with greater than 70% slope or fragile soils would be cable yarded with full suspension systems, and most sediment produced from logging would travel a short distance before being trapped by duff, woody materials or other obstructions. There is a total of approximately 80 acres proposed for timber harvest that has greater than 70% slope or is located in an area with fragile soils; approximately 15 acres are in riparian reserves, approximately 6 acres within the first site potential tree height and 8 acres within the second site potential tree

height. None of the riparian reserves associated with fragile soils or greater than 70% slope are adjacent to ESA listed fish species.

There are three proposed units that would treat riparian reserves associated with ESA listed Lower Columbia River coho salmon, unit 8 section 7; unit 3 in section 11 (both located adjacent to South Scappoose Creek); unit 9 in section 13 adjacent to Lazy Creek. The two units adjacent to South Scappoose Creek would have 100 foot no harvest buffers and the unit adjacent to Lazy Creek is 350 feet from Lazy Creek at the closest point.

Road 3N-2-17, a double lane, rocked road, currently bisects the riparian reserve of South Scappoose Creek and unit 8 lies entirely upslope of this road. The area proposed for riparian reserve treatment in unit 8 does not currently function as a riparian reserve, trees are not providing cover for the stream channel and trees are not acting as LWD recruitment, therefore harvest of this unit would not affect fish or fish habitat.

Unit 8 is at the uppermost extent of coho salmon distribution on South Scappoose Creek and would be cable yarded. Unit 9 is at the uppermost extent of coho salmon distribution and is 350 feet from Lazy Creek and would be harvested through ground based methods. Any sediment or ground disturbance associated with either of these units is expected to be localized and the 100 foot buffer on unit 8 and the minimum 350 feet distance from unit 9 is expected to prevent any sediment from reaching stream channels, is not expected to affect LWD recruitment, and would not affect stream shade or stream temperature, therefore there would be no effect to fish or fish habitat.

Road Construction, Renovation, and Decommissioning
As discussed in the Hydrology analysis *(EA section 3.2.2*) road construction, renovation and decommissioning activities may contribute small amounts of sediments most likely following culvert replacements or removals. The road construction and renovation may contribute sediment to local streams but BMPs implemented during construction and project design features (*EA section 2.4.2*) would keep the volume of sediment entering local waterways at levels that would have an immeasurable effect on ESA listed fish.

There are a total of 21 culverts associated with this project; of these two would be permanent stream crossings on live streams. The permanent culvert replacement in section 19 is a perennial stream channel approximately 2 miles from coho salmon habitat on Gourlay Creek. The second permanent live stream culvert replacement is on a perennial stream channel in section 20 and is 0.6 miles from coho salmon habitat on Gourlay Creek. See Table 5 for all culvert replacements and descriptions.

There would be no measurable impacts to fish or fish habitat from these culvert replacements attributable to distance from ESA listed species, small stream size, seasonal work restrictions (road construction would be limited to the dry season, generally June 1 through October 1), and small amounts of anticipated sediment released as a result of this action. Most of the sediment

generated would move through the stream system during periods of high flows when normal sediment background levels are high.

See Table 3 for road work summary of the proposed action. Through decommissioning of natural surface roads there would be a net decrease in road miles by 3.05 miles and an additional 25.06 miles of maintenance, renovation, and stabilization would be implemented. Attributable to the distance of culvert removals associated with road decommissioning to ESA listed coho salmon, the small magnitude of the sediment releases, the generally small stream size associated with culvert removals and the spatial and temporal distribution of the culvert removals throughout the project area, there are no anticipated measurable impacts to ESA listed fish or their habitat. Indirect long term benefits of the road decommissioning to ESA listed fish would be a more stable road system that would reduce sediment contribution to area streams.

See Table 4 for new road construction summary within second site potential tree height and first site potential tree height riparian reserves. All new roads within riparian reserves would be temporary, new rocked roads would be stabilized after use and new natural surface roads would be decommissioned after use.

There is one new road, P-8, that would cross an intermittent stream channel. This is the only new road segment that is within the no-treatment buffers, all other new road construction would be at least 100 feet from stream channels. The temporary road crossing on road P-8 is 0.2 miles from cutthroat and steelhead trout habitat on McLafferty Creek and 0.5 miles from coho salmon habitat on South Scappoose Creek. This road segment would be natural surface, haul would be in the dry season only, and the road segment would be decommissioned after use, therefore no measurable effects are expected to ESA listed fish or their habitat.

Timber Hauling

See Figure 11 for fish distribution and haul routes. Season-long haul routes are restricted to Pisgah Home Road (road segments P-1, 2, 3, 17, 31, 32, 33, 35, 37, and 38 that accesses proposed skyline units in section 1) and Dixie Mountain Road (road 3N-2-29.3) that accesses proposed skyline units in section 19. All other haul routes and timber harvest, both skyline and ground based would be restricted to the dry season, generally June 1 through October 15. Both roads proposed for season long use are located in ridgetop areas with little hydrologic connectivity and are currently in good condition. Hauling timber is unlikely to contribute any measurable, quantifiable sediments to streams because, with exception to the two roads discussed above, haul would be restricted to dry season only. Analysis of the proposed season long haul routes determined that the use of BMPs included in design features (*EA section 2.4.2*) and good road conditions reduce sediment inputs to immeasurable quantities. The distance to ESA listed fish downstream and lack of hydrologic connectivity further reduces the chance of impacts.

Stream Temperature

As discussed in the hydrology analysis (*EA section 3.2.2*), the proposed action would maintain the current stream temperature ranges and any effective shade that is lost would be quickly recovered; as such, there is no causal mechanism to affect fish or their habitat.

Physical Integrity
With the exception of small streams in road drainage crossings in the project area, the proposed action would not directly alter any stream channels. With the exception of road drainage crossings all ground equipment would be kept away from stream channels and wetlands.

Culvert work at stream crossings would disturb stream channel beds and stream banks which would result in minor, short-term (1 to 2 years) channel adjustments. All affected streams are small (mostly less than 5-feet bank full width) and are intermittent first order stream channels. As discussed in the hydrology analysis (*EA section 3.2.2*) anticipated sediment generated from culvert removal/replacement would be small in magnitude, short term (less than half an hour), and is expected to only move a short distance (less than 150 feet). In the long-term (greater than 3 years), this action would have a beneficial effect by reducing the risk of future road failure and improve stream channel form and function by resizing replaced culverts to accommodate 100-year flood events.

Large Woody Debris
Approximately 29% of the proposed project area (approximately 479 acres) would occur within riparian reserves. These riparian reserve treatments would occur outside no-harvest buffers that would be implemented on all stream channels. Harvesting trees within the riparian reserve and outside the no harvest buffers would directly remove a potential source of small wood to stream channels. In the Pacific Northwest, the majority of woody debris recruitment occurs within 59 to 65 feet of the stream edge (McDade et al 1990, Van Sickle and Gregory 1990, Meleason et al 2002). The use of 60- or 100-foot no harvest buffers precludes most of the potential loss of this wood.

The Curtis relative density following treatment in the riparian reserve first site potential tree height (240 feet) would be maintained at 30 or higher. When used in combination with no-harvest buffers a Curtis relative density of greater than or equal to 30 following timber harvest has been accepted by NMFS as having no measurable effect to large woody debris recruitment. Although the thinning of riparian reserves removes some potential small diameter wood available for future stream recruitment, small diameter wood does not last as long and is more readily moved from the system than large diameter wood. Thinning would be expected to accelerate the growth rate of the trees that remain in the riparian reserves and increase the quality and volume of large woody debris naturally recruited to the stream channel. The benefit of this growth would be very minor as the majority of perennial streams within the project area lack the power to move wood (see hydrology section - EA *section 3.2.1*).

Construction of approximately 0.65 miles of new road may occur within one site potential tree height of stream channels. Removing trees during construction may directly result in a small loss in potential wood recruitment to adjacent stream channels. The effect would be small and local because most roads are on gently sloping benches and ridgetops, roads are at least 100 feet away from any stream channels, and most of the trees that would be removed are shorter than the distance separating the new roads to the nearby streams. Any trees that would be removed for

the proposed road construction are unlikely to contribute large wood to downstream fish-bearing reaches because affected streams are small and lack the power to move large wood.

Road Density
As described in the proposed action there would be a net decrease in road mileage of 3.05 miles. Decreases in road density are considered beneficial to watershed function, however this benefit is difficult to quantify as it relates to habitats or fish that are not in close proximity. Any effect would be immeasurable with no anticipated or measurable changes, either beneficial or adverse, where fish species with ESA or bureau status are reached.

Streamflow
As discussed in the hydrology section of this analysis (*EA section 3.2.2*), the proposed action is unlikely to measurably change stream flows at the project area or affected sub-watershed scale, and therefore there is no causal mechanism to affect fish.

Fish Passage
The proposed action would have no effect on fish passage. This project neither creates nor improves fish passage culverts for fish species and therefore has no effect on fish or fish habitat.

Forage Species
Juvenile coho forage primarily on insects that fall into streams from adjacent riparian vegetation and drifting aquatic insects in the water column. Most of the riparian areas within the project area have mixed stands of hardwoods and conifers with a dense shrub understory. A recently completed study on the impacts of streamside shrubs and trees found that forage species were greater in areas with abundant streamside shrubs and trees (Romero, Gresswell, and Li 2005). Substrate in stream channels is a mix of gravels, cobbles and boulders that provide good quality habitat for macro-invertebrates. Limited sediment inputs associated with culvert removal and design features such as 60-foot minimum no-harvest buffers would avoid adverse effects on existing in-stream woody material levels, LWD recruitment rates to area streams, and stream substrate material, therefore treatment of riparian stands would not affect forage species.

Conclusions for MSA-EFH and Bureau Status Species
The environmental effects resulting from implementing the proposed action alternative are highly unlikely to have any effect on EFH or species with Bureau Status. Potential long-term beneficial effects could include larger sized LWD entering the stream network sooner as a result of increased growth rates of trees in the treated units. Based on the incorporated design features, proximity of project actions to MSA fish species and their habitat, and seasonal restrictions, it is unlikely that the proposed action would have any effect on EFH. No effects to EFH resulting from implementing the project are expected. Therefore, the effect call for ESA listed coho salmon is *No Effect.* The proposed action would not contribute to the need to list Lower Columbia/Southwest Washington steelhead trout, or Lower Columbia/Southwest Washington cutthroat trout, currently Bureau Sensitive species.

Cumulative Effects
The proposed action when combined with other actions occurring on private forest lands in the subwatershed would be unlikely to have any detectable impacts on fish or fish habitat in the short term (1-3 years). Any effects as a result of the Proposed Action would be within the range of effects disclosed in the RMP/FEIS (pp. 4-14 to 4-19). Most of the sediment generated as a result of the proposed action would be stored in small non-fish bearing stream channels during the dry season.

The long term (over 3 years) cumulative impacts associated with the removal of 3.05 miles of roads, improved road/stream crossings, road maintenance activities, and increased growth and vigor of trees in the riparian zone associated with the proposed action would result in minor improvement of the indicators listed above for ESA , MSA (EFH) and Bureau Sensitive species.

3.4 Soils

The following soil resource issues will be addressed in the environmental effects section below:

1. How would be the effects of vegetative removal and ground disturbance through timber harvest and roadwork affect soil productivity?
2. How would be the effects of ground disturbance through timber harvest and roadwork affect slope stability?

The BLM Resource Area Soil Scientist visited the project area numerous times, spot-checking soil maps and soil descriptions conducted by the Natural Resource Conservation Service (http://www.or.nrcs.usda.gov/pnw_soil/or_data.html), evaluating soil conditions and suitability, and verifying and mapping the Timber Production Capability Classification (TPCC) on BLM lands in the project area (USDI-BLM, 1987). All sites in the proposed area for timber harvest are capable of sustaining intensive timber management without long-term loss of productivity.

3.4.1 Affected Environment

Physical Setting
The landscape is comprised of rolling hills, broad ridgetops and low rounded mountains intersected by steep slopes and cut by small headwater streams. Elevations within harvest units range from about 280 to 2,000 feet. The humid mild climate in this area is favorable for growing trees. The bedrock geology consists of bedded sandstone and siltstone capped by basalt on mountain ridgetops and upper hilltops. The dominant erosion processes within the project area are small surface slumps and shallow, rapid-moving landslides. With high infiltration rates and dense vegetative cover on most forested hillslopes in the project area, surface runoff is relatively rare and hillslope erosion rates are very low. Most surface erosion is associated with roadways including poorly vegetated cutbanks.

Project Soils

The dominant soil types found within the proposed timber harvest units, in descending abundance, are the Tolany, Goble, Scaponia-Braun, Bacona, and Olyic soil series. The Tolany soil series is cool (frigid), loamy, very deep, well-drained soil formed largely from volcanic ash. It is on broad mountain ridgetops and upper sideslopes, mainly in the northern half of section 1 and most of section 11. It has typical Andic properties including low bulk density, high infiltration rate, high water absorption, low cohesion, low bearing strength and poor compactability.

The Goble soil series is loamy, 30 to 45 inches deep to a dense, slowly permeable layer (fragipan) which extends below 40 inches in depth. Goble soils formed from silty loess over mixed alluvium found on stable, convex, broad ridgetops and side slopes of rolling hills primarily in sections 19, 21, and 29. Some of the Goble soils located in depressions may have surface ponding in the winter.

Scaponia and Braun series are intricately intermingled. The Scaponia soils are loamy, 40 to 60 inches deep to soft bedrock and are well drained. Braun soils are similar to the Scaponia except they are 20 to 40 inches deep to siltstone or sandstone. They formed from colluvium from siltstone or sandstone, typically found on lower convex side slopes of hills incised by streams throughout most of the project area. They develop on young landscapes, often on steep slopes where soil erosion removes parts of their topsoil continuously, resulting in limited soil development. Slumping is common on very steep (>70%) slopes that have been clear-cut or on steep headwall and inner gorge areas cut by streams. Some drier, steep, south-facing slopes that were clear-cut have had reforestation problems. The Braun soils are at higher risk to windthrow when stands are opened up.

The Bacona soil series is loamy, very deep and well drained, formed from silty loess and colluvium weathered from sedimentary rocks. It occurs on stable, convex broad ridgetops and sideslopes of mountains, primarily in the southern half of section 1 and in the upper hillslopes of section 7. The Bacona soil has a buried, well developed subsoil and a profile where most of the weatherable minerals have been leached out.

The Olyic soil series is similar to the Bacona series except that it formed from basalt, has a slightly coarser texture and lacks a buried subsoil horizon. It is found in the western portion of sections 13 and 19.

Existing Conditions

Project area soils have moderately high potential for growing timber. The site index, the most common method of measuring timber productivities, ranges from 137 to 176 on Douglas fir, 50-year basis (USDA SCS, 1882 and USDA SCS, 1986).

Most soils within proposed harvest units have good physical and biological properties (deep, low bulk density, high organic matter content) for growing forest vegetation. Currently, there are low levels of CWD in proposed harvest units. CWD provides habitat for a number of important

soil organisms (fungi, bacteria, and macro invertebrates) that decompose organic material and make soil nutrients available to plants.

Road densities vary between 4.48 to 6.32 miles/sq. mile and percent roaded areas vary from 2.1 to 3.0 within the affected subwatersheds (Table 13). Based upon soil scientist field observations and a review of aerial photos, it is estimated that about 3% to 7% of the soils within the proposed ground-based units and up to 2% of the proposed skyline harvest units have heavy compaction, rutting and topsoil displacement. Most these disturbances are confined to narrow linear features, principally primary skid trails and natural surface spur roads. There is little evidence that these disturbances are having noticeable impacts on timber productivity. Generally, forest stands within proposed harvest units are fully occupied by tree canopies.

Slope Stability and TPCC

Slope gradient is the most easily measured and probably the major cause of slope stability and landsliding. Most commonly, the steeper the slope, the less stable it is. Therefore, steep slopes are more likely to experience slope instability than gentle sloping ones.

Approximately 93% of the proposed timber units are located on slopes less than 60 percent, most mainly on hummocky irregular and benchy terrain. The dominant mass movement process on these gentle to moderately steep slopes is soil creep (very slow, downslope movement of soil) and small scale slumping. The current risk of landslides on these slopes is very low. The remaining 7% (approximately 111 acres) of proposed harvest ground is on steep, 60 to 80 percent, mountain and hill slopes. The dominant mass movement process is small-scale slumps and rapid moving, shallow translational landslides (e.g., debris slides). The current risk of landslides on these slopes is low.

Within the proposed area for timber harvest there is 1 acre of FWR1 and 80 acres of FGR1 identified under the Timber Production Capability Classification (TPCC). FWR1 sites are very moist, poorly drained sites. The main management concerns for FWR1 sites are alteration of the hydrology, changed vegetation, and loss in timber production. FGR1 sites are steep sites most commonly in headwalls and along streams that have moderate potential to become unstable when disturbed.

3.4.2 Environmental Effects Alternative 1: No Action

The effects of the no action alternative would be a continuation of current soil processes and conditions as described in the Affected Environment section. Existing soil compaction would continue to recover very slowly. Soil creep and small slumps would continue to occur infrequently, mostly consisting of small (<1/8 acre) slumps. Vegetation would continue to grow and organic matter including CWD would slowly accumulate.

3.4.3 Environmental Effects Alternative 2: The Proposed Action

Soil Productivity

Soil disturbance effects from forest management activities can affect tree growth negatively, neutrally, or even positively. The direct link between disturbance and loss in forest productivity is often difficult to predict. A number of factors such as the magnitude and duration of the disturbance, sensitivity of the soil to the disturbance, and the climate can affect forest productivity and effects are site specific and highly variable.

Fuel reduction actions are not expected to measurably decrease productivity because project design features would be implemented to minimize soil disturbance and the amount of area affected would be small (totaling less than 2 acres) and widely dispersed. To minimize soil damage, burning would be restricted to wet soil conditions when soil resources are less vulnerable to impacts and all heavy equipment would be restricted to existing roads. The majority of the burning would be done on existing roads and landings.

The primary concerns for this project are the potential soil productivity effects of soil compaction caused by equipment traffic and removal of top soil from ground-based yarding and new road construction. Project soils, with their high contents of clay and silt particles in their surface horizons, are prone to compaction from heavy equipment traffic and dragging of logs. Once they become compacted, they are very slow to recover (commonly 50+ years). Soil removal or displacement is always a concern because most of the productivity of a soil is stored in its surface and soils form very slowly.

To prevent potential loss in long-term soil productivity, several management practices would be implemented including restricting ground-based equipment to tracked equipment, generally limiting them to slopes less than 35%, and restricting their use to times when soils are dry and strong, and avoiding yarding logs or building skid trails across wet areas.

Under the proposed action, ground-based systems would yard approximately 925 acres, or about 56% of the total harvest units and skyline-yarding systems would yard about 715 acres, or about 44% of the total harvest units. Most of the ground-based yarding would occur on slopes less than 35% and most of the skyline yarding would occur on slopes greater than 45%. (For a list of PDFs that would be used in this project to protect soils and other resources, (see *EA section 2.4.2*.)

In ground-based yarding units, if a tractor/skidder were used, ground disturbances would be concentrated in skid trails and landings. It would be expected to result in a moderate amount of topsoil displacement and moderate to heavy soil compaction (over 20% increase in density), covering about 6 to 8% of each harvest unit, totaling about 55 to 74 acres. If mechanized harvest or cut-to-length systems were used, the more likely method, the placement of slash and large wood in front of the machine would result in less displacement and heavy compaction and more dispersed light compaction.

Skyline yarding would result in some discontinuous strips of compaction and displacement in skyline corridors. About half of the landings would be located in roadbeds. Total severe disturbance, mostly coming from building landings, would average about 2% through each harvest unit, totaling about 14 acres.

In conclusion, the proposed timber harvest is expected to maintain soil productivity and be within the range of effects analyzed in the RMP/FEIS, to which this EA is tiered. The aerial extent and degree of disturbance would remain within accepted ROD/RMP guidelines of less than 10% disturbance. Project Design Features and Best Management Practices would be implemented to limit soil disturbance. All sites too sensitive to tolerate any forest management activities (Non-suitable Woodland under TPCC) were removed from the proposed action. Project soils have moderate to moderately high potential for growing timber and are in good overall condition. The climate is favorable for growing forest vegetation. Based upon a number of recent, short-term (less than 10 years) forest disturbance studies, sites with favorable soil and climate conditions in the Pacific Northwest show no or very little effect on short-term tree growth when logged by current standard timber harvest practices (Miller, 1996; Heninger, 2002; Scott et al, 2004, Ares, et al, 2005). Many of the forest stands proposed for treatment are currently densely stocked. The proposed thinning by reducing plant competition (e.g., light, nutrients, water and growing space) would probably slightly increase the productivity of residual trees.

Constructing approximately 1.4 miles of new permanent rocked and approximately 4.2 miles of new temporary, natural surface roads would result in approximately 14 acres of severe soil disturbance (i.e. topsoil removal, reduction in infiltration, increase in density, reduction in water storage, and potentially increased soil erosion). Renovating approximately 7.2 miles of existing roads would result in approximately 9 acres of severe soil disturbance. This figure assumes that disturbance from road renovation would be about half of that from the original road construction.

Upon completion of the logging, all of the new, natural-surfaced roads and approximately 4.4 miles of the renovated existing natural surface roads would be decommissioned resulting in a net reduction of about 3.0 miles in the project area. Decommissioning would put the roads in an "erosion resistant" condition, help to restore some of the hydrologic function, and improve soil physical properties.

Severe soil disturbance resulting from road construction and renovation would result in some measureable loss in soil productivity on about 23 acres. Subsoiling up to 4.4 miles of road would accelerate soil remediation, but the soil function and soil productivity would be impaired for at least 50 years.

Slope Stability

The proposed action would slightly increase the short-term (ten years or less) risk of harvest-related landslides from low to the low-moderate range on 111 acres where slopes range from 60 to 80 percent. The increase in risk would be difficult to quantify but it would likely remain in slight for the following reasons:

1. All or nearly all of this area would be thinned, not regeneration harvested. Most of the vegetation, root systems and litter would remain in place thereby retaining most of the soil moisture and root strength. Many field and experimental studies have confirmed the importance of trees and root mass on shallow forest soils for slope stability (Roering, 2003, Schmidt, 2001, Krogstad, 1995; Sidle, 1992, Ziemer, R.R., 1981b, Burroughs, 1977.)
2. Forest stands are intermediate age. Landsliding is less likely to occur in areas covered by intermediate age trees. An Oregon Department of Forestry study (also confirmed by Miller et al, 2007) found that the fewest landslides and smallest erosion volumes occur on forest slopes covered by intermediate age stands.
3. Logs would be yarded using full suspension on areas identified as FGR1 or on slopes 70 percent or greater. The majority of the FGR1 sites (~29 acres) occur along a steep escarpment far away from streams

Cumulative Effects

The proposed timber harvest and roadwork would increase soil compaction and topsoil displacement at specific sites within the project area. Some of the soil recovering from past disturbances would be re-disturbed, increasing the recovery period. However, the overall timber growth and soil productivity would not be detectable on a local or watershed scale because direct effects would not be measurable in the project area. The occurrence of any landslide under the proposed action would be expected to be small (<1/8 acre) and would not be detectable on a local or watershed scale.

3.5 Threatened or Endangered Wildlife Species, Habitat and/or Critical Habitat

Table 17 shows the wildlife species listed under the Endangered Species Act whose range includes the Tillamook Resource Area. Only those species for which the Proposed Action could result in an effect whether negative, positive or both will be discussed. Table 18 contains the habitat definitions used in this analysis for ESA listed wildlife species.

Table 17: ESA Listed Wildlife Species that could occur within the Tillamook Resource Area

Common Name	Status	Impact Synopsis
Mammals:		
Columbia White-tailed Deer (*Columbia River DPS*)	ESA-Endangered.	**Not Affected** – Not in expected range
Birds:		
Marbled Murrelet	ESA-Threatened.	**Affected** – Very minor potential for disturbance near unsurveyed Potential Habitat.
Northern Spotted Owl	ESA-Threatened.	**Affected** – Direct and Cumulative Impacts to dispersal habitat. Very minor potential for disturbance near 37 acres of poor quality unsurveyed suitable habitat.

Table 18: Habitat Definitions for ESA Listed Wildlife Species Used in this Evaluation[1]

Northern Spotted Owl Suitable Habitat: Stands used by spotted owls for nesting, roosting and foraging. Generally these stands are conifer-dominated, 80-years-old or older, multi-storied in structure, and have sufficient snags and downed wood to provide opportunities for owl nesting, roosting and foraging. Mean tree diameter generally exceeds 18 inches dbh and canopy closure generally exceeds 60 percent. At the project area scale, the local biologist evaluates the habitat to make a final determination of whether the features associated with functioning nesting, roosting, and/or foraging habitat are present and the stand meets the definition of suitable habitat.

Northern Spotted Owl Dispersal Habitat: Conifer and mixed conifer-hardwood habitats with a canopy cover greater than or equal to 40 percent and conifer trees usually greater than or equal to 11 inches average dbh. Within the South Scappoose Creek Project Areas this generally equates to stands greater than approximately 35-years-old.

Marbled Murrelet Suitable Habitat: Conifer-dominated stands that generally are 80-years-old or older, and/or have trees greater than or equal to 18 inches mean dbh. Murrelet suitable habitat must include trees with potential nesting structure(s) as described in the March 26, 2004 policy by the Level 2 Team for the North Coast Planning Province (USDA and USDI – USFWS et. al, 2004). Suitable habitat generally contains six or more trees with potential nesting structure(s) within a 5-acre area. *Note: Habitat with fewer than six trees with potential nesting structure(s) within a 5-acre area, and located further than twenty miles from the ocean as described in the March 26, 2004 policy is referred to as "Potential Habitat."*

[1]Habitat Definitions as described in the most recent Biological Assessment prepared by the Interagency Level 1 Team (terrestrial subgroup) for the North Coast Planning Province (USDI-USDA 2010)

3.5.1 Affected Environment

The following general landscape or watershed scale discussion of wildlife habitat applies to the South Scappoose Creek Project to provide a general context to the more project-specific analyses. Where appropriate, additional species-specific discussions at the landscape, watershed, or Analysis Area scale are included within the species-specific discussions.

As in most areas, ownership patterns of the northern Coast Range of Oregon strongly influence the character of the landscape. The South Scappoose Creek Project is located in an area where Federal lands are distributed in a scattered, non-contiguous or "checkerboard" fashion intermingled with non-Federal forestlands primarily owned by industrial timber companies and managed for timber production on relatively short rotations. Management practices on these non-federal timberlands tend to dominate the character of the forested landscape.

Per the Scappoose Creek Watershed Analysis, the watershed is near one of western Oregon's largest contiguous blocks of private forest land and nowhere in western Oregon do the management practices occurring on industrial timberlands more strongly influence the character of the landscape pattern than in the Scappoose Creek watershed and the surrounding landscapes. Falling under various ownerships, this block of private land is approximately 345,000 acres (540 square miles) in size and is generally providing little habitat for cavity nesters. On a larger scale continuing to the north, most of southwest Washington is also dominated by industrial timberlands (USDI – BLM, 1996a.)

Located approximately 20 miles west and southwest of the project areas is the largest block of public ownership in northwest Oregon. This block of public ownership is within the Clatsop and Tillamook State Forests managed by the Oregon Department of Forestry (ODF). With most of these areas located within the historic "Tillamook Burns", early to mid-seral stage habitat dominate much of these areas managed by ODF. The nearest large block of federal land in the Oregon Coast Range within the LSR LUA is located approximately 36 miles to the southwest of the proposed project areas.

Relative to wildlife resources, the pertinent issues or concerns identified within the *Scappoose Creek Watershed Analysis* with a likelihood for cumulative effects are related to factors affecting the distribution of species dependent upon late-seral habitat or habitat features such as large forest "legacies" (e.g. large trees, snags and down logs). These issues are related to ownership patterns and past management practices that have resulted in a high degree of forest fragmentation, small patch sizes, and a general lack of late-seral habitat (*Scappoose Creek Watershed Analysis*, pgs. 23-25). These factors can result in dispersal problems for some species and a high degree of regional isolation.

The South Scappoose Creek Wildlife Analysis Area
The South Scappoose Creek Wildlife Analysis Area was configured and used for a portion of the impact analysis of the Timber Management Project upon wildlife resources. It is defined as an

aggregated area of land centered on the proposed South Scappoose Creek treatment areas with a 1.5 mile buffer. The Wildlife Analysis Area is approximately 27,184 acres in size (42 square miles) and spans the eastern slopes of the Coast Range Mountains almost up to the summit of the Coast Range on its western boundary (Figure 12). Approximately 81% of the Analysis Area is privately owned with industrial timber companies owning the vast majority of the private land. The 4,908 acres of BLM land within the Analysis Area is configured into more than 20 different parcels of land scattered across 16 odd numbered sections in a total area approximately 42 square miles in size. A breakdown of ownership within the Analysis Area and the BLM Land Use Allocations is shown in Table 19.

Table 19: Ownership and BLM Land Use Allocations (LUA) within the South Scappoose Creek Wildlife Analysis Area

Ownership		Acres	% of total
Total BLM		4,908	18%
Breakdown of BLM Land by LUA *	Late Successional Reserve	78	
	Riparian Reserve	2,516	
	Matrix – Connectivity	662	
	Matrix – GFMA	1,652	
State of Oregon (ODF)		266	1%
Private Lands (primarily industrial timber companies)		22,010	81%
Total (All Ownerships)		27,184	

* *Some BLM land use allocations overlap such as Late-Successional Reserve and Riparian Reserve. For consistency and acreage display purposes such overlaps are displayed in only one category according to the following hierarchy: 1) Late-Successional Reserve, 2) Riparian Reserves, and 3) Matrix*

General Habitat Conditions within the South Scappoose Creek Wildlife Analysis Area

As a result of fire history and past timber harvesting activities that focused on clearcut harvesting there currently is very little late-seral habitat within the Wildlife Analysis Area. There is no identified late-seral habitat on non-federal land. In addition to clearcut harvest activities, salvage operations and historic snag felling programs, have resulted in old-growth remnants and higher quality large snags being deficient or totally lacking within most of the Analysis Area – regardless of ownership. Therefore, the Wildlife Analysis Area currently contains very little habitat for those species dependent upon mature or late-seral stage habitat including large blocks of interior forest habitat or for species that depend upon large snags or down wood for nesting, denning or foraging areas.

Ownership patterns and management practices within the Analysis Area, like the larger landscape, strongly influence the available habitats. The trend for mid-seral stands on non-Federal land within the Analysis Area (forest stands greater than 40- to 60-years old) is one of

decreasing quantities as merchantable stands are harvested – primarily through clearcut harvesting. As such, there is currently a great deal of habitat within the Analysis Area for some of those species which depend upon or utilize early-seral stage habitats, smaller forested patches, and/or high contrast edges resulting from the juxtaposition of different habitat types. However, clearcut harvest units created on private industrial lands are generally very different than most naturally occurring early seral stage habitats. Most natural early seral habitats are characterized by numerous legacies of the previous stand such as large quantities of snags and down wood, scattered clumps of live, damaged or dying trees, and hardwoods and fruit-bearing shrubs that provide habitat (cover and food) for many insect and wildlife species. In general high plant diversity characterizes most natural early-seral habitats. Industrial timber companies within the Analysis Area typically treat recent clearcut units with herbicides and then replant the site exclusively with Douglas-fir seedlings. Under this management scenario, flowering and fruit-bearing shrubs are usually rare if not totally lacking. The vast majority of the acres contained within these clearcut harvest units do not contain scattered legacies such as green conifers, hardwoods or snags which further limits the habitat quality for a wide range of additional species. These stands generally will not have time to develop complex early seral conditions before the site is completely occupied by the monoculture of Douglas-fir seedlings.

Non-forestland within the South Scappoose Creek Analysis Area

A portion of the lands within the Wildlife Analysis Area are permanently non-forested acres utilized for land use practices other than forestry. An estimated 937 acres (approximately 3%) of the Analysis Area are located within utility corridors, or agricultural or rural residential areas.

Northern Spotted Owl

Spotted Owl Habitat Conditions at the Landscape Scale

The majority of forest land in that portion of the state which includes the South Scappoose Creek project area is privately owned and is currently managed for timber production in such a way as to preclude the development of suitable owl habitat or maintenance of adequate dispersal habitat. The federal lands in the area are distributed in a checkerboard fashion and do not lend themselves to the management of wide ranging species such as the spotted owl. Many of these federal lands are within the Matrix LUA and intended to be managed for timber production with rotation lengths that would also preclude the development or long-term maintenance of suitable spotted owl habitat. The nearest large block of federal land in the Oregon Coast Range within the LSR LUA is located approximately 36 miles to the southwest of the proposed project areas. Clatsop and Tillamook State Forests are located approximately 20 miles west and southwest of the project areas. However a large contiguous block of private land separates the proposed project area and these larger holdings of public land. Land use practices and current habitat conditions at the landscape scale, which include a general lack of adequate spotted owl dispersal habitat, has effectively isolated the proposed project area from these larger blocks of public ownership.

Spotted Owl Habitat Conditions within the South Scappoose Creek Wildlife Analysis Area
An evaluation of the spotted owl habitat quality and quantity within the Analysis Area was done using BLM GIS data, 2009 aerial photography and on-the-ground visits. Table 20 below displays the results of this habitat evaluation by the estimated acres of owl habitat types located on the various ownerships (BLM, ODF or Private).

All of the suitable owl habitat identified within the Analysis Area is located on BLM land and is considered to be very marginal in quality. This is based on the fact that it lacks sufficient CWD, a complex multi-storied structure, and/or is distributed in small forest patches set in the context of a highly fragmented landscape dominated by early-seral stage habitats.

Currently, approximately 32% of the forest lands within the Analysis Area (8,422 acres) is estimated to be in a condition to facilitate spotted owl dispersal – that is to say is either dispersal or suitable habitat as defined on Table 18. This amount is not considered sufficient to currently support spotted owl movement and survival (dispersal) within the Analysis Area especially considering the marginal nature of most of the habitats present. Approximately 54% of the habitat currently in a condition to facilitate spotted owl dispersal is located on BLM land although BLM manages only 19% of the forestland within the Analysis Area. Given the current trends, it would be expected that much of the dispersal habitat currently located on non-federal land will be clear-cut harvested within the next decade.

Since the summer of 2000, approximately 310 acres (6.8%) of the identified BLM habitat currently in a condition to facilitate owl dispersal within the Analysis Area has been treated with commercial thinning treatments. While the adverse impacts resulting from these past thinning treatments are expected to ameliorate overtime, the dispersal habitat quality of some of these acres is likely still somewhat compromised by the recent BLM thinning treatments.

Table 20: Estimated Acres of Spotted Owl Habitat Types Currently within the South Scappoose Creek Analysis Area by Ownership

Habitat Type		BLM	State (ODF)	Private	Total Acres	Percent of Total Forest Lands[2]
Suitable		2,015	0	0	2,015	8%
Dispersal		2,554	176	3,677	6,407	24%
Non-habitat	Forest lands	294	85	17,446	17,825	68%
	Non-forest lands[1]	46	5	887	938	n/a
Total		4,908	266	22,010	27,184	n/a

[1]Lands devoted to uses other than forestry such as utility corridors, agricultural or residential areas
[2]Percent of total forest lands considers only the forested acres within the Analysis Area (26,246 acres)

Designated Critical Habitat

Critical Habitat is a term defined in the ESA identifying specific geographic areas containing features essential to the conservation of a threatened or endangered species. It is designated by USFWS to provide for the conservation and eventual recovery of listed species and may require special management considerations or protection. The proposed action areas are not designated as spotted owl critical habitat (USDI 2008). Spotted owl critical habitat will receive no further discussion or analysis within this EA.

Spotted Owl Surveys and Proximity to Known Spotted Owl Sites

No spotted owl surveys which would currently meet protocol standards have been conducted within the proposed project areas; none are required. The last known spotted owl surveys to be conducted within any portion of the Wildlife Analysis Area were conducted in the early 1990s in support of the BLM's Buckbrush and Cesspool Timber Sales. These surveys were conducted within the northern portions of the Analysis Area including South Scappoose Creek project areas in sections 1, 7 and 11. There were no spotted owl detections within the Analysis Area.

There are no historic, known occupied or predicted spotted owl sites within the Wildlife Analysis Area, including near any of the proposed project areas. The nearest known spotted owl sites (Big Canyon and Denny/Whiskey) are purely historical in nature and are located approximately 4 to 5 miles southwest of the nearest proposed project areas; the last spotted owls documented at both these sites was in 1978.

Spotted Owl Habitat Conditions Within the Proposed Treatment Units

The proposed project includes the thinning of 1540 acres and the regeneration harvest of 100 acres. Although there is considerable variation in habitat quality, all of the treatment acres have been determined to be spotted owl dispersal habitat. There is no spotted owl suitable habitat within any of the proposed treatment units although some of the areas proposed for treatment are directly adjacent to a few small patches of lower-quality suitable habitat.

There is considerable variation in the amount of CWD within the proposed treatment units but in general they are deficient in CWD, especially in higher quality large snags. Currently, there is a weighted average (by acres) of 5 snags per acre which average approximately 11 inches dbh and approximately 45 feet in height.

Six of the proposed treatment units, totaling 136 acres, currently have QMDs over 18 inches with canopy closures greater than 60% (see Table 8). This is the point at which some stands begin exhibiting characteristics of suitable spotted owl habitat and as such are considered to be suitable habitat rather than dispersal habitat (see Table 18). Largely a result of these stands' current ages which range from 61 to 73 years, and due to the general lack of structural diversity, legacy trees and sufficient snags and downed wood, all of these stands have been determined be dispersal habitat rather than suitable. In addition to the stand-level characteristics of these stands, the fact that the acres in question are scattered across five sections in a highly fragmented landscape strongly dominated by earlier-seral stage habitats further supports the determination that they are more likely to function as spotted owl dispersal habitat rather than suitable habitat.

While there is uncertainty regarding the forest conditions required for spotted owl dispersal, it is assumed dispersal success is better when the habitat more closely resembles suitable habitat (USDI-USFWS, 2008). All of the conifer and mixed conifer-hardwood stands to be treated are currently considered to be fair to good quality dispersal habitat. However, the project also includes management of some stands with a very substantial hardwood component (>60% hardwood trees). Depending upon patch size, most of these areas are considered to be poor quality dispersal habitat at best. These stands (units 4, 20, 22, 23 and 24) total 86 acres and are 52 to 67 years-old. Up to 89% of the trees within these proposed treatment units are hardwoods (Table 8).

Marbled Murrelet

Marbled murrelets are seabirds that come on-shore to nest in large trees with adequate platform structures. Located in a band of land that ranges from approximately 45 to 50 miles from the ocean, the South Scappoose Creek project areas are located within the outer portion of marbled murrelet Zone 2. In Oregon, Zone 1 is located in a band of land extending up to 35 miles inland and Zone 2 is located 35 to 50 miles from the sea (NWFP C-10); Zone 1 holds a higher likelihood for murrelet occupancy than Zone 2.

Designated Critical Habitat
Critical Habitat is a term defined in the ESA identifying specific geographic areas containing features essential to the conservation of a threatened or endangered species. It is designated by USFWS to provide for the conservation and eventual recovery of listed species and may require special management considerations or protection. The proposed action areas are not designated as marbled murrelet critical habitat (USDI-USFWS 1996). Marbled murrelet critical habitat will receive no further discussion or analysis within this EA.

Proximity to Known Murrelet Sites
There are no known occupied marbled murrelet sites within the vicinity of any of the proposed treatment units or haul routes. Given the lack of suitable or potential habitat within the general project area and the fact that the project area is located approximately 45 to 50 miles from the ocean, it is highly unlikely there are any murrelets currently inhabiting the analysis area or would be expected to in the foreseeable future.

Murrelet Habitat within the Analysis Area and within or near proposed treatment units
Per the March 26, 2004 policy by the Level 2 Team for the North Coast Planning Province, suitable murrelet habitat contains six or more trees with potential nesting structure(s) within a 5-acre area. Habitat with one to five trees with potential nesting structure(s) within a 5-acre area, and located further than twenty miles from the ocean is referred to as "Potential Habitat."

The Wildlife Analysis Area, including areas within and near the proposed project areas, contains no identified stands of marbled murrelet suitable habitat. Additionally, as a result of past management practices and fire history there are very few areas containing scattered individual or

small clumps of trees with potential nesting structure(s) referred to as "Potential Habitat." While there may be a few unidentified stands of murrelet Potential Habitat on non-Federal land within the Wildlife Analysis Area, the few areas that have been identified to date are located on BLM land.

There are a few individual large trees with potentially suitable murrelet nesting platforms (Potential Habitat) near a few of the proposed treatment units (SE of section 29 and section 9). None of these areas have been surveyed for murrelets. These trees would be protected and managed in accordance with Option 3 as described by the Level 2 Team for the North Coast Planning Province (USDA and USDI - USFWS et al. 2004) and as such, no surveys are scheduled to be conducted within these areas. There currently is no additional identified suitable or potential murrelet habitat within ¼ mile (the USFWS disturbance distance) of any of the proposed project areas.

3.5.2 Environmental Effects Alternative 1: No Action

Also see the Environmental Effects section of the Forest Vegetation analysis of the "No Action" alternative (*section 3.1.2)* for a description of the expected impacts to the forest vegetation component of wildlife habitat.

Northern Spotted Owl

By not thinning the 46 to 73 year old stands, development of suitable spotted owl habitat would be retarded in the long term by the slowed growth rate and increasing instability of the stands. The lack of understory and structural diversity would limit the potential habitat for spotted owl prey species. Eventually the stands would self-thin as scattered Douglas-firs succumb to suppression mortality and existing red alder begin to drop out of the stand. Additional small scale disturbances such as insect and windthrow events would help open the canopy and release some of the understory and overstory trees thus over time, provide an increased structural diversity. However, without density management within the relative near future, the process could be delayed for decades.

If the no action alternative is selected, the stands considered for thinning would continue to age naturally. The stands with higher densities of trees would enter the stem exclusion stage in the near future and begin to produce snags from the currently suppressed trees. These snags would tend to be small but would provide good foraging habitat for a variety of woodpeckers and also habitat for secondary cavity users such as chickadees, nuthatches and small owls. There would be some scattered medium to larger size snags that could provide habitat for northern flying squirrels and thus benefit the spotted owl, but generally most of the snags would not be large enough to accommodate pileated woodpeckers or other species that require larger snags. Those stands that are less well stocked would take longer to reach the stem exclusion stage and thus the snags produced would be larger and last longer. The estimated parameters for snags created from suppression mortality 25 years after implementing the No Action Alternative are displayed on Table 11.

By not thinning the overstory now during this window of opportunity, the trees would be less able to respond in the future and the development of a second canopy layer would be delayed by a few decades thus taking longer to reach the vertical diversity characteristic of late-successional stands.

Under the No Action Alternative, the proposed 100 acres of regeneration harvest would not occur. These forested acres would continue to provide dispersal habitat, albeit some of it poor quality, in a landscape where the quantity of habitat which is in a condition to facilitate spotted owl dispersal is considered insufficient to support spotted owl movement and survival. Given the current degree of the poor dispersal habitat conditions within the area, and current clearcut harvesting trends expected to continue on private land, the actual benefits derived from maintaining an additional 100 acres of owl dispersal habitat upon a spotted owl's ability to actually survive while dispersing through the area would be minimal.

Marbled Murrelet

By not thinning the 46 to 73 year old stands, development of potential or suitable murrelet habitat would be retarded in the long term by the slowed growth rate, decreased crown ratios and decreased stability of the forested stands. The development of large platform structures suitable for murrelet nesting would continue at a very slow. Given the fact that the project area is located in a band of land that ranges from approximately 45 to 50 miles from the ocean (the outer portion of marbled murrelet Zone 2) the adverse impacts resulting from the No Action Alternative upon the development of murrelet habitat and murrelet recovery would be considered to be negligible.

Cumulative Effects

Cumulative effects of the No Action Alternative upon the spotted owl and marbled murrelet, if any, would be negligible. This is based on the fact that the identified effects of the No Action Alternative are considered to be minimal, especially given the context of the surrounding landscape.

3.5.3 Environmental Effects Alternative 2: The Proposed Action

Northern Spotted Owl

As previously outlined within the general discussion of the Affected Environment at the landscape and Wildlife Analysis Area scales, the majority of forest land in the vicinity of the proposed project area is privately owned and currently managed for timber production in such a way as to preclude the development of suitable owl habitat or maintenance of adequate dispersal habitat.

The South Scappoose Creek Project is consistent with the 2011Revised Recovery Plan for the Northern Spotted Owl (USDI, 2011). None of the proposed treatment units are stands that would meet the objectives of Recovery Action #32 of the 2011 Northern Spotted Owl Recovery Plan

(e.g., "*Because spotted owl recovery requires well distributed, older and more structurally complex multi-layered conifer forests on Federal and non-federal lands across its range, land managers should work with the Service as described below to maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees.*"

Impacts to Known Owl Sites

There are no historic, known occupied or predicted spotted owl sites within the Wildlife Analysis Area, including near any of the proposed project areas. Furthermore, given the habitat conditions within the general project area, it is highly unlikely that there are any spotted owls currently inhabiting the analysis area or would be expected to in the foreseeable future. The proposed project would have no impacts upon any spotted owl known sites.

Impacts due to Modification of Spotted Owl Habitat

The proposed project includes the thinning of 1540 acres and the regeneration harvest of 100 acres. Although there is considerable variation in the quality of this habitat, all of the treatment acres have been determined to be spotted owl dispersal habitat; no treatment areas are currently considered to be suitable habitat. The 1640 acres proposed for treatment represents 36% of the BLM land within the Wildlife Analysis Area that is estimated to currently be in a condition to facilitate spotted owl dispersal – that is to say is either dispersal or suitable habitat. Considering all ownerships, it represents 19% of the habitat which could facilitate owl dispersal.

While there would be some identified adverse impacts and the current habitat quality would be degraded through the thinning operation, post-treatment the 1540 acres of spotted owl dispersal habitat proposed thinning would be expected to remain in a condition capable of facilitating owl dispersal. This is largely based upon the fact that the average canopy closure within the thinned stands would be expected to average between approximately 58% and 69% immediately after thinning and CWD creation (see Table 10). While small openings such as patch-cuts to control *Phellinus weirii*, landings, and areas thinned to wider spacing may result in isolated portions of these thinning treatment areas having a post-treatment canopy closure of less than 40%, the project areas being proposed for thinning as a whole are not expected to be removed from a condition to function as spotted owl dispersal habitat. Any adverse impacts to dispersal habitat resulting from a reduction in canopy closure would be expected to ameliorate over time (<20 years) as the retained trees respond to the thinning with increased growth rates and expanding crowns. Chan et al. (2006) found that thinned stands in the Oregon Coast range may experience increasing canopy cover by up to 2% per year. They also found that thinning stopped crown recession by increasing the longevity of lower branches that would have been suppressed if the stands were not thinned. While the stands proposed for thinning would be expected to continue to function as dispersal habitat post-treatment, that is not to say that the thinning operation would not be expected to have some adverse impact upon the habitat quality of the thinned stands.

Within the northern coast range of Oregon flying squirrels are the principal prey species of the

spotted owl (Forsman et al., 1991, 2004). Carey (2000) found lower abundances of flying squirrels in recently-thinned (within 10 years) stands in Washington than in stands that were clear-cut 50 years prior to the study, with retention of both live and dead trees. He attributed his results to the apparently negative effects of commercial thinning on canopy connectivity, downed wood and truffle communities in the area. Wilson (2010) also reported most thinning is likely to suppress flying squirrel populations for several decades, but the long-term benefits of variable-density thinning for squirrels are likely to be positive.

Bigleaf maples would be reserved in all treatment areas where it currently exists, however the current red alder component would be removed entirely from approximately half of the thinned stands (604 acres), those portions of the treatment areas located within the uplands (stands within the Matrix LUA within units 3, 4, 6, 8 and 10 - 14). Where present, an alder component would be maintained within all thinning areas located within the Riparian Reserve LUA – approximately 479 acres. Numerous studies have cited the importance of hardwoods as an element of spotted owl habitat and for their prey (Hershey 1998, Thrailkill et al. 1998, Glenn et al. 2004, Forsman et al. 1984). Scattered hardwoods within conifer-dominated stands not only can increase the horizontal and vertical complexity of the forest, but larger, older hardwoods often contain numerous denning opportunities for prey species. Scattered and small clumps of hardwoods, especially red alder in mixed conifer-hardwood stands, can also increase the future horizontal diversity of the stand by creating canopy gaps as they being much shorter-lived species, drop out of the stand sooner as it moves through successional stages. Despite the retention of the big-leaf maple component in all treatment areas where it currently exists, the total removal of the red alder component from 604 acres of stands thinned would have an adverse impact upon the current and future spotted owl habitat quality within the treatment areas. This impact would be expected to be most pronounced within those treatment units which currently do not have a big-leaf maple component. Post-harvest, those portions of Units 6, 8, 10 and 13 within the Matrix LUA, totaling 447 acres, would totally lack a hardwood component - that is, they currently do not contain any big-leaf maple and all the red alder would be removed as a part of the thinning operation.

The thinning proposal would result in some habitat features developing sooner than would be expected without treatment. These features include large trees within the overstory which would be potential sources of future snags and down logs. In addition to the trees retained within the overstory, the proposed thinning is expected to result in increased or maintained growth rates of the understory conifer and shrub species. The majority of stands being thinned (68.4%) are being proportionally thinned across all size classes rather than "thinning from below" which is a common silvicultural practice; therefore, trees of all size classes distributed in a fashion with some variety in spacing would be represented in the post-harvest stand. In time, the thinning would result in a structurally diverse forest, both within the treatment areas and across the individual parcels of BLM's checkerboard ownership.

Not all thinning units or portions of units would be treated with the same silvicultural prescription which would help promote a horizontal diversity of habitats across the larger parcel. Post-treatment, the basal area (a measurement of density) of the thinned stands would range from

135 to 180 sq ft/acre or 52 to 138 trees per acre (Table 10). As previously discussed, all red alders would be removed from 447 acres of the thinning areas located within the Matrix LUAs while an alder component would be retained within the adjacent Riparian Reserves which also are being thinned. Stands within the Matrix LUAs would be proportionally thinned while stands within the Riparian Reserve LUA would be thinned from below. Small areas treated with patch cuts to limit the spread of *Phellinus weirii* and underplanted with disease resistant species would add additional structural diversity to future stand. Finally, also contributing to the horizontal diversity of habitats is the fact that proposed treatment areas are generally intermingled with areas not proposed for thinning. These areas include no-harvest stream buffers and areas dropped from the thinning proposal due to lack of economical access, logging feasibility, or various resource concerns (see *EA section 3.1.1*).

In the long term (20+ years) the 479 acres of thinning treatments areas located within the Riparian Reserve LUA would be expected to begin to develop into spotted owl suitable habitat sooner than under the No Action Alternative. Consistent with the ROD/RMP and NWFP, it would be expected that the 568 acres of forested stands proposed for thinning within the GFMA LUA would be evaluated for regeneration harvest in approximately 15 to 20 years and likely harvested prior to or soon after developing into suitable owl habitat. The 493 acres proposed for thinning within the CON LUA are managed on a 150 year rotation – that is to say, acres within this LUA are to be regenerated at a rate of approximately $1/15^{th}$ per decade. These acres, in association with the adjacent Riparian Reserves, could provide for the maintenance of suitable owl habitat on the landscape for several decades; the beneficial impacts of the thinning proposal would therefore be most noteworthy and long-lasting on these acres.

The most adverse and long-lasting effect of the thinning upon spotted owls and their habitat would probably be halting or greatly reducing the natural snag recruitment processes for up to 20 or 30 years, by removing those trees that might otherwise have died from the effects of tree-to-tree competition (i.e. suppression mortality). Snags are important habitat elements for spotted owls in that they are the primary nesting and cover habitat for the northern flying squirrel (Carey 1991), which is the principal prey species for spotted owls in the northern Coast Range (Forsman et al., 1991). The estimated parameters for snags produced from suppression mortality 25 years after implementing the proposed action compared to the No Action Alternative are displayed on Table 11. The loss of natural snag production for several to many decades on the thinned acres would be expected to reduce the potential for owl use due to the lack of suitable prey habitat.

Although a large portion of the existing snags would be expected to be felled has safety hazards or inadvertently knocked over during logging operations, they would be retained on site as down woody debris habitat. The thinning would also provide a small pulse of newer CWD (down wood and to a lesser degree snags) near the time of harvest. This input would largely be expected to be in the form of trees broken or damaged during timber harvest operations, potential windthrow after harvest, and the potential snags or down logs created as a design feature of the proposed action. This would be beneficial to small mammals and temporarily help offset some of the identified adverse impacts associated with the loss of many of the existing snags and disruption of the natural snag recruitment processes. However, this pulse in CWD input in the

near term would not be expected to provide an adequate bridge of CWD habitat into the future, three or more decades, until the stands begin to naturally recruit appreciable amounts of coarse wood.

Suppression mortality is expected to continue occurring within clumps of relatively dense conifers remaining after thinning treatment is applied as well as within adjacent untreated areas such as riparian buffers and other areas dropped from the proposal. These acres would help provide some of the habitat features expected to be in shorter supply within the majority of the acreage treated with the thinning operation.

In addition to the thinning, the proposal also includes a total of 100 acres of regeneration harvest (removal) of spotted owl dispersal habitat. While there is uncertainty regarding the forest conditions required for spotted owl dispersal, it is assumed dispersal success is better when the habitat more closely resembles suitable habitat (USDI-USFWS 2008a). For that reason, a portion of the 100 acres proposed for regeneration harvest are considered to be poor quality dispersal habitat at best. These regeneration harvest units (units 20, 22, 23 and 24) total approximately 52 acres and with up to 89% of the trees within these proposed treatment units being hardwoods, (Table 8) are more hardwood-dominated rather than conifer. The remaining 48 acres proposed for regeneration are conifer or more mixed conifer-hardwood stands that are currently considered to be fair to good quality dispersal habitat.

The acres proposed for regeneration harvest are scattered across 5 sections of lands and configured into 12 non-contiguous treatment areas averaging approximately 8.3 acres in size; sizes range from approximately 1 to 20 acres with five of these 12 treatment areas being approximately three acres or less in size. The dispersed configuration and relatively small sizes of the regeneration harvest units would help minimize some of the impacts associated with regeneration harvest. The regeneration harvest units as configured would not be adding to the size of the existing large dispersal barriers or obstacles which are scattered across the current landscape (i.e. large areas of congregated private clearcuts) to the same degree as if the same number of acres were configured into one or two large units. However, the fact remains, regeneration harvest would contribute to fragmentation of the remaining habitat and results in the removal of dispersal habitat in an area which currently does not contain adequate acreage of habitat in a condition to facilitate owl dispersal.

While there would be adverse impacts to spotted owl habitat resulting from the proposed action, the actual impact to spotted owls would be expected to be relatively minor. This is based on the current quality of the habitats to be impacted, lack of owl sites within or near the area, design features incorporated to help offset or minimize some of the identified adverse impacts, but most notably the fact that the project is set in the context of a landscape which is so heavily impacted by management practices occurring on industrial timber lands that it likely is not currently in a condition to support dispersing owls.

Impacts to Spotted Owls due to Disturbance

Proposed actions that include habitat modification treatments and associated road construction and decommissioning, yarding, loading, hauling, site preparation, burning, brushing, piling, scarification and coarse woody debris and snag creation can generate noise levels that may disturb northern spotted owls and interfere with essential foraging or nesting behaviors. Although adult birds can move away from a noise source, nesting adults moving away from disturbance could cause increase predation to young, or missed feedings, which could result in reduced fitness of the young and even death.

Harvest operations and/or associated activities (e.g. yarding, hauling, culvert replacement or removal) could occur within the spotted owl critical breeding season. Some of these activities (e.g. road or corridor construction, road maintenance, felling) utilize heavy equipment or chainsaws thereby generating noise above the ambient level and would occur within 0.25 miles of approximately 37 acres of unsurveyed marginal quality spotted owl suitable habitat. This habitat is located within a total of seven small patches on BLM land in T.3N., R.2W., sections 7, 9, 19 and 29 and T.3N., R.3W., sections 3 and 13. For the purpose of this evaluation, this habitat is assumed to be suitable based on the fact that it is 80-years-old or older; a field evaluation of these stands would likely result in at least a portion of these acres being determined to be dispersal habitat rather than suitable.

There are no historic or known occupied spotted owl sites within or near any of the proposed project areas. Proposed disruptions within or near suitable habitat with no history of an owl nest site or activity center have the potential to occur within the disruption distance of an unknown active nest site during the breeding season, but the potential likelihood of impacts is considerably less than operations occurring within the vicinity of a known nesting pair of spotted owls. Based on the fact that the 37 acres of marginal quality suitable habitat discussed above are very isolated from any other suitable habitat, potential disturbance to unknown spotted owls resulting from implementation of the South Scappoose Creek Project is highly unlikely.

Cumulative Effects

In addition to the impacts of the proposed action upon spotted owls, there are also past activities, other current activities occurring nearby on other lands, and future actions that are reasonably certain to occur that may also affect owls and/or their habitat. Since the summer of 2000, approximately 310 acres (6.8%) of the identified BLM habitat currently in a condition to facilitate owl dispersal within the Wildlife Analysis Area has been treated with commercial thinning treatments. While the adverse impacts resulting from these past thinning treatments are expected to ameliorate overtime, the dispersal habitat quality of some of these acres is likely still somewhat compromised by the recent BLM thinning treatments. These projects include BLM's McLafferty Creek Density Management Project, Pisgah Progeny including the Pisgah Progeny Salvage and the Pigs Puzzle Project. No additional, future BLM projects are currently being planned within the Wildlife Analysis Area. Given the current trends, it would be expected that much of the dispersal habitat currently located on non-federal land will be clear-cut harvested within the next decade.

As previously stated within discussions above in the Affected Environment - Spotted Owl Habitat Conditions at the Landscapes Scale and within the Wildlife Analysis Area (section 3.5.1), there has been a great deal of historical and recent timber harvest on non-federal land within the Analysis Area. There is no identified spotted owl suitable habitat on non-federal land within 1.5 miles of the proposed project. Currently, approximately 32% of the forest lands within the Analysis Area (8,422 acres) is estimated to be in a condition to facilitate spotted owl dispersal. This amount is not considered sufficient to currently support spotted owl movement and survival (dispersal) within the Analysis Area. Approximately 54% of the habitat currently in a condition to facilitate spotted owl dispersal is located on BLM land although BLM manages only 19% of the forestland within the Analysis Area. The proposed action would treat 1640 acres (36%) of this BLM habitat or approximately 19% of the habitat capable of facilitating owl dispersal regardless of ownership.

Considering the current habitat conditions within and near the Analysis Area, the impacts of the proposed project and other identified BLM projects, as well as the expected trends on private industrial and ODF forest lands, there would be adverse cumulative impacts to spotted owl dispersal habitat as a result of the South Scappoose Creek Project. However, set in the context of the habitat conditions on the surrounding landscape and the ongoing effects of habitat loss on private land, the cumulative impacts of the proposed action is of little consequence to owl recovery. It is not likely that spotted owls could breed successfully anywhere near the analysis area due to the overall habitat conditions, and if a spotted owl were dispersing through the area, survivability would probably be similar regardless of whether the proposed action occurred or not. The relative geographic isolation of the project areas creates a low likelihood that the habitat within this area facilitates owl dispersal between blocks of suitable habitat or has potential to appreciably contribute to spotted owl recovery.

Marbled Murrelet

Impacts to Known Murrelet Sites

There are no known occupied marbled murrelet sites within the vicinity of any of the proposed treatment units or haul routes. Given the lack of suitable or potential habitat within the general project area and the fact that the project area is located approximately 45 to 50 miles from the ocean, it is highly unlikely there are any unknown murrelets currently inhabiting the analysis area or would be expected to occupy the area within the foreseeable future. No impacts to any known marbled murrelet sites would be expected to result from implementation of the Proposed Action.

Impacts to Murrelet Suitable or Potential Habitat

There are a few individual unsurveyed trees with potentially suitable nesting platforms within or near a few of the proposed treatment units (SE of section 29 and section 9). These trees would be protected and managed in accordance with Option 3 as described by the Level 2 Team for the North Coast Planning Province (USFWS et al. 2004). All habitat modifications that occur within a distance equal to one site-potential tree height of these trees (if any) would be designed to protect and improve future murrelet habitat conditions. No potentially suitable murrelet nest

trees would be felled as a part of the South Scappoose Creek project. Design features around these potentially suitable murrelet nest trees would include a no-harvest buffer at least 60 feet around each tree (or group of trees) to assure protection of the roots and crown, and no openings would be created within the canopy within one tree length surrounding a potential murrelet nest tree.

Due to the lack of suitable murrelet habitat within or near the project areas and design features incorporated to protect those few trees with potentially suitable murrelet nesting platforms, the South Scappoose Creek project would result in no habitat modification to current marbled murrelet habitat.

In the long-term (greater than 50 years) the 479 acres of thinning treatments areas located within Riparian Reserves would be expected to begin to develop into murrelet potential habitat and eventually, suitable habitat sooner than without treatment. Proposed thinning within the Riparian Reserves consists of thinning from below, favoring the retention of the larger trees within the thinning areas. Thinning would result in maintaining or increasing stand vigor and growth, thereby promoting crown development including large limbs (potential nesting structure) and increasing the treated stands horizontal and vertical structural diversity. Consistent with the ROD/RMP and NWFP, it would be expected that the 568 acres of forested stands proposed for thinning within the GFMA LUA would be evaluated for regeneration harvest in approximately 15 to 20 years and likely harvested prior to developing into potential or suitable murrelet habitat. The 493 acres proposed for thinning within the CON LUA are managed on a 150 year rotation – that is to say, stands within this LUA are regenerated at a rate of approximately $1/15^{th}$ per decade which would also likely preclude the development and/or long-term maintenance of suitable murrelet habitat.

Given the fact that the project area is located in a band of land that ranges from approximately 45 to 50 miles from the ocean (the outer portion of marbled murrelet Zone 2) the potential long-term benefits of the South Scappoose Creek project and the development of murrelet habitat upon murrelet recovery would be considered to be minor.

Impacts to Marbled Murrelets due to Disturbance

The potential for disturbance impacts to murrelets exist where activities that generate noise above the ambient forest level occur near breeding murrelets. Although it is very unlikely that murrelets occupy any stands near the proposed project areas, it is possible. There are a few unsurveyed large trees with potentially suitable murrelet nesting platforms (Potential Habitat) near a few of the proposed treatment units (SE of section 29 and section 9). These trees would be protected and managed in accordance with Option 3 as described by the Level 2 Team for the North Coast Planning Province (USDA and USDI - USFWS et al. 2004). However, activities including road construction and timber felling and yarding could occur within 300 feet of these few trees (the disruption distance for murrelets) during the murrelet breeding season resulting in a very minor potential for disturbance.

Cumulative Effects

There would be no adverse cumulative effects to marbled murrelets as a result of implementing the Proposed Action. There is no known murrelet habitat on private land in the Analysis Area and there is not expected to be any in the foreseeable future. The proposed action would not affect murrelet habitat, and consequently it would not contribute any cumulative impacts to the current habitat condition.

3.6 Special Status (BLM 6840 Policy), SEIS Special Attention (Salem ROD/RMP), and Migratory Bird Treaty Act Wildlife Species and Habitat.

The analysis below includes species that could occur within the Tillamook Resource Area; have the potential to be impacted by the South Scappoose Creek Project; and are on either the BLM State Director's Special Status Species List from February 2008, Survey and Manage Species (SEIS Special Attention Species within the ROD/RMP) as identified within the 2001 S&M ROD as modified by the 2011 Settlement Agreement, the USFWS's 2008 "Birds of Conservation Concern" list for the U.S. portions of the Northern Pacific Forest Bird Conservation Region, or are included in the Salem District's ROD/RMP. Table 21 below contains the complete list of species and a brief impact synopsis which shows which species may be impacted and are thus carried forward to the analysis below.

Table 21: Special Status (BLM 6840 Policy), Survey and Manage Species (SEIS Special Attention Species in Salem ROD/RMP) and Migratory Bird Treaty Act wildlife species that could occur within the Tillamook Resource Area.

Project Name: South Scappoose Creek		
Common Name	**Status***	**Impact Synopsis**
Mammals:		
Fringed Myotis	BS, Salem ROD/RMP	Not affected – negligible impact to low quality habitat
Long-eared Myotis	Salem ROD/RMP	Not affected – negligible impact to low quality habitat
Long-legged Myotis	Salem ROD/RMP	Not affected – negligible impact to low quality habitat
Silver-haired Bat	Salem ROD/RMP	Not affected – negligible impact to low quality habitat
Townsend's Big-eared Bat	BS, Salem ROD/RMP	Not affected – No roosting habitat in project areas
Red Tree Vole	BS, S&M	Not affected – No habitat within project areas. Adverse impacts upon the development of suitable habitat.
Birds:		
Bald Eagle	BS	Not affected – No suitable habitat within or near project area. Nearest known eagle nest greater than one mile from treatment area.

Project Name: South Scappoose Creek		
Common Name	**Status***	**Impact Synopsis**
Black Swift	MBTA	Not affected – No habitat within project areas
Harlequin Duck	BS	Not affected – Project not within suitable habitat
Horned Lark	MBTA	Not affected – Project not within suitable habitat
Lewis' Woodpecker	BS	Not affected – Project not in suitable habitat
Olive-sided Flycatcher	MBTA	**Affected** – Possible improvement of habitat
Oregon Vesper Sparrow	MBTA, BS	Not affected – Project not in suitable habitat
Peregrine Falcon	MBTA, BS	Not affected – No habitat affected
Purple Finch	MBTA	**Affected** – Possible improvement of habitat
Purple Martin	BS	Not affected – No habitat affected
Rufous Hummingbird	MBTA	**Affected** – Possible improvement of habitat
Willow Flycatcher	MBTA	**Affected** – Possible improvement of habitat
Reptiles and Amphibians:		
Cope's Giant Salamander	BS	Not affected – No impact to stream habitat
Northwestern Pond Turtle	BS	Not affected – No habitat within project areas
Painted Turtle	BS	Not affected – No habitat within project areas
Invertebrates (Mollusks):		
Crowned tightcoil (snail)	BS	**Affected** – possible impact to potential habitat
Evening Field slug	BS, S&M	Not affected – Preferred habitat excluded from project by riparian buffers
Pacific Walker (snail)	BS	Not affected – Not in range
Puget Oregonian (snail)	BS S&M	**Affected** – possible impact to potential habitat
Salamander slug	BS	**Affected** – possible impact to potential habitat
Spotted taildropper (slug)	BS	**Affected** – possible impact to potential habitat
Tillamook Westernslug	BS	**Affected** – possible impact to potential habitat
Warty jumping slug	BS	**Affected** – possible impact to potential habitat
Invertebrates (Arthropods):		
Johnson's Hairstreak (butterfly)	BS	Not affected – No habitat within project areas

* **BS** = Species listed as Sensitive under the BLM's 6840 Special Status Species Policy
Salem ROD/RMP = Species included in the Salem District ROD/RMP for special consideration
MBTA = Species covered by the Migratory Bird Treaty Act of 1918
S&M = Survey and Manage Species (SEIS Special Attention Species) as identified within the 2001 S&M ROD as modified by the 2011 Settlement Agreement

3.6.1 Affected Environment

Terrestrial Mollusks Bureau Sensitive and/or S&M

The South Scappoose Creek project is within the range and contains habitat for six terrestrial mollusk species (see Table 19) that are on BLM's Special Status Species list as Bureau Sensitive

and/or are Survey and Manage Species (SEIS Special Attention Species within the ROD/RMP). These species are generally associated with the organic duff layer and moss on the floor of cool forested areas containing coarse woody debris, sword ferns, hardwood shrub species and for some species, hardwood trees, especially big-leafed maple.

Warty jumping slugs are a very common slug on the west side of the Coast Range in northern Oregon with over 1,400 known sites entered in the regional special status species database. On the east side of the Coast Range the warty jumping slug is much less common but has been encountered during various past surveys. The Tillamook westernslug occurs in the same general habitat and area as the warty jumping slug and is also very common on the west side of the northern Coast Range. Neither of these species have yet been encountered during mollusk surveys conducted within or near the South Scappoose Creek project areas.

The other four species either have never been found in the Tillamook RA after approximately 10,000 acres of survey effort or have only been encountered a very few times. There are three known sites of the Puget Oregonian in the Tillamook RA (approximately 38 miles southwest of the project area) which represents a range extension of what was thought to be a Washington Cascades and Columbia gorge species and these sites are the only records in the Coast Range. According to the BLM's regional database the only site of the crowned tightcoil in all of Oregon and Washington is in the Nestucca drainage more than 35 miles southwest of the project area. Little is known about the spotted taildropper and there appears to be some disagreement about which specimens actually represent the spotted taildropper. The Tillamook RA has one record of finding a specimen that according to Nancy Duncan (BLM mollusk expert, retired) represents the species and there are only three other records in the area of the Northwest Forest Plan. The salamander slug has not been encountered in the Tillamook RA.

Two rounds of mollusk protocol surveys were completed in the fall of 2010 and the spring of 2011 on approximately 500 acres located in and/or near selected South Scappoose Creek proposed harvest units (Project Record Documents 10 & 32). These acres, located in sections 1, 7 and 13, represent some of the best mollusk habitat within or near the project areas. These surveys detected no target mollusk species.

Additionally the first round of the two visit mollusk protocol surveys was completed in the spring of 2011 on the 100 acres of the South Scappoose Creek proposed regeneration harvest units (Project Record Document 31). No target mollusk species were located during the first round of these protocol surveys. The final round of surveys necessary to complete the survey protocol is scheduled to be completed in fall of 2011.

Red Tree Vole (Bureau Sensitive and S&M)

The red tree vole is an arboreal rodent that rarely comes to the ground and may live its entire life on a few acres. It is thought to be strongly associated with mature and late-successional Douglas-fir forest with optimal habitat being old-growth forests. Some recent studies and the results of many surveys over the last ten years have shown that red tree voles are also sometimes

found in younger forests, especially if they contain a component of older trees or are located near stands of mature forest. At this time it is uncertain what role younger forests play in the general health of the red tree vole populations, especially in the northern mesic zone where the South Scappoose Creek Project area is located. Gomez (1992) did not capture the species in hardwood stands, and generally hardwoods are not recognized as an important habitat component. According to Eric Forsman, a noted spotted owl and red tree vole researcher, tree voles are quite uncommon in the northern coast range; and genetic work by Miller et al. (2006) suggests that in the historical past the northern populations of red tree voles had become fragmented and discontinuous with the southern populations by climate change associated with glaciation.

The USFWS has initiated a status review of the species, including an evaluation of the north Oregon coast population of red tree vole and the red tree vole throughout its range, and will determine whether listing under the ESA is warranted (USDI-U.S. Fish and Wildlife Service. 2008b).

There are relatively few records of the red tree vole in the northern coast range. In the last ten years of red tree vole surveys covering about 5,000 acres, the Tillamook RA BLM has located approximately 100 red tree vole nests of which about 40 were active. All of the located nests are on the west side of the Coast Range summit within the Nestucca drainage. The nearest known red tree vole site is located more than 30 miles from the proposed project areas.

The proposed treatment areas are comprised of second-growth Douglas-fir, conifer/hardwood mixed, or hardwood dominated stands which range in age from 61 to 73 years. The stands lack a multi-storied structure and contain no legacy trees – predominate trees in the overstory remaining from previous stand. None of the stands proposed for treatment are considered to be red tree vole habitat or able to support viable tree vole populations. No red tree vole surveys have been conducted within the South Scappoose Creek project areas, nor are they required based upon the habitat conditions present.

Migratory Bird Treaty Act

Executive Order (EO) 13186, issued Jan. 17, 2001 directs federal agencies to enter into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service to further the goals of the Migratory Bird Treaty Act of 1918 (MBTA). The pertinent goals of the EO are to "support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures and practices into agency activities and by avoiding or minimizing to the extent practicable adverse impacts on migratory bird resources when conducting agency actions"; and to "ensure that environmental analyses for Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern". On April 12, 2010 the Director of the BLM signed a Memorandum of Understanding with the USFWS which outlines a collaborative approach to promote the conservation of migratory bird populations. The portion of the MOU that is most applicable to the South Scappoose Creek Project follow: "*At the project level, evaluate the effects of the BLM's actions on migratory birds*

during the NEPA process, if any, and identify where take reasonably attributable to agency actions may have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In such situations, BLM will implement approaches lessening such take . . . "

The South Scappoose Creek project would cut and remove trees, and construct, renovate and decommission roads which could result in the unintentional take of adult or nestling birds that are covered by the MBTA, or result in failed nesting attempts. In general, thinning of young conifer forests results in greater abundance of birds and, depending on the presence of other habitat features such as snags, hardwoods, etc., can also increase bird species richness. Of the bird species that are included in the USFWS's 2008 "Birds of Conservation Concern" list for the U.S. portions of the Northern Pacific Forest Bird Conservation Region only the olive-sided and willow flycatchers, purple finch and the rufous hummingbird occur within the analysis area and have the potential, either negatively, positively or both, to be impacted by the South Scappoose Creek Project.

Olive-sided Flycatcher

In the Coast Range, the olive-sided flycatcher builds nests in mature conifer stands, preferring western hemlock and Douglas-fir, with openings nearby such as early seral forest stands, marshes, ponds, etc., over which they forage. They are most abundant in landscapes containing late-seral forests highly fragmented by early-seral habitats – a landscape rich in high contrast edges. Olive-sided flycatchers are conspicuous when singing and fly catching from high perches on snags or tall trees adjacent to openings.

Although the oldest stands within the area are still somewhat younger than those preferred by olive-sided flycatchers, the South Scappoose Creek project area contains some marginal quality flycatcher habitat. This habitat is located along forest edges containing relatively larger trees particularly along forest gaps such as *Phellinus weirii* areas.

Willow Flycatcher

In northwest Oregon's conifer-dominated landscapes, the willow flycatcher nests within a few feet of the ground in brushy, early-seral habitats. Industrial timber companies within the area of the proposed project are currently providing a great deal of early-seral habitats, however many typically treat recent clearcut units with herbicides and then replant the site exclusively with Douglas-fir seedlings. Under this management scenario, brushy thickets are usually rare if not totally lacking. These stands generally will not have time to develop complex early seral conditions before the site is completely occupied by the monoculture of Douglas-fir seedlings.

Habitats within the proposed treatment units currently do not provide habitat for the willow flycatcher with the possible exception of BLM forest openings that may be located directly adjacent to a private clearcut.

Purple Finch

Purple finches are breeding residents of low to mid elevation, open to semi-open conifer forests in western Oregon and parts of the Blue Mountains of eastern Oregon. Winter residency in Oregon is erratic, varying from year to year with most individuals migrating south for the winter. While purple finches are still somewhat common, their numbers have been declining in recent years. The reasons for the perceived decline are unclear but loss of habitat from conversion of forestland to urban or agricultural uses and competition from the house finch are thought to be contributors (M. Patterson; *in* Birds of Oregon: A General Reference, 2003).

Purple finches undoubtedly breed in the vicinity of the South Scappoose Creek Project along riparian corridors, at the edges of *Phellinus weirii* areas, along edges of old clearcuts and in other areas of reduced canopy cover. With the exception of the outer edges, the proposed treatment units are probably not currently preferred purple finch habitat in that the canopy is rather closed and the shrub layer is rather simple.

Rufous Hummingbird

Rufous hummingbirds can be found in a variety of habitats as long as a well-developed flowering shrub layer is present. Foraging consists of feeding on nectar from flowering shrubs such as red-flowering current and red elderberry, as well as on tiny insects, spiders and mites that are gleaned from plants. Nests are generally found between ground level and about 16 feet (D. Vroman; *in* Birds of Oregon: A General Reference, 2003). This hummingbird is the most common hummingbird in Oregon and is the only breeding hummingbird in the South Scappoose Creek area. While the private lands near the project area are strongly dominated by early seral habitat, management strategies there keeps competing vegetation suppressed which includes flowering shrubs. Thus, while there is a large quantity of early seral habitat, much of it may not be suitable for rufous hummingbirds. In general, the proposed units themselves do not currently contain hummingbird habitat in that there is little foraging opportunity. Possible exceptions would include along an edge of a proposed harvest unit, property line or near a current opening within the treatment unit where suitable habitat exists.

3.6.2 Environmental Effects Alternative 1: No Action

Special Status Species (BLM 6840 Policy)

Under the "No Action" alternative the current habitat condition for Special Status species would be unaffected now and into the near future. The young stands would continue to grow at a declining rate and become less stable over time. Eventually disturbances such as windthrow, root disease, insect attack, or possibly fire will influence the character of the stands and introduce more structural diversity into the ecosystem thus affecting the suite of animals that would use these stands. The attainment of a more structurally complex stand may take longer under the No Action alternative and would eventually result in an old forest system with more, smaller trees but with a high amount of coarse wood (although of smaller piece size). It is not clear in the

long term whether the overall animal species composition and abundance resulting from the No Action alternative would be appreciably different than from what it is today.

Under the "No Action" alternative, there would not be any potential for additional drying of the terrestrial environment that may otherwise result from a reduction in canopy cover that would affect terrestrial mollusk habitat, nor would there be any damage or destruction of existing coarse woody debris. Habitat for red tree voles would remain poor as it is today and would, over time, continue to improve at a slow rate.

Cumulative Effects
Generally speaking the Special Status Species analyzed here would not experience any cumulative effects in the next several decades. Beyond the next two to three decades, a very small cumulative effect could occur for species that may prefer older forest structure such as the red tree vole. None of the affects, if realized, would change the level of population viability for any of the Special Status Species.

Migratory Bird Treaty Act

Under the "No Action" alternative the current habitat conditions for the MBTA listed Species of Concern would be unaffected now and in the near future. The stands would continue to grow at a declining rate and become less stable over time. Eventually disturbances such as windthrow, root disease, insect attack, or possibly fire will influence the character of the stands and introduce more structural diversity into the ecosystem thus affecting the suite of animals that would use these stands.

Not treating those stands proposed for thinning would maintain less desirable habitat conditions for the rufous hummingbird and the purple finch in the near term (next few decades) and possibly into the long term since both of these species favor more open forested conditions. The olive-sided flycatcher may also find the unthinned stands less favorable than thinned stands but that assessment is less clear in that stands that are too open are not favored for nest site selection. However thinned stands that maintain high growth rates and then recover canopy closure with larger, denser crowns that mimic late-seral conditions may be more beneficial to olive-sided flycatchers within a few decades as long as open foraging areas still occur nearby.

Not treating those stands proposed for regeneration harvest would not create additional nesting habitat for the willow flycatcher or rufous hummingbird. It would maintain less desirable habitat conditions for the olive-sided flycatchers, and the purple finch in the near term (next few decades) and possibly into the long term since these species favor more open forested conditions.

Due to the limited scale of the project area and the small potential for impacts, neither the proposed action nor the "No Action" alternative would be expected to affect the population viability or population trends for the purple finch, rufous hummingbird or the olive-sided and willow flycatchers.

Cumulative Effects
While the actions on some of private lands in the analysis area may benefit the rufous hummingbird and willow flycatchers, they are most likely detrimental to the purple finch and olive-sided flycatcher and not implementing the South Scappoose Creek Project would have little impact on any of these species. Considering the scope of activity on private land compared to the potential for impacts, or lack thereof, from the "No Action" alternative, no cumulative impacts are expected from a decision to select the "No Action" alternative.

3.6.3 Environmental Effects Alternative 2: The Proposed Action

Terrestrial Mollusks

In general, light to moderate thinning of mid-seral forest stands causes minor changes in the microclimate at the ground level post-harvest whereas heavy thinning, small gap creation and regeneration harvest would have greater potential adverse impacts. Results from studies of microclimate changes between various thinning densities compared to unthinned stands seem to indicate that, although thinned stands are warmer and dryer than unthinned stands, there is considerable overlap in conditions between them suggesting that these stands provide a wide range of microclimates (Chan et. al., 2004). The South Scappoose Creek Project proposes to thin the majority of the stands (68.4%) by thinning across all size classes and would result in an average canopy closure within the thinned stands expected to average between approximately 58% and 69% immediately after thinning and CWD creation (see Table 10).

Hardwoods are an important habitat component for some mollusk species. Big-leaf maples would be reserved in all treatment areas where it currently exists which would help minimize the adverse impacts of the project, however the current red alder component would be entirely removed from approximately half of the thinned areas (604 acres), those stands located within the uplands (stands within the Matrix LUA). Where present, an alder component would be maintained within all thinning areas located within the Riparian Reserve LUA – approximately 479 acres. Despite the retention of the big-leaf maple component in all treatment areas where it currently exists, the total removal of the red alder component from 604 acres of stands thinned would have an adverse impact upon the current and future mollusk habitat quality within the unit. This impact would be expected to be most pronounced within those treatment units which currently do not have a big-leaf maple component. Post-harvest, those portions of Units 6, 8, 10 and 13 within the Matrix LUA, totaling 447 acres, would totally lack a hardwood component - that is, they currently do not contain any big-leaf maple and all the red alder would be removed as a part of the thinning operation.

Considering that even in unthinned stands there are long periods in a given year when the climate is unsuitable for terrestrial mollusk activity, it stands to reason that there may only be a slight change in the average time when conditions in the thinned stands are unsuitable for mollusk activity compared with the unthinned stand condition, presumably on the cusps of the dry weather in the early summer and later fall, and if there is a change, it may be within the range of natural variability. Also, the additional cover at the ground level provided by the increase of the

shrub layer due to the thinning would help moderate some of the effects of additional solar radiation and air movement through the stand.

Within the thinning units, treatment on up to a total of approximately 81 acres would include removing most trees susceptible to *Phellinus weirii* creating heavily thinned gaps (up to 1 acre in size) where post-harvest tree densities would be approximately 20 trees per acre. If the slash resulting from these treatments is determined to be excessive, it would be treated by pile burning or some mechanical method; this would have an adverse impact upon mollusk habitat. In these "gap" or heavy thinning areas, ground conditions could be changed to a point where they are unfavorable to terrestrial mollusks for a longer portion of a year, perhaps by as much as 6-8 weeks. The adverse warming and drying effects of the proposed project upon mollusk habitat would be most pronounced and long-lasting within the 100 acres of regeneration harvest; design features including green tree retention, those addressing CWD habitat and the fact that the regeneration harvest acres are generally configured into dispersed, relatively small treatment units would help minimize the adverse impacts.

Harvest activities, especially ground-based harvesting and new road construction, can have direct impact on mollusks and mollusk habitat by crushing individuals or breaking apart later decay stage coarse wood.

The principles of conservation biology hold that species with patchy distribution and that have genetically isolated populations are at greater risk of extinction. With so little available information and few records of the crowned tightcoil, salamander slug, spotted taildropper and Puget Oregonian (in Oregon) it is impossible to accurately assess the impacts of a project like the South Scappoose Creek project on these species. That said, we expect the level of direct and indirect impacts to Sensitive mollusk populations to be minor based on the project design features and the fact that no sensitive mollusk species were located during protocol surveys conducted within and near the project areas.

If any sites of S&M mollusk species (Puget Oregonian or evening field slug) are located during fall 2011 surveys scheduled to be conducted within or near South Scappoose Creek proposed regeneration harvest units, as required they would be protected and managed with an appropriate buffer to control impacts to the site (see *EA section 1.3.1* - Survey and Manage Species Review).

Cumulative Effects

The Sensitive species addressed by this analysis generally require attributes found in forests that are in the mature to late-seral stage. The project area is on the young side of qualifying as suitable habitat for these species. There is no identified late-seral habitat on non-federal land within the analysis area. Generally forest management on private land is aimed at maximizing the production of Douglas-fir and there is no requirement to reserve any down woody debris. Bare ground and young plantations of Douglas-fir are not favorable habitat for Sensitive terrestrial mollusks. While the thinning of about 1540 acres of conifer forest on BLM land may temporarily reduce the habitat quality on those acres, and the 100 acres of regeneration harvest would remove those acres from a condition of being considered suitable mollusk habitat, the

project's cumulative impact compared to the intensity of impacts on private lands would be imperceptible and would not result in any additional population viability loss.

Red Tree Vole

The proposed treatment areas are comprised of second-growth Douglas-fir, conifer/hardwood mixed, or hardwood dominated stands which range in age from 61 to 73 years. The stands lack a multi-storied structure and contain no legacy trees – predominate trees in the overstory remaining from previous stand. None of the stands proposed for treatment are considered to currently be red tree vole habitat or able to support viable tree vole populations.

The proposed thinning could result in slowing the development of suitable red tree vole habitat. Swingle and Forsman (2009) suggest that thinning of young conifer forest could have detrimental effects on red tree vole habitat speculating that decreased connectivity between individual tree crowns may be the reason. While the proposed level of thinning would be considered a moderate thinning, it would nonetheless result in a variably spaced canopy where in some portions of the stands there would be several decades before crowns are again interconnected enough to allow tree voles to travel from tree to tree. However, as the treated stands continue to mature and once the crowns of the retained trees have expanded, the quality of the vole habitat would likely be better than had the stand not been thinned. A relatively variable spaced thinning would encourage increased crown development and heavier branching which would provide stable potentially suitable nest sites. A common response of Douglas firs to thinning is an increased occurrence of epicormic branching. Red tree voles commonly use clusters of epicormic branching as nest sites.

Taken in context, the overall potential for impact to the red tree vole is exceptionally small. Given the nature of the habitats to impacted, the fact that the project area is on the fringe of the tree vole range and that that there is little possibility that there would be direct impact to voles, the proposed action would have a negligible potential for impacts (beneficial or adverse) to the red tree vole population.

Cumulative Effects

Considering the lack of red tree vole habitat in the analysis area and the rapid conversion of mid seral stands to plantations on non-federal lands in the area, the proposed action would not have any perceptible cumulative effects upon the red tree vole.

Migratory Bird Treaty Act

Olive-sided Flycatcher

There is a small possibility that the proposed project could affect individual flycatcher nests that could be present in the treatment units, and thus result in "Take" under the MBTA. This potential impact is however, considered to be rather remote based on the fact that even the oldest stands within the area of the South Scappoose Creek project are still somewhat younger than

those preferred by olive-sided flycatchers. The South Scappoose Creek project areas currently contain marginal-quality flycatcher nesting habitat at best.

The proposed thinning would provide some benefit to flycatcher habitat by providing more early seral openings (*Phellinus weirii* areas, and small gaps) in the vicinity of the mid-seral stands – both those stands being thinned and additional stands reserved from treatment; created openings would provide additional foraging opportunities. Given that the stands proposed for thinning are somewhat younger than those preferred by olive-sided flycatchers and the fact that stands that are too open are not favored for nest site selection, in the near term it is questionable as to whether or not there would be a benefit to flycatchers through providing additional nesting habitat. In the long-term (approximately 20+ years), the project would benefit olive-sided flycatchers through the development of mature/late-seral stage habitats; this beneficial impact would likely be most realized with the 964 acres of thinning proposed in Riparian Reserve and CON LUAs.

Post-treatment the 100 acres of regeneration harvest units would be expected to provide high-quality foraging opportunities. Olive-sided flycatchers typically forage by catching flying insects from high perches on snags or tall trees adjacent to forest openings. The facts that the acres proposed for regeneration are, on the ground, configured into 12 treatment areas averaging approximately 8.3 acres in size, generally set in the context of surrounding conifer forest and would contain numerous scattered and clumped reserve trees would all help promote high-quality flycatcher foraging habitat.

Willow Flycatcher

In general, habitats within the proposed treatment units currently do not provide habitat for the willow flycatcher with the possible exception of BLM forest openings that may be located directly adjacent to a private clearcut. It is possible that through the harvesting process one or more nests could be destroyed if willow flycatcher were nesting within the proposed units during the harvest operation. Therefore "Take" under the MBTA is possible, although somewhat remote.

In contrast to practices common to many industrial timber companies within the area of the proposed project, the BLM does not treat recent regeneration harvest units with herbicides. The techniques of manual brushing of competing vegetation utilized by the BLM does not result with the site being so exclusively dominated by planted conifer seedlings. Shrub species preferred by nesting willow flycatchers are usually a major habitat component within BLM regeneration harvest units. Post-treatment the 100 acres of regeneration harvest units would be expected to provide increased nesting opportunities for the willow flycatcher. This nesting habitat would be expected to be a condition favored by willow flycatchers for up to approximately 15 years after harvest operations. The proposed thinning treatment would also benefit the development of a shrub layer. This would have some potential to benefit willow flycatcher habitat but most likely the habitat benefits would be very localized into more open areas based on the species preference

for shrub-dominated habitats. These areas could include areas of heavier thinning and *Phellinus weirii* areas, especially those along property boundaries with adjacent clearcut harvest units.

Purple Finch

It is possible that through the harvesting process one or more nests could be destroyed if purple finches were nesting within the proposed units during the harvest operation. Therefore "Take" under the MBTA is possible, although somewhat remote.

In western Oregon, purple finches prefer open to semi-open conifer forest habitat. The proposed thinning would generally benefit the purple finch by increasing or improving breeding habitat through the opening of the canopy and treatment of *Phellinus weirii* areas by removing the majority of trees in infected patches thus creating small, early seral gaps/edges. As with the olive-sided flycatcher, the design features incorporated into the proposed regeneration harvests would also benefit purple finch habitat.

Rufous Hummingbird

The proposed action most likely would not directly impact any hummingbirds except for the very slight possibility that there may be a few nesting along an edge of a proposed harvest unit, property line or near a current opening within the treatment unit where suitable habitat exists. "Take" under the MBTA is possible if harvest operations were to be active during the breeding season in an area containing nesting hummingbirds. On the other hand, the expected development of the understory brush layer within the treatment units, especially in the gaps created to treat *Phellinus weirii* and areas of heavier thinning within the thinning units, and the 100 acres of regeneration harvest would appreciably improve hummingbird foraging and nesting habitat within the area for the next ten to twenty years.

Cumulative Effects
Considering the low level of potential impacts associated with the proposed action there are not expected to be any cumulative impacts caused by the proposed action relative to the impacts occurring on the private lands in the analysis area. From a population viability perspective, the low level of impacts and the relatively small scale of the project compared to the range of the three species analyzed here would not result in any additional cumulative effects.

3.7 Recreation and Visual Resources Management

3.7.1 Affected Environment

Recreational opportunities within the project areas consist primarily of hunting, recreational Off-Highway Vehicle (OHV) use, limited dispersed camping and harvesting of special forest products, such as mushrooms. Public vehicular access into sections 9, 19, and 29 is available; the remaining project areas are accessed from private lands which are behind gates that are usually locked. Areas that have been gated can usually be accessed by the public by foot travel.

Private landowners within the area may open gates that are locked for most of the year, in order to grant public hunting access during big game hunting seasons. Dumping of household garbage and yard debris is apparent on many of the side roads and landings with public vehicular access.

The entire project area is designated under the ROD/RMP as "open" for OHV use. Open OHV use is classified as an area where all types of vehicle use are permitted at all times, anywhere in the area subject to the operating regulations and vehicle standards set forth in 43 CFR 8341and 43CFR 8342. Signs of past and current OHV use can be seen throughout the project area.

Recreational OHV use has risen progressively over the last few years primarily due to closure of many private lands to motorized use and limitations placed on public lands. The project area is within reasonable travel distance from major metropolitan areas and within close proximity to urban communities which enables OHV users to schedule day trips to the area as opposed to multi-day trips required for many public land locations that allow for OHV use.

The majority of the lands within the project area fall under Visual Resource Management (VRM) IV classification. VRM class IV allows for major modifications of existing character of landscapes. Section 9 is VRM class III objectives which are to partially retain the existing character of landscapes.

3.7.2 Environmental Effects Alternative 1: No Action

Hunting, camping, hiking, mushroom gathering and OHV use are the primary recreational activities found within the project area. Under the no action alternative, recreational opportunity would remain at current levels.

3.7.3 Environmental Effects Alternative 2: The Proposed Action

Due to the nature of the proposed action alternative, it would have no effect on hunting and camping opportunities following harvest activities within the project area. The project would have minimal adverse effects upon OHV riding opportunities, primarily during harvest activities. Temporary roads would be closed and OHV use discouraged by signing and/or blocking of the access points. Additional slash material resulting from project activities may hinder cross country travel access to small areas as no measures would be taken to remove materials from existing trails.

Placement of a gate on road 3N-2-29.3 would potentially limit the dumping activities currently taking place at that location. The primary use of this location by the public appears to be illegal disposal of household waste and yard debris. Restricting public vehicular access with a gate on this relatively short road would have no effect on any legal recreational activities.

The proposed action would meet the objectives of VRM classifications within the entire project area.

Cumulative Effects

Private lands have been previously restricted for various recreational use types. The proposed action would not place any additional limitations on recreational opportunities following harvest activities. Road 3N-2-29.3 is a short spur road ending at a landing; placement of a gate would not affect other recreational uses available at that location.

3.8 Invasive, Non-native Species (Executive Order 13112)

3.8.1 Affected Environment

Examples of forest management activities within the project area that would create soil disturbance and influence the spread of invasive/non-native plant species are: commercial and pre-commercial density management thinning, young stand maintenance, new road construction, road decommissioning, road maintenance, culvert replacements, and off highway vehicle (OHV) trails. Activities that do not necessarily create disturbance but influence the spread of weed seeds are recreational hiking, biking, horseback riding, fishing, and hunting. Other sources of seed dispersal are from wildlife that are either passing through or frequent the area, water movement, and wind. Many past and present management activities tend to reduce or eliminate forest canopy closure and disturb soils therefore providing opportunities for widespread weed infestations to occur. Many, if not all of the weed species designated as category B (established infestations) on the Oregon Department of Agriculture's (ODA) noxious weed list are most likely present throughout the area. Because they are present in and adjacent to the project area, newly formed seed is readily available and/or an established seed bank is present. Most non-native weed species are not shade tolerant and will not persist in a forest setting as they compete for light when tree canopies close and light to the understory is reduced. So, based on what we know about invasive plants distribution, dispersal mechanisms and their ability to establish in newly disturbed sites we can expect new and old populations to fluctuate over time within the analysis area based on these factors as described.

3.8.2 Environmental Effects Alternative 1: No Action

No appreciable increase in the invasive non-native plant populations is expected to occur if no action is taken.

Cumulative Effects

Because there would be no appreciable increase in the invasive non-native plant populations if no action is taken, there would be no cumulative effects.

3.8.3 Environmental Effects Alternative 2: The Proposed Action

The conifer stands proposed for management currently range in age from 46 to 73 years old with scattered pockets of hardwoods, an under-story of common shrubs and scattered populations of grasses and forbs. Plant surveys began in May of 2011 and were completed on August 17, 2011. A complete record of the field surveys including a comprehensive plant list is available for review at the Tillamook Resource Area field office. Intuitive controlled surveys were conducted in a variety of habitats throughout the project area (substrates, rock, features, elevations, slopes, aspects, water, and topography). Any ground-disturbing activity that occurs within these habitats offers opportunity for the introduction of noxious weeds and/or invasive non-native plant species based on the existence of a seed source. Past surveys completed within close proximity of the proposed project area have indicated that where mature native plant communities are established, non-native species are not dominant or do not exist. It is expected that most invasive weed species encountered will be Category B Noxious weeds and are prevalent throughout Western Oregon and proliferate easily through vectors such as human traffic, animal movement, wind, and water. Ground disturbing activities such as new road construction, reconstruction and decommissioning, yarding corridors, tractor skid trail development, landing use, and haul road maintenance are the most likely activities that could produce conditions conducive to noxious weed establishment. Some degree of noxious/exotic weed introduction or spread is probable as management activities occur in the project area.

Any increase in available light or soil disturbance throughout the project area would promote the possible introduction of invasive non-native plant species. Project Design Features have been incorporated to limit the spread of invasive/non-native species resulting from the proposed action (see *EA section 2.4.2*).

Cumulative Effects

No cumulative effects are expected with regard to invasive/non-native plants because the project would not contribute to the spread of invasive species populations or to the introduction of new species with the implementation of project design features and because little or no difference in the composition or numbers of invasive/non-native species populations have been observed in similar projects on BLM lands in the vicinity.

3.9 Special Status and SEIS Special Attention Plant Species and Habitat

As discussed, it is the policy of the BLM to conserve Threatened and Endangered species and the ecosystems they depend upon primarily by prescribing management for conservation of lands these species inhabit (BLM Manual Chapter 6840). The primary goals of the Threatened and Endangered Species Program are inventory, monitoring, plan preparation, and plan implementation to ensure the maintenance and recovery of these species.

Similarly, it is BLM policy to manage Candidate species and their habitats to ensure that BLM actions do not contribute to the need to list any Candidate species as Threatened or Endangered. The Oregon BLM Director has the authority to designate Sensitive (or Special Status) Species,

which are to be managed under the same policy as Candidate species. It is also BLM policy to carry out management for the conservation of state-listed plants. Surveys being conducted for the South Scappoose Creek Project area are compliant with these management policies.

Based on the "Pechman Exemptions" all proposed thinning proposals are exempt from Survey and Manage Standard and Guide requirements based on being in stands with an average age of less than 80 years (see *EA section 1.3.1*). For those 100 acres of the South Scappoose Creek Project that entail regeneration harvest and to which none of the Pechman exemptions apply, required S&M pre-project surveys would be completed prior the issuance of a South Scappoose Creek Project Decision with any newly discovered site(s) appropriately protected and/or managed,(refer to *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, January 2001).

3.9.1 Affected Environment

BLM managed lands are in a checkerboard pattern throughout this part of the coast range. Much of the adjacent ownership is in private holdings and has been observed at an accelerated harvest rate and only requires compliance with the Oregon State forest practices act concerning habitat alteration. Because the forest practices act does not require the private land owners to conduct pre-disturbance surveys and identify sensitive plant sites, a considerable amount of habitat for sensitive plant species adjacent to the project area is continuously being reduced, therefore increasing the importance of known site protection of sensitive plant species on public lands. Design features such as establishing no-harvest stream buffers, and increasing the amount of down woody debris, all contribute to the essential habitat requirements for sensitive plant species throughout the project area. Sensitive plant species located within or adjacent to the analysis area only have the ability to colonize or populate where required habitat is available. Existing habitats within the proposed project areas consists of 46-73 year-old conifer stands, including scattered pockets of hardwoods, an under-story of common shrub species and scattered populations of grasses and forbs. A variety of habitats are represented throughout the project area (substrates, rock, features, elevations, slopes, aspects, water, and topography). Surveys for BLM Special Status Species and all lichens, bryophytes, and vascular plants identified on the Oregon Natural Heritage Information Center Rare, Threatened and Endangered species of Oregon website (http://oregonstate.edu/ornhic/publications.html) are currently being conducted.

Plant surveys began in May of 2011 and were completed on August 17, 2011. A complete record of the field surveys including a comprehensive plant list is available for review at the Tillamook Resource Area field office. No Threatened or Endangered, Special Status, or Survey and Manage species have been identified.

3.9.2 Environmental Effects Alternative 1: No Action

There would be no effects to any Survey and Mange, Special Status and Special Attention plant species and habitats under the No Action alternative.

3.9.3 Environmental Effects Alternative 2: The Proposed Action

There would be no indirect or direct effects resulting from the proposed action alternative upon Survey and Mange, Special Status and Special Attention plant species.

Cumulative Effects

There would be no indirect or direct effects under the proposed action alternative; therefore there would be no cumulative effects.

3.10 Air Quality, Fire Risk and Fuels Management

3.10.1 Affected Environment

Air Quality

The major source of air pollutants within the South Scappoose Creek project area would come from potential wildfire starts, and from associated resource management activities including prescribed burning (swamper burning, hand, machine, and landing piles), and dust from the use of natural-surfaced roads in association with road construction, road maintenance, and log hauling.

Smoke and dust contain pollutants consisting of small particles called particulate matter (PM). Particulate matter can cause health problems, especially in individuals with respiratory illness. Smoke in the air also affects visibility. Air quality standards are set by the Environmental Protection Agency and provide health and visibility protection as directed by the Clean Air Act of 1970, with amendments. The state of Oregon also sets standards to help protect air quality. The project area is located 8- 13 miles southwest of the city of St. Helens, Oregon, and closer to numerous unincorporated, rural areas. St. Helens is classified as a Smoke Sensitive Receptor Area under the Oregon State Implementation Plan and Oregon Smoke Management Plan. The anticipated haul routes would include BLM, private and county maintained asphalt, gravel, and natural-surfaced roads.

Fire Risk

The climate in Northwest Oregon is generally mild and wet in the winter. Occasionally, snowfall will remain at higher elevations for an extended period of time. Summers are warm with periods of dry weather usually during the months of July, August, and September. Summer

temperatures during this period average approximately 60° F with high temperatures reaching the mid to upper 90's, and occasionally topping 100° F for short periods of time. During average weather years the conditions under the forest canopy remain relatively moist. The two main causes of wildfire starts across the state are lightning and people. Dry lightning (lightning that that has no accompanying moisture) that occurs during the summer months is rare in Northwest Oregon. Within the Oregon Department of Forestry's Astoria, Forest Grove & Tillamook Districts approximately 4% of fire starts in the analysis area are attributed to lightning (http://oregon.gov/ODF/FIRE/HLCause.pdf). The highest risk ignition source within the analysis area is people. Sections 7, 1, 11, and 13 are located behind locked gates on Dutch Canyon Road. Section 9 is located behind a locked gate on Rabinski Road. Large portions of Section 19 and 29 are located behind locked gates on Otto Miller road and Dixie Mtn. Road; however these sections also have portions accessible to the public via these roads. Many of these areas may be accessible to the public via rocked roads during harvest operations on private land or during hunting season. OHV use on drivable and unimproved roads and trails is prevalent even when gates are locked. OHV use is one of the major human activities in the analysis area. The Oregon Department of Forestry regulates the use of forested lands during fire season. OHV riding in non-designated areas falls under the Oregon Department of Forestry Regulated Use Fire Season Closure.

Fire Regime and Condition Class (FRCC)

The modeling predictions from the LANDFIRE Rapid Assessment Vegetation Models (http://www.fs.fed.us/database/feis/fire_regime_table/fire_regime_table.html) within the South Scappoose Creek analysis area are listed in Table 22.

Table 22: Modeling Predictions of Fire Regimes for the South Scappoose Creek Project Area

Vegetation Community (Potential Natural Vegetation Group)	Fire Regime	Condition Class	Fire Severity	Fire Regime Characteristics			
				Percent of fires	Mean interval (years)	Minimum Interval (years)	Maximum interval (years)
Douglas-fir/western hemlock (dry mesic)	III	1	Replacement	25%	300	250	500
			Mixed	75%	100	50	150
Douglas-fir/western hemlock (wet mesic)	V	1	Replacement	71%	400	N/A	N/A
			Mixed	29%	>1000	N/A	N/A

The fire regime classifies the role fire would play across the landscape in the absence of modern human intervention. The analysis area falls within two different Fire Regimes. Fire Regime III is characterized by a moderate to low fire return interval with a mixed severity and is associated with south and west facing slopes. Fire Regime V is characterized by a low fire return interval with a high severity and is associated with north facing slopes. The Condition Class classifies the amount of departure from the natural fire regime. The timber stands in the analysis area generally fall within Condition Class 1 with species composition and structure functioning within their natural (historical) range. Some stands are moving into Condition Class 2 with moderate increases in tree density, recent fire exclusion, and replacement of shrubs with woody fuels and litter.

Timber Stand and Fire History

The South Scappoose Creek analysis area has experienced numerous management activities over the past 100 years. In August of 1939, BLM managed land in the NW and SW quarters of Section 1, and almost all of Sections 11, 13, and 7 were burned during the Columbia County Fire. In addition, 1951 saw 40 acres in the N1/2 of the SW quarter of Section 13 burned in the upper Lazy Creek drainage. The sections experienced a varied burn pattern with areas that were severely impacted to areas where only the underbrush was burned with very few trees killed. Fire salvage logging operations took place in these sections during the 1940's and 1950's, and harvested dead standing trees. Many of the BLM contracts of the time included snag falling stipulations to remove smaller diameter dead trees that were not merchantable. This was the case in Section 11. These stipulations were designed to help reduce the potential for wildfire starts and to reduce the intensity and spotting potential if a fire did start. Clearcut harvesting occurred in small sale areas from the 1960's through the early 1990's within the analysis area. There are very few documented records that prescribed burning occurred on these clearcut harvest units, although it is likely, as with most timber sales of that era, that some of these areas had some type of prescribed fire activity for either hazard reduction or site preparation. Commercial thinning also occurred into the 1990's with the BLM McLafferty Creek timber sale.

It has been over 70 years since the 1939 Columbia County Fire. Small amounts of the landscape have had fuels treatments including broadcast or spot burning. This is well within the range of a normal fire return interval.

Fire Effects

Fire effects on forested areas are influenced by fire frequency, fire duration, and fire intensity (Van Wagner 1965). These factors in turn vary with forest type, depending on fuel type and structure, topography, and weather variables (east winds often have a major influence on wildfire events in the area). Previous wildfires, fuels treatments, and timber harvests, proposed treatments in the analysis area that would occur in the future, as well as the suppression priorities placed on BLM land by the Oregon Department of Forestry (the contracted agency responsible for fire protection on BLM land) would result in a continued low risk of a major stand replacement wildfire.

The National Fire Plan (August, 2000) and the Ten-Year Comprehensive Strategy for Reducing Wildland Fire Risks to Communities and the Environment (May, 2002) places a priority on working collaboratively within communities to reduce their risk from fires. The Healthy Forest Restoration Act of 2003 (HFRA) builds on existing efforts of the Ten-Year Strategic Plan and stresses the need for development of Community Wildfire Protection Plans (CWPP's). The South Scappoose Creek analysis area is located within Columbia and Washington Counties, OR. Columbia and Washington Counties both completed a CWPP in August, 2007. These plans identify "Communities at Risk" within the county where natural cover and wildland fires pose a potential threat to people and their homes. The analysis area is not immediately adjacent to any identified "Communities at Risk". Columbia County specifically identified Wildland Urban Interface (WUI) boundaries within their CWPP. BLM managed land within Sections 1, 11, 13, and 7 of the analysis area fall within this designated WUI. Action plans were identified for Communities at Risk within the WUI boundaries. Washington County specifically identified parts of BLM managed land in Sections 19 and 29 as WUI. Within this plan the Tupper Ranch Strategic Planning Area (SPA) identifies fire potential, ingress/egress, infrastructure, fire protection, risk assessment, and mitigation activities that would be most beneficial toward enabling a safe response and escape in the event of a wildfire. Sections 9 and 21 in Columbia and Washington Counties respectively fall within managed Rural Interface Areas as identified in the ROD/RMP. Collaboration is essential to meet the objectives of the HFRA so fuels treatments that would reduce the likelihood of wildfire starts on federal land spreading to private land and eventually "Communities at Risk" would help the counties to meet the goals of their CWPP's.

Fuels Management

Regeneration harvest and commercial thinning prescriptions would change the structure of the BLM managed timber stands in the analysis area. Management direction within the Matrix land use allocation (CON and GFMA) calls for minimizing intensive burning. Prescribed fires should minimize the consumption of litter and CWD. The current dead fuel load in the regeneration and commercial thinning timber stands was identified during stand exams and by using GTR PNW-105 *Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest* (Maxwell and Ward, 1980) is listed in Table 23.

There is very little existing CWD within the analysis area. The current CWD falls within all Decay Classes, however Decay Classes 4 & 5 comprise approximately 79% of this material. The stands currently fall under National Fire Danger Rating System (NFDRS) Fuel Model 10 (Timber - (closed timber litter)). Following regeneration harvest and commercial thinning, management direction further requires leaving additional logs to meet short term needs (Decay classes 1 & 2). Also, additional trees must be left for future recruitment of snags and CWD.

When harvest has been completed, fuels surveys would be conducted and treatment units that are identified as containing hazardous fuels or areas that need site preparation (regeneration harvest units, and *Phellinus weirii* areas) for reforestation may have hand piles constructed within areas

containing dense slash. Machine piles may be constructed along roads, and landing piles may be constructed where logs are hauled to roads. If fuel loads are relatively light along property lines or roads, slash pullback may be incorporated as the desired fuels treatment.

Table 23: Dead Fuel Loading in Proposed Treatment Units

Unit Number & Harvest Type	Unit Acres	Curtis Relative Density Pre-Harvest	Curtis Relative Density Post-Harvest	Current Decay Class 1/2 CWD tons/ac.[1]	Future Decay Class 1/2 CWD to = 240 Linear Feet tons/ac. [2]	Current Decay Class 3/4/5 CWD tons/ac.[1]	Future Decay Class 1 & 2 Post - Harvest (tops, limbs, bark) tons/ac. [3]	Future Snag to CWD (Regen) tons/ac. [4]	Future Snag to CWD (Thin) ton/ac.[4]	Total Future CWD tons/ac.[5]
1-Thin	220	65	40	.3	12	2.2	11.2	0	4	29.7
2-Thin	39	62	36	.5	11	2	7.8	0	4	25.3
3-Thin	179	60	36	0	12	.4	7.8	0	2	22.2
4-Thin	26	65	30	.6	10	.4	16.1	0	2	29.1
5-Thin	19	60	35	0	12	0	8.4	0	2	20.4
6-Thin	37	62	36	0	12	0	10.1	0	2	24.1
8-Thin	375	62	35	0	12	7.7	8.7	0	2	30.4
9-Thin	348	64	39	0	12	0	6.0	0	4	22.0
10-Thin	60	67	36	.6	8.5	.7	19.5	0	4	33.3
11-Thin	20	53	35	1.6	4.5	0	5.8	0	2	12.3
12-Thin	69	59	32	2.6	4.5	0	11.8	0	2	20.9
13-Thin	76	63	35	1.2	7.5	.3	11.0	0	2	22.0
14-Thin	38	71	35	.8	10	2.9	13.2	0	2	28.9
16-Regen	13	78	17	0	12	3.1	23.1	0	4	42.2
17-Thin	16	65	35	0	12	0	11.0	0	2	25.0
17-Regen	3	65	13	0	12	0	21.2	4	0	37.2
18-Thin	8	70	36	0	12	7.7	12.0	0	2	33.7
18-Regen	1	70	12	0	12	7.7	23.0	4	0	46.7
20-Regen	7	64	12	0	12	3.4	19.4	4	0	38.8
21-Regen	20	53	14	1	9.5	0	16.5	4	0	31.0
22-Regen	13	58	8	0	12	0	25.2	4	0	41.2
23-Thin	8	66	35	.5	10	0	11.7	0	2	24.2
23-Regen	20	66	14	.5	10	0	21.0	4	0	35.5
24-Regen	12	52	13	0	12	1.1	20.4	4	0	37.5
25-Regen	11	73	12	1.4	3.5	0	19.7	4	0	28.6

[1]Current CWD identified during stand exams.
[2]Includes additional logs required to meet 240 linear feet of Decay Class 1 & 2 CWD. (1 log 20" x 20' = 1 ton)
[3]Smaller diameter slash added to harvest unit after removal of trees (1 ton/ac for every 7 harvested trees (tops, limbs, and bark).
[4]Includes additional snags for future CWD recruitment by Land Use Allocation and harvest method.
[5]Total of all current CWD and future CWD from snags left following harvest.

3.10.2 Environmental Effects Alternative 1: No Action

Air Quality

With no regeneration harvest or commercial thinning project there would be no need for road construction or log hauling, and little need for road maintenance. There would be little need for hazard reduction and no need for site preparation prior to reforestation. Consequently, there would be no need for prescribed burning and no localized effects to air quality.

Fire Risk / Fuels Management

With no regeneration harvest or commercial thinning project the no action alternative would allow the analysis area to continue on its current trend. The current risk of a fire start would remain low. There would be a slow increase in the coarse woody fuel load (1000 hour fuels) as well as the fine fuel load (1, 10, and 100 hour fuels) in these timber stands as stress-induced mortality within the stands increases. Areas infected with *Phellinus weirii* would see somewhat larger increases in fuel loading as Douglas-fir tree roots are weakened and the trees fall in small 1 to 2 acre pockets. Ladder fuel densities would continue to increase as understory trees grow larger and new understory trees begin to grow. The potential for these stands to eventually succumb to a wildfire would continue to increase. There would be little need for hazard reduction anywhere except along roads, and no need for site preparation. As a consequence, there would be no need for broadcast burning, hand or machine piling and burning, or landing burning, and no risk of one of these treatments escaping and starting a wildfire. The same areas currently behind locked gates would remain relatively inaccessible to the public. The risk of a wildfire would gradually increase as the fuel load accumulates and the stands near the mean interval for a naturally occurring return of fire.

Cumulative Effects

Under the no action alternative there would be no commercial harvest of timber, no log hauling, and no prescribed burning, and therefore no cumulative effect to air quality or fire risk. The stands would continue on their trajectory toward a natural return of fire as the main disturbance mechanism with the fuel load slowly increasing over time and with it the potential for producing large quantities of smoke associated with a wildfire.

3.10.3 Environmental Effects Alternative 2: The Proposed Action

Air Quality

The project areas would have timber harvested and logs would be hauled over short sections of BLM and other roads. Dust created from vehicle traffic on gravel or natural-surface roads, from road construction, road maintenance, logging operations, or log hauling, would contribute short-

term effects to air quality. None of these management activities would create dust above threshold levels. These effects would be localized to the immediate vicinity of the operations.

If the increased fuel load resulting from the regeneration or commercial thinning timber harvest project is determined by the BLM to be a fire hazard, or to significantly reduce the ability to reforest the treatment areas, then prescribed burning in the form of hand or machine piling and burning, swamper burning, or landing burning would be conducted and smoke would be created. Hand or machine pile burning, swamper burning, and landing pile burning would occur during the fall/winter time period. All prescribed burning would require a Prescribed Fire Burn Plan that is signed by the Authorized Officer, and would be coordinated with the local Oregon Department of Forestry office. All burning would be conducted in accordance with the *Oregon State Implementation Plan* and *Oregon Smoke Management Plan*. These plans limit or prohibit burning during periods of stable atmospheric conditions. Burning would be conducted when the prevailing winds are blowing away from SSRA's (Smoke Sensitive Receptor Areas) in order to minimize or eliminate the potential for smoke intrusions. The potential for smoke intrusion would be further reduced by burning under atmospheric conditions that favor good vertical mixing so that smoke and other particulate matter is borne aloft and dispersed by upper elevation winds.

Where hand or machine pile burning, swamper burning, or landing pile burning is the designated hazard reduction or site preparation strategy the short term impacts to air quality within one-quarter to one mile of units would persist for 1-to-3 days. None of the harvest units or other treatment areas are sufficiently close to any major highways that motorist safety would be affected. The overall effects of smoke on air quality is predicted to be local and of short duration. Activities associated with the proposed action would comply with the provisions of the Clean Air Act.

Fire Risk

Fire is the major natural disturbance process in the analysis area. Initially, the fuel load, risk of a fire start, and the ability to control a fire, would all increase as a result of the proposed action.

Slash created by the harvest of timber, and the addition of coarse woody debris for wildlife habitat within harvest units would add an estimated 27 - 42 tons/acre of dead fuel to the regeneration harvest units, and 10 - 32 tons/acre of dead fuel to the commercial thinning harvest units.

Wildfire or prescribed fire has a major influence on vegetation in the analysis area. It specifically affects seedbed preparation, nutrient cycling, successional pathways, fish and wildlife habitat, vegetative species composition, age, and structure, insect and disease susceptibility, and fire hazards.

Fire effects from wildfire may include: total tree mortality, formation of snags, loss of plant, fish and wildlife habitat, loss of resources on adjacent private land, elimination of the duff and litter

layers, reduction of the downed woody component (especially logs in later stages of decay), loss of soil productivity, increased soil erosion, increased sediment loading to streams, decreased infiltration rates, and short term, high level inputs of smoke into the air. All regeneration and commercial thinning harvest projects result in short term (1-5 year) increased fire ignition potential because of the increase of fine dead fuels.

The first strategy to reduce the risk of a fire is to reduce fuels in accessible areas. Although the majority of the project areas are located behind locked gates, these gates are often open when logging operations are taking place on private industrial forest land. In addition, many of these gates are open during hunting season leaving the project areas accessible to the public immediately after the close of fire season when fuels are often still highly ignitable.

Regeneration harvest and commercial thinning would remove ladder fuels (fuels that provide a "ladder" for fire to climb from the surface into the crowns) and decrease tree crown density (or crown bulk density) to levels that would be unlikely to sustain a high intensity crown fire. A relative density of 35-45 has been identified as the point where crown bulk density is unlikely to sustain a high intensity crown fire (Agee, 1996). The silvicultural prescription for all of the units in the analysis area (see Table 10) falls within or below this range.

Surface fuel reduction in strategic locations such as landing areas, along roads, property lines, and in regeneration harvest units, *Phellinus weirii* areas, and gaps through hand piling and burning, machine piling/landing piling and burning, swamper burning or slash pullback would further reduce the risk in accessible areas. Increasing the height to the live crown base, opening canopies, and reducing surface fuels should result in lower fire intensity, less probability of torching, and a lower probability of an independent crown fire.

The second strategy to reduce the potential of a large fire is through aggressive initial attack of all fire starts. BLM managed lands in Western Oregon are protected through the Western Oregon Fire Protection Services Contract with the Oregon Department of Forestry. BLM land managed under the Matrix land use allocation within the analysis area has been identified in most cases for aggressive initial attack using minimum impact suppression techniques that are appropriate to the land use allocation.

For the short term, the fire risk associated with the regeneration harvest and commercial thinning of timber stands within the analysis area would remain low. Over the long term, the fuel load would steadily increase, primarily as a consequence of increased mortality of diseased (*Phellinus weirii* infected) and other stressed trees in the stands, but also as a result of the wildlife trees left as snags and other trees left for future CWD recruitment.

Fuels Management

The fuel load would increase as a result of the proposed action. Slash created by the harvest of timber, and the addition of coarse woody debris for wildlife habitat within harvest units would

add an estimated 27 - 42 tons/acre of dead fuel to the regeneration harvest units, and 10 - 32 tons/acre of dead fuel to the commercial thinning harvest units.

Treatment of selected, high hazard fuel concentrations is planned for hazard reduction and site preparation. Hand piling and burning, machine/landing piling and burning, swamper burning, slashing, lopping and scattering, and pullback of slash to create fuel free zones would be used individually or in combination in the project area.

Fuels treatments in areas with elevated risk of human-caused ignition would reduce potential fire starts. Fuels treatments adjacent to areas with high value resources such as riparian habitat, and private lands, would reduce potential costs associated with fire suppression. The proposed fuel treatments associated with prescribed burning would result in small (<0.5 acre), scattered, localized areas of severe soil disturbance. This would potentially alter nutrient availability, soil infiltration, and soil structure. To mitigate this damage burning would be conducted during the fall with wet soil conditions, when soil resources are less vulnerable to impacts. Piles would not be constructed in riparian buffers. See Table 6 for approximate treatment acres and numbers of piles to be constructed in each unit.

Cumulative Effects

Under the proposed action alternative, air quality issues would be local and of short duration during timber harvest, and burning of hand, machine, and landing piles. With the current trend in the public's activities on federal lands the potential for wildfire starts would be expected to remain the same or increase slightly if recreational activities increase. The commercial thinning units within the analysis area would likely see a decrease in use as a result of the slash created during harvest. The regeneration harvest units would likely see an increase in activity where they are accessible to the public as they green up and begin providing early seral habitat for deer and elk. There would be a decrease in the potential for wildfire moving from surface fuels in the harvest units into the crowns with the removal of ladder fuels, however there would be a cumulative short term one to five (1 - 5) year increase in the risk of a fire start due to the residual slash left following harvest. This increase would be somewhat mitigated by the burning of hand, machine, and landing piles. The 1939 Columbia County Fire that burned several of the sections, and the small amount of prescribed burning treatments that occurred would further mitigate the potential spread of wildfire in the analysis area. Cumulative potential for a wildfire start would decrease in the longer term over the next few decades as the logging slash decays, and because the potential natural increase in the fuel load as a result of suppression mortality would not be present following harvest.

3.11 Carbon Storage, Carbon Emissions, and Climate Change

Resource Specific Methodology

The BLM modeled forest stand growth using data from stand exams and modeled using ORGANON. The BLM compiled models to calculate carbon contained in biomass in: the live

tree pool in decadal increments, "other than live tree" biomass, harvested forest products, fuel used to harvest timber and slash burning into a "carbon calculator" tool used to quantify changes in carbon storage and release. The BLM calculated carbon sequestration, storage and emissions at the project scale as a basis for evaluating their significance relative to the following spatial and temporal scales. The quantities and percentages for the South Scappoose Creek project area were generated by this carbon calculator.

Spatial Context: Climate change is inherently a global issue. Carbon cycling is only an issue as it relates to contributing to greenhouse gasses and these gasses potentially contribute to climate change. Carbon cycling at the project level is compared at regional, continental and global scales to provide perspective.

Temporal Context: The BLM selected 0-10 years as the short term analysis time period because all operations and direct carbon emissions would occur within one decade. The BLM selected 11-30 years as the long term analysis period because the BLM would assess the project area for potential management needs within that time. Some projections to 100 years are made to provide perspective.

3.11.1 Affected Environment

Carbon currently contained in biomass in the South Scappoose Creek project units = 335,800 tonnes (0.0003358 gigatonnes (Gt)). Of this, 335,800 tonnes (approx. 76 percent) is in live trees and 80,600 tonnes (approx. 24 percent) is in "other than live trees" biomass. This comprises the following portions of forest carbon storage at larger scales:

0.0001866-0.0001679 percent of 1.8-2 Gt in the Pacific Northwest, Coast Range (Hudiburg, et al. 2009)

0.00001243 percent of 27 Gt in the United States (US EPA, 2009)

0.000002544-0.0000007348 percent of 132-457 Gt worldwide (Matthews et al, 2000, p. 58)

Average annual sequestration (accumulation) of carbon in live trees in the South Scappoose Creek project is currently 4,920 tonnes (0.00000492 Gt). This is 0.29 percent of 0.00169 Gt on BLM-managed lands in western Oregon and .0026 percent of 0.191 Gt in the United States (2008 FEIS, p. 4-537).

3.11.2 Environmental Effects Alternative 1: No Action

Under the no action alternative, no changes to carbon emissions (as greenhouse gasses), carbon storage or carbon sequestration would be caused by management actions at this time.

Live tree carbon storage would increase to 436,240 tonnes (0.000436 Gt), a net increase of 165,640 tonnes (0.000166 Gt) from present levels. This is 139,400 tonnes (0.000139 Gt) more total storage of carbon in the project area after 30 years than for the proposed action alternative.

3.11.3 Environmental Effects Alternative 2: The Proposed Action

In the short term (0-10 years) the proposed thinning would reduce carbon storage in the live trees pool by 121,360 tonnes, to 149,240 tonnes in the project area immediately after thinning. Carbon removed would be transferred to the "other than live trees" and "harvested wood products" pools or would be emitted as carbon dioxide (CO_2). Changes to storage in the "other than live trees" pool were not quantified because they are assumed to balance in the long run (30 years) as logging slash and understory growth adds biomass while decay and fuels treatments reduce biomass and emit CO_2.

In the short term average annual emissions of carbon would be 16,505 tonnes (0.000016505 Gt) caused by harvest operations (diesel fuel used), fuels treatments (slash burning), and decay or burning (without energy capture) of forest products. This comprises the following portions of carbon emissions at larger scales:

0.001032 percent of 1.6 Gt in the United States (US EPA, 2009. pp. 2-3)

0.0002427 percent of 6.8 Gt Worldwide (Matthews et al, 2000, p. 58)

In the short and long term (0 to 30 years) the 13-138 trees per acre retained after thinning (*EA section, 3.1.3,* Table 10) would continue to store carbon and sequester additional carbon at an average rate of 4,920 tonnes per year. This would increase total carbon storage in the project area to 296,800 (0.0003 Gt) tonnes, a net increase of 26,200 tonnes (0.0000262 Gt) of carbon stored.

In the long term (11-30 years) an additional 4030 (0.00000403 Gt) tonnes of carbon would be emitted from harvested wood by decay and burning without energy capture. 54,990 tonnes (0.00005499 Gt) of carbon would remain stored in wood products still in use, in landfills, or burned with energy capture.

Cumulative Effects

The proposed thinning would contribute to cumulative effects to carbon emissions by emitting a total of 0.000016505 Gt of Carbon over the next 10 years which is 0.001032 percent of US emissions and 0.0002427 percent of global emissions. The incremental increase in carbon emissions as greenhouse gasses that could be attributable to the proposed project is of such small magnitude that it is unlikely to be detectable at any scale (global, continental or regional) and thus would not affect the results of any models now being used to predict climate change.

3.12 Review of Elements of the Environment Based On Authorities and Management Direction

Table 24: Elements of the Environment Review based on Authorities and Management Direction

Element of the Environment /Authority	Remarks/Effects
Aquatic Conservation Strategy	In compliance with PCFFA IV (Civ. No. 04-1299RSM), this project complies with the Aquatic Conservation Strategy described in the Northwest Forest Plan and ROD/RMP. This project also complies with the PCFFA II (265 F.3d 1028 (9th Cir. 2001)) by analyzing the site-scale effects on the Aquatic Conservation Strategy. EA sections 3.1, 3.2, 3.3, 3.4 and 3.13 show how the South Scappoose Creek Project meets the Aquatic Conservation Strategy in the context of the PCFFA cases.
Air Quality (Clean Air Act as amended (42 USC 7401 et seq.)	This project is in compliance with this direction because air quality impacts would be of short duration. Addressed in Text (EA section 3.10).
Cultural Resources (National Historic Preservation Act, as amended (16 USC 470) [40 CFR 1508.27(b)(3)], [40 CFR 1508.27(b)(8)]	This project is in compliance with this direction and it would have no effect on this element because cultural resource inventories of the affected area would precede management actions that include any ground disturbing activities that could potentially damage cultural resources.
Ecologically critical areas [40 CFR 1508.27(b)(3)]	This project would have no effect on this element because there are no ecologically critical areas present within the project area.
Energy Policy (Executive Order 13212)	This project is in compliance with this direction because it would not interfere with the Energy Policy (Executive Order 13212).
Environmental Justice (E.O. 12898, "Environmental Justice" February 11, 1994)	This project is in compliance with this direction because it would have no effect on low income populations.
Fish Habitat, Essential (Magnuson-Stevens Act Provision: Essential Fish Habitat (EFH): Final Rule (50 CFR Part 600; 67 FR 2376, January 17, 2002)	This project is in compliance with this direction. No effects to Essential Fish Habitat are anticipated; as such consultation under the Act is not required. Effects to this element are addressed in text (EA section 3.3).
Farm Lands, Prime [40 CFR 1508.27(b)(3)]	The project would have no effect on this element because no prime farm lands are present in the project area.
Floodplains (E.O. 11988, as amended, Floodplain Management, 5/24/77)	This project is in compliance with this direction because the proposed treatments would not change or affect floodplain functions.
Hazardous or Solid Wastes (Resource Conservation and Recovery Act of 1976 (43 USC 6901 et seq.) Comprehensive Environmental Repose Compensation, and Liability Act of 1980, as amended (43 USC 9615)	This project would have no effect on this element because no Hazardous or Solid Waste would be stored or disposed of on BLM lands as a result of this project.

Element of the Environment /Authority	Remarks/Effects
Healthy Forests Restoration Act (Healthy Forests Restoration Act of 2003 (P.L. 108-148)	This project is in compliance with this direction because treatments would decrease the risk of fire and help restore forests to healthy functioning condition (EA section 3.10)
Migratory Birds (Migratory Bird Act of 1918, as amended (16 USC 703 et seq)	This project is in compliance with this direction because treatments would generally enhance habitat for migratory birds. Addressed in text (EA section 3.6).
Native American Religious Concerns (American Indian Religious Freedom Act of 1978 (42 USC 1996)	This project is in compliance with this direction because no Native American religious concerns were identified during the scoping period (EA section 1.4).
Noxious weed or non-Invasive, Species (Federal Noxious Weed Control Act and Executive Order 13112)	This project is in compliance with this direction because Project Design Features would minimize the potential for the establishment of new populations of invasive plant species. Addressed in text (EA section 3.8)
Park lands [40 CFR 1508.27(b)(3)]	The project would have no effect on this element because there are no parks within or adjacent to the project area.
Public Health and Safety [40 CFR 1508.27(b)(2)]	The project would have no effect on this element because public access would be controlled within the project area during operations and the project would not create hazards lasting beyond project operations.
Threatened or Endangered Species (Endangered Species Act of 1983, as amended (16 USC 1531)	This project is in compliance with this direction because there would be minor adverse effects on Threatened or Endangered Species and ESA consultation would be completed as required (EA sections 3.3 and 3.5).
Water Quality –Drinking, Ground (Safe Drinking Water Act, as amended (43 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.)	This project is in compliance with this direction because Oregon State water quality standards would be adhered to and the area hydrology would not be changed measurably. Addressed in text (EA section 3.2)
Wetlands (E.O. 11990 Protection of Wetlands 5/24/77) [40 CFR 1508.27(b)(3)]	This project is in compliance with this direction because no wetlands are within the project area and adjacent wetlands would be protected by buffers (EA section 3.2)
Wild and Scenic Rivers (Wild and Scenic Rivers Act, as amended (16 USC 1271) [40 CFR 1508.27(b)(3)]	This project is in compliance with this direction because there are no Wild and Scenic Rivers within or adjacent to the project area.
Wilderness (Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.); Wilderness Act of 1964 (16 USC 1131 et seq.)	This project is in compliance with this direction because there are no Wilderness Areas or areas being considered for Wilderness Area status in or adjacent to the project area.

3.13 Compliance with the Aquatic Conservation Strategy

Based on the environmental analysis described in the previous sections of the EA, Tillamook Resource Area staff has determined that the project complies with the ACS on the project (site) scale. The project complies with the four components of the Aquatic Conservation Strategy, as follows:

- ***ACS Component 1 - Riparian Reserves:*** The project would comply with ACS Component 1 by promoting canopy stratification, establishment of understory vegetative growth, by maintaining canopy cover along all streams and wetlands, which protect stream bank stability and water temperature. Streamside shading along most of the streams on public lands is currently near system potential. No-harvest buffers would protect streams from direct disturbance from logging. Construction of approximately 0.87 mile of new temporary road may occur within Riparian Reserves. However, most of the new roads would be located on ridge tops and benches and none of the new roads that would be constructed are within 100 feet of any stream thereby maintaining current vegetation in the primary shade zone and most of the current levels of shading in the secondary shade zone would be retained. There would be only one new stream crossing, a small (less than 5 feet wide), deeply incised, 1st order, perennial stream. Thus, impacts to aquatic habitat downstream would not be anticipated, Addressed in text (*EA sections 3.2 - 3.3*).
- ***ACS Component 2 - Key Watershed***: The project would comply with Component 2 by establishing that the South Scappoose Creek Project is not within a Key watershed (ROD/RMP p. 7).
- ***ACS Component 3 - Watershed Analysis:*** The project would comply with Component 3 by incorporating the following recommendations from the Scappoose Creek Watershed Analysis and Dairy-McKay Watershed Analysis.
    - Density management and thinning in Riparian Reserve to enhance structural complexity of relatively dense conifer stands and to encourage remaining confers to attain larger (primarily diameter) sizes in a much shorter amount of time than would occur through natural "self-thinning" process.
    - Because of the relatively high proportion of stands in hardwood-dominated condition, and because many of them are reaching their peak volume production, convert some of the alder-dominated stands to conifers to help restore timber production capacity of these lands.
    - Retain quantities of CWD and wildlife trees in harvest areas commensurate with availability of such habitat in adjacent areas. Retain higher levels of CWD and wildlife trees) e.g. 8-12 trees rather 6-8) when adjacent sites are, or will be, deficient over time.
    - When logging inside Riparian Reserves, leave a no-cut vegetation buffer generally not less than 50 feet on intermittent stream and 100 feet on perennial streams.
    - Avoid removal of vegetation along perennial streams that will decrease stream shading during the summer months.

- Reduce existing soil compaction levels by obliterating roads that are not needed for future management and by decompacting old compacted areas such as natural-surfaced roads and skid trails.
- Minimize new roads within Riparian Reserves, where roads are necessary, use management practices to minimize impacts to aquatic systems.

- ACS Component 4 – Watershed Restoration – The project would comply with Component 4 by the combination of thinning and unthinned areas in Riparian Reserves, which would further enhance terrestrial habitat complexity in the long- and short-term. Thinning in all LUAs would be expected to result in long-term restoration of large conifers and the potential for material that would contribute to in-stream habitat complexity in the long-term.

Tillamook Resource Area staff has reviewed this project against the ACS objectives at the project or site scale with the following results. The No Action alternative does not retard or prevent the attainment of any of the nine ACS objectives because this alternative would maintain current conditions. The Proposed Action does not retard or prevent the attainment of any of the nine ACS objectives for the following reasons.

ACSO 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. Addressed in Text (*EA sections 3.1, 3.5 and 3.6*). In summary:

No Action Alternative: The No Action alternative would maintain the development of the existing vegetation and associated stand structure at its present rate. The current distribution, diversity and complexity of watershed and landscape-scale features would be maintained.

Proposed Action: The proposed treatment would maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features. Commercial thinning treatments in the GFMA LUA would maintain good timber productivity of the stand as well as reducing potential losses from *Phellinus weirii*. Thinning in the CON LUA would result in forest stands that exhibit some attributes typically associated with stands of a more advanced age and stand structural development (larger trees, a more developed understory). This would occur sooner than under the No Action alternative. With a few exceptions such as the retention of the red alder component, thinning treatments in Riparian Reserves would be the same as the adjacent LUAs. It would increase the growth of residual trees and reduce the time for those trees to become large enough to provide a future source of large woody debris to stream channels. Regeneration harvest would initiate new age class stands composed of mixed conifers and numerous legacy trees comprised of mature green trees, snags, and down wood to further diversify the stands within the Matrix LUA.

ACSO 2: Maintain and restore spatial and temporal connectivity within and between watersheds. Addressed in Text (*EA sections 3.1, 3.3, 3.5 and 3.6*). In summary:

No Action Alternative: The No Action alternative would have little effect on connectivity except in the long term within the affected watersheds.

Proposed Action: The long-term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development. In time, the Riparian Reserve LUA would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as the Riparian Reserve LUA develops late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.

ACSO 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. Addressed in Text (*EA sections 3.2, 3.3 and 3.4*). In summary:

No Action Alternative: It is assumed that the current condition of physical integrity would be maintained.

Proposed Action: Physical integrity of short channel segments at existing stream crossings would be altered for one to a few years following the temporary placement of one new culvert and replacement of two culverts under the Proposed Action. Because the streams are stable and low gradient at these stream crossings, the work would cause little or no disturbance to channel morphology upstream or downstream from the crossings. In the long-term, upgrading the two undersized culverts would improve the passage for high stream flows, wood, and bedload transport, and reduce the potential for future culvert and road fill failures.

ACSO 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Addressed in Text (*EA sections 3.2, 3.3 and 3.4*). In summary:

No Action Alternative: It is assumed that the current condition of the water quality would continue a gradual downward trend with more sediment delivery and higher turbidity due to a poorly maintained road system.

Proposed Action: Sediment delivery rates and turbidity levels in the affected subwatershed are likely to increase over the short-term as a direct result of road maintenance, road decommissioning, and hauling. Sediment increases would not be visible beyond 150 feet downstream from road/stream intersections and would not be expected to affect recognized beneficial uses. Over the long-term (beyond 3-5 years), conditions and trends in turbidity and sediment yield would likely be slightly improved under the proposed action. The

proposed action would be unlikely to have any measurable effect on other water quality parameters including bacteria, stream temperatures, pH, or dissolved oxygen.

ACSO 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Addressed in Text (*EA sections 3.2 and 3.3*). In summary:

No Action Alternative: It is assumed that the current levels of sediment delivered to streams would continue to gradually increase primarily due to lack of road maintenance.

Proposed Action: Short-term localized increases in stream sediment can be expected during temporary roadwork (mainly at stream crossings) and, to much more limited extent, timber hauling. Project planning, PDFs and BMPs would be implemented to minimize sediment delivery to streams. Over the long-term (beyond 3-5 years), the sediment inputs would decrease with road maintenance and road improvements.

ACSO 6: Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. Addressed in Text (*EA sections 3.2 and 3.3*). In summary:

No Action Alternative: No change in in-streams flows would be anticipated.

Proposed Action: The risk of increases to peak flows based on the proposed management activity is low based upon analysis conducted using the Oregon Watershed Assessment Manual Analysis. Stream channels adjacent to the proposed harvest units are not sensitive to increases in streamflow. While the proposed action may slightly increase water yields and base flows, it is unlikely to have noticeable effects on channel morphologies or beneficial uses.

ACSO 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands. Addressed in Text (*EA sections 3.2 and 3.3*). In summary:

No Action Alternative: The current condition of flood plains and their ability to sustain inundation and the water table elevations in meadows and wetlands is expected to be maintained.

Proposed Action: With the exception of in-channel road work at a few small stream crossings, there would be no alteration of any stream channel, wetland or pond morphological feature. All logging equipment would be kept a minimum of 100 feet from all large wetlands (larger than one acre) and perennial stream channels, and 60 feet from all small wetlands (one acre or less) and intermittent stream channels. Thus, the current condition of floodplain inundation and water tables would be maintained

ACSO 8: Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability. Addressed in Text (*EA sections 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6*). In summary:

No Action Alternative: The current species composition and structural diversity of plant communities would continue along the current trajectory. Diversification would occur over a longer period of time.

Proposed Action: The proposed timber harvest (no-harvest buffers from 60 feet on intermittent streams to 100 feet on perennial streams in thinning units and no timber harvest in Riparian Reserves in regeneration units) would maintain the current species composition and structural diversity of plant communities in riparian areas and wetlands. In thinning units, riparian areas adjacent to no-harvest buffers would retain a canopy closure of 50% or greater.

ACSO 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species. Addressed in Text (*EA sections 3.3, 3.4, 3.5 and 3.6*). In summary:

No Action Alternative: Habitats would be maintained over the short-term and continue to develop over the long-term with no known impacts on species currently present.

Proposed Action: Habitat to support well distributed riparian-dependent and riparian associated invertebrate and species would be restored by reducing overstocked stands, moderating tree species diversity, altering vertebrate forest structural characteristics and amending CWD conditions.

3.14 Comparison of Alternatives with regard to the Decision Factors

This section compares the two alternatives with regard to the decision factors described in *EA section 1.2.3* and the project objectives in *EA section 1.2.2*.

1. Provide timber resources and revenue to the government from the sale of those resources (objectives 1 and 2);
2. Reduce the short-term and long-term costs of managing the lands in the project areas (objectives 1 and 2);
3. Provide safe, cost-effective access for logging operations, fuels management and fire suppression (objectives 2 and 8);

Decision Factors 1-3: The No Action alternative would not meet these factors since no timber sales would take place. The proposed action would provide timber resources to the market and would use commonly used silvicultural, transportation and logging

practices that BLM experience with past timber sales has shown to be cost-effective, providing revenue with reasonable logging costs.

4. Reduce competition-related mortality and increase tree vigor and growth (objective 1);

   Decision Factor 4: The No Action alternative would not meet this factor. The proposed action would meet this factor (*EA section 3.1.3*).

5. Provide for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris (objectives 3, 6, 7 and 8);

   Decision Factor 5: The No Action alternative would not meet this factor because the stand health and tree growth rates would decline if stands are not thinned. Competition would result in mortality of smaller trees and some co-dominant trees in the stands, resulting in numerous snags and CWD that are too small to meet resource objectives (minimum 15 inches diameter for snags, minimum 20 inches diameter for CWD). This alternative retains existing elements, but does not enhance conditions to provide these elements for the future stand. Trees would continue to grow slowly until reaching suitable size for large woody debris, snags and late-successional habitat.

   The proposed action would meet decision factors 5. Stand health and tree growth rates would be maintained as thinned trees are released from competition. The alternative retains the elements described under "no action" on untreated areas of the stands in the project area and encourages development of larger diameter trees and more open stand conditions in treated areas. These conditions add an element of diversity to the landscape on BLM lands which is not provided under the No Action alternative.

6. In the CON LUA, manage available forest land on a 150-year rotation;

   Decision Factor 6: The No Action alternative does not meet this factor. The Proposed action would regeneration harvest 13 acres within the CON LUA which would contribute toward the management of available forest land with the LUA on a 150-year rotation.

7. Manage hardwood stands located on lands that are not otherwise constrained from timber management (objective 5);

   Decision Factor 7: The No Action alternative does not meet this factor. The Proposed action would meet this factor through the regeneration harvest of approximately 52 acres of hardwood dominated stands within the Matrix LUA (units 20, 22, 23 and 24).

8. Promote the development of healthy late-successional characteristics in the Riparian Reserve land use allocation (objectives 6, 7 and 8);

Decision Factor 8: The No Action alternative does not meet this factor. The Proposed action would meet this factor through thinning 479 acres within the Riparian Reserve LUA to promote the development of late-successional forest characteristics.

9. Minimize erosion and subsequent sedimentation into streams from roads (objective 9).

   Decision Factor 9: The proposed No Action alternative does not meet this factor because the current sediment and turbidity condition on BLM land is expected to continue a gradual downward trend with more erosion and sediment delivery due to a poorly maintained road system. Without additional funding that the timber sale would provide, current and anticipated road maintenance budgets are insufficient to properly maintain roads in the project area.

   The Proposed Action alternative meets this factor because existing roads would be maintained, renovated, stabilized or decommissioned, reducing the risk of erosion and sedimentation associated with the existing road system. Most new roads would be constructed on gentle to moderate hillslopes far away from streams. Wet season haul routes are located on ridgetop positions with few, mostly intermittent, headwater stream crossings. Project design features would be implemented to eliminate and/or minimize erosion generation and sediment delivery. Upon project completion, road decommissioning would result in an overall reduction of approximately 3.05 miles of road. Over the long-term (beyond 3-5 years), the fine sediment inputs would decrease with improved road drainage conditions.

4. LIST OF PREPARERS

Table 25 below displays the BLM staff members who participated on the interdisciplinary team (IDT) to develop and analyze the South Scappoose Creek Project and/or were consulted in the preparation of this Environmental Assessment.

Table 25: List of Preparers

RESOURCE or IDT Role	NAME
Wildlife, IDT Leader	Steve Bahe
Recreation	Deb Drake
Silviculture	Clint Gregory
Botany, Invasive Weeds	Kurt Heckeroth
NEPA Support	Bob McDonald
Air Quality, Fire Risk, Fuels Treatment, Carbon Storage, Carbon Emissions, and Climate Change	Kent Mortensen
Fisheries, Hydrology	Angela San Filippo
Engineering	Vanessa Stone
GIS and Forestry (logging systems)	Christian Sween
Cultural Resources	Heather Ulrich
Soils, Hydrology	Dennis Worrel

5. CONTACTS AND CONSULTATION

5.1 Consultation

5.1.1 US Fish and Wildlife Service (USFWS)

The spotted owl would be affected by this project through the modification of 1540 acres of dispersal habitat that would continue to function in the same capacity after treatment (thinning) and 100 acres of dispersal habitat that would be removed from a condition to function as dispersal habitat (regeneration harvest). The marbled murrelet would be affected by this project

through the generation of noise above the ambient level within 300 feet (murrelet disruption distance) of unsurveyed potential habitat during the breeding season. Due to these potential impacts to the spotted owl and marbled murrelet, informal consultation with the U.S. Fish and Wildlife Service is warranted and would be completed programmatically within the appropriate years (year of sale if the proposed action is selected) Biological Assessment in the "Light to Moderate Thinning" and "Regeneration Harvest" categories.

As a part of the normal streamline consultation procedures and consistent with the most recent programmatic BA/BOs, the Level I Team would be consulted specifically on two identified impacts of the proposed action. They would verify that the proposed management of the marbled murrelet Potential Habitat near two of the proposed units is in accordance with Option 3 as described by the Level 2 Team for the North Coast Planning Province (USDA and USDI - USFWS et. al. 2004). Additionally, they would assure that it is appropriate to include the project within the batched consultation process given the fact that the proposed treatments would cause a further loss of northern spotted owl habitat in an area where such habitat currently is insufficient for owl movement and survival.

5.1.2 National Marine Fisheries Service (NMFS)

Consultation with the National Marine Fisheries Service on the potential effects of the proposed action on the Lower Columbia River coho salmon would be completed with project specific consultation (Section 7 Streamlined Consultation) or one of the programmatic consultation processes available at the time of implementation for actions that require consultation.

Required consultation for Magnuson-Stevens Fisheries Conservation and Management Act Essential Fish Habitat for the proposed action is included in *EA section 3.3.3*.

Section 7 Endangered Species Act Consultation would be completed prior to the Field Manager authorizing an action.

5.2 Public Scoping and Notification - Tribal Governments, Adjacent Landowners, General Public, and State, County and local government offices

For information on project scoping, see *EA section 1.4*.

The EA and FONSI will be made available for public review from ***September 21, 2011 to October 21, 2011*** and posted at the Salem District website at http://www.blm.gov/or/districts/salem/plans/index.php. The notice for public comment will also be published in a legal notice in *The South County Spotlight* newspaper of Scappoose Oregon. Written comments should be addressed to Stephen M. Small, Field Manager, Tillamook Resource Area, 4610 Third Street, Tillamook, Oregon, 97141. E-mailed comments may be sent to sbahe@blm.gov.

6. GLOSSARY AND ACRONYMS

6.1 Glossary

303(d) Water Quality Listing - Impaired waters, identified by ODEQ, that do not meet water quality standards as required by the Clean Water Act.

acre - A measure of surface land area, in U.S. customary units, measuring 43,560 square feet, which is 1/640 of a square mile (or approximately 0.4 hectares). If square, it is nearly 209 feet on each side.

activity fuel - Debris (wood chips, bark, branches, limbs, logs, or stumps) left on the ground after management actions, such as logging, pruning, thinning, or brush cutting, in contrast to debris left after storms or fires.

age class - A management classification for a stand of trees using the age of the stand.

allowable sale quantity - The timber yield that a forest can produce continuously under the intensity of management outlined in the ROD/RMP from those lands allocated for permanent forest production.

alternative - One of several proposed management actions that have been studied and found to meet the goals and objectives of a project's purpose and need and, as a result, is suitable to aid decision-making.

anadromous fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Includes species such as salmon and steelhead. Also see *salmonid.*

analysis - The scientific evaluation of the environmental impacts of proposed planning decisions.

analytical assumption - A judgmental decision that is based on the science and relationships of natural systems assumed to be true and from which conclusions can be drawn to supply the missing values, relationships, or societal preferences needed for proceeding with an analysis of alternatives.

(ACS) Aquatic Conservation Strategy - A Northwest Forest Plan methodology designed to restore and maintain the ecological health of watersheds and aquatic ecosystems, consisting of four components: riparian reserves, key watersheds, watershed analysis, and watershed restoration.

aquatic habitat - Habitat for vertebrate and invertebrate wildlife species and vascular and non-vascular plants occurring in free water (e.g. lakes, ponds, streams, rivers, springs and seeps).

authority - The right and power to make decisions and give orders such as the United States Congress exerts when passing legislation (e.g. the O&C Act and the Endangered Species Act).

basal area - The cross-sectional area of a single stem, of all stems of a species in a stand, or of all plants in a stand (including the bark) that is measured at breast height (about 4.5 feet up from the ground) for larger plants (like trees) or measured at ground level for smaller plants.

baseline - The starting point for the analysis of environmental consequences, often referred to as the Affected Environment. This starting point may be the condition at a point in time (e.g., when inventory data is collected) or the average of a set of data collected over a specified number of years.

beneficial use - In federal and state water use law, uses of water necessary for the survival or well-being of man, plants and wildlife. Examples include: instream, out of stream, and ground water uses; domestic, municipal, and industrial water supplies; mining, irrigation, and livestock watering; fish and aquatic life; wildlife watering; fishing and water contact recreation; aesthetics and scenic attraction; hydropower; and commercial navigation.

(BMPs) Best Management Practices - BMPs are defined as methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality would be maintained at its highest practicable level. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation).

biological assessment - A biological assessment is a document that evaluates potential effects of a proposed action to listed and proposed species and designated and proposed critical habitat and determines whether any such species or habitats are likely to be adversely affected by the action. It is used in determining whether formal consultation or conferencing with the U.S. Fish and Wildlife Service or National Marine Fisheries Service is necessary (50 CFR 402.12[a])

(BO) biological opinion - An opinion by the U.S, Fish and Wildlife Service or the National Marine Fisheries Service as to whether or not a federal action is likely or not to jeopardize the continued existence of listed species, or would result in the destruction, or adverse modification, of critical habitat. The opinion may contain reasonable and prudent alternatives, a statement of anticipated take of listed animals, and conservation recommendations for listed plants.

Bureau Strategic Species - A special status species category established by the Oregon/ Washington BLM that includes animal, plant and fungi species that are of concern in the two states. The special status species policy (BLM **6840**) does not apply to these species, and no

analysis of them is required in NEPA documents. Field units are required to collect occurrence field data and maintain records. Also see *Bureau sensitive species*.

Bureau Sensitive Species - A special status species category established by the BLM that includes those plant and animal species eligible for status as federally listed, federal candidate, state listed, or state candidate (plant) species; **on** List 1 of the Oregon Natural Heritage Database or approved for this category by the BLM state director; or included under agency species conservation policies. Also see *Bureau strategic species*.

canopy - The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result.

canopy closure - The ground area covered by the crowns of trees as delimited by the vertical projection of crown perimeter and commonly expressed as a percent of total ground area.

checkerboard land ownership pattern - A land ownership pattern in which square-mile sections of federal lands are typically intermixed, on the basis of alternating sections, with adjoining private lands. The O&C lands of western Oregon are an example of checkerboard ownership. This ownership pattern resulted from the revestment back to the federal government of lands granted by the federal government to early railroad companies. The checkerboard ownership pattern of the O&C lands creates additional access, management, and perception issues.

(CWD) coarse woody debris – The term coarse woody debris usually refers to the combination of both snag and down log habitat. Snags include standing dead trees. Down logs (or down woody debris) generally include those portions of trees at least 20 feet long and 20 inches in diameter that have naturally fallen or have been cut and left in the forest.

commercial thinning - Any type of thinning producing merchantable material at least equal to the value of the direct cost of harvesting. See *thinning*.

Consultation - A formal review between the U.S.Fish and Wildlife Service or National Marine Fisheries Service and another federal agency when it is determined that an action by the agency may affect critical habitat or a species that has been listed as threatened or endangered to ensure that the agency's action does not jeopardize a listed species or destroy or adversely modify critical habitat. Critical habitat is an Endangered Species Act term denoting a specified geographic area occupied by a federally listed species, and on which the physical and biological features are found that are essential to the conservation and recovery of that species and that may require special management or protection.

crown - The upper part of a tree that has live branches and foliage.

crown fire - Fire that moves through the crowns of adjacent trees independent of any surface fire. Crown fires can often move faster and ahead of ground fires.

(CMAI) culmination of mean annual increment - the age in the growth cycle of a tree or **stand** at which the **mean annual increment (MAI)** for height, diameter, basal area, or volume is at its maximum—*note* at culmination, MAI equals the **periodic annual increment (PAI)**. (Helms 1998)

cumulative effect - The impact on the environment that results from incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

(CAI) current annual increment – the growth observed in a tree or **stand** in a specific one-year period –*note* although the current annual increment is strictly that of the year just passing, it is generally taken as the mean of a few preceding years, i.e., a short-term mean annual increment termed a periodic (mean) annual increment –*see* **mean annual increment (MAI), periodic annual increment (PAI)** (Helms 1998)

diameter at breast height (DBH) - The diameter of the stem of a tree measured at 4.5 feet above the ground level on the uphill side of the stem.

dispersal habitat (spotted owl) - Forest habitat that allows northern spotted owls to move (disperse) across the landscape; typically characterized by forest stands with average tree diameters of greater than 11 inches, and conifer overstory trees having closed canopies (greater than 40 percent canopy closure) with open space beneath the canopy to allow owls to fly.

effective shade - The proportion of direct beam solar radiation reaching a stream surface to total daily solar radiation.

environmental effects - The direct, indirect and cumulative effects of a proposed action or alternative on existing conditions in the environment in which the action(s) would occur. Also see *baseline*.

fine sediment - Fine-grained soil material, less than 2mm in size, normally deposited by water, but in some cases by wind (aeolian) or gravity (dry ravel).

floodplain - Level lowland bordering a stream or river onto which the flow spreads at flood stage.

(FOI) Forest Operations Inventory - An intensive inventory that provides managers with information regarding the age, species, stand location, size, silvicultural needs, and recommended treatment of stands based on individual stand conditions and productivity.

fuel loading - The dry weight of all accumulated live and dead woody and herbaceous material on the forest floor that is available for combustion, and which poses a fire hazard.

green tree - A live tree.

forest habitat - An area containing the forest vegetation with the age class, species composition, structure, sufficient area, and adequate food source to meet some or all of the life needs (such as foraging, roosting, nesting, breeding habitat for northern spotted owls) of specific species.

harvesting - The process of onsite cutting and removing of merchantable trees from a forested area.

Increment – the increase in circumference (girth), diameter, basal area, height, volume, quality, or value of individual trees or crops. (Helms 1998)

key watershed - A Northwest Forest Plan term that denotes a watershed that contains habitat for potentially threatened species, stocks of anadromous salmonids, or other potentially threatened fish, or is an area of high-quality water and fish habitat. Also see *watershed*.

(LUA) land use allocation - A designation for a use that is allowed, restricted, or prohibited for a particular area of land. Examples include the matrix, adaptive management, riparian reserve or late-successional reserve land use allocations.

late-successional forest - A forest that is in its mature stage and contains a diversity of structural characteristics, such as live trees, snags, woody debris, and a patchy, multi-layered canopy.

Long-term - A period of time used as an analytical timeframe; starts more than 10 years after implementation of a project, depending on the resource being analyzed. Also see *short term*.

long-term soil productivity - The capacity of the soil to grow vegetation, specifically commercial trees, over time.

mass wasting - The sudden or slow dislodgement and downslope movement of rock, soil, and organic materials.

mature stage - Generally begins as tree growth rates stop increasing (after culmination of mean annual increment), and as tree mortality shifts from density-dependent mortality to density-independent mortality.

(MAI) mean annual increment – the total **increment** of a tree or **stand** (standing crop plus thinnings) up to a given age divided by that age –*note* the MAI for a whole rotation is termed the final MAI – *see* **Culmination of mean annual increment, current annual increment (CAI), periodic annual increment (PAI), periodic increment** (Helms 1998)

merchantable - Trees or stands having the size, quality and condition suitable for marketing under a given economic condition, even if not immediately accessible for logging

modeling - A scientific method that operates by a structured set of rules and procedures to simulate current conditions and predict future conditions. Also see *analysis*.

multi-layered canopy - Forest stands with two or more distinct tree layers in the *canopy*.

National Marine Fisheries Service - A federal agency under the United States Department of Commerce that is responsible for working with others to conserve, protect, and enhance anadromous fish and their habitats. NMFS is an agency in the National Oceanic Atmospheric Administration (National Marine Fisheries Service [NMFS] is now called NOAA Fisheries)

non-point source pollution - Water or air pollutants where the source of the pollutant is not readily identified and is diffuse, such as the runoff from urban areas, agricultural lands, or forest lands. Also see *point source*.

(NWFP) Northwest Forest Plan - Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl (1994) (Northwest Forest Plan). A 1994 common management approach for the 19 national forests and 7 BLM districts located in the Pacific Northwest ecological region and jointly approved by the Secretary of Agriculture and the Secretary of the Interior.

nutrient cycling - Circulation of elements (such as carbon or nitrogen) between vegetation/organic material and soil, water and air.

old-growth forest - A forest stand usually at least 180-220 years old with moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

overstory - That portion of trees forming the uppermost canopy layer in a forest stand and that consists of more than one distinct layer.

(PAI) periodic annual increment – the growth of a tree or **stand** observed over a specific time period divided by the length of the period –*see* **mean annual increment (MAI), current annual increment (CAI), periodic annual increment** (Helms 1998)

periodic increment – the growth of a tree or stand during any specified period, commonly 10 or 20 years –*see* **mean annual increment, periodic annual increment** (Helms 1998)

plan conformance - The determination that a management action is consistent with the terms, conditions, decisions, and is within the anticipated environmental consequences, of an approved resource management plan.

point source - An origin of water or air pollutants that is readily identified, such as the discharge or runoff from an individual industrial plant or cattle feedlot. Also see *nonpoint source*.

relative density - A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum that is based on tree size and species composition. Relative density is determined mathematically by dividing the stand basal area by the square root of the quadratic mean diameter.

(ROD/RMP) Record of Decision/Resource Management Plan - Salem District Record of Decision and Resource Management Plan (1995). A BLM planning document, prepared in accordance with Section 202 of the Federal Land Policy and Management Act that presents systematic guidelines for making resource management decisions for a resource area. An RMP is based on an analysis of an area's resources, their existing management, and their capability for alternative uses. RMPs are issue-oriented and developed by an interdisciplinary team with public participation.

rotation - The planned number of years between establishment of a forest stand and its regeneration harvest.

short term - A period of time used as an analytical timeframe and that is within the first 10 years of the implementation of a resource management plan. Also see *long term*.

silvicultural prescription - A planned series of treatments designed to change current stand structure to one that meets management goals.

site index – A measure of forest productivity expressed as the height of the tallest trees of a particular species (e.g. Douglas-fir) in a stand at an index age (e.g. 50-years).

site potential tree – The average maximum height of the tallest dominant trees (200 years or older) for a given site class (from FEMAT 1993, p.V-34). Under the NWFP and ROD/RMP the site potential tree height is used to calculate the width of the Riparian Reserves.

snag - Any standing (upright) dead tree.

special forest products (SFP) - Those plant and fungi resources that are harvested, gathered, or collected by permit, and have social, economic, or spiritual value. Common examples include mushrooms, firewood, Christmas trees, tree burls, edibles and medicinals, mosses and lichens,

floral and greenery, and seeds and cones, but not soil, rocks, fossils, insects, animal parts, or any timber products of commercial value.

special status species - Those species that are listed under the Endangered Species Act as threatened or endangered (including proposed and candidate species); listed by a state as threatened, endangered or candidate species; and listed by the BLM as sensitive species. Under the BLM Special Status Species policy (BLM 6840), the BLM State Director has created an additional category called Bureau Strategic Species (see glossary *Bureau strategic species*).

stand - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

standards and guidelines – Rules for managing lands in the different land use allocations found in the NWFP and ROD/RMP.

stream, intermittent - Drainage feature with a dry period, normally for three months or more, where the action of flowing water forms a channel with well-defined bed and banks, supporting bed-forms showing annual scour or deposition, within a continuous channel network.

stream, perennial - Permanent channel drainage feature with varying but continuous year-round discharge, where the base level is at or below the water table.

structurally complex stage - Stage at which forested stands develop the structural characteristics approximating "old-growth" stands.

swamper burning - A prescribed fire method in which fuels are gradually and continually added (usually over the course of a day) to a hand or machine pile.

thinning - A silvicultural treatment made to reduce the density of trees primarily to improve tree/stand growth and vigor, and/or recover potential mortality of trees, generally for commodity use.

timber - Forest crops or stands, or wood that is harvested from forests and is of a character and quality suitable for manufacture into lumber and other wood products rather than for use as fuel.

Timber Production Capability Classification (TPCC) - An analytical tool that inventories and identifies sites as capable of sustaining intensive timber management without it degrading their productive capacity. This tool evaluates a site's soil depth, available moisture, slope, drainage, and stability to determine site capacity for timber management activity. Sites that prove incapable of sustaining intensive timber management are typically not included in the harvest land base.

Total Maximum Daily Load (TMDL) - Is a regulatory term in the U.S. Clean Water Act (CWA), describing the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. It is for a particular pollutant calculated to protect the beneficial use that is most sensitive to that pollutant.

turbidity - Is the amount of light scattered or absorbed by a fluid and is measured in nephelometric turbidity units (NTU).

understory - Portion of trees or other woody vegetation that forms the lower layer in a forest stand, and that consists of more than one distinct layer.

(USFWS) United States Fish and Wildlife Service - A federal agency under the United States Department of the Interior that is responsible for working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats.

watershed - All of the land and water within the boundaries of a drainage area that are separated by land ridges from other drainage areas. Larger watersheds can contain smaller watersheds that all ultimately flow their surface water to a common point.

wetland - Land with presence and duration of water, sufficient to support wetland vegetation.

wildfire - Any nonstructural fire, other than prescribed burns, that occurs on wildland.

(WUI) wildland/urban interface- The area in which structures and other human development meet or intermingle with undeveloped wildland. The term used primarily for wildfire prevention and suppression. Rural/Urban Interface is used primarily for other recreation and forest management activities.

windthrow - A tree or trees uprooted or felled by the wind.

6.2 Additional Acronyms

BLM – Bureau of Land Management
BMP – Best Management Practices
BS – Bureau Sensitive, a category of species under the Oregon/Washington Special Status Species Policy
CON – Connectivity Land Use Allocation (subset of the Matrix Land Use Allocation)
DBH – Diameter at Breast Height
EA - Environmental Assessment
EFH – Essential Fish Habitat
ESA – Endangered Species Act
FONSI – Finding of No Significant Impact
GFMA – General Forest Management Area Land Use Allocation (subset of the Matrix Land Use Allocation)
IDT - Interdisciplinary Team
LUA – Land Use Allocation
MSA – Magnuson-Stevens Fishery Conservation and Management Act
NEPA – National Environmental Policy Act (1969)
NWFP - Northwest Forest Plan - April 1994 *(Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl*)
ODEQ – Oregon Department of Environmental Quality
QMD – Quadratic Mean Diameter
RIA – Rural-Urban Interface (recreation, visual and sociological issues)
RMP/FEIS – Salem District Proposed Resource Management Plan / Final Environmental Impact Statement (1994)
ROD/RMP - Salem District Record of Decision and Resource Management Plan (1995)
ROW – right-of-way (roads)
RR – Riparian Reserve (Land Use Allocation)
SPT – Site Potential Tree
SPZ – Stream Protection Zone (no-cut protection zone)
TMDL - Total Maximum Daily Load
USDI – United States Department of the Interior
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service

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8. ADDITIONAL SUPPORTING DATA AND MAPS OF THE ACTION ALTERNATIVE

8.1 Maps

Figure 3. Proposed Treatment Areas

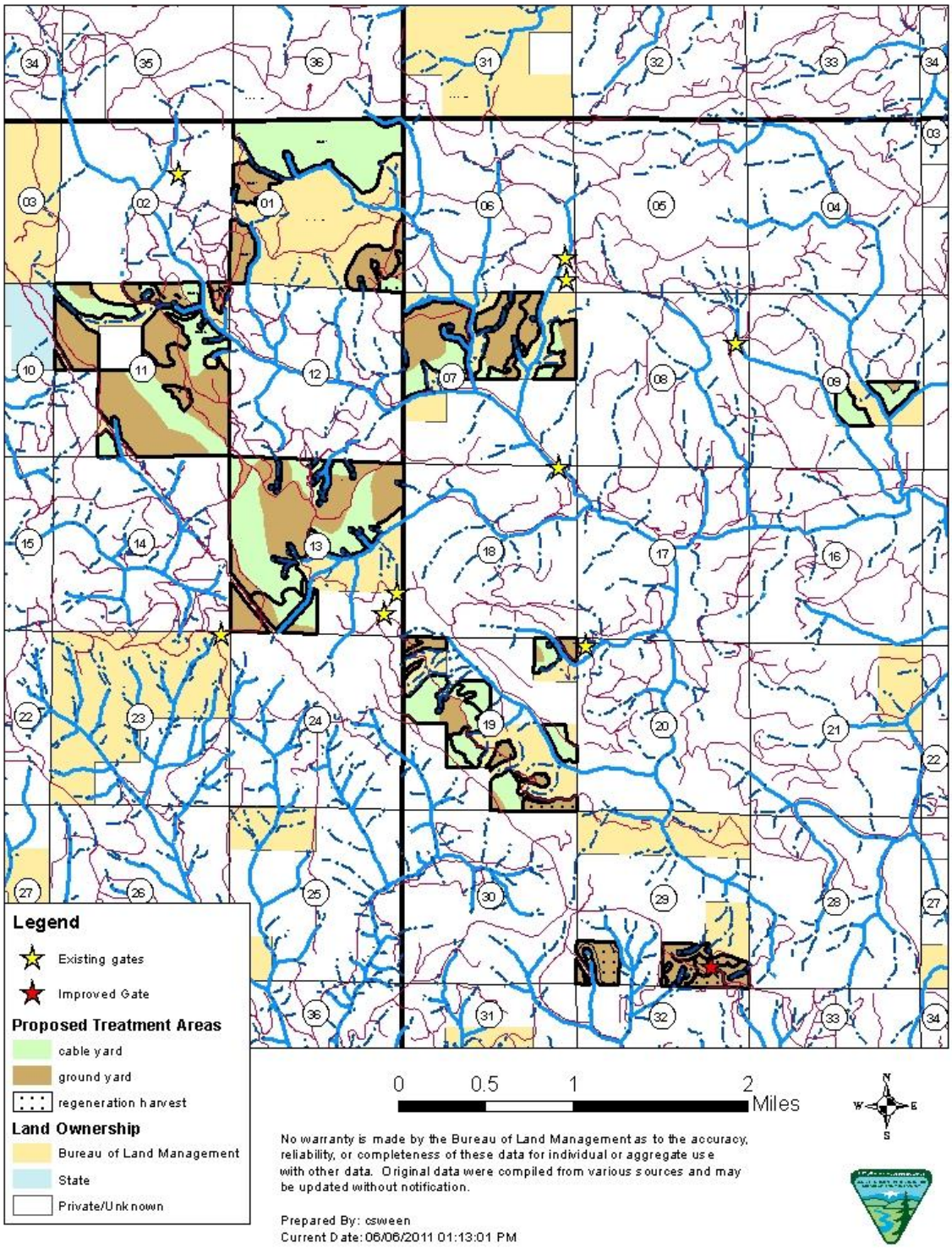


Figure 4. Proposed Action – T3N, R2W, Section 7

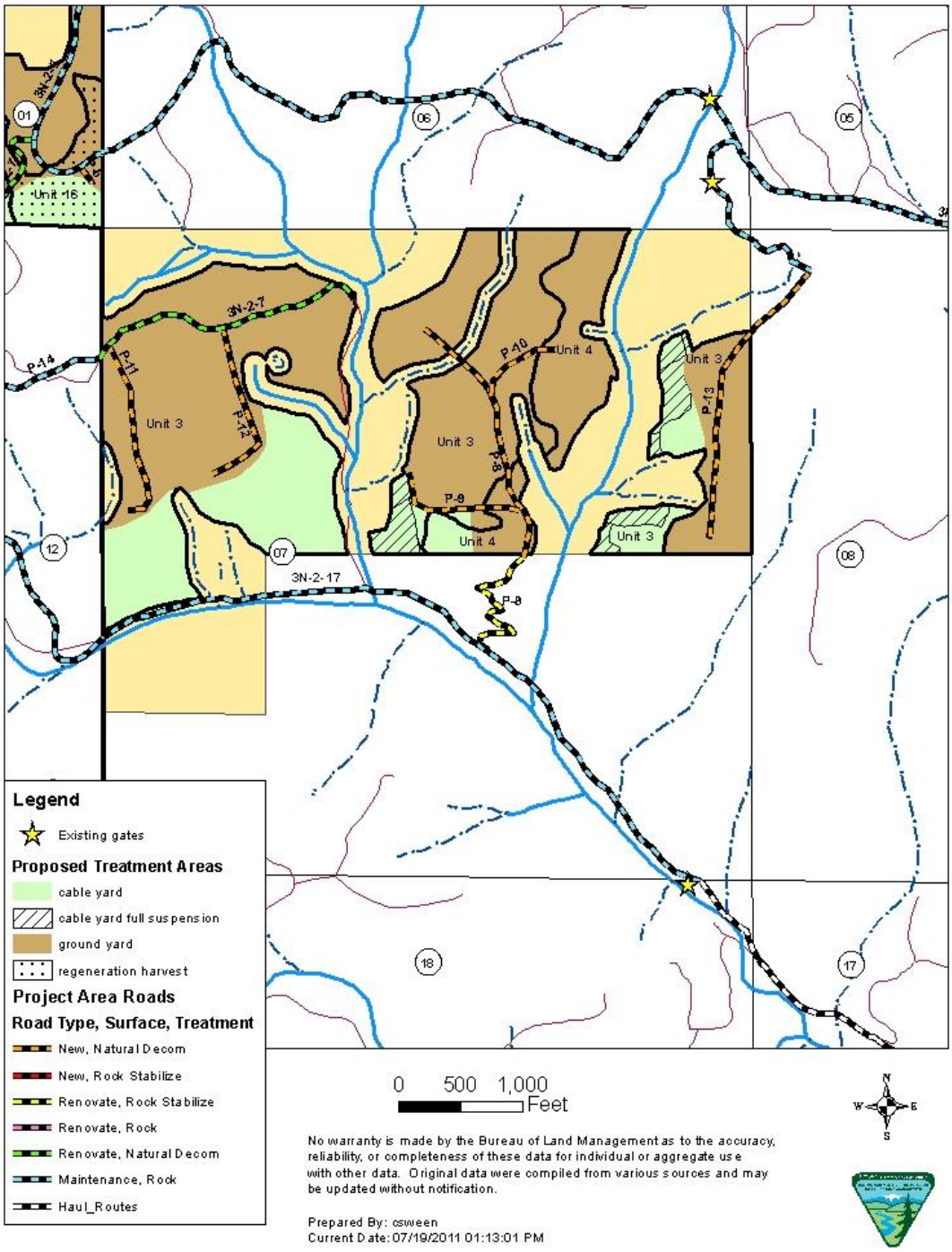


Figure 5. Proposed Action – T3N, R2W, Section 9

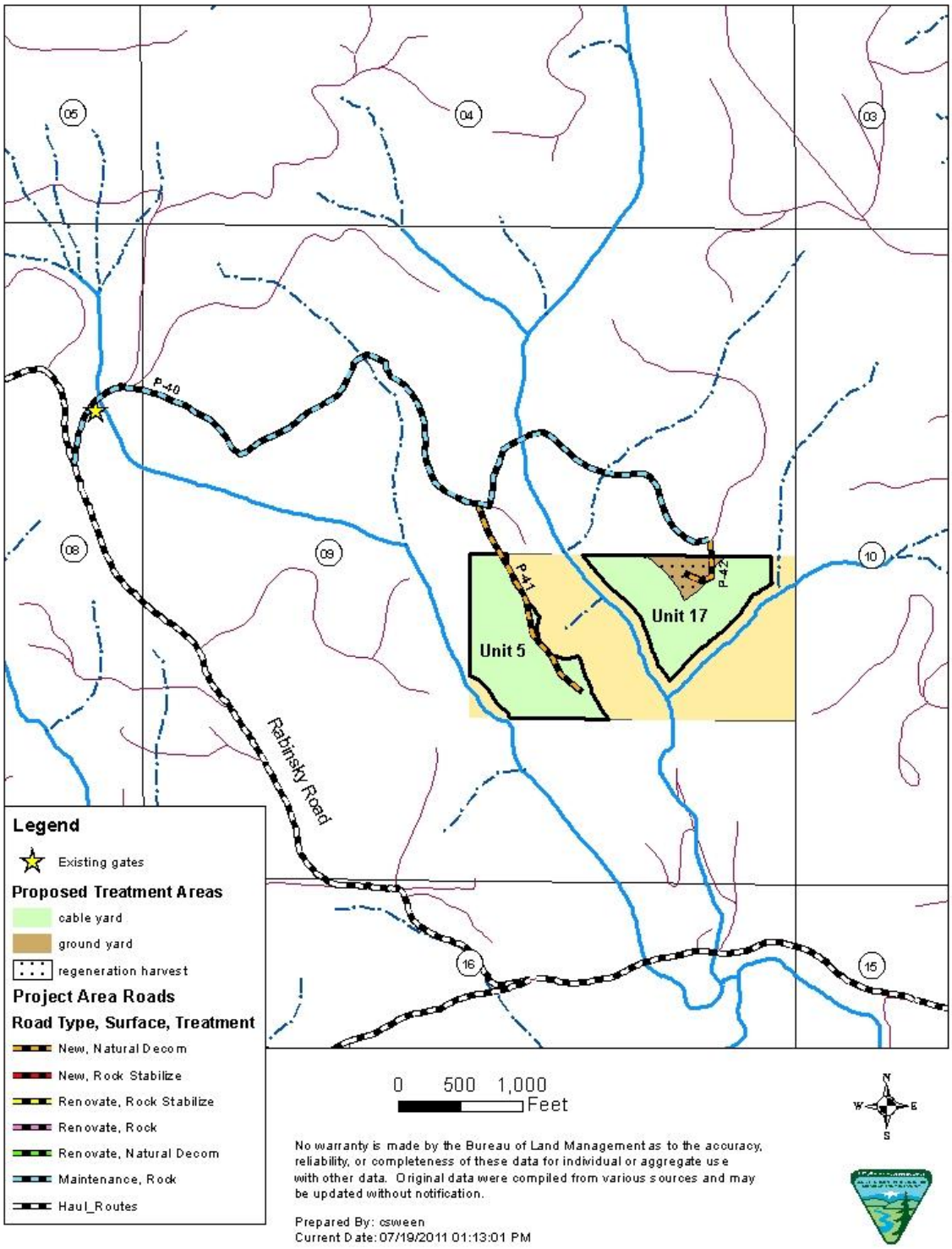


Figure 6. Proposed Action – T3N, R2W, Section 19

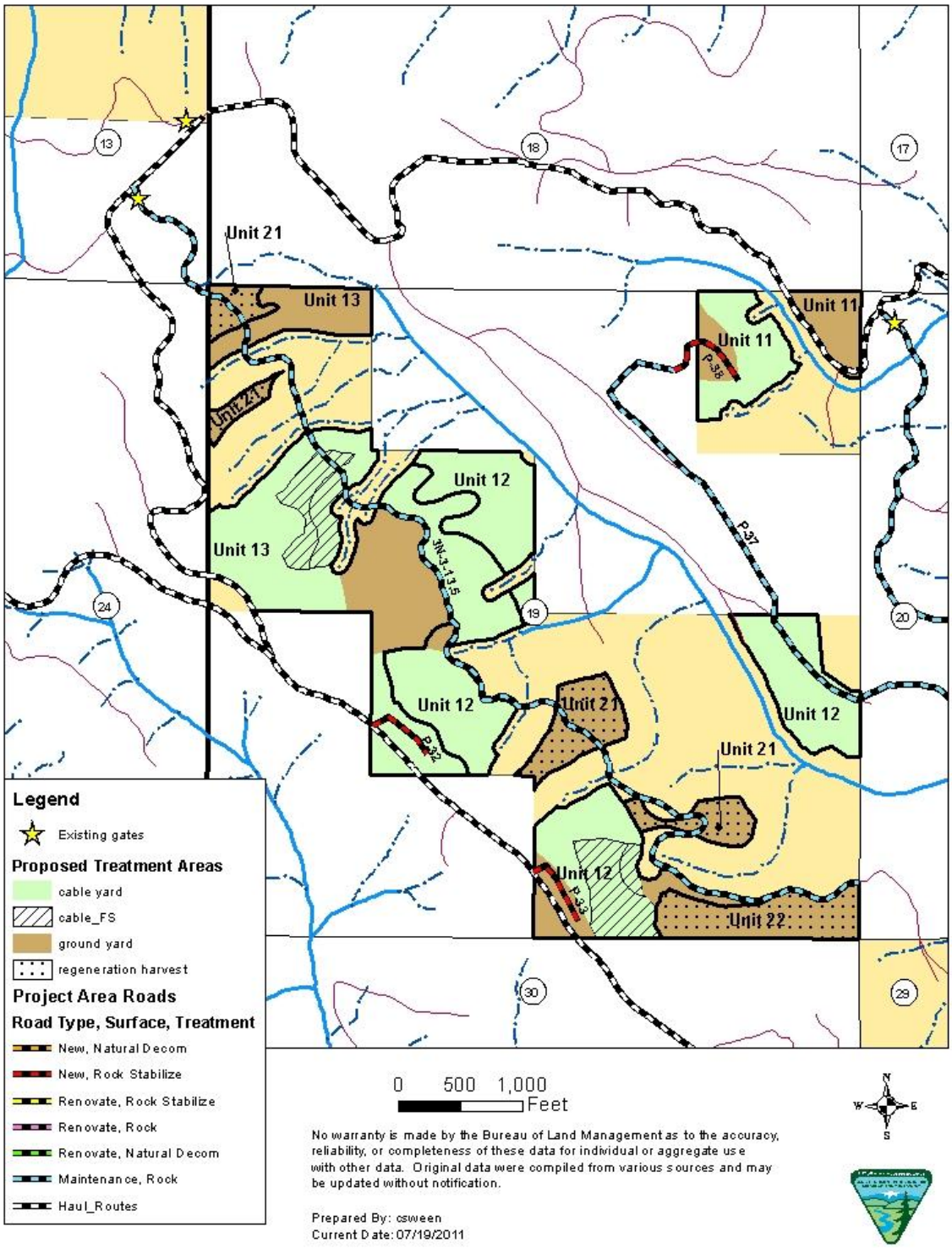


Figure 7. Proposed Action – T3N, R2W, Section 29

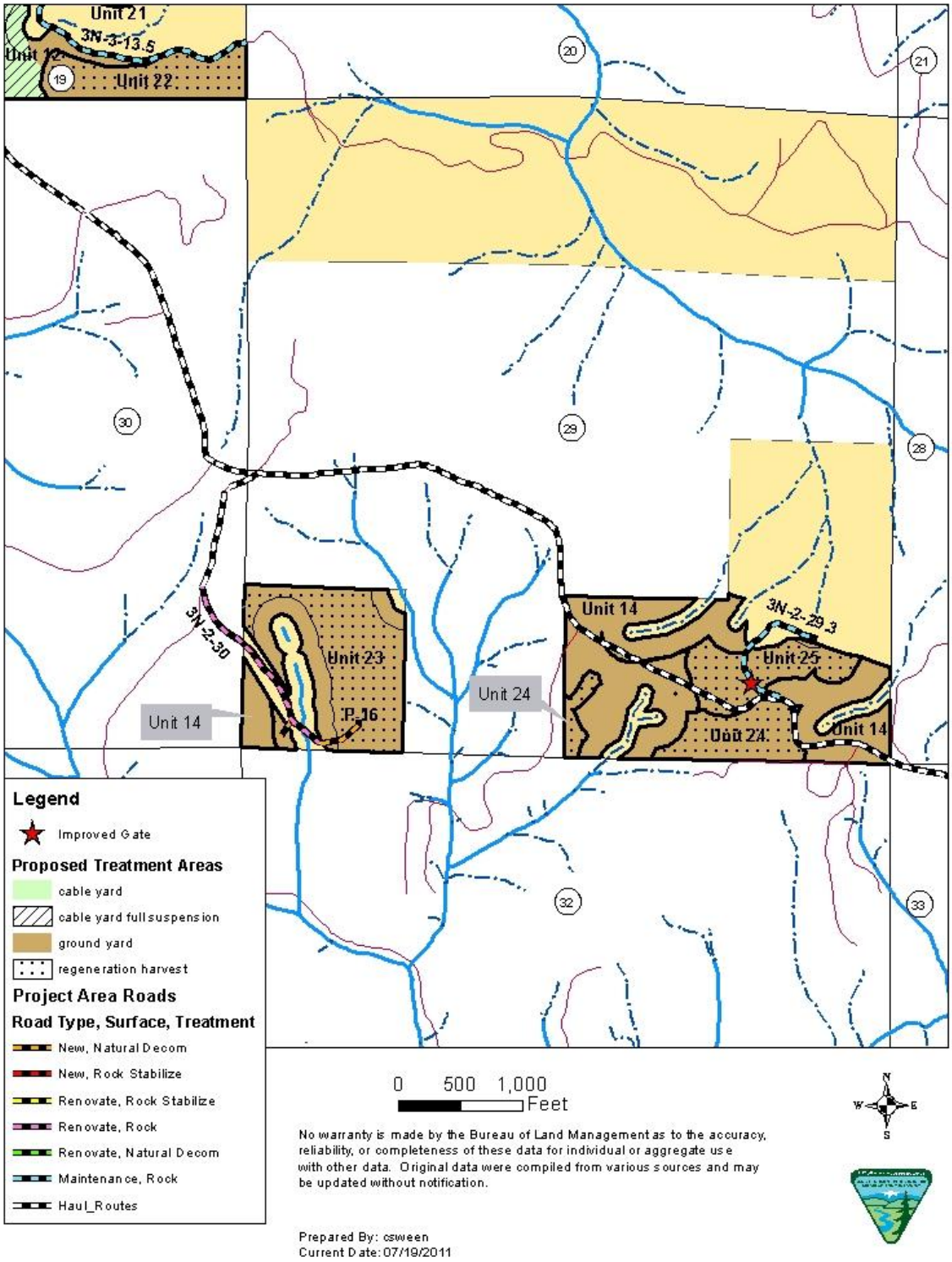


Figure 8. Proposed Action – T3N, R3W, Section 1

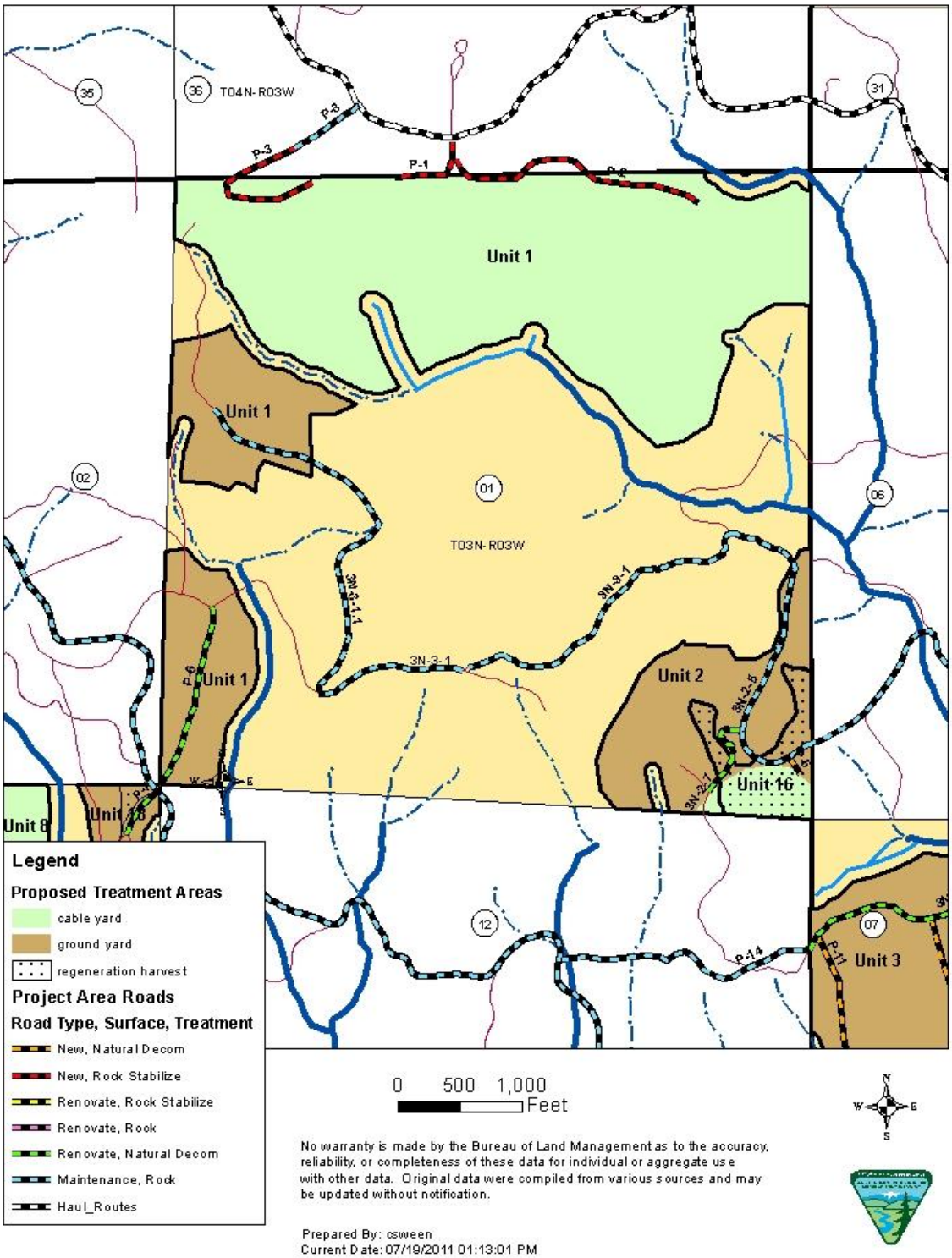


Figure 9. Proposed Action – T3N, R3W, Section 11

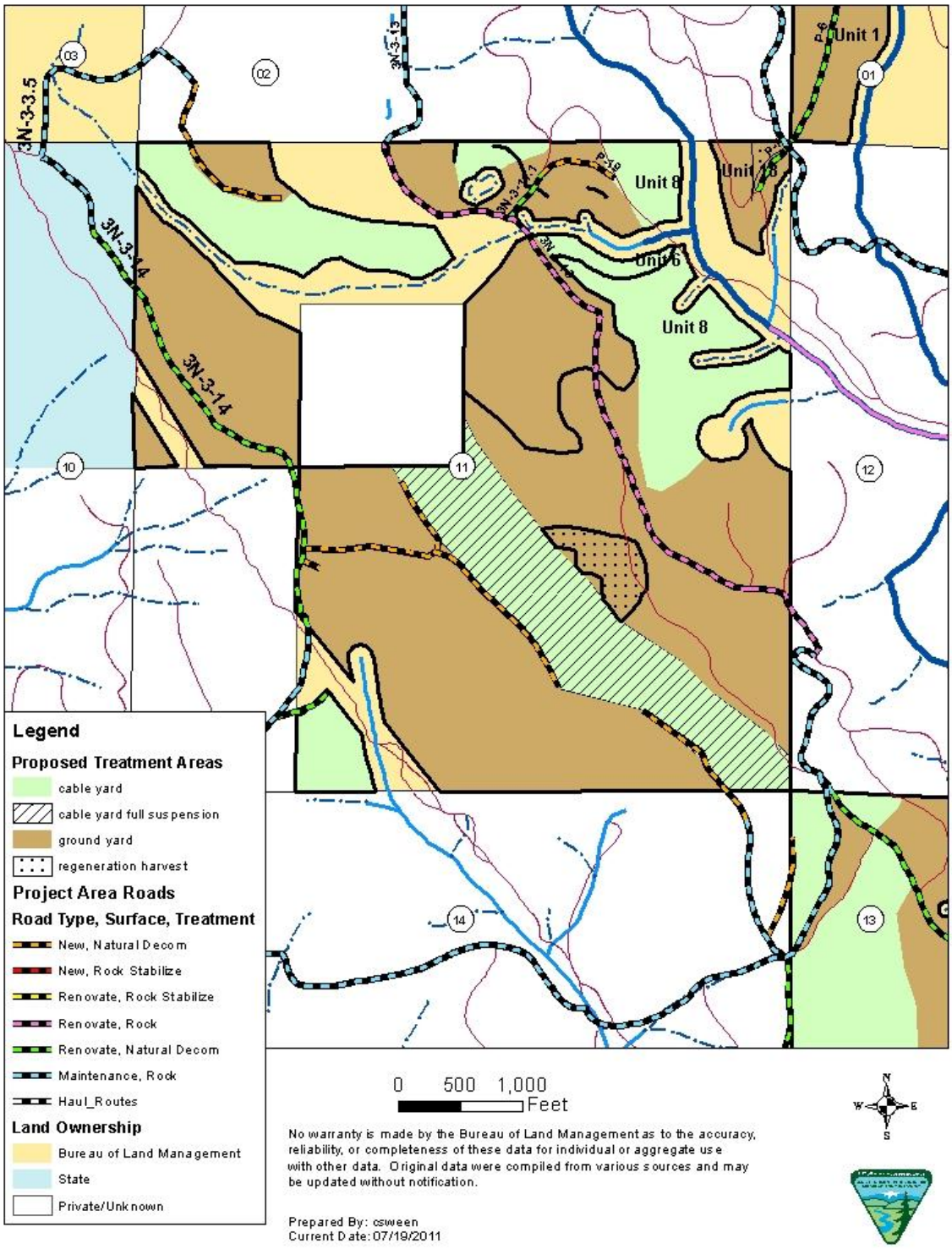


Figure 10. Proposed Action – T3N, R3W, Section 13

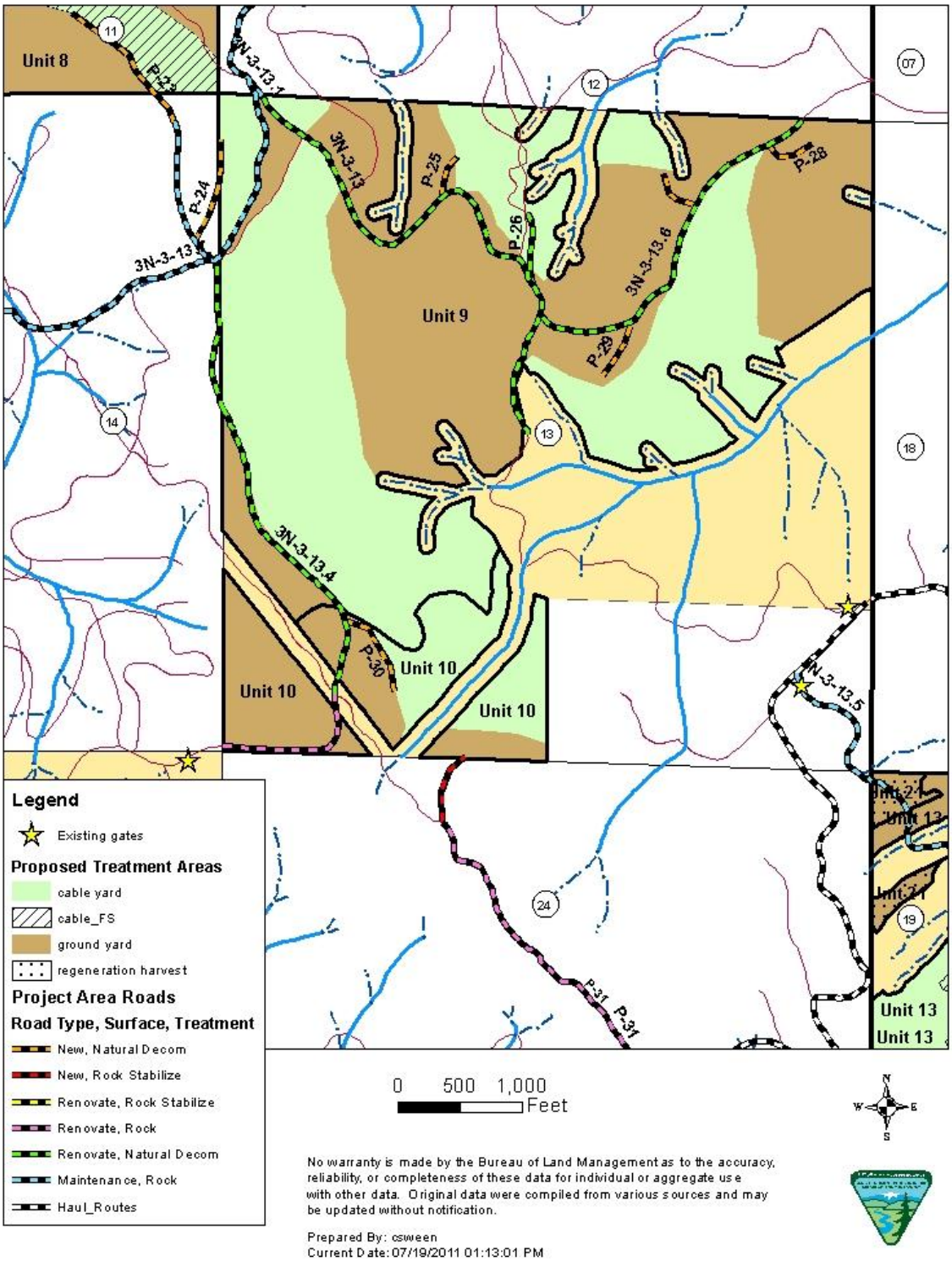


Figure 11. Proposed Treatment Areas, Haul Routes, Season of Haul and Fish Distribution

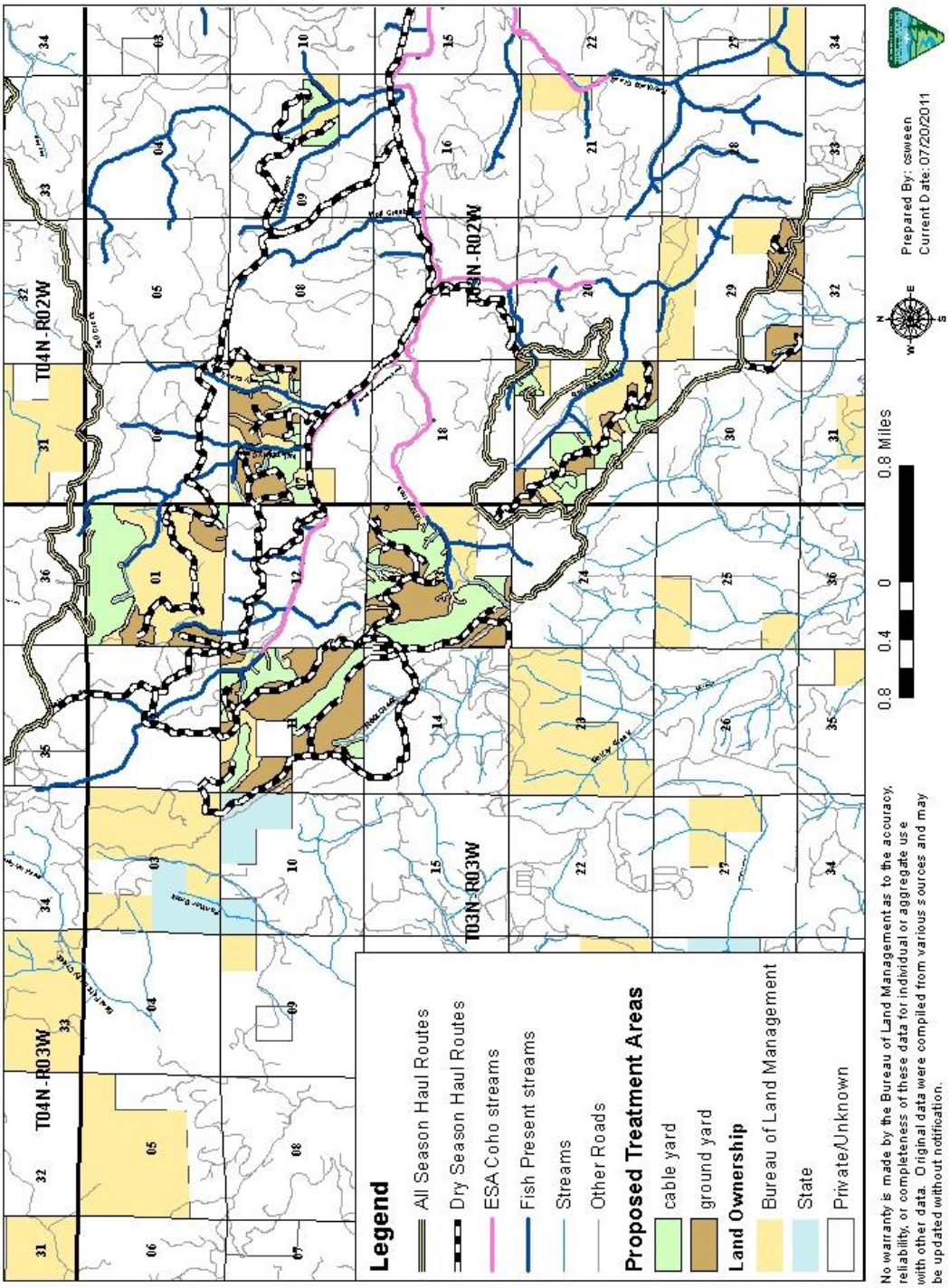
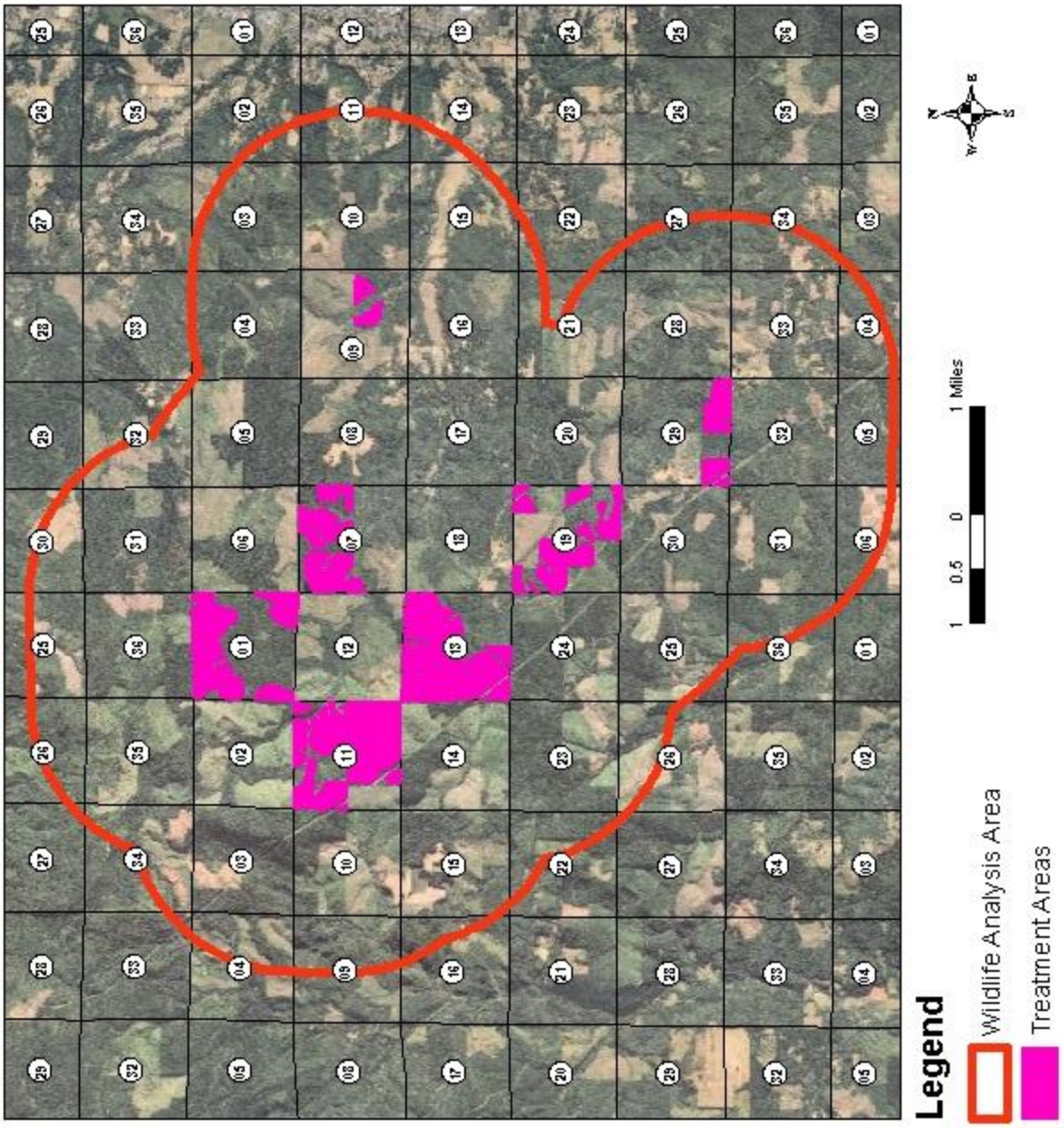


Figure 12. Wildlife Analysis Area



Additional Supporting Data

8.2 Water Quality Management Plan

Introduction

Water Quality Management on BLM-administered lands that are covered under the South Scappoose Creek EA is based on the site specific application of Best Management Practices (BMPs) and disclosed as Project Design Features (PDFs).

Best Management Practices

Best Management Practices are required by the federal Clean Water Act as amended to mitigate the potential for non-point source pollution. Non-point source pollution is pollutants detected in concentrated water (e.g. stream or lake) from a wide range of forest management activities on federal lands administered by the Bureau of Land Management (BLM). BMPs are considered the primary methods for achieving Oregon's water quality standards.

The overall goal is not to strictly adhere to the wording of the BMP, but rather to implement the intent of the prescribed BMP. That is to protect, promote and enhance water quality in order to meet federal and state water quality objectives. In that matter, BMPs are site specific and the implementation of the BMP is tailored to the "on the ground" conditions. The following BMPs are site-specific applications to forest management activities undertaken by South Scappoose Creek EA on the Tillamook Resource Area.

Table 26: Best Management Practices

BMP No.	Practice Technique
R 1	Locate temporary and permanent roads and landings on stable locations, e.g., ridge tops, stable benches or flats, and gentle-to-moderate side slopes. Minimize construction on steep slopes, slide areas and high landslide hazard locations.
R 2	Locate temporary and permanent road construction or improvement to minimize the number of stream crossings.
R 2	Locate cross drains to prevent or minimize runoff and sediment conveyance to wetlands, riparian management areas, floodplains and waters of the state. Implement sediment reduction techniques such as settling basins, brush filters, sediment fences and check dams to prevent or minimize sediment conveyance.
R 41	Locate waste disposal areas outside wetlands, riparian management areas, floodplains and unstable areas to minimize risk of sediment delivery to waters of the state. Apply surface erosion control prior to the wet season. Prevent overloading areas, which may become unstable.
R 42	Confine pioneer roads to the construction limits of the permanent roadway to reduce the amount of area disturbed and avoid deposition in wetlands, riparian management areas, floodplains and waters of the state. Install temporary drainage, erosion, and sediment control structures. Storm proof or close pioneer roads prior to the onset of the wet season.
R 45	Use temporary sediment control measures (e.g., check dams, silt fencing, bark bags, filter

	strips and mulch) to slow runoff and contain sediment from road construction areas. Remove any accumulated sediment and the control measures when work or haul is complete. When long-term structural, sediment control measures are incorporated into the final erosion control plan, remove any accumulated sediment to retain capacity of the control measure.
R 46	Conduct all non-emergency in-water work during the ODFW instream work window.
R 50	Remove temporary crossing structures promptly after use. Follow practices under the Closure/Decommissioning section for removing stream crossing drainage structures and reestablishing the natural drainage.
R 61	Limit road and landing construction, reconstruction, or renovation activities to the dry season. Keep erosion control measures concurrent with ground disturbance to allow immediate storm-proofing.
R 65	Suspend ground-disturbing activity if projected forecasted rain will saturate soils to the extent that there is potential for movement of sediment from the road to wetlands, floodplains and waters of the state. Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include but not limited to erosion control blankets and mats, soil binders, soil tackifiers, slash placement.
R 71	Prior to the wet season, provide effective road surface drainage through practices such as machine cleaning of ditches, surface blading including berm removal, constructing sediment barriers, cleaning inlets and outlets.
R 80	Stormproof open resource roads receiving infrequent maintenance to reduce road erosion and reduce the risk of washouts by concentrated water flows. Stormproof temporary roads if retained over-winter.
R 81	Suspend storm proofing/decommissioning operations and cover or otherwise temporarily stabilize all exposed soil if conditions develop that cause a potential for sediment laden runoff to enter a wetland, floodplain or waters of the state. Resume operations when conditions allow turbidity standards to be met.
R 83	Fully decommission or obliterate temporary roads upon completion of use.
R 84	Consider decommissioning or fully decommissioning low volume permanent roads not needed for future resource management located in, or draining into wetlands, riparian management areas, floodplains or waters of the state.
R 87	Remove stream crossing culverts and entire in-channel fill material during ODFW instream work period.
R 91	Following culvert removal and prior to the wet season, apply erosion control and sediment trapping measures (e.g., seeding, mulching, straw bales, jute netting, native vegetative cuttings) where sediment can be delivered into wetlands, riparian management areas, floodplains and waters of the state.
R 94	On active haul roads, during the wet season, use durable rock surfacing and sufficient surface depth to resist rutting or development of sediment on road surfaces that drain directly to wetlands, riparian management areas, floodplains and waters of the state.
R 95	Prior to winter hauling activities, implement structural road treatments such as: increasing the frequency of cross drains, installing sediment barriers or catch basins, applying gravel lifts or asphalt road surfacing at stream crossing approaches, and cleaning and armoring ditchlines.
R 96	Suspend commercial use where the road surface is deeply rutted or covered by a layer of mud or when runoff from the road surface is causing a visible increase in stream

	turbidity in the receiving stream.
R 99	Maintain road surface by applying appropriate gradation of aggregate and suitable particle hardness to protect road surfaces from rutting and erosion under active haul where runoff drains to wetlands, riparian management areas, floodplains and waters of the state.
R 100	To reduce sediment tracking from natural surface roads during active haul, provide gravel approach before entrance onto surfaced roads.
TH 2	Design cable yarding corridors so as to limit canopy loss in Riparian Reserves to meet shade targets. Where feasible, require full suspension over flowing perennial and intermittent streams with erodible bed and bank, and jurisdictional wetlands.
TH 3	Where workable, require full suspension over flowing streams, non-flowing streams with erodible bed and bank, and jurisdictional wetlands.
TH 4	Limit downhill logging into Riparian Reserves where yarding trails can converge, and potentially intersect the stream network.
TH 5	Where slopes exceed 60 percent along stream channels, yard with full suspension, or one-end suspension using seasonal restrictions. Yard remaining areas using one-end suspension.
TH7	Exclude equipment from riparian management area retention areas (60 feet from the edge of the active stream channel for fish bearing and perennial streams, lakes and ponds, and 35 feet for intermittent streams), except for road crossings, restoration, wildfire, or similar operational reasons.
TH 9	Plan use on existing and new skid trails, to be less than 12 percent of the harvest areas.
TH 11	Ensure one-end suspension of logs; e.g. integral arch on all conventional ground-based yarding equipment.
TH12	Restrict ground-based harvest and skidding operations to periods of low soil moisture when soils have resistance to compaction and displacement.
TH14	Limit conventional ground-based equipment to slopes less than 35 percent.
TH16	Designate skid trails where water from trail surface would not be channeled into unstable areas adjacent to water bodies, floodplains, and wetlands.
TH18	Apply erosion control practices to skid roads and other disturbed areas with potential for erosion and subsequent sediment delivery to water bodies, floodplains, or wetlands.

Appendix 1 – Public Comments to Scoping for the South Scappoose Creek Project, Including BLM Responses

On February 17, 2011, a Scoping Letter was sent to 21 individuals, organizations and agencies (Project Record Document 7) and was posted to the BLM's Salem District website. A Notice for Public Comment was published in *The South County Spotlight* newspaper of Scappoose Oregon on February 23, 2011. Finally, a description of the proposal was included in the Salem District, Bureau of Land Management Project Update for the spring and summer of 2011 which was mailed to more than 1000 individuals, organizations and agencies. As a result of this scoping effort, nine letters providing comments were received (Project Record Documents 15, 16, 17, 18, 19, 20, 21, 22 and 24). In addition to the letters, three phone calls were received from individuals requesting additional information or wishing to provide comment (Project Record Documents 12, 13 and 23).

Below is a summary of the public comments received and BLM's Response to those comments:

Project Record Document 17

Madelynne Diness Sheehan
Scappoose Bay Watershed Council Member

Project Record Document 21

Janelle St. Pierre
Scappoose Bay Watershed Council Coordinator

Project Record Document 22

Lona Pierce
Warren, Oregon

Project Record Document 24

Alison Charbonneau
Scappoose Bay Watershed Resident and Watershed Council Member

BLM Summary of Comments:

Four letters were received from members of the Scappoose Bay Watershed Council and/or residents of the watershed which provided comments of a similar nature. They generally expressed concerns of the potential impacts the project concerning erosion and sedimentation,

impacts to in-stream flow, temperature increases, and reductions in large wood recruitment potential. They also made references to the facts that the City of Scappoose municipal water supply originates in the headwaters of South Scappoose Creek, Lazy (Lacey), and Gourlay Creeks and the area's streams are valuable resources from a salmon/trout habitat perspective. Additional concerns were expressed concerning the current management practices implemented on the majority of the forestlands within the watershed by industrial timber companies and the resultant severe lack of mature/older forest habitat within the area. They pointed out the importance of older forests and riparian corridors to fisheries and wildlife and that because there is very little state land and few parks in the area, local residents have come to depend upon BLM lands for recreation, hunting and the harvest of alternate forest products.

BLM Response:

BLM is aware of the municipal water supply intakes near the project areas and other aspects of the Affected Environment you mention. A detailed description of the proposed project including design features to reduce the potential for adverse impacts can be found in *EA section 2.4*. The anticipated impacts of the project upon the various resources within the area including water quality, fisheries, wildlife and forest vegetation are contained within *EA section 3*.

Project Record Document 15
Brian Tenbusch
American Forest Resource Council

Comment 1:

"*AFRC would like to see all timber sales be economically viable. Appropriate and locally available harvesting systems should be used on all thinning units in the South Scappoose Project to achieve an economically viable sale and increase the revenues to the government. To improve the economic viability of timber sales, AFRC would like to see the commercial thinning units within the Project harvest adequate volumes. Light thinning of 4 -8 mbf /acre makes it difficult to economically log*."

BLM Response to Comment 1:

BLM attempts to design timber sale projects to be economically viable. At a minimum, it is our expectation that the proposed thinnings would yield at least 12 mbf/acre with most units producing volumes appreciably higher.

Comment 2:

"*AFRC would like to encourage the BLM to offer sales that will allow wet season harvesting on improved roads or allow for roads and spurs to be improved so wet season harvesting can be*

accomplished. The loggers need winter work and the mills generally need winter wood, this is a big bidding issue for a purchaser."

BLM Response to Comment 2:

In designing this project we have attempted to allow for flexibility in the seasons of operation. A detailed description of the proposed project can be found in *EA sections 2.4.1* and *2.4.2*.

Project Record Document 18
Bill Richardson
Rocky Mountain Elk Foundation

BLM Summary of Comments:

RMEF suggested the project include an objective to improve wildlife forage habitat for deer, elk and other wildlife. They noted the project offers opportunity to create early seral vegetation for wildlife in an area where it is currently in short supply. They offer several suggestions for improving wildlife habitat, including reducing crown closures to 40% and creating larger openings to allow for early seral species establishment, and re-vegetating disturbed areas and decommissioned roads with native forage species for deer and elk.

BLM Response:

As described in *EA section 3.1.2*, the thinning prescribed for the proposed treatment areas would result in a relatively variable crown cover over the project area, including areas with sufficient light for establishment and growth of early seral species already present in those areas. Approximately 81 acres of heavy thinning treatment would be implemented through designated *Phellinus weirii* areas. The proposal also includes a total of 100 acres of regeneration harvest; on the ground, these acres are scattered across 5 sections of lands and configured into 12 non-contiguous treatment areas averaging approximately 8.3 acres in size.
Decommissioned roads and other areas of disturbed soils would be planted with native plants, which may include grasses, forbs and trees. A more detailed description of the proposed project can be found in *EA sections 2.4.1* and *2.4.2*.

Project Record Document 16
Josh Laughlin
Cascadia Wildlands

Comment 1:

"*Are all of the stands human created plantations or are some fire-regenerated? Cascadia Wildlands supports variable density thinning in human-created plantations and encourages the agency to defer from logging fire regenerated stands, which develop older forest complexity*

without intervention. The BLM should consider an alternative that focuses exclusively on human-created plantations."

BLM Response to Comment 1:

See EA section 3.1.1

Comment 2:

"*The EA or EIS for the South Scappoose Creek Project should clearly outline how many miles of road are proposed in Riparian Reserves*".

BLM Response to Comment 2:

See *EA Table 4*

Comment 3:

"*Cascadia Wildlands encourages the use of variable density thinning when treating homogenous, human-created tree plantations, regardless of the land allocation. This maximizes future options in the stand.*"

BLM Response to Comment 3:

The South Scappoose Creek Project proposes to thin the majority of the stands (68.4%) by thinning across all size classes. This would be expected to result in a degree of variability across the thinning units, both in terms of sizes of trees retained and numbers of trees per acre. (see *EA sections 2.4 and 3.1*)

We disagree with your assertion that variable density thinning is appropriate when treating plantations, regardless of the land allocation. Per the ROD/RMP, the primary functions of the Matrix land-use allocation are the production of timber and other commodities, providing for connectivity to support dispersal between reserves and providing habitat for species associated with both late successional and younger forests (USDI-BLM 1995) Variable-density thinning is not effective at achieving Matrix - General Forest Management Area (GFMA) objectives of sustainable timber supplies that are described in the ROD/RMP because the variable stocking levels utilized in variable-density thinning produce less wood volume per acre and wood that is of lower quality than that produced in stands thinned for timber production purposes. Variable density thinning of forest stands is appropriate in land-use allocations designed to provide greater ecological diversity, spotted owl nesting, foraging, and roosting habitat such as Late Successional Reserves (LSR) and the North Coast Range Adaptive Management Area (AMA).

Comment 4:

"*We do not support hardwood regeneration up to 10 acres in size as outlined in the scoping notice. Our experience of this practice results in major swaths of forest being clearcut typically in riparian reserves where alder have colonized in disturbed areas that may have once housed conifers. If hardwood conversion is being proposed in riparian reserves, the BLM must show how ACS objectives are being met and that the logging is "needed" to obtain objectives as directed by the standards and guidelines in the Northwest Forest Plan*."

BLM Response to Comment 4:

None of the proposed regeneration harvest areas are located within the Riparian Reserve LUA.

Comment 5:

The project must disclose full impacts to spotted owls.

BLM Response to Comment 5:

The analysis of impacts to spotted owls is contained within *EA section 3.5*

Comment 6: "*We encourage the BLM to take a hard look at all the decommissioning opportunities that are presented in the project area*."

BLM Response to Comment 6:

BLM considered the decommissioning opportunities within the area and incorporated those road segments as appropriate into the proposed action. None of the roads considered for decommissioning but for varying reasons were not carried forward into the proposed action, were determined to be of risk for failure or sediment delivery into streams.

Project Record Document 19
Doug Heiken
Oregon Wild

BLM Summary of Comments:

Oregon Wild provided a number of general comments and project recommendations.

Several of their recommendations dealt with varying aspects of the design of the proposed silvicultural prescription including the use of skips and gaps to achieve a variable density outcome, the management of Coarse Woody Debris (protection and recruitment), and Riparian Reserve Management.

BLM Response:

A description of the proposed project can be found within *EA sections 2.4.1* and *2.4.2*. Also see BLM Response to Cascadia Wildlands Comment 3.

Project Record Document 20
Local Resident (name withheld per request for confidentiality)

BLM Summary of Comments:

A local resident shared information pertaining to existing road easements and expressed concerns relative to existing road conditions and the potential for impacts resulting from use by heavy equipment or trucks during the wet season.

BLM Response:

The specific road system which concerned this resident has been dropped from consideration. This is due to the fact that harvest units accessed by the roads in question were dropped from the project proposal for a number of reasons during the time period between scoping and issuance of the EA.