UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

DECISION RECORD
Burnt Bottle Re-thin EA

Environmental Assessment
DOI-BLM-OR-E050-2011-0004-EA

DECISION

It is my decision to implement Burnt Bottle project analyzed under the Re-thin EA. The Re-thin Environmental Assessment (EA) was made available for a 30 day public comment period from February 21, 2013 to March 22, 2013. Comments were received from three groups, responses to substantive comments are being provided. The EA analyzed the effects of thinning on approximately 750 acres of previously thinned forest stands located in Late Successional Reserve (LSR), Matrix and Riparian Reserve (RR) land use allocations (LUA). A description of the Alternatives follows later in this decision. My decision is to implement Alternative 3 (relative density between 30 and 38) in Matrix and associated Riparian Reserves for thinning and coarse woody debris/snag creation. Alternative 2 (relative density between 25 and 27) will be implemented in LSR and associated Riparian Reserves for thinning, gap creation and coarse woody/snag creation. Burnt Bottle unit is a LSR unit, however Alternative 3 will be implemented in Burnt Bottle unit, thinning to a higher relative density would maintain a higher canopy cover to minimize impacts to existing blackberry infestations. In addition, no gaps are to be implemented in the Burnt Bottle unit. Blackberry treatments will not occur at this time and will be evaluated for implementation after thinning. There will be no new roads constructed however road renovation/improvement will occur as needed in the planning area.

Burnt Bottle project is located in T20S, R4W, Section 31; it is an LSR land use allocation and consists of 55 acres; treatment includes thinning from below to a relative density of 35. Three snag patches (6 snags per patch) providing 30% tolerance level will be created more than 200 feet from dense blackberry infestations.

Rationale for selection: The Alternatives chosen best meet the purpose and need for the action and provide the most appropriate use and protection of resources based on management direction provided in the 1995 Eugene District RMP.

PLAN CONFORMANCE

This action is in conformance with the 1995 Eugene District Resource Management Plan *(amended)*. The RMP anticipated the need to: (1) conduct commercial thinning in Matrix land use allocations by primarily thinning from below to improve growing conditions for remaining conifers and other tree species and to provide commodities; (2) Implement silvicultural treatments such as density management in LSR and RR land use allocations by thinning to accelerate the development of structural characteristics typical of late-successional forests, improve understory species composition, provide openings for development of early seral habitat and enhance snag and coarse woody recruitment to benefit multiple species; and (3) Improve riparian function in the riparian reserve land use allocations to contribute to the attainment of Aquatic Conservation Strategy (ACS) objectives.

SURVEY AND MANAGE

The Burnt Bottle project is consistent with court orders relating to the Survey and Manage mitigation measure of the Northwest Forest Plan, as incorporated into the Eugene District Resource Management Plan.

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in Conservation Northwest, et al. v. Rey, et al., No. 08-1067 (W.D. Wash.) (Coughenour, J.), granting Plaintiffs' motion for partial summary judgment and finding a variety of NEPA violations in the BLM and USFS 2007 Record of Decision eliminating the Survey and Manage mitigation measure. Judge Coughenour deferred issuing a remedy in his December 17, 2009 order until further proceedings, and did not enjoin the BLM from proceeding with projects. Plaintiffs and Defendants entered into settlement negotiations that resulted in the 2011 Survey and Manage Settlement Agreement, adopted by the District Court on July 6, 2011.

The Ninth Circuit Court of Appeals issued an opinion on April 25, 2013, that reversed the District Court for the Western District of Washington's approval of the 2011 Survey and Manage Settlement Agreement. The case is now remanded back to the District Court for further proceedings. This means that the December 17, 2009, District Court order which found National Environmental Policy (NEPA) inadequacies in the 2007 analysis and records of decision removing Survey and Manage is still valid.

Previously, in 2006, the District Court (Judge Pechman) had invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation had entered into a stipulation exempting certain categories of activities from the Survey and Manage standard (hereinafter "Pechman exemptions").

Judge Pechman'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 (emphasis added):
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."

Following the District Court's December 17, 2009 ruling, the Pechman exemptions still remained in place. I have reviewed the Burnt Bottle Project in consideration of both the December 17, 2009 partial summary judgment and Judge Pechman's October 11, 2006 order. Because the Burnt Bottle project includes no regeneration harvest and includes thinning only in stands less than 80 years old, I have made the determination that this project meets Exemption A of the Pechman Exemptions (October 11, 2006 Order), and therefore may still proceed to be offered for sale even if the District Court sets aside or otherwise enjoins use of the 2007 Survey and Manage Record of Decision since the Pechman exemptions would remain valid in such case.

DESCRIPTION OF THE ALTERNATIVES

Alternative 1 is the no action Alternative**.** Three action Alternatives were designed and analyzed in the Rethin EA. Alternative 2 includes thinning from below to a relative density between 25 and 27 in Matrix and LSR lands, including their associated Riparian Reserve lands; LSR and the associated RR treatments include: small gaps less than 1 acre and no gaps in Burnt Bottle unit; snags and coarse woody debris in clumps to provide 50% tolerance level (DecAID 2012); Burnt Bottle would receive three snag patches located more than 200 feet from dense blackberry infestations but no coarse woody debris additions would occur. Blackberries would be controlled using prescribed fire and planting a mixture of hardwoods and conifers in Burnt Bottle and Territorial thinning units.

Snags and coarse woody debris would be enhanced in clumps to provide a 30% tolerance level (DecAID 2012) within Riparian Reserves associated with the Matrix land use allocations in both Alternatives 2 and 3.

Alternative 3 includes thinning from below to a relative density between 30 and 38 in Matrix and LSR lands and their associated Riparian Reserves; LSR and the associated RR treatments include: small gaps less than one acre; snags and coarse woody debris enhancements in clumps to provide 80% tolerance level (DecAID 2012). Blackberries would be controlled without prescribed fire in Burnt Bottle and Territorial units for both Alternatives 3 and 4.

Alternative 4 includes thinning from below to a relative density between 30 and 38 in Matrix and LSR lands and their associated Riparian Reserves; LSR and the associated RR treatments include: No gaps; snags and coarse woody debris enhancements that are well distributed to provide 50% tolerance level (DecAID 2012). Snags and coarse woody debris would be well distributed to provide a 30% tolerance level (DecAID 2012) within Riparian Reserves associated with Matrix land use allocations in Alternative 4.

None of the Alternatives considered new road construction however road renovation and improvement was included in all the Alternatives. Streamside no treatment buffers were a minimum of 75 feet for all Alternatives.

Minor changes to the EA since the public comment period
Wild Fish unit 2: Marbled murrelet surveys were completed in this unit yielding a detection resulting in the entire unit demarcated as an occupied site for marbled murrelets. The land use allocation has also been changed from Matrix to Late Successional Reserve. Thinning in Wild Fish unit 2 will occur under Alternative 2 however gaps will not be implemented since the unit has been declared a marbled murrelet occupied site. Snags and coarse wood additions will be implemented.

Pataha Ridge units 1 and 2: Spur B was wrongly identified as 90 feet in the draft EA; the correct length for Spur B is 250 feet, this has been changed in the current EA.

Descriptions of Alternatives 2 and 3 (pages 5 and 6) include the following: The few coarse woody clumps located south, east or west of a perennial stream would be a minimum of 100 feet from the stream where harvest of the inner portion of the secondary shade zone would also be avoided. Instead these coarse woody clumps located south, east or west of a perennial stream would be a minimum of 150 feet from the stream, harvest of the inner portion of the secondary shade zone would be avoided.

All thinning units except Territorial unit were identified as being located within 2012 designated Northern Spotted Owl Critical Habitat in the draft EA. Wildfish unit 2 has also been identified as being outside 2012 designated Northern Spotted Owl Critical Habitat.

CONSULTATION AND COORDINATION:

Public participation
Scoping was initiated in August of 2011; a scoping letter was mailed out to local businesses, groups, government agencies and individuals soliciting feedback about the thinning project. Three groups and individuals responded with the following comments. They were: generally were in support of thinning, economic viability, gap creation, protection of hardwoods, no new road construction, stream and riparian protection and adequate provisions for snags and downed wood.

EA public review
This EA and preliminary finding of no significant impact statement were made available for public review and comment for a 30 day period starting on February 21 inviting public comment, three comments were received. In addition the EA was posted on the Eugene District internet website. A copy of this Decision Record and Finding of No Significant Impact (FONSI) and a copy of the EA will be mailed to the commenters; the Environmental Assessment, FONSI and Decision Record will be posted on the Eugene District internet website.

U.S. Fish and Wildlife Service (USFWS)

ESA consultation
Consultation with the USFWS has been completed under the 2013-2014 programmatic consultation documents (USDI-FWS LOC-01EOFW00-2012-I-0214, 2013) (USDI-FWS BO 01EOFW00 2013F, 2013). Burnt bottle is being thinned to a light to moderate prescription under Alternative 3. Alternative 3 would not likely to adversely affect northern spotted owl habitat because the lighter thinning prescription being applied in the Burnt Bottle thinning units maintains >60% canopy cover in foraging habitat. For other thinning units in the Rethin EA, other LSR and associated RR units would be moderately thinned under Alternative 2 and would likely adversely affect northern spotted owl habitat in the short term due to moderate thin prescriptions. The moderate thinning may cause the habitat to function as dispersal habitat rather than low quality foraging habitat for a few years before gaining characteristics of well-functioning foraging habitat in response to thinning. In the long term, thinning under Alternative 2 is likely to benefit spotted owl habitat because of the long term enhancement of high quality habitat attributed to the actions proposed for implementation. Matrix units in the Rethin EA to be implemented under Alternative 3 would not likely to adversely affect the northern spotted owl because the light to moderate thinning applied, maintains >60% canopy cover in foraging habitat.

National Marine Fisheries Service (NMFS)

ESA consultation
The proposed thinning action may affect, but are not likely to adversely affect, coho salmon and their designated critical habitat in the Wolf Creek 5th-field watershed. Therefore, the BLM will conduct informal consultation with NMFS prior to reaching a decision on the proposed action for Eames Swing Units I and II. The proposed action as described and analyzed in this environmental assessment would have no effect on coho salmon and their designated critical habitat in the Wildcat Creek and Upper Siuslaw 5th-field watersheds. The Burnt Bottle timber sale is located in the Upper Siuslaw 5th field watershed and would have no effect on coho salmon and their designated critical habitat.

Essential Fish Habitat
The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) under the Act. The actions being implemented under the Rethin EA would have “No Effect” on waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

TRIBAL COORDINATION
The Bureau of Land Management Siuslaw Resource Area sent scoping letters to the Confederated Tribes of Siletz, the Confederated Tribes of the Grand Ronde and the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians during the scoping period. No response was received. Copies of the EA were mailed to them for public comment and no responses were received.

CULTURAL RESOURCES
The Burnt Bottle project occurs in the Oregon Coast Range physiographic province where the terms of Appendix D of the *Protocol between the Oregon State Historic Preservation Office and the Bureau of Land Management* are in effect.

Eugene District Cultural Resource maps and survey reports were consulted; there are no known cultural resources that occur in the vicinity of the project area.

Survey techniques are based on those described in Appendix D of the *Protocol for Managing Cultural Resource on Lands Administered by the Bureau of Land Management in Oregon*. Post-disturbance survey, when conducted, follows standards based on slope as defined in the Protocol appendix. These standards only mandate post-disturbance survey on slopes of 10% or less, or if professional judgment prompts such efforts due to topographic features or existence of nearby cultural resources.

Ground disturbing work must be suspended if cultural material is discovered during project work until an archaeologist can assess the significance of the discovery.

ADMINISTRATIVE REMEDIES

The decision to implement this project may be protested under 43 CFR 5003 - Administrative Remedies. In accordance with 43 CFR 5003.2, the decision for this project will not be subject to protest until the notice of sale is first published in the Eugene Register-Guard. This published notice of sale will constitute the decision document for the purpose of protests of this project (43 CFR 5003.2b). Protests of this decision must be filed with this office within fifteen (15) days after first publication of the notice of sale. As interpreted by BLM, the regulations do not authorize the acceptance of protests in any form other than a signed, written hard copy that is delivered to the physical address of the BLM Eugene District Office.

/s/Michael J. Korn *February 24, 2014*

Michael J. Korn, Date

Field Manager, Siuslaw Resource Area

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Re-Thin EA

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

FINDING OF NO SIGNIFICANT IMPACT

DOI-BLM-OR-E050-2011-0004-EA
Re-Thin EA

BACKGROUND

The Bureau of Land Management (BLM) prepared an Environmental Assessment (EA) (DOI-BLM-ORE050-2011-0004-EA) which analyzed the effects of timber harvest and related management activities in nine forest stands consisting of approximately 750 acres. The proposed action analyzed thinning in Matrix, Late-successional Reserve (LSR) and Riparian Reserve (RR) land use allocations and includes density management, commercial thinning, gap creation, coarse woody debris (CWD) and snag creation, culvert removal, road renovation/improvement and road decommissioning. The EA analyzed in detail the effects of four alternatives, including the No Action Alternative.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the information contained in the EA, and all other information available to me, it is my determination that the implementation of the proposed action would be consistent with the Eugene District Record of Decision/Resource Management Plan, as amended. The implementation of any of the action alternatives would not have significant environmental effects and does not constitute a major federal action having significant effects on the human environment. Therefore, an environmental impact statement is not necessary and will not be prepared. This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

CONTEXT

The action alternatives would occur in nine forest stands consisting of approximately 750 acres located within Matrix, Late-Successional Reserve (LSR) and Riparian Reserve (RR) land use allocations as designated by the 1995 Eugene District Resource Management Plan (RMP).

The RMP anticipated the need to: (1) conduct commercial thinning in Matrix land use allocations by primarily thinning from below to improve growing conditions for remaining conifers and other tree species and to provide commodities; (2) Implement silvicultural treatments such as density management in LSR and RR land use allocations by thinning to accelerate the development of structural characteristics typical of late-successional forests, improve understory species composition, provide openings for development of early seral habitat and enhance snag and coarse woody recruitment to benefit multiple species; and (3) Improve riparian function in the riparian reserve land use allocations to contribute to the attainment of Aquatic Conservation Strategy (ACS) objectives.

INTENSITY

I have considered the potential intensity of the impacts that would result from the proposed action relative to each of the ten areas suggested for consideration by the Council on Environmental Quality (CEQ), as detailed below:

1. **Impacts that may be both beneficial and adverse.** The EA considered both potential beneficial and adverse effects, especially for relevant resources such as Endangered Species Act (ESA) listed wildlife and fish. None of the effects are beyond the range of effects analyzed in the Eugene District "Final Proposed Resource Management Plan/Environmental Impact Statement" (November 1994), to which this EA is tiered. (RMP, p. 38)

2. **The degree to which the proposed action affects public health and safety.** No aspect of the Proposed Action or the action alternatives would have an effect on public health and safety.

3. **Unique characteristics of the geographic area such as proximity of historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.** There are no known parks, prime farmlands, wild and scenic rivers or wilderness characteristics in the project area. The proposed project is not expected to affect cultural resources, but ground disturbing work must be suspended if cultural material is discovered during project work until an archaeologist can assess the significance of the discovery. If necessary, the project would be redesigned to protect the values present.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** The effects of actions planned under the proposed action are similar to many other forest management projects implemented within the scope of the 1995 Eugene RMP. No unique or appreciable scientific controversy has been identified regarding the effects of the proposed action.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** The analysis has not shown that there would be any unique or unknown risks to the human environment not previously considered and analyzed in 1994 EIS, to which this decision is tiered. Thinning and density management treatments have been conducted for many years in the vegetation types typical of the project area.

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.** This project neither establishes a precedent nor represents a decision in principle about future actions. The proposed action is consistent with actions appropriate for the Matrix, LSR and RR land use allocations, as designated by the 1995 Eugene District ROD/RMP (EA, p. 2).

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** The environmental analysis did not reveal any cumulative effects beyond those already in the 1995 RMP EIS. The EA adequately analyzes the effects at the cumulative scale including those to: water quality (pp. 25-38), forest habitat and endangered species (pp. 38-42).

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or 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 historic resources.** There are no features within the planning area that are listed or eligible for listing in the National Register of Historic Places or are significant scientific, cultural, or historic resources.

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.** Alternative 2 and those portions of Alternative 4 that would thin to a canopy cover of about 50% are likely to adversely affect (LAA) the demographic value of critical habitat ORC 3 from reducing canopy cover below 60%. However, this is a short term effect; canopy cover will recover from about 50% to over 60% in approximately 5 to 10 years. The project only affects a small portion of owl territories in critical habitat. Therefore *this project will not appreciably reduce the likelihood of these areas to continue to fulfill their intended conservation purpose because of the relatively small area affected in the Oregon Coast Range critical habitat (USDI-FWS BO 01EOFW00 2013F, 2013, pp. 138-141).*

   Light thinning of alternative 3 and portions of Alternative 4 may affect but are not likely to adversely affect (NLAA) critical habitat because light thinning would not downgrade low quality foraging to dispersal habitat; post-thinning canopy cover would remain above 60%.

Alternative 2 or the LSR portions of Alternative 4 would not adversely affect critical habitat at the 500 acre scale because none of the units would reduce the amount of suitable habitat (foraging or nesting/roosting) below 50% at roughly the 500 acre scale.

Potential adverse effects from short term canopy cover reduction are not likely to appreciably affect Siuslaw Resource Area's ability to support spotted owl recovery. The overall effects from thinning within a small portion of owl territories and within 1% of suitable habitat in critical habitat ORC 3 sub-unit will have minimal effects at the sub-unit scale and this project is not likely to appreciably reduce the ability of this sub-unit to contribute to the recovery of the species at the larger range wide scale (USDI-FWS BO 01EOFW00 2013F, 2013, p. 141).

Over the long term the action alternatives are expected to have beneficial effects to spotted owls and their critical habitat, and the areas treated with moderate thinning are expected to have the greatest benefits. Moderate thinning of Alternative 2 as well as the LSR and RR portions of Alternative 4 would affect some aspects of foraging habitat, resulting in short term adverse effects because canopy cover may be reduced below 60%. However, long term beneficial effects would result by improving the quality of habitat at the stand scale. At larger scales these areas may affect but are not likely to adversely affect critical habitat because of the relatively small amount of area affected (< 1% of the critical habitat sub-unit affected) by short term canopy cover reductions, and long term beneficial effects. Alternative 3 and Matrix portions of Alternative 4 may affect but are not likely to adversely affect critical habitat because these areas would retain at least 60% canopy cover.

All action alternatives would protect trees that have the potential for marbled murrelet nesting. No harvest would occur within these sites and operational timing restrictions in adjacent areas would protect these areas during nesting season (EA, p. 12).

Analysis of the action alternatives concluded that there would be long-term benefits from infrastructural improvements that would occur under this EA. Timber haul from Eames Swing unit 1 and the east half of Eames swing unit 2 may increase the potential for sedimentation in the short term, however it is not likely to adversely affect coho salmon or their habitat because haul would occur during the dry season and the road will be renovated to federal standards. In addition, the proposed action would also not result in adverse effects to Essential Fish Habitat as designated by the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1855 as amended) (EA, p. 62).

There are no Threatened or Endangered botanical species within the project area.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.** The proposed action would not violate Federal, State or local laws imposed for the protection of the environment. These include the Endangered Species Act and the Clean Water Act. The proposed action is in compliance with the 1995 Eugene RMP, which provide direction for the protection of the environment on public lands.

Signature of the Responsible Official:

/s/Michael J. Korn
Michael J. Korn
Field Manager
Siuslaw Resource Area

February 24, 2014
Date:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

ENVIRONMENTAL ASSESSMENT
DOI- BLM- OR- E050- 2011- 0004- EA
Re- Thin EA

INTRODUCTION

This Environmental Assessment (EA) analyzes alternatives for timber harvest and related management activities in the locations shown in Table 1. Nine forest stands consisting of approximately 750 acres are proposed for thinning. The proposed action analyzes thinning in Matrix, Late-Successional Reserve (LSR) and Riparian Reserve (RR) land use allocations and includes density management, commercial thinning, gap creation, coarse woody debris (CWD) and snag creation, culvert removal, road renovation/improvement and road decommissioning.

Table 1: Name and location of the units proposed for thinning.

Unit name	Location	LUA	Acres
Wild Fish Unit 1	T. 17 S., R. 7 W., Sec. 33	Matrix	225
Wild Fish Unit 2	T. 18 S., R. 7 W., Sec. 3	LSR	77
Pataha Ridge Unit 1	T. 18 S., R. 7 W., Sec. 15	Matrix	74
Pataha Ridge Unit 2	T. 18 S., R. 7 W., Sec. 15	Matrix	58
Pataha Ridge Unit 3	T. 18 S., R. 6 W., Sec. 21	LSR	61
Eames Swing Unit 1	T. 18 S., R. 6 W., Sec. 31	LSR	40
Eames Swing Unit 2	T. 19 S., R. 6 W., Sec. 13	Matrix	105
Burnt Bottle Unit 1	T. 20 S., R. 6 W., Sec. 3	LSR	57
Territorial Unit 1	T. 20 S., R. 4 W., Sec. 31	Matrix	50

PURPOSE AND NEED

The purpose of the action is to:

- Conduct commercial thinning in Matrix land use allocations by primarily thinning from below to improve growing conditions for remaining conifers and other tree species and to provide commodities.
- Implement silvicultural treatments such as density management in LSR and RR land use allocations by thinning to accelerate the development of structural characteristics typical of late-successional forests, improve understory species composition, provide openings for development of early seral habitat and enhance snag and coarse woody recruitment to benefit multiple species.
- Improve riparian function in the Riparian Reserve land use allocation to contribute to the attainment of Aquatic Conservation Strategy (ACS) objectives.

The need has been established in the Eugene District Record of Decision and Resource Management Plan (RMP, June 1995). Specifically the RMP directs:

- Matrix lands be managed to provide a sustainable supply of timber to support local economies and to promote productivity of the forest ecosystem and provide connectivity and dispersal habitat for late-successional species. In Late-Successional Reserve land use allocations, density management treatments designed to maintain, protect and enhance late-successional conditions would be promoted.
- In Late-Successional Reserve land use allocations, density management treatments will be designed to maintain, protect or enhance late-successional conditions.

- Actions to be undertaken in riparian reserves include density management to attain aquatic conservation strategy (ACS) objectives that restore and maintain the ecological health of watersheds and aquatic ecosystems by promoting the development of large conifers and improving species composition. The Wildcat Creek, Wolf Creek and Siuslaw Watershed Analysis Reports (USDI BLM) substantiate the need for the action in riparian reserves.

CONFORMANCE WITH LAND USE PLANS

The Eugene District initiated planning and design for this project to conform and be consistent with the Eugene District's 1995 RMP.

The implementation of this project will not have significant environmental effects beyond those already identified in the 1995 Final EIS/Proposed RMP.

SCOPING AND ISSUES

External scoping was completed in September of 2011 and internal scoping was conducted by convening an interdisciplinary team. The purpose and need for the action, design features incorporated into the alternatives and the issues analyzed were based on scoping comments received for this Environmental Assessment (EA).

ISSUES

AQUATIC CONSERVATION STRATEGY

ISSUE 1: <u>What are the effects of timber harvest and associated activities on the attainment of Aquatic Conservation Strategy (ACS) objectives?</u>

Actions proposed within the riparian reserves and adjacent uplands may affect attainment of ACS objectives. ACS objectives were developed under the 1995 RMP to maintain and restore ecological health of watersheds and aquatic ecosystems on public lands. Initial evaluation of this issue determined that ACS objectives 1, 7, 8, and 9 would be maintained under all action alternatives, whereas effects on ACS objectives 2, 3, 4, 5, and 6 could differ by alternative. Analysis of this issue will compare how each alternative contributes toward attainment of ACS objectives 2, 3, 4, 5, and 6. Wildcat Creek, Wolf Creek and the Upper Siuslaw River 5th-field watersheds contain designated critical habitat for listed coho salmon and also provide habitat for bureau sensitive cutthroat trout. Actions are proposed that may affect their habitat.

WILDLIFE

ISSUE 2: <u>What are the effects of management actions on late-successional and early seral habitat which contribute to forest habitat quality?</u>

An objective for thinning and gap creation in LSR and RR land use allocations is to improve the quality and diversity of forest habitats, especially late-successional and early-seral habitat. Gap creation encourages adjacent tree growth and multi-layered and multi-species canopy development which is an important component of late-successional forest development and benefits forest habitat quality and spotted owls and their prey species. These treatments, especially gap creation, encourage understory development of shrubs, grasses and forbs, which are important for species that are dependent on early-seral habitat.

ISSUE 3: <u>What are the effects of management actions on northern spotted owl habitat?</u>

Forest stands proposed for thinning are low quality foraging habitat less than eighty years of age with a few large remnant trees. Thinning would impact northern spotted owl habitat and analysis of this issue allows for comparison of the effects of thinning treatments among alternatives.

Northern spotted owl foraging habitat is defined as forest with sufficient open space below the canopy for northern spotted owls to fly and canopy closure greater than 60%; habitat quality improves where habitat elements increase, such as old forest, hardwood patches, multi-layered multi-species canopies, amount of trees >31 inches dbh, and amount of snags and down wood >20 inches dbh. Nesting/roosting habitat is defined as foraging habitat with a high incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence). Conifer forests above 40 years of age with minimum 40% canopy closure are considered dispersal habitat for northern spotted owls.

BOTANY/INVASIVE SPECIES

ISSUE 4: What are the effects of management activities on the spread of invasive species?

Management actions such as thinning that cause a decrease in canopy closure, and road and landing work, generally lead to an increase in invasive non-native and noxious weeds, as reported in published literature and from field observations within the Eugene District. Analysis of this issue will determine the increase of non-native and noxious weed cover resulting from ground disturbing activities and decreases in canopy closure proposed in the action alternatives.

HAZARDOUS FUELS

ISSUE 5: What are the effects of management activities such as thinning on the amount of hazardous fuels in the Wildland-Urban Interface (WUI)?

The units being considered for thinning are identified by the Lane County Community Wildfire Protection Plan as WUI, where wildfire is of particular concern. Proposed management activities such as thinning may alter the amount of slash (hazardous fuels) within the WUI, thereby affecting the risk of catastrophic loss of property and resources both on BLM lands and adjacent private lands, should a fire occur. Analysis of this issue allows for comparison of the risk of fire occurrence among alternatives.

ISSUES CONSIDERED BUT NOT ANALYZED

What are the effects of thinning on carbon release and sequestration?

This issue was considered but not fully analyzed because it has been analyzed in previous thinning EAs for the Eugene District. The outcome of those analyses indicate that the quantities of carbon released during thinning operations in harvested wood, slash disposal, biomass recovery, yarding and hauling would be less than the amount of carbon sequestered post-thinning because of rapid increase in tree growth from thinning. Overall values of carbon sequestered were found to be less in the action alternatives when compared with the no action alternative.

What are the effects of thinning on marbled murrelet potential nesting structure and adjacent occupied sites?

This issue was considered but not fully analyzed because required protection measures would be applied to all action alternatives. Trees contributing to the potential for marbled murrelet nesting would be protected from harvest. Sites that are considered occupied by marbled murrelets will be protected. No harvest would occur within these sites and operational timing restrictions in adjacent areas would protect these areas during nesting season.

What are the effects of management actions on special status species plants?

This issue was considered but not fully analyzed. Site-specific botanical surveys have been completed. No special status plants have been identified within the thinning units. If special status plants had been found, they would be managed in accordance with land use objectives and special status species management policies.

What are the effects of management actions on special status fish or wildlife species?

This issue was considered but not fully analyzed because all action alternatives contain site-specific design features implemented in accordance with land use objectives and special status species management policies. Habitat occupied by special status fish species would be protected by untreated riparian buffers and seasonal use restrictions on specific haul routes.

ALTERNATIVES

Three action alternatives and a no action alternative have been analyzed in this EA. The action alternatives include thinning and road maintenance in Matrix lands and thinning, creation of openings and road maintenance in LSR and RR. The analysis of environmental consequences includes direct, indirect, and cumulative effects of the issues being considered. Appendix I provides a summary of the alternatives.

ALTERNATIVE 1: No Action

Under this alternative none of the management actions proposed under the action alternatives would occur. There would be no commercial thinning or density management thinning within the Matrix, LSR or RR land

use allocations. Coarse woody additions and snag creation would not be implemented. No road renovation/improvement, culvert replacements/removals or road decommissioning would occur. Blackberry control would not be considered. Actions specifically required by the RMP or by law or policy would occur, such as wildfire suppression, salvage harvest in response to insects, disease or fire, felling of hazard trees along roads or trails, road maintenance, and timber haul and road construction by adjacent landowners.

ALTERNATIVE 2: Open canopy cover; clumped CWD and snags.

Matrix land use allocations: Thin from below to a Curtis relative density of 25 to 27.

LSR and associated RR land use allocations:

- Thin from below to a Curtis relative density of 25 to 27.
- Small gaps less than one acre.
- No gaps in the Burnt Bottle Unit.

CWD and snags:

- Provide CWD and snags in clumps located within the units.
- Provide 29 trees per clump (18 snags; 11 CWD) (2.9 trees per acre) maintaining 50% tolerance level within the clumps (Mellen, et al., 2012).
- One clump located every 10 acres.
- Clump size is approximately 6/10th of an acre.

The Burnt Bottle unit has special CWD design features to accommodate weed issues:

- Provide CWD and snags in clumps located within the units.
- Provide 6 trees per clump (6 snags; no CWD) (1.2 trees per acre) maintaining 30% tolerance level within the clumps.
- Three clumps would be located >200 feet from blackberry patches.
- Clump size is approximately 1/5th of an acre.

RR land use allocations adjacent to Matrix

- Thin from below to a Curtis relative density of 25 to 27.

Coarse Woody Debris (CWD) and snags:

- Provide CWD and snags in clumps located within the units.
- Provide 9.5 trees per clump (6 snags; 3.5 CWD) (1.9 trees per acre) maintaining 30% tolerance level within the clumps.
- One clump located every 5 acres.
- Clump size is approximately 1/4th of an acre.

Design features to protect stream shade:

Gaps and coarse woody clumps larger than 1/4 acre in the three LSR units would be located a minimum of one site tree (210 feet) away from any stream. The smaller coarse woody clumps (less than a 1/4 acre) in the LSR and RR land use allocations would be located adjacent to intermittent streams, on the north side of perennial streams, or at a location greater than one site tree from streams. No coarse woody clumps would be located within primary shade zones of streams. The few coarse woody clumps located south, east or west of a perennial stream would be a minimum of 150 feet from the stream where harvest of the inner portion of the secondary shade zone would also be avoided. These clumps would also be widely dispersed.

Blackberry treatments:

Blackberries would be suppressed by piling and burning slash after thinning specifically in the Burnt Bottle and Territorial units. Fast growing trees such as alder and bigleaf maple along with shade-tolerant conifers such as western redcedar would be planted after burning slash in these units.

ALTERNATIVE 3: Moderate canopy cover; clumped CWD and snags.

Matrix land use allocations: Thin from below to a Curtis relative density of 30 to 38.

LSR and associated RR land use allocations

- Thin from below to a Curtis relative density of 30 to 38.
- Small gaps less than one acre.

CWD and snags:

- Provide CWD and snags in clumps located within the units.
- Provide 60 trees per clump (36 snags; 24 CWD) (2.9 trees per acre) maintaining 80% tolerance level within the clumps.
- One clump located every 10 acres.
- Clump size is approximately one acre.

RR land use allocations adjacent to Matrix

- Thin from below to a Curtis relative density of 30 to 38.

CWD and snags:

- Provide CWD and snags in clumps located within the units.
- Provide 9.5 trees per clump (6 snags; 3.5 CWD) (1.9 trees per acre) maintaining 30% tolerance level within the clumps.
- One clump located every 5 acres.
- Clump size is approximately 1/6th of an acre.

Design features to protect stream shade: Same as Alternative 2.

Gaps and coarse woody clumps larger than 1/6 acre in the three LSR units would be located a minimum of one site tree (210 feet) away from any stream. The smaller coarse woody clumps (less than a 1/4 acre) in the LSR and RR land use allocations would be located adjacent to intermittent streams, on the north side of perennial streams, or at a location greater than one site tree from streams. No coarse woody clumps would be located within primary shade zones of streams. The few coarse woody clumps located south, east or west of a perennial stream would be a minimum of 150 feet from the stream where harvest of the inner portion of the secondary shade zone would also be avoided. These clumps would also be widely dispersed.

Blackberry treatments:

Blackberries would be cut. Prescribed fire would not be used.

ALTERNATIVE 4: Moderate canopy cover; well-distributed CWD and snags.

Matrix land use allocations: Thin from below to a Curtis relative density of 30 to 38.

LSR and associated RR land use allocations

- Thin from below to a Curtis relative density of 30 to 38.
- No gaps.

CWD and snags:

- Provide CWD and snags that are well distributed within the units.
- Provide 18 snags per acre and 11 CWD per acre maintaining 50% tolerance level within the treated stands.

RR land use allocations adjacent to Matrix

- Thin from below to a Curtis relative density of 30 to 38.

CWD and snags:

- Provide CWD and snags that are well distributed within the units.
- Provide 6 snags per acre and 3.5 CWD per acre maintaining 30% tolerance level within the treated stands.

Blackberry treatments

Blackberries would be cut. Prescribed fire would not be used.

DESIGN FEATURES COMMON TO ALL ACTION ALTERNATIVES

Management actions are being considered in nine units and would be implemented in approximately four to five separate timber sales. Project design features are operating procedures used to avoid or reduce adverse environmental impacts and are developed by the interdisciplinary team. They would be incorporated in the timber sale contracts as required provisions when applicable. Best Management Practices (BMPs) from the Eugene District RMP (1995) would be applied where needed. A copy if the BMPs are located in the project analysis file. The following design features would be implemented in conjunction with the action alternatives.

General

1. All Pacific yew and hardwoods would be retained to the maximum extent possible, to maintain diversity of tree species.
2. Un-merchantable tree tops and limbs would not be yarded to the landing and would be left on site to contribute to soil productivity where feasible and not in conflict with hazardous fuels objectives.
3. All streams would receive a minimum buffer of 75 feet within which no thinning would occur. Cable corridors would be placed across streams and their buffers as needed. Yarding corridors would be as close to perpendicular as possible to streams to minimize the size of openings along the channels.
4. The criteria used to maintain stream temperature would consider topography; aspect; slope; canopy cover; under and over story species/density/height; stream characteristics; primary and secondary shade zones; yarding method; proximity to roads; skid trails; landings; and silvicultural prescriptions in the adjacent riparian reserves.

Roads

5. Drainage and soil erosion control practices would be applied to improved or renovated roads as needed. This may include, but is not limited to, dry season grading and ditch relief (cross drain) culvert replacements; ditch relief additions; appropriate end haul and disposal areas; proper dispersal of water from ditch relief culverts; removal of bank slough; and adding gravel lifts of sufficient quality and quantity to accommodate timber haul. Existing drainage ditches that are functioning and have a protective cover of non-woody vegetation would not be disturbed.
6. Appropriate waste area disposal sites would be located prior to road renovation or fill removal. These areas would be located away from stream channels, wetlands, floodplains and unstable areas, and would be kept properly shaped, drained and vegetated.
7. Haul on native (dirt) surfaced roads would be prohibited under wet road surface conditions, generally November through April, and would receive seasonal preventative maintenance prior to the onset of winter rains. These could include the installation of water bars or drain dips, sediment control mats or devices, removing ruts, mulching or barricades.
8. Road conditions would be monitored during winter use to prevent rutting of the rock surface. Haul may be restricted during conditions when fines (sand, silt or clay particles) are “pumped” to the surface in areas where they could be washed into streams by runoff.

Silviculture

9. Harvest activities would not occur during sap flow season, generally April 15 – June 15, to limit bark/cambium damage to residual trees, unless waived by the Authorized Officer. Log lengths would be restricted to a maximum of 40 feet in order to protect residual trees during yarding, unless waived by the Authorized Officer.

Logging Systems

Cable Logging

10. Road and landing improvement or renovation activities would be limited to the dry season.
11. All cable yarding would be to designated or approved landings. Landings would be located to minimize impacts to reserve trees and soils.
12. To minimize impacts, spacing of cable corridors should be kept to 150 feet apart at one end and limited to 12 feet in width. A cable system capable of 75 foot lateral yarding would be used.
13. Minimum one-end suspension would be required. Intermediate supports could be necessary to achieve the required suspension.
14. Full suspension would be required when yarding over streams.
15. Cable corridors used for yarding in concave slopes above stream channel initiation points (headwall areas) should be 45 degrees of perpendicular to the centerline. This is to provide a sharp channel junction to dissipate the energy of any potential debris flows or torrents.
16. Cable yarding systems should be laid out to eliminate gouging (log dragging) to reduce concentration of drainage delivering sediment to streams. Cable yarding corridors would be made erosion-resistant if needed where gouging has occurred.
17. Existing corridors should be utilized where possible to minimize impacts.

18. Skyline cable corridors could be necessary through riparian reserves, including untreated stream buffers, in order to gain additional lift or deflection of the skyline, and to attain the required suspension of logs during yarding. Intermediate supports or lift trees could be needed to attain the required suspension. Trees in the skyline cable corridors located within the untreated stream buffers would be felled and retained on site to provide down wood.
19. Directional felling and yarding away from streams would be required where feasible to provide for stream bank stability and water quality protection.

Ground-Based Logging

20. Operations would occur when soil moisture content provides the most resistance to compaction, generally during the dry season.
21. All skid trails would be pre-designated (mapped and flagged), approved by the Authorized Officer and would occupy less than ten percent of the ground-based yarding area. This can be accomplished by a minimum 150 foot spacing between skid trails and limiting the width of skid trails to 12 feet. Excavation on skid trails would not exceed one foot in depth.
22. Skid trails would be limited to slopes less than 35% with approval from the Authorized Officer.
23. Use existing skid trails wherever possible.
24. Logs would be skidded to designated or approved landings.
25. Felling of trees to lead to the skid trails and maximization of winching distances would be required.
26. Use of low ground pressure (<6 psi), ground-based mechanical harvesting equipment would be limited to a single pass when operating outside designated primary skid trails; walking on downed slash to minimize soil disturbance.
27. Ground-based yarding could occur in riparian reserves, however no ground-based yarding equipment would be operated within 75 feet of the harvest unit boundary.
28. Immediately after project completion, during the dry season, compacted skid trails would be decompacted (laterally shattering the soil profile) using appropriate decompaction equipment. Care should be taken not to mix or displace the soil profile. The trails would be covered with slash and brush and blocked as needed. If decompaction cannot be accomplished during the same operating season, all trails would be left in an erosion-resistant condition and blocked.

Noxious Weeds

29. All yarding and road construction equipment would be cleaned prior to arrival on BLM-managed lands to lessen the spread of noxious weed seed. Other specific measures to control weeds are incorporated in the description of the alternatives section.
30. Slash would not be placed on closed roads where it would inhibit ongoing noxious weed control efforts, including Wild Fish Units 1 and 2, Pataha Ridge Unit 3, Burnt Bottle, and Territorial.
31. Native grass seed would be sowed on decommissioned, decompacted roads and other areas as appropriate after operations have been completed.
32. Sites were evaluated using criteria from the BLM Manual 9015 for risk assessment and based on site conditions, treatment and monitoring of some sites was recommended. Specifically:

    - Burnt Bottle, Territorial. Utilize control actions such as cutting to reduce existing Himalayan blackberry prior to project activity, cutting once or twice per year, in June or July and September or October. Continue annual or biannual treatments as necessary to preclude fruiting or vegetative spread, and to reduce extent. Monitor weeds for at least five consecutive years after timber sale implementation, and control infestations discovered through monitoring as appropriate.
    - Wild Fish Unit 2. Utilize control actions such as cutting to reduce existing Scotch broom prior to project activity. Monitor weeds for at least five consecutive years after timber sale implementation, and control infestations discovered through monitoring as appropriate.
    - Wild Fish Unit 1, Pataha Ridge Unit 3. Utilize control actions such as cutting to reduce existing false brome prior to project activity. Monitor weeds for at least 5 consecutive years after timber sale implementation, and control infestations discovered through monitoring as appropriate.

- Pataha Ridge Units 1 and 2, Eames Swing Units 1 and 2. Monitor for at least three consecutive years after timber sale implementation, and control infestations discovered through monitoring as appropriate.

Wildlife

33. Large remnant trees would be maintained in all land use allocations.
34. Potential marbled murrelet nest trees would be retained.
35. The size of openings within the distance of one site potential tree height (approximately 200 feet) of possible marbled murrelet nest trees would be limited to less than 1/4 acre in size in order to minimize potential adverse effects to marbled murrelets.
36. Management activities would be limited so as not to disrupt normal behavior near active northern spotted owl or marbled murrelet breeding sites during critical breeding seasons.
37. Treatments would maintain at least 40% canopy cover on at least 75% of each unit to minimize potential adverse effects to spotted owls or marbled murrelet habitat.
38. The size of created openings would be limited to less than one acre to avoid removal of northern spotted owl habitat.
39. For the purpose of long term productivity and maintenance of biological diversity, all down CWD of advanced decay (Decay Class 3, 4, or 5) would be retained on site.
40. To provide habitat for cavity-dependent wildlife and to protect the future source of downed logs, snags not posing a safety hazard would be reserved. Directional felling and yarding would be utilized to protect residual green trees and snags consistent with Occupational Safety and Health Administration (OSHA) practices. Snags felled for safety reasons would be retained as down wood.
41. Comply with standards from ESA programmatic consultation (USDI-FWS LOC-01EOFW00-2012-I-0214, 2013, p. 20) (USDI-FWS BO 01EOFW00 2013F, 2013, p. 32).

Design features specific to each thinning unit

Fuels

Wild Fish:

- Unit 1: Boles yarded to Road No. 17-7-33.5 would be yarded with the tops and limbs attached, to the extent possible. Landings would be piled and either hauled away for utilization or covered and burned.
- Unit 2: Slash on landings and within 25 feet of Road No. 18-7-3.1 would be piled and either hauled away for utilization or covered and burned.

Pataha Ridge:

- Unit 1 and 2: Slash on landings would be piled and either hauled away for utilization or covered and burned.
- Unit 3: Slash on landings and within 25 feet of the A-Line, B-Line and D-Line roads would be piled and either hauled away for utilization or covered and burned.

Eames Swing:

- Unit 1: Slash on landings would be piled and either hauled away for utilization or covered and burned.
- Unit 2: Slash on landings and within 25 feet of Panther Creek Road and Battle Creek Road would be piled and either hauled away for utilization or covered and burned.

Burnt Bottle: Under Alternative 2, slash would be grapple piled and burned, which would remove most of the slash generated in the unit. Under Alternatives 3 and 4, slash on landings, and within 25 feet of Road No. 20-6-3 would be piled and either hauled away for utilization, or covered and burned.

Territorial: Under Alternative 2 slash would be grapple piled and burned, which would remove most of the slash generated in the unit. Under Alternatives 3 and 4, tops and limbs would be yarded, to the extent possible, along with the bole to the landing and piled. Piles would either be hauled away for utilization, or covered and burned.

Timber Haul

Winter haul would be an option for all units except for Eames Swing Unit 1 and the east half (aggregate road portion) of Eames Swing Unit 2. There will be no new road construction for actions being considered in this EA. All existing roads would use a combination of grading, brushing, spot scarification, paving, spot rocking, ditch line establishment and realignment (see Appendix II). BMPs for reducing sediment delivery from roads will be followed according to the Eugene District RMP (1995) and the BLM BMPs to Reduce Sediment Delivery from BLM Roads in Oregon (2011).

Culvert removals

After completion of thinning activities, five stream crossing culverts inWild Fish Unit 1, located on streams 33-1 and 33-2 on Road No. 17-7-33.6, would be removed. The entire in-channel fill material would be removed. Stream flow would be diverted around the work areas as needed and sediment containment devices such as appropriate filters or barriers would be used. Adequate erosion control would be established before the onset of fall rains. Channel widths, bank angles, cross sectional areas and grades would be restored to match upstream and downstream channel dimensions as authorized by the BLM engineer, fisheries biologist and/or hydrologist. Seeding and mulching with native species would occur and erosion mats would be placed on soil disturbance sites at stream crossing removal sites to reduce erosion and sedimentation.

Road Decommissioning

See attached road decommissioning tables in Appendix IV for each timber sale.

Roads will be decommissioned as needed after project completion following the Western Oregon Districts BLM Transportation Management Plan guidelines. The following situations would be evaluated prior to decommissioning: 1) future use of the road, 2) private access (e.g., right-of-ways), 3) County Commissioner approval, 4) public access needs, 5) illicit dumping/use, 6) potential for environmental damage (e.g., sediment delivery, weeds, OHV), and 7) current road surfacing (native or rock). Design features for decommissioning natural surfaced (dirt) and rock surfaced roads are listed below:

Natural surfacing (dirt roads)

Natural surfaced renovated roads, natural surfaced spur roads and landings requiring operation during more than one dry season would be placed in an erosion resistant condition and temporarily blocked prior to the onset of wet weather. This could include construction of drainage dips, water bars, lead-off ditches or barricades.

Decommissioning of the road could include any of the following measures:

- Discontinuing road maintenance and/or full obliteration
- Decompacting the road surface with dozer and subsoiler implement or a track mounted excavator
- Scarifying roads for creation of planting areas
- Removing unstable side cast from fillslopes
- Filling and recontouring cutslope ditch lines to the adjacent hill slope
- Removing stream crossing culverts
- Stabilizing stream crossings (e.g. re-contouring road crossing fill, placing mulch or mats
- And seeding for erosion control, placing rock and logs)
- Installing water bars, cross sloping or drainage dips to ensure drainage is filtered onto
- Vegetated areas and away from streams or unstable road fills
- Blocking using barricades, gates or earth-berm barriers
- Placing slash, boulders and/or root wads where available on the road surface to deflect
- Runoff, discourage motorized vehicle use and promote vegetative growth
- Seeding or planting for erosion control, weed exclusion and revegetation

Rock surfaced roads

Rock surfaced roads and landings to be decommissioned would be left in an erosion-resistant condition by using any of the following measures:

- Leaving rock in place
- Tilling gravel surface to meet decommissioning objectives
- Roads could be closed using barricades, gates or earth-berm barriers
- Installing water bars or drainage dips to ensure drainage is filtered onto vegetated areas and away from streams or unstable road fills
- Removing fills on unstable areas along existing roads
- Removing culverts and establishing water bars where needed to eliminate delivery potential to stream channels
- Removing rock and road recontouring could occur if road is eligible for a full obliteration
- Treating exposed soils if needed to reduce sedimentation, utilizing slash and/or seeding, for erosion control, weed exclusion and revegetation
- Placing slash, boulders, and/or root wads where available on the road surface to deflect runoff and discourage motorized vehicle use
- Storm proofing of roads to place them in a self-maintaining condition consists of some of the following:
- Stream crossing culvert removal to allow debris and bedload passage
- Removal of relief culverts and relieving inboard ditchlines using rolling dips
- Seeding, mulching, and re-vegetating erosion prone surfaces and near stream channels
- Applying site-specific measures to alleviate concentration of road drainage causing erosion, sediment delivery to streams, or slope stabilization
- Removing or lowering unstable fills.
- Outsloping and crowning roads or using ditchouts to relieve drainage from the road tread

AFFECTED ENVIRONMENT

This section describes key components of the existing environment. The resources in the planning area do not differ significantly from those discussed in the Eugene District Resource Management Plan/Environmental Impact Statement (RMP/EIS) (1995, Chapter 3). The following resources are also discussed in greater detail in the project file located at the Eugene District Office.

FOREST CONDITIONS

Most of the units proposed for thinning were previously thinned between 1990 and 1997. Riparian reserves were not thinned in treatments that occurred from 1995 to 1997. Previous thinning emphasized leaving a well-stocked stand of trees intended to encourage timber growth and maintained fairly high canopy closure. In most stands, the forest canopy was opened sufficiently to enable understory conifers to become established, but has since closed to the point where stand growth has slowed and most understory saplings are of poor vigor. Table 2 summarizes stand metrics for each of the treatment units.

Table 2: Metrics for each thinning unit based on stand examinations.

Project Name	Legal Location	Land Use Allocation	Acres	Stand Birth Date	1st Thin	Existing Condition			
						QMD[1]	TPA[2]	BA[3]	RD[4]
Wild Fish Unit 1	17-7-33	GFMA	225	1938	1994	19.1	127	252	58
Wild Fish Unit 2	18-7-3	LSR	77	1935	1992	19.8	100	212	48
Pataha Ridge Unit 1	18-7-15	GFMA	74	1941	1995	17.5	130	216	52
Pataha Ridge Unit 2	18-7-15	GFMA	58	1941	1995	19.3	95	192	44
Pataha Ridge Unit 3	18-6-21	LSR	61	1937	1996	18.9	150	293	67
Eames Swing Unit 1	18-6-31	LSR	40	1941	1997	16.1	205	291	73
Eames Swing Unit 2	19-6-13	GFMA	105	1939	1996	19.3	112	227	52
Burnt Bottle	20-6-3	LSR	57	1940	1990	21.9	98	255	55
Territorial	20-4-31	CONN	53	1937	1992	17.6	145	244	58

[1] QMD is Quadratic Mean Diameter; [2] TPA is Trees per Acre; [3] BA is Basal Area; 4 RD is Relative Density.

Unit vegetation conditions are as follows:

Wildfish Unit 1

This stand, located in the Upper Wildcat Creek 6th field sub-watershed, is dominated by Douglas-fir, with a few scattered, big, remnant seed trees. Minor components of western hemlock and western redcedar, as well as bigleaf maple, red alder and chinquapin, are also present. The first thin, in 1994, opened the canopy sufficiently that hemlock and redcedar saplings have become established in the understory.

This stand has grown since the 1994 thinning to the point where competition between trees for growing space is causing reduction in growth rates, receding crown depth and high canopy closure that is slowing growth and development of the understory.

Wildfish Unit 2

This stand, located in the Upper Wildcat Creek 6th field sub-watershed, is dominated by Douglas-fir with minor components of chinquapin, red alder and western redcedar and a few scattered, big remnant trees. Douglas-fir saplings have become established in the understory where the tree canopy had been opened adequately in the first thin, but these saplings are now growing poorly due to high canopy closure. This stand has grown since the 1992 thinning to the point where competition between trees for growing space is approaching the level where growth rates will begin to decline.

Pataha Ridge Unit 1

This stand, located in the Upper Wildcat Creek 6th field sub-watershed, is dominated by Douglas-fir with a minor bigleaf maple component and scattered big remnant Douglas-fir trees. Forest canopy closure was kept high during the first thin, so few conifer saplings have become established in the understory. Stand growth since the previous thinning is approaching the point where competition between trees for growing space will cause a decline in growth rates and will cause canopy depth to recede.

Pataha Ridge Unit 2

This stand, located in the Upper Wildcat Creek 6th field sub-watershed, is dominated by Douglas-fir with a minor component of western hemlock and bigleaf maple. Western redcedar and western hemlock saplings have become well established in the understory. Forest canopy closure is beginning to impact understory conifer growth and development into a mid-canopy crown layer.

Pataha Ridge Unit 3

This stand, located in the Upper Wolf Creek 6th field sub-watershed, is dominated by Douglas-fir with minor components of western hemlock and grand fir and several remnant trees. Western redcedar was planted and tubed after the first thinning and hemlock saplings have seeded in naturally. Many of the understory conifer saplings are not growing well, are spindly or are dead due to high canopy closure. Stand growth since the previous thinning in 1996 has developed to the point where competition is causing reduced growth rates.

Eames Swing Unit 1

This stand, located in the Lower Wolf Creek 6th field sub-watershed, is dominated by Douglas-fir. This stand was lightly thinned in 1997 and is past the point where competition for growing space is causing mortality. There is little understory conifer regeneration.

Eames Swing Unit 2

This stand, located in the Upper Wolf Creek 6th field sub-watershed, is dominated by Douglas-fir with a minor component of western redcedar and western hemlock. Canopy closure generally remained high after the first thin, so that there is little understory conifer regeneration except for a few hemlock. Stand growth since the previous thinning is approaching the point where competition between trees for growing space will cause a decline in growth rates and will cause canopy depth to recede.

Burnt Bottle

This stand, located in the Siuslaw Falls 6th field sub-watershed, is dominated by Douglas-fir and several scattered, big remnant trees. Stand growth since the previous thinning is at the point where competition between trees for growing space will cause a decline in growth rates and will cause canopy depth to recede.

Territorial

This stand, located in the South Fork Siuslaw River 6th field sub-watershed, is dominated by Douglas-fir with a minor component of western hemlock and several scatted remnant trees. Stand growth since the previous thinning is at the point where competition between trees for growing space is causing a decline in growth rates and is causing canopy depth to recede.

BOTANICAL RESOURCES

SPECIAL STATUS PLANTS, LICHENS AND FUNGI

Botanical surveys for BLM Special Status (federally-listed Threatened or Endangered and BLM Sensitive) vascular plants, lichens and bryophytes documented or suspected to occur on the Eugene District have been completed in the units being proposed for thinning. Established survey methods for rare plants ("intuitive-controlled" surveys) were used. Surveys for lichens and bryophytes occurred in June and July 2011. Surveys for vascular plants occurred in August and September 2011.

No Special Status Species were located. *Platismatia lacunosa*, a former Survey and Manage lichen, was recorded. The units showed signs of the previous thinning, having greater than usual brush growth, and early-successional species such as *Lotus aboriginus, Lupinus latifolius, Rubus leucodermis* and introduced weeds. Brush cover may have suppressed bryophyte growth on soil and down woody debris.

Surveys were not conducted for fungi. The Eugene District has three documented and 19 suspected Bureau Sensitive fungi species, and nine documented and 67 suspected Bureau Strategic species. According to BLM Information Bulletin No. OR-2004-145, pre-disturbance surveys in proposed project areas for these fungi are not practical to conduct and should not be attempted. No currently known sites of Special Status fungi are found in the project area.

NOXIOUS AND INVASIVE WEEDS

Executive Order 13112 refers to invasive species as non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health. "Noxious weeds" refer to species listed by the Oregon Department of Agriculture (ODA) as noxious weeds. These weeds are particularly

detrimental to agriculture, biodiversity and other resources, and are the subjects of control measures. Weed control measures within the Eugene District are implemented to primarily control noxious weeds.

During 2011 botanical surveys, the Re-Thin timber sales were surveyed for noxious and invasive weeds. The most egregious weeds were inventoried (Table 3). Because these units have been relatively recently thinned (14-21 years ago), they often have an off-road weed component. Three units had heavy off-road infestations: Burnt Bottle, with 65% of the surveyed area infested with blackberry, Wild Fish Unit 2 with 25% infested with Scotch broom, and Territorial, with 20% of the surveyed area infested with blackberry. Small roadside sites of false brome occur in Wild Fish Unit1, Pataha Ridge Unit 3 and Burnt Bottle. Widely scattered ODA noxious weed species not explicitly mapped include bull thistle, Canada thistle, common St. Johnswort and tansy ragwort. A large number of other non-native species occur; English holly is of particular concern. Acres of weeds treated from 1995 to 2011 are also enumerated in Table 3; all of these treatments occurred along roadsides.

Table 3. Acres of invasive species identified in Re-Thin timber sale botany survey units in 2011 and treatments occurring on roadsides by unit, 1995-2011.

Species	Acres Infested	Extent	Acres Treated
Himalayan blackberry	61	Heavy off-road infestations occur	5
Scotch broom	46	Heavy off-road infestations occur	30
Cut-leaf blackberry	9	Mostly roadside infestations	
Herb Robert	3	Mostly roadside infestations	
False brome	2	Roadside infestations	2
Shining geranium	1	Roadside infestations	
Meadow knapweed	1	Roadside infestations	
Bohemian knotweed	0.1	Roadside infestations	

Ocular estimates of the percent cover of noxious weeds and non-native invasive species within the timber sale units made by the Siuslaw Resource Area botanist in 2011 are shown in Table 4. Roadside infestations generally included a 10-20 foot band on either side of the road. Roadside weed cover was highest next to openings in the tree canopy and low in shady sites adjacent to well-developed native vegetation and tree canopy cover. Weeds on roadsides mainly consisted of grasses, scotch broom and blackberries.

Table 4. Approximate percent cover of non-native vegetation and noxious weeds by unit.

	Percent non-native and noxious weeds	
	Roadsides	Within units
Wild Fish Unit 1	60	3
Wild Fish Unit 2	25	4
Pataha Ridge Units 1 and 2	1	0.1
Pataha Ridge Unit 3	20	0.5
Eames Swing Unit 1	20	0.1
Eames Swing Unit 2	20	0.1
Burnt Bottle	60	25
Territorial	75	5

HYDROLOGY

The activities proposed under this Re-Thin EA are located within four 5th-field watersheds and nine 6th field sub-watersheds under all action alternatives. Table 5 summarizes where timber thinning **(T)** and timber haul **(H)** (on non-paved roads) would occur for each proposed project area.

Table 5: Proposed activities by watershed and sub-watershed

	WATERSHED																	
	Wildcat Creek HUC=1710020602				Wolf Creek HUC=1710020601				Upper Siuslaw River HUC= 1710020603						Long Tom River HUC=1709000301			
	SUB-WATERSHED																	
	Upper Wildcat		Lower Wildcat		Upper Wolf		Lower Wolf		Siuslaw Falls		South Fork Siuslaw		Dogwood Creek		Elk Creek		Fern Ridge Lake	
Project Name	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)	(T)	(H)
Wild Fish Unit1	x	x	*	+														
Wild Fish Unit 2	x	x														x		
Pataha Ridge Unit 1	x	x				x		x										x
Pataha Ridge Unit 2	x	x		+		x		x										x
Pataha Ridge Unit 3	*	+			x	x											*	x
Eames Swing Unit 1						x	x	x										
Eames Swing Unit 2					x	x												
Burnt Bottle									x	x			*	x				
Territorial											x	x						

* < 10 acres of thinning proposed. + less than 0.25 miles of haul route. HUC = Hydrologic Unit Code**.**

Most (80%) of the thinning would occur in the Upper Wildcat and Upper Wolf sub-watersheds. Less than 1% of the thinning would occur in the Elk Creek, Fern Ridge Lake, Lower Wildcat Creek and Dogwood Creek sub-watersheds. Table 6 is a breakdown of the approximate project area acres by sub-watershed and the percent of thinning that would occur within sub-watersheds.

Table 6: Number of acres and percent proposed for thinning located within each sub-watershed (6th field hydrologic unit code)

	Project Name									Total Project Acres	Sub-Water-shed Acres	% Thinning of Sub-Watershed Acres
	Unit Number											
Sub-Watershed	Wild Fish Unit		Pataha Ridge Unit			Eames Swing Unit		Bottle Creek	Territorial			
	1	2	1	2	3	1	2					
Siuslaw Falls								52		52	17123	0.3
Dogwood Creek								5		5	20443	0.02
South Fork Siuslaw									47	47	16364	0.3
Lower Wolf Creek						37				37	18359	0.2
Upper Wolf Creek					53		105			158	19534	0.8
Upper Wildcat Creek	225	77	72	57	6					437	13934	3.1
Lower Wildcat Creek	0.1									0.1	20925	0
Fern Ridge Lake					2					2	42158	0.005
Total acres	225	77	72	57	61	37	105	57	47	738		

Annual precipitation in the project areas ranges from about 51 to 66 inches. The higher rainfall areas (above 60 inches annually) are located in the Wild Fish and Pataha Ridge units. The monthly minimum temperatures in the watersheds are typically above freezing. The majority of precipitation occurs in the form of rainfall between November and March. The thinning units are characterized as relatively low in elevation (550 to1,750 feet above sea level), placing them in the lowland and rain-dominated zones. Most (about 97%) of the thinning units are below 1,500 feet in elevation. The highest elevation units are the Wild Fish

and Pataha Ridge units. Areas that are most susceptible to rain-on-snow events in this portion of the Coast Range are above 2,000 feet elevation (Greenberg and Welch, 1998).

Less than 20 acres of proposed harvest in the project areas is above 1,500 feet elevation and is located in Wild Fish Unit 1. There is no harvest planned above 1,800 feet elevation in any of the project areas. None of the action alternatives would harvest more than 1% of the area above 1,200 feet elevation in any of the sub-watersheds. The project areas and the sub-watersheds are considered low risk for impacts from rain-on-snow events using either the Oregon Watershed Enhancement Board (OWEB) or Washington Forest Practices Board (WFPB 1997) methodologies.

Canopy cover along the streams in the units typically exceeds 80% because previous thinning treatments were generally light and canopies have had 15 to 20 years to recover. The majority of perennial streams within several units (Pataha Ridge Units 1, 2, 3; Eames Swing Units 1,2; Burnt Bottle and Territorial) were either not thinned within the riparian reserves or had variable-width no-harvest buffers.

The roads and drainage structures (stream and relief culverts) on federal land within the project areas vary in age and design but a majority of this infrastructure is more than 20 years old. A road inventory was conducted in 2011 to evaluate the proposed haul route for the thinning units. Data collected for this survey is available in the Re-Thin project analysis file. The road system, drainage structures and road sediment delivery potential were evaluated on about 32 miles of road. The conditions of dozens of culverts were assessed on the access routes. Most (>90%) of the non-paved road haul route would occur in the Upper Wildcat, Upper Wolf, Fern Ridge Lake, Lower Wolf Creek and Dogwood Creek sub-watersheds. Less than a 1/4 mile of haul route is in the Lower Wildcat Creek sub-watershed. Table 7 summarizes the haul route lengths located within sub-watersheds for each thinning unit.

Table 7: Haul route summary (approximate miles) by unit and sub-watershed

Project Name	Siuslaw Falls	Dogwood Creek	South Fork Siuslaw	Lower Wolf Creek	Upper Wolf Creek	Upper Wildcat Creek	Lower Wildcat Creek	Elk Creek	Fern Ridge Lake	Totals
Wild Fish Unit 1	0.0	0.0	0.0	0.0	0.0	3.5	0.03	0.3	0.0	3.8
Wild Fish Unit 2	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.9	0.0	3.0
Pataha Ridge Unit 1	0.0	0.0	0.0	+1.2	1.6	4.2	0.0	0.0	++3.9	**10.9
Pataha Ridge Unit 2	0.0	0.0	0.0	1.7	1.6	4.2	0.2	0.0	++3.9	11.6
Pataha Ridge Unit 3	0.0	0.0	0.0	0.0	1.2	0.2	0.0	0.0	4.0	*5.4
Eames Swing Unit 1	0.0	0.0	0.0	1.2	5.3	0.0	0.0	0.0	0.0	6.5
Eames Swing Unit 2	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	2.2
Burnt Bottle	0.5	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9
Territorial	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7
TOTALS	0.5	2.4	0.7	!2.9	!9.8	!10.7	0.2	1.2	!4.0	^32.4

* includes 4.5 miles that also accesses Units 2 and 3. ** includes 10.0 miles that also accesses Unit 2.
^ includes a total of 13.1 miles from all three Pataha Ridge units. + sub-set of Pataha Unit 2. ++ sub-set of Pataha Unit 3.
! value derived from all three Pataha Ridge units without duplicating haul miles needed to access multiple units.

The 2011 survey identified up to five stream crossing culverts and 30 cross drain culverts on the haul routes (BLM-controlled roads only) that were suitable for replacement based on size, age and/or condition. These culverts have at least a moderate risk of reduced performance or failure in the next decade or two because they are undersized, already past the lifespan of typical use or are rusted or damaged. The stream culverts are also currently barriers to fish and aquatic passage. The BLM controls slightly less than half of the roads (miles) on the haul routes to the project areas. The only BLM-controlled stream culverts located along haul routes are located in Wild Fish Unit 1.

The 2011 road inventory results show that about 81% of the haul route roads (in miles) were not "connected" to streams via cross drains or stream crossings. These road segments have no potential to deliver sediment to streams from road surface erosion and timber haul. The road inventory indicated that

about 19% (15% direct delivery; 4% indirect delivery) of the non-paved surveyed roads has the potential to deliver sediment to streams via road surface erosion in its existing condition without road upgrades. Road upgrades to facilitate haul would occur where needed during implementation. Table 8 summarizes the existing sediment delivery miles on the proposed haul route by project area and sub-watershed.

Table 8: Existing sediment delivery from roads (miles) by sub-watershed and unit

Project Name	Total Haul Route Miles	Total Sediment Delivery Miles	Sediment Delivery Miles by Sub-watershed				
			Upper Wildcat Creek (Wildcat Creek)	Elk Creek (Long Tom River)	Upper Wolf Creek (Wolf Creek)	Lower Wolf Creek (Wolf Creek)	Fern Ridge Lake (Long Tom River)
Wild Fish Unit 1	3.8	0.64	0.64	0.0	0.0	0.0	0.0
Wild Fish Unit 2	3.0	0.53(0.15i)	0.53 (0.15i)	0.0	0.0	0.0	0.0
Pataha Ridge Unit 1	**10.9	0.06	0.0	0.0	0.0	0.06	0.0
Pataha Ridge Unit 2	11.6	0.06	0.0	0.0	0.0	0.06	0.0
Pataha Ridge Unit 3	*5.4	0.0	0.0	0.0	0.0	0.0	0.0
Eames Swing Unit 1	6.5	3.8(0.6i)	0.0	0.0	3.7 (0.5i)	0.1(0.05i)	0.0
Eames Swing Unit 2	2.2	1.1(0.4i)			1.1 (0.4i)		
Burnt Bottle	2.9	0.0	0.0	0.0	0.0	0.0	0.0
Territorial	0.7	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	^32.4	6.1 (1.2i)	1.17 (0.15i)	0.0	4.8 (0.9i)	0.16 (0.05i)	0.0

(i) amount of indirect delivery only. The numbers not in parentheses are the sum of direct and indirect delivery. *includes 4.5 miles that also accesses Units 2 and 3. **includes 10.0 miles that also accesses Unit 2. ^includes a total of 13.1 miles from all three Pataha Ridge Units.

The haul routes to the project areas are predominately durable surfacing (approximately 80% of the road miles are rock surfaced). These roads are much less susceptible to erosion than natural surface roads. Wild Fish Units 1 and 1 are the exception with about two-thirds of the haul route currently native surface.

Road densities in the sub-watersheds range from 5.2 miles/square mile to 6.7 miles/square mile. The highest road densities are in the South Fork Siuslaw and Upper Wolf Creek sub-watersheds. The lowest road densities are in the Lower Wildcat, Lower Wolf, Dogwood Creek and Upper Wildcat Creek sub-watersheds.

SOILS AND GEOLOGY

The thinning units are located within the Central Oregon Coast Range and within the hills south of the Willamette Valley which is in a landform transition between the Coast Range and the composite volcanic Cascade Range to the east. The topography is complex, and includes steep slopes with high relief and confined streams, deep seated and shallow-rapid landslides (debris flows) and small unconfined valley floors along hill slopes of lower relief and elevation.

The Coast Range is composed of ancient and younger sedimentary rocks, primarily sandstone, siltstone and clay. The Willamette Valley is a structural depression between the Coast and Cascade Ranges. The southern Willamette Valley is composed of continental Fisher Fm and the waterlain Eugene Fm that are thousands of feet thick, both composed of volcanic eruptive rock and ashes and pyroclastic flows originating from the chain of mountains building the Cascade Range.

The forest soils in the Re-Thin units are predominantly fine textured. They are well developed with clay-enriched sub soils and dark, organic matter-rich top soils. Where rock exists, soils may be shallow to bedrock and erode quickly due to steep slopes and gravitational pull. Soils in the Oregon Coast Range have high site index qualities for growing Douglas-fir trees. The soils found in the thinning units include

Xeric Haplohumults, Dystric Eutrochrepts, Typic Haplohumults, Typic Haplumbrepts, Ultic Hapludalfs, Ultic Haploxeralfs and Aquultic Haploxeralfs.

TPCC (Timber Production Classification Code)

The TPCC inventory is designed to identify sites capable of sustaining intensive timber management without degradation of productivity (1995 Eugene District RMP, p 170). TPCC areas have been mapped and those areas less capable of sustaining standard timber harvest management without long-term loss are withdrawn from timber management. TPCC areas suggested for withdrawal have been identified and buffered or removed from the thinning units. Wetlands have also been identified, mapped and withdrawn from thinning units (see Table 9).

Table 9 TPCC designations (mapped wetland acres) and soil series by unit.

Unit	Sub-watershed	Location (TRS)	TPCC & Wetlands*	Soils
Wild Fish Unit 1	Upper Wildcat Cr	17-7-33	RLR – CFL RWNW Wetlands: 0.4 acres 0.7 acres withdrawn	Honeygrove, Peavine
Wild Fish Unit 2	Upper Wildcat Cr	18-7-3	RLR – CFL Wetlands: 0.6 acres withdrawn	Bellpine
Pataha Ridge Unit 1 & 2	Upper Wildcat Cr	18-7-15	RLR – CFL No wetlands	Bohannon, Honeygrove, Peavine
Pataha Ridge Unit 3	Upper Wolf Cr	18-6-21	RLR – CFL No wetlands	Digger, Peavine, Preacher
Eames Swing Unit 1	Lower Wolf Cr (Western Unit)	18-6-31	RLR – CFL No wetlands	Digger, Peavine, Preacher
Eames Swing Unit 2	Upper Wolf Cr (Panther Cr Rd)	19-6-13	RMLR – CFL FWR/RL – CFL Wetlands: outside of unit	Bellpine, Jory, Eilertsen, Nekia Willakenzie
Burnt Bottle Unit 1	Dogwood Cr-Sius R	20-6-3	RLR – CFL RMLR – CFL Wetlands: 0.3 acres withdrawn	Bohannon, Honeygrove, Peavine
Territorial Unit 1	Sius Falls-Sius R	20-4-31	RMR – CFL No wetlands	Bellpine, Dupee, Jory

***** **RLR**: Hardwood or brush species that will limit tree seedling survival or growth by restricting available light.
RMR: Evapotranspiration rates are high and competition for moisture by native plants is severe (Low available soil moisture).
RMLR: Same as **RMR** with restricted light.
CFL: Hardwood or **brush** species that can be treated using operational practices to meet minimum stocking levels
RWNW: Withdrawn Groundwater-soils moderately well to poorly drained. Sites in depressions, stream-adjacent, high-chroma mottling or gleying of soils.
FWR/RL: Fragile-**Groundwater**-soils moderately well to poorly drained. Sites in depressions, stream-adjacent, high-chroma mottling or gleying of soils.

FISHERIES

Coho salmon are a federally-listed threatened fish species which occupy streams in the vicinity of many of the thinning units.

Wild Fish Unit 1

There is no recent data showing coho presence in the unnamed tributary 123547334404683 of Fish Creek within the sale unit. A human-created dam at approximately 2,250 stream feet in Fish Creek exists that would prevent all fish passage.

Fish Creek headwater streams 33-1 and 33-2 (reaches 123543004405283 and 123545434405620) are bisected by culverts associated with road 17-7-33.6. Both of these culverts are barriers to fish and amphibian movements at this time.

Wild Fish Unit 2

Wild Fish Unit 2 has no fish issues within the proposed sale unit or in any of the reaches within the newly designated hydro streams 3-1 through 3-9. The closest cutthroat populations are found over 300 feet to the west of the sale unit in unnamed tributary 123523104403492 at ~2,775 stream feet and to the east of the unit in unnamed Wildcat tributary 123510074403018 up to 4,325 feet (~550 feet from the sale boundary).

Pataha Ridge Units 1 and 2

From mainstem Bulmer Creek to the forks with East Fork Bulmer Creek (6,130 stream feet) is designated as critical habitat for coho salmon. Coho were observed to 1,870 feet up the West Fork or mainstem of Bulmer Creek (8,000 feet), approximately 75 feet below the confluence with hydro stream 15-12. Coho were also observed in the East Fork of Bulmer Creek to 4,075 stream feet. The upper limits of cutthroat trout were observed west of Unit 2 and just below the confluence of hydro stream 15-6. To the east of Unit 2, cutthroat trout upper limits were identified just north of the 23/14 sectional border in reach 123508504399855 of the East Fork of Bulmer Creek (~6,000 stream feet from the East Fork confluence with mainstem Bulmer Creek. Cutthroat trout were observed at around 9,000 feet up the mainstem, to the northwest of Unit 1, in reach 123526684400444.

The habitat in the fish bearing reaches of the West Fork to the north and between the sale units is constrained by high terraces and broad valleys. The average stream gradient of ~3% climbs to an 11% average at the upper limits of cutthroat. Overall, the riparian zone is dominated by hardwoods consisting of maple, alder, cascara and myrtle (~90%). Conifers here consist of Douglas-fir, western hemlock and some western redcedar. Stream habitats are largely pools with occasional riffles or rapids. Wetted substrates are mostly gravels (~40%) followed by sand, silt/organics and cobbles (20% each). There is a good component of key pieces and associated debris jams. Of interest are the jams that have evolved as a result of railroad trestle wood acting as key pieces.

Similar to the West Fork, the East fork of Bulmer Creek is constrained by high terraces and is dominated by broad valleys. The average stream gradient from the confluence to tributary 123503474400370 (~450 feet downstream of Hydro stream 15-10) is ~3.5% and ranges from 2% to 5%. These stream gradients are conducive to suitable coho habitat. Although the riparian here is dominated by hardwoods, there are considerably more conifers along these reaches than those found in the West Fork. Gravel substrates are the dominant feature instream (~60%) followed by sand, silt/organics and cobbles (15% each). From 1,250 to 1550 stream feet key pieces of wood are numerous and provide good channel complexity; however the remainder of the East Fork contains low levels of CWD.

Pataha Ridge Unit 3

Pataha Ridge Unit 3 is located at the pinnacle of four different stream headwalls: Wildcat, Eames, Swamp and Cedar Creeks. Designated critical habitat for coho salmon is not found in Cedar Creek; however, critical habitat is located approximately 1,600 feet downstream of the northwest sale unit boundary in Wildcat; approximately 3,000 feet to the southwest in Eames Creek and 3,000 feet to the southeast in Swamp Creek. There are no fish species within the unit boundary of this sale.

Eames Swing Unit 1

Mainstem Grenshaw Creek is designated as critical habitat for coho salmon. Instream restoration work was completed in 1995 from the confluence to approximately 5,900 stream feet and consisted of boulder, log and gravel placements. Three non-fish bearing, unnamed tributaries of Grenshaw Creek are associated with this sale unit. These tributaries have been designated as: hydro stream 31-3 (Stream link no. 123460644396357), 31-2 or reach 123461364396108, and reach 123464904395867 (south of the unit).

The bulk of the 6.3 mile haul route from sale unit to Wolf Creek Road is under private control (91.5%). Of this, 3.27 miles (52%) is within 150 feet of water.

Eames Swing Unit 2

Swing Log Creek (reach 123358184392201, hydro stream 13-3) bisects the sale unit from east to west, with mainstem Wolf Creek paralleling the southern boundary. Three unnamed tributaries of Wolf Creek (hydro streams 13-2, 13-5 and 13-6) and one unnamed tributary of Swing Log (13-1, 123354884393290) have been identified within the boundaries of the sale unit. Only one of these tributaries, 13-1, is considered to be fish-bearing; coho and cutthroat have been identified. All Swing Log and Wolf Creek reaches here are designated as critical habitat for coho salmon.

The Lane County Road system throughout much of the proposed sale unit has been recently updated. County Road No. 4082 at MP 0.25 or the east side of the concrete bridge over Swing Log Creek had been delivering large amounts of sediment directly into the creek. Road mitigations (leadoffs) here and on the west side of the bridge have reduced direct delivery substantially. From MP 0.0 to ~0.09 Road No. 4082 delivers directly into hydro stream 13-1, which is fish bearing below the culvert. No mitigations have been installed here. The bituminous surfaced portion of Road No. 4086 used to end at the junction with the start of Road 4082. The bituminous application has recently been extended ~0.20 miles to the east on Road No. 4082 (~200 feet east of the concrete bridge over Swing Log Creek). Much of aggregate portion of Road No. 4082 road continues to deliver sediment into Wolf Creek via associated ditch lines and tributaries 13-5 and 13-6.

Burnt Bottle

An unnamed, non-fish bearing, third order tributary of the Siuslaw River at stream mile 95 abuts the sale unit on the western boundary. To the east of the unit, small first order tributaries (non-fish bearing) drain into Doe Creek. All of Doe Creek in Section 2 is designated critical habitat for coho. A third watershed draining directly into the Siuslaw River abuts the sale unit on the southwest corner. This tributary is non-fish bearing.

Territorial

The South Fork Siuslaw River is designated as critical habitat for coho salmon. The northeast corner of the unit is approximately 3,000 stream feet away from critical habitat.

WILDLIFE

Historically, fire was the primary disturbance that created a diversity of high quality habitat across the landscape (Impara, 1998) (Wimberley, 2002). With an increase in fire suppression and an increase in managed forestry, the variety of habitat types available for healthy diverse wildlife species has declined. Historically the Oregon Coast Range was composed of about 20% early seral, 20% young, 20% mature and 40% old growth habitat types (Wimberley, 2002). In order to provide for a diverse range of wildlife species it is reasonable to re-create historic conditions that accommodate a diverse range of high quality habitat types (Thompson, Duncan, & Johnson, 2010).

The Siuslaw Resource Area currently lacks adequate amounts of early seral and old growth habitat. Old growth habitat type is approximately 50% less and early seral habitat types are 60% less than historic levels. The Siuslaw Resource Area currently contains about 60% young habitat type (less than 80 years of age). The stands proposed for thinning under the action alternatives consist of young forest habitat type that lack the desired components of high quality habitat such as hardwood patches, multi-layered multi-species canopies, trees > 31 inches dbh, large amount of snags and down wood > 20 inches dbh and a high incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections and other evidence of decadence). These types of habitat components are important for the northern spotted owl (USDI-FWS, *Revised Critical Habitat for the Northern Spotted Owl*, 2012, p. 71903, 71906 and 71908). In the central Oregon Coast Range, northern spotted owls appear to benefit from a mixture of older forests with younger forest and non-forested areas in their home range (USDI-FWS, 2011, pp. III-43). Habitat choice by spotted owls is influenced by hardwood trees and understory shrubs that produce fruit and mast supplies for the owls' small mammal prey. Therefore early seral habitat is important for spotted owl foraging (Irwin, Rock, & Rock, 2012, p. 208 & 210).

While thinning objectives in Matrix lands are primarily for maintaining conifer productivity, Late-Successional Reserves are areas where objectives include diversity and habitat complexity to benefit late-successional species and other species. Heavy thinning and gap creation are implementation tools that improve habitat complexity and diversity creating high quality habitat. Projects that have incorporated heavy thinning and

gap creation in Late-Successional Reserves such as Dutch Treat thinning have been implemented in the Siuslaw Resource Area.

Thinning units in this EA consist of both Matrix and LSR units. Table 11 highlights the existing conditions within the thinning units being considered in this EA. Data in this table comes from GIS, stand exams, marbled murrelet habitat field surveys and general data from field visits.

Table 11: Stand characteristics relevant to spotted owl habitat by unit

Project name	Wild Fish Unit 1	Wild Fish Unit 2	Pataha Ridge Unit 1	Pataha Ridge Unit 2	Pataha Ridge Unit 3	Eames Swing Unit 1	Eames Swing Unit 2	Burnt Bottle	Territorial
Land Use Allocation	**GFMA**	**LSR**	**GFMA**	**GFMA**	**LSR**	**LSR**	**GFMA**	**LSR**	**CONN**
Acres	225	72	72	57	61	37	105	56	47
Quadratic Mean Diameter (QMD)	19.1	19.8	17.5	19.3	18.9	16.1	19.3	21.9	17.6
Total trees in units >32" dbh*	30	32	31	0	13	3	0	30	13
Trees per acre >32" dbh	0.1	0.4	0.4	0	0.2	0.1	0	0.5	0.3
Overstory canopy cover	85%	77%	82%	75%	90%	94%	80%	81%	86%
Middle story conifers and hardwoods >20" dbh	<5%	<5%	<1%	<1%	<1%	<1%	<1%	<1%	<5%
Snags per acre 10 to 20" dbh	1.2	0	5.2	No data	2.0	6.6	No data	0	0
Snags per acre >20" dbh	0.5	0.2	0	No data	0	0	No data	1.3	0.6
Average dbh of snags	15.2	40	16.4	No data	17.7	12.6	No data	21	37.7
Down wood % ground cover	<4%	<4%	<4%	<4%	<4%	<4%	<4%	<4%	<4%

*dbh diameter at breast height

Wildfish Units 1 and 2, Pataha Ridge Unit 1 and Burnt Bottle have the greatest number of large remnant trees (>32 inches dbh) and all thinning units have some hardwoods, though neither metrics are available in sufficient quantity to contribute to complex high quality habitat. Overstory canopy ranges from 75% to 94%; a desired condition is about 25% to 35% overstory canopy cover and 25% to 45% middle-story canopy cover.

Snags and down wood are important for several bird and mammal species. Mellen, et. al. (2012) recommends a range of densities and distribution patterns to maintain from 0% to 80% tolerance levels across the landscape. Tolerance levels are best described as a percent of individual animals observed using snags and down wood. For example, six snags per acre that are 10 to 20 inches dbh produces a 30% tolerance level because past studies have indicated that 30% of individuals using snags were found in areas with about six snags per acre and about 10 to 20 inches dbh in size. In Table 11, Pataha Ridge Unit 1 and Eames Swing Unit 1 are two units which may come close to a 30% tolerance level of existing snags of 10 to 20 inches dbh. However, Mellen, et al. (2012) suggests that half of the snags should be >20 inches in diameter and all thinning units are deficit in this. Amounts of down wood are also below 30% tolerance level (4% ground cover).

Endangered Species Act listed species

Northern spotted owls and marbled murrelets are present in the vicinity of the units proposed for thinning. Their critical habitat designations and are listed below (Table 12) for each thinning unit.and zone.

Table 12: Critical habitat designations and zone designations for ESA listed species by unit

	Wild Fish Unit 1	Wild Fish Unit 2	Pataha Unit 1	Pataha Unit 2	Pataha Unit 3	Eames Swing Unit 1	Eames Swing Unit 2	Burnt Bottle	Territorial (AOC)
Marbled Murrelet Zones*	1	1	1	1	2	1	2	2	2
Marbled Murrelet Critical Habitat	N	N	N	N	OR-04-i	OR-04-i	N	OR-04-i	N
Northern Spotted Owl Critical Habitat 2012	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No

*Zone 1 is < 35 miles from the coast, and Zone 2 is 35-50 miles from the coast

Northern Spotted Owls

With the exception of Territorial unit and Wild Fish Unit 2, all of the thinning units lie within the 2012 northern spotted owl critical habitat designations. Table 13 describes the primary constituent elements (PCEs) found in the proposed thinning units.

Table 13: Primary constituent elements from the 2012 critical habitat for spotted owls.

PCE 2 nesting/roosting habitat described in the 2012 critical habitat plan	**Existing conditions in units in critical habitat**
PCE 2(b)(i): Moderate to high canopy closure (60% to 80%)	Yes
PCE 2(b)(ii): Multilayered, multispecies canopies with large (20-30 in (51-76 cm) or greater dbh) overstory trees,	No multi-layering, but Yes, over-story trees are large (20-31: dbh)
PCE 2(b)(iii): High basal area (greater than 240 ft2/acre (55 m2/ha))	Yes (54% of acres have high basal area) & No (46% of acres do not have high basal area)
PCE 2(b)(iv): High diversity of different diameters of trees	No
PCE 2(b)(v): High incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence)	No (0.2 trees per acre > 40"dbh)
PCE 2(b)(vi): Large snags and large accumulations of fallen trees and other woody debris on the ground	No
PCE 2(b)(vii): Sufficient open space below the canopy for northern spotted owls to fly.	Yes
PCE 3: foraging habitat for West Cascades/Coast Ranges of Oregon and Washington	**Existing conditions in units in critical habitat**
PCE 3(a)(i): Stands of nesting and roosting habitat; additionally, owls may use younger forests with some structural characteristics (legacy features) of old forests, hardwood forest patches, and edges between old forest and hardwoods;	Yes: stands contain small amounts of legacy features
PCE 3(a)(ii): Moderate to high canopy closure (60 to over 80 percent)	Yes
PCE 3(a)(iii): A diversity of tree diameters and heights [multi-layered canopy]	No
PCE 3(a)(iv): Increasing density of trees greater than or equal to 31 in dbh increases foraging habitat quality (especially above 12 trees per ac (30 trees per ha))	No
PCE 3(a)(v): Increasing density of trees 20 to 31 in (51 to 80 cm) dbh increases foraging habitat quality (especially above 24 trees per ac (60 trees per ha))	Yes (more than 24 tpa are 20-31" dbh)*
PCE 3(a)(vi): Increasing snag basal area, snag volume (the product of snag diameter, height, estimated top diameter, and including a taper function (North et al. 1999, p. 523)), and density of snags greater than 20 in (50 cm) dbh all contribute to increasing foraging habitat quality, especially above 4 snags per ac (10 snags per ha)	No
PCE 3(a)(vii): Large accumulations of fallen trees and other woody debris on the ground; and	No
PCE 3(a)(viii): Sufficient open space below the canopy for northern spotted owls to fly.	Yes

PCE 4: dispersal habitat	Existing conditions in units in critical habitat
PCE4 (a): Habitat supporting the transience phase of dispersal, which includes:	Yes
PCE4 (a)(i): Stands with adequate tree size and canopy closure to provide protection from avian predators and minimal foraging opportunities; in general this may include, but is not limited to, trees with at least 11 in (28 cm) dbh and a minimum 40 percent canopy closure; and	Yes
PCE4 (a)(ii): Younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, if such stands contain some roosting structures and foraging habitat to allow for temporary resting and feeding during the transience phase.	Yes
PCE4 (b): Habitat supporting the colonization phase of dispersal, which is generally equivalent to nesting, roosting, and foraging habitat as described in PCEs (2) and (3), but may be smaller in area than that needed to support nesting pairs.	No

* From stand examination data

Seventy-four percent of the Siuslaw Resource Area lies within the 2012 critical habitat designations. Sixty percent of this land use allocation consists of low quality younger stands between 40 to 80 years of age. The stands being proposed for thinning in this EA are younger than 80 years of age and currently provide low quality foraging habitat for spotted owls in addition to serving as dispersal habitat (USDI-FWS, 2012, p. 71907). Because the stands do not contain moderate to high amounts of large live trees with deformities they likely do not function as nesting habitat for spotted owls. In addition, units lack an adequate diversity of tree diameters and heights (multi layered multi-species canopies), trees greater than 31 inches dbh and large dead wood to function as anything better than low quality foraging habitat.

Multi-layered and multi-species canopies are very important for foraging spotted owls. Spotted owls are ambush predators (i.e., they usually perch in hiding cover about 20 to 40 feet above the ground and wait for opportunities to pounce on prey). Stands proposed for thinning do not provide the type of cover spotted owls use while hunting. Currently this area within the stands is extremely open, leaving spotted owls vulnerable to attacks from predators. Although the existing canopy closure is over 80% in these stands, the bottom of the overstory canopy is over 70 feet above the ground, and there is very little canopy 20 to 40 feet above the ground. Studies have found that flying space tends to be more constricted (higher canopy cover) at foraging and nest sites compared to random locations (Irwin, Rock, & Miller, Stand structures used by northern spotted owls in managed forests, 2000, pp. 180, 184).

Northern spotted owl prey species

Diets of northern spotted owls are dominated by a few species of mammals including flying squirrels, woodrats, tree voles, redbacked voles, deer mice and juvenile rabbits or hares (Forsman E. D., Anthony, E, & Zabel, 2004) (Wiens, 2012, p. 44). Hagar (2007) found 90% of the diet of northern spotted owls is composed of small mammals that are associated with non-coniferous vegetation, such as northern flying squirrels, wood rats and other rodents. These species are associated with snags, conifer and deciduous vegetation, multi-layered canopies, grasses/forbs, or shrubs (Carey, Maguire, & Biswell, Distribution and Abundance of Neotoma in Western Oregon and Washington, 1999) (Johnson & O'Neil, 2001). An important habitat element for flying squirrels is the density of trees at 30 feet above ground level in forest stands (Wilson, 2010). Most stands being proposed for thinning in this EA lack adequate amounts of this mid-story component.

Marbled Murrelets

There is one known occupied murrelet site in the project area, located adjacent to Wildfish Unit 2. There are two known occupied marbled murrelet sites about 1/4 and one mile from Wild Fish Units 1 and 2. Five units are within the known range of murrelets in the Oregon Coast Range (less than 35 miles from the ocean; Zone 1), and four are beyond the known range (Zone 2) (see Table 12).

Marbled murrelets nest primarily in large trees located in old growth stands and occasionally in large trees located in younger stands. There are approximately 115 large remnant trees in the thinning units that have potential nesting structures for the marbled murrelet; about 90 of these trees are in Zone 1. The survival of nesting structures for marbled murrelets in these remnant trees is adversely affected by the existing high canopy cover of adjacent Douglas-fir trees. Most of the limbs with potential nesting platforms that are located at or below the dense canopy of these stands are dead and no longer provide potential nesting sites for the marbled murrelet. Thinning these stands would improve conditions for limb development in large remnant trees. None of the large trees with marbled murrelet nesting structure are proposed for harvest.

All of the action alternatives may affect but are not likely to adversely affect critical habitat for the marbled murrelet because design features assure that existing potential for nesting would remain after harvest in all areas. Units in critical habitat for marbled murrelet are Burnt Bottle, Eames Swing Unit 1 and Pataha Unit 3.

FUELS

All units are located within the Wildland-Urban Interface identified in the Lane County Community Wildfire Protection Plan. However, individual unit locations and characteristics result in varying levels of wildfire risk to the resources and improvements.

Wild Fish:

- Unit 1: Approximately 11 residences are located along Highway 126 within a mile of the unit. Residences are considered both a source of ignition, as well as a valued improvement that is at risk of wildfire. Highway 126 would potentially make a good control point. The highway poses a high risk of ignition due to the amount of traffic present.
- Unit 2: Approximately nine residences are located along Penn Road within one-half mile of the unit. Residences are considered both a source of ignition, as well as a valued improvement that is at risk of wildfire. A powerline right-of-way bisects the unit, roughly paralleling Penn Road. This power line would likely be ineffective in stopping a fire moving uphill from Penn Road given the topography and adjacent young plantations. The ridgeline road (Road No. 8-7-3.1) in this unit would potentially make a good control point, depending on the location and behavior of the fire.

Pataha Ridge

- Unit 1 & 2: The nearest residences are located 1.5 miles to the north along Penn Road. The road system is gated and has a low risk of ignition. It is not located at a particularly good control point.
- Unit 3: The nearest residences are located 1.3 miles to the northeast along Penn Road. The road system is gated, but has a moderate risk of ignition due to the amount of logging traffic at the junction of the A-Line, B-Line and D-Line roads, in addition to the gate remaining open much of the time. Those three mainline roads would potentially all make good control points.

Eames Swing:

- Unit 1: The road system is gated and has a low risk of ignition. It is not located at a particularly good control point. The nearest residences are located three miles to the southeast along Wolf Creek Road.
- Unit 2: The unit is intersected by Panther Creek Road and Battle Creek Road, both of which are high-use roads, and there is evidence of considerable OHV use in the vicinity. These factors greatly increase the risk of ignition. Approximately five residences are located within 500 feet to a mile west of the unit. Residences are considered both a source of ignition, as well as a valued improvement that is at risk of wildfire. Both major roads would potentially make good control points.

Burnt Bottle: Located on a ridgetop above the Siuslaw Access Road, which has historically been a common source of ignition. This ridge would be a critical control point for fires starting below.

Territorial: Located directly adjacent to the Territorial Highway, which is a high-use paved county road, and is a high risk of ignition. Approximately 30 residences are located 900 feet to a mile from the unit, generally to the north and east. These homes are primarily located in grass fuels. Residences are considered both a source of ignition, as well as a valued improvement that is at risk of wildfire.

ENVIRONMENTAL CONSEQUENCES

This section explains and summarizes the direct, indirect, short term, long term and cumulative effects of the alternatives in relation to the identified issues.

This EA incorporates the analysis of environmental consequences, including cumulative effects, in the USDA Forest Service and USDI Bureau of Land Management "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, (Chapters 3 and 4) and in the Eugene District

"Final Resource Management Plan/Environmental Impact Statement ," November 1994 (Chapter 4). These documents analyze most effects of timber harvest and other related management activities. None of the alternatives in this assessment would have effects on resources beyond the range of effects analyzed in the above documents. The following section supplements those analyses, providing site-specific information and analysis particular to the alternatives considered here.

PAST, PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS

The following timber sales have been implemented within the last ten years in the four 5th-field watersheds (Wildcat Creek, Wolf Creek, Upper Siuslaw River, and Long Tom River) where the proposed actions would be implemented.

Upper Siuslaw River – *Dogwood Creek*: Density management thinnings. Dutch Treat (2005), 87 acres; Last Hurrah (2006), 76 acres; Pita Ridge (2006), 128 acres; River Camp (2009), 246 acres; Stone Pony (2010), 31 acres.

Upper Siuslaw River – *Siuslaw Falls*: Density management thinnings. Pita Ridge (2006), 59 acres; Trivial Tempest (2008), 243 acres; Stone Pony (2010), 117 acres.

Upper Siuslaw River – *South Fork Siuslaw River*: Commercial thinnings. Norris Divide (2005), 126 acres; Tucker Creek (2005), 101 acres; Kelly Creek (2012), 227 acres; Gowdy View (2012), 46 acres. Density management thinning. Bottomline (2008) 177 acres. Regeneration harvest. Norris Divide (2005), 18 acres.

Wolf Creek – *Upper Wolf*: Density management thinnings. Link 'n Log (2005), 114 acres. River Camp (2009), 1 acre.

Wildcat Creek – *Upper Wildcat*: Regeneration harvest. Badger 1 (2003), 27 acres.

Future timber sales within these sub-watersheds include thinning projects which have been analyzed in the Upper Siuslaw Landscape Plan and the Long Tom Landscape Plan EAs.

Upper Siuslaw River – *South Fork Siuslaw River*: Approximately 580 acres have been analyzed for commercial thinning in the Upper Siuslaw Landscape Plan EA.

Wildcat Creek – *Upper Wildcat*: Approximately 20 acres in this sub-watershed have been analyzed for commercial thinning in the Long Tom Landscape Plan EA

Long Tom – *Fern Ridge Lake*: Approximately 1,800 acres have been analyzed for commercial thinning or density management thinning in the Long Tom Landscape Plan.

On private lands within these sub-watersheds, most forested acres would likely be harvested when they reach approximately 50 to 60 years of age.

HYDROLOGY AND FISHERIES

AQUATIC CONSERVATION STRATEGY

ISSUE 1: What are the effects of timber harvest and associated activities on the attainment of Aquatic Conservation Strategy (ACS) objectives?

Actions proposed within the RR and adjacent uplands may affect attainment of ACS objectives. ACS objectives were developed under the Eugene District RMP (1995) to maintain and restore ecological health of watersheds and aquatic ecosystems on public lands. Initial evaluation of this issue determined that ACS objectives 1, 7, 8 and 9 would be maintained under all action alternatives, whereas effects on ACS objectives 2, 3, 4, 5 and 6 could differ by alternative. Analysis of this issue will compare how each

alternative contributes toward attainment of ACS objectives 2, 3, 4, 5 and 6. Wildcat Creek, Wolf Creek and the Upper Siuslaw River 5th-field watersheds contain designated critical habitat for listed coho salmon and also provide habitat for Bureau-sensitive cutthroat trout. Actions are proposed that may affect their habitat.

ACS No. 2: *Maintain and restore spatial and temporal connectivity within and between watersheds and drainage network connections including floodplains, wetlands, upslope areas, headwater tributaries and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Measures:
Connectivity within watershed maintained, restored or degraded by measuring:

- Number of barrier culverts removed.
- Number of barrier culverts removed or replaced with fish friendly culverts for Oregon Coast Coho salmon passage.
- Number of barrier culverts removed or replaced with fish-friendly culverts for cutthroat trout and other resident aquatic species.

Alternative 1 – No Action

Under Alternative 1, spatial and temporal connectivity within the planning area would be maintained. No barriers would be removed under this action.

Number of barrier culverts removed: 0

Alternatives 2, 3, and 4

No new roads or new temporary or permanent stream crossings would be added under action alternatives. No-harvest buffers (minimum of 75 feet adjacent to harvest areas) would be placed around all streams within the project areas. These measures would maintain connectivity in these areas.

Wild Fish Unit 1:

Under the action alternatives, four barrier stream crossing culverts would be removed upon completion of the timber harvest. One non-barrier culvert, at the headwater to hydro no. 33-12, would be removed.

Spatial and temporal connectivity for resident fish as well as other aquatic species would be restored at two of the culvert sites. Spatial and temporal connectivity for other aquatic species would also be restored at the other two culvert sites. The removal of these five culverts would also eliminate stream crossing failure risk at these sites and subsequent downstream delivery of unwanted sediment in trout and salmon reaches. These culvert sites are located in the Upper Wildcat sub-watershed of the Wildcat Creek Watershed.

Number of barrier culverts removed: 4, plus 1 culvert at the headwater stream 33-12 (coho passage, 0; cutthroat and other fish species, 2)

Wild Fish Unit 2, Pataha Ridge Units 1-3, Eames Swing Units 1-2, Burnt Bottle, Territorial:

There are no existing stream crossings that are controlled by the BLM on the haul routes to these units. The existing stream culverts on privately-controlled roads would not be replaced or removed. These measures would maintain connectivity in these areas.

- Number of barrier culverts removed: 0

Sub-Watershed/Watershed Effects:

This ACS objective would be maintained at the sub-watershed and watershed scales. There would be a slight decrease in the number (4) of barrier culverts in Wild Fish Unit 1 unit under all action alternatives. There would be no change in the number of barrier culverts in the remaining units in which the proposed projects would occur.

ACS No. 3: *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks and bottom configurations.*

Measures:
Physical integrity of the aquatic system maintained, restored or retarded by measuring:

- Number of stream crossings removed or replaced.
- Reduction in fill failure risk from removing stream crossings (cubic yards).
- RR thinning (acres) within one site tree of channels.

- Number of created snags within one site tree of channels.
- Miles of stream channel habitat restored or improved.
- Reduction of sediment delivery to streams from haul routes.

Alternative 1 – No Action

No stream crossing culverts would be installed, removed or replaced under this alternative. The culverts in Wild Fish Unit 1 would continue to pose fill failure risk until they are replaced or removed. This risk would increase over time until the culverts are replaced (upgraded) or removed. Failure of any of these culverts could lead to unwanted sediment delivery in fish-bearing reaches downstream, thereby degrading ACS Objectives 3 and 5 at the site scale (Wild Fish Unit 1 in the Upper Wildcat Creek sub-watershed).

Under this alternative, the physical integrity of the aquatic system would initially be maintained. Forest stands adjacent to the riparian areas of streams would continue to develop along their current trajectory. There would be no creation of snags or CWD. Restoration of the physical integrity of stream channels would take place over the long term (decades) as large wood is recruited into the stream channels.

- Number of stream crossings removed or replaced: 0
- Reduction in fill failure risk (cubic yards): 0
- RR thinning (acres) within one site tree of channels: 0
- Number of created snags within one site tree of channels: 0
- Miles of stream channel habitat improved or restored: 0

Alternatives 2, 3, and 4

The proposed haul routes would be identical for all action alternatives. The number of stream crossing culverts to be removed and the number of cross drains to be replaced or added were determined from the 2011 road/culvert inventory of the proposed haul routes. There would be no new stream crossings and no new road construction under any of the action alternatives. Preventive maintenance on haul routes will occur to minimize sediment delivery to fish bearing stream reaches. Site-specific seasonal haul restrictions may be implemented to reduce sediment delivery to streams (dry vs. wet weather haul).

Cross drain culverts would be replaced on the BLM-controlled road segments of haul routes in order to improve road drainage and reduce the possibility of road failure and road related landslides that could potentially affect the physical integrity of channels. Approximately 30 cross drain culverts on the proposed haul routes have at least a moderate risk of reduced performance or failure in the next decade or two because they are undersized, already past the lifespan of typical use, buried, or are rusted or damaged.

Untreated stream buffers would maintain the physical integrity of stream banks and channels. Buffers are designed on a site-specific basis to protect stream banks, maintain root strength, minimize the potential for sediment delivery from yarding and harvest activities, to provide adequate stream shading in order to avoid increases in stream temperatures.

Thinning in the riparian reserve would accelerate the development of larger trees more quickly than if left untreated. Alternative 2 would obtain larger trees the quickest and the effects from thinning would last the longest (approximately two to three decades) due to the wider spacing between leave trees. Alternative 4 would be intermediate in terms of speed in development of larger trees and in the length of thinning effect (around two decades) in the RR. Alternative 4 is similar to Alternative 2 in the LSR units because of the number of snags and CWD created in the RR. Alternative 3 would obtain larger trees slower than the other two action alternatives and the effects from thinning would last a shorter period of time (approximately one to less than two decades) in the RR because of the lighter thinning prescription. The number of thinned acres would be the same for all the action alternatives.

The potential for CWD recruitment would occur in the future when some of the larger trees eventually fall into stream channels. The majority of wood that falls into stream channels from adjacent uplands occurs within about one site tree of the channel (FEMAT 1993, p.V-27). More recent research has supported this with two studies from the Pacific Northwest.

More than half of all the CWD contribution (volume and number of pieces) originated within 30 meters of streams (May and Gresswell 2003) in one study. The other study found that 90% of the CWD at the study sites originated within 18 meters of the streams at 90% of sites (Johnston, et. al 2011).

Snags and CWD would be produced in clumps under Alternatives 2 and 3. The snags and CWD under Alternative 4 would be well distributed (not clumped) throughout the treated stands in the LSR units and in the treated portion of the RR adjacent to Matrix units. Alternative 4 would produce a greater number of snags and CWD (see Table 14) in the RR than Alternatives 2 or 3. The snags created within one site tree of the channels have the highest likelihood of eventually reaching streams and providing benefit to the physical integrity of the streams.

The physical integrity of the streams would eventually be restored under all action alternatives. The no-harvest buffers within the project areas would be the same for all action alternatives and would vary from 75-120 feet depending on the stream. The number of trees retained within the buffer areas would be identical to the No Action alternative except for areas where corridors across stream channels occur. Field analysis by BLM logging specialists indicated that corridors across streams are unlikely for all units except for a few short reaches across two streams (33-1 and 33-9) in Wild Fish Unit 1. Full suspension would protect the active channel in all cases through these corridors.

- Number of stream crossings removed or replaced: 4 (plus 1 culvert at the headwater stream 33-12)
- Reduction in fill failure risk (cubic yards): 490
- RR thinning (acres) within one site tree of channels (all action alternatives, all units): 204
- Number of created snags within one site tree of channels:
  - Alternatives 2 or 3, all units: 333
  - Alternative 4, all units: 1,548
- Miles of stream channel habitat improved or restored: 0

Table 14: Estimated number of RR thinning acres within one site tree of channels and the approximate number of created snags within one site tree of channels (by alternative), by unit.*

Unit	Riparian Thinning acres w/in one site tree of channels	Un-thinned acres w/in one site tree of streams	No. of wildlife clumps w/in one site tree of streams (Alts 2 or 3)	No. of "created" snags w/in one site tree of streams (Alts 2 or 3)	No. of "created" snags w/in one site tree of streams (Alt 4)	No. of "created" CWD trees w/in one site tree of streams (Alts 2 or 3)	No. of "created" CWD trees w/in one site tree of streams (Alt 4)
Wild Fish Unit 1	76	60	23	138	462	81	266
Wild Fish Unit 2	18	8	5	30	108	18	63
Pataha Unit 1	26	21	10	60	156	35	91
Pataha Unit 2	7	3	2	12	42	7	25
Pataha Unit 3	15	10	3	27	288	17	165
Eames Swing Unit 1	9	6	0	0	162	0	99
Eames Swing Unit 2	40	38	8	48	246	28	140
Burnt Bottle	3	1	0	0	54	0	33
Territorial	10	5	3	18	60	11	35
TOTALS	204	152	54	333	1,548	197	917

* This table represents only a subset of total snags and CWD created in each unit, by alternative.

Sub-Watershed/Watershed Effects:

This ACS objective would be maintained at the sub-watershed and watershed scales. There would be a slight decrease in the number (4) of stream crossing culverts (plus one additional culvert at the headwater of stream 33-12) in the Upper Wildcat Creek sub-watershed (Wildcat Creek Watershed) under all action alternatives. This would also eliminate the potential risk of up to 490 cubic yards of fill failures at these sites. Proposed culvert removals at the end of the Wild Fish Unit 1 sale plan (Wildcat drainage) would likely add a

small amount of sediment to unit streams at initiation and would protect against potential failure of five culverts and associated fills that could end up in coho critical habitat in the long term. Although the planned cross drain installs on the haul route to Wild Fish Unit 2 would reduce potential sediment delivery to the same sub-drainage, the amounts reduced would be small. Since no other actions of this type are planned in project areas of the Wolf, Eames and Siuslaw drainages, this ACS objective would be maintained at these scales. There would be no change in the number of stream crossing culverts removed or a reduction in fill failure risk (stream crossing sites) in the remaining eight sub-watersheds and three watersheds in which the proposed projects would occur.

Riparian Reserve thinning within one site tree of streams would occur in five sub-watersheds with about 90% of it occurring in the Upper Wildcat (127 acres) and the Upper Wolf (55 acres) sub-watersheds. Approximately 22 acres (combined) of RR thinning within one site tree of streams would occur in three other sub-watersheds (Lower Wolf, South Fork Siuslaw, and Siuslaw Falls). The acreage of RR thinning would be the same for all action alternatives but the effect on obtaining larger trees would be quicker and would last longer for Alternative 2 than for Alternatives 3 or 4.

Alternatives 2 or 3 would produce a similar number of snags and CWD within the RR (one site tree) in three sub-watersheds (Upper Wildcat, Upper Wolf and South Fork Siuslaw). The majority (97%) of this would occur in the Upper Wildcat (75%) and Upper Wolf (22%) sub-watersheds. Alternative 4 would also produce snags and CWD in two additional sub-watersheds (Lower Wolf and Siuslaw Falls). More than 90% of the snags created within the RR (one site tree) under Alternative 4 would be in the Upper Wildcat (48%), Upper Wolf (34%) and Lower Wolf (10%) sub-watersheds.

The overall number of created snags within the RR would be about four to five times higher under Alternative 4 than under Alternatives 2 or 3. The number of created snags is a relatively small amount at a sub-watershed scale (from a maximum of about 760 trees in the Upper Wildcat for Alternative 4 (240 trees for Alternative 2 or 3) to about 54 trees in the Siuslaw Falls sub-watershed for Alternative 4 (18 trees for Alternative 2 or 3 in the South Fork Siuslaw sub-watershed)). Some of these trees might eventually reach some of the channels and contribute to the physical integrity of these channels.

ACS No. 4: *Maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical and chemical integrity of the system and benefits survival, growth, reproduction and migration of individuals composing aquatic and riparian communities.*

This objective would be maintained under all alternatives at the site scale and at the sub-watershed and watershed scales. Changes to dissolved oxygen are unlikely under any of the action alternatives. The majority of the streams in the project areas are moderately steep to steep and have turbulent streams with oxygen-saturated waters that rapidly re-aerate. None of the alternatives would involve the use of fertilizers, spraying or organic chemicals. Large inputs of fine organic material into low gradient streams would not occur under any alternative. There is a low risk of hazardous material reaching a hydrologic feature under all action alternatives because best management practices would be implemented.

Solar radiation is generally considered the most important source of radiant energy to impact stream temperature (Beschta, 1997) (Brown, 1983). The effectiveness of stream side vegetation in shading streams depends on forest structure, the amount of canopy opening above the channel, topography and stream orientation (USDA USDI, 2005).

No-harvest buffers 75 to 120 feet wide would be implemented within thinned areas. The minimum no-harvest riparian buffer width would be the same for all action alternatives. However, the riparian no-harvest buffer widths were adjusted based on the proposed silvicultural prescriptions for Alternative 2 for the Matrix units and Alternatives 2 and 4 for the three LSR units because these alternatives would retain the fewest live trees in the RR.

On-site factors and design features based on the proposed management actions were used to determine the no harvest buffer widths for each stream in the project areas. These factors included canopy cover; topographic influences; aspect; under story and overstory species; vegetation height and density; stream characteristics; analysis of primary and secondary shade zone widths; yarding method; slope stability; proximity to roads, skid trails, and landings; and silvicultural prescriptions. The potential for Alternatives 2, 3, or 4 to impact stream temperatures is very unlikely because of the no-harvest areas retained around all streams, the retention of numerous leave trees in the thinned areas and because the proposed design features would minimize changes to existing shading of streams.

The primary shade zone is the area of vegetation that intercepts solar radiation during the period (typically between 10 a.m. and 2 p.m.) when the greatest solar heating occurs (USDA USDI, 2005). Trees and vegetation closest to the stream provide shading in the primary shade zone. Trees and vegetation in the secondary shade zone can provide some shading in the early morning (before 10 a.m.) and late afternoon (after 2 p.m.), particularly if the vegetation in the primary shade zone is of lower density or poorer shade quality (USDA USDI, 2005).

Field analysis by BLM logging specialists indicate that yarding corridors across streams are unlikely for all units (all alternatives) except for a few short reaches of streams 33-1 and 33-9 in Wild Fish Unit 1. Any yarding corridors would be <12 feet in width and would be spaced about 150 feet apart to minimize disturbance of riparian vegetation.

The gaps and the larger (>1/4 acre) wildlife clumps (snags and CWD) created in the three LSR units would be located a minimum of one site tree away from all streams and would not have an impact on stream temperature as they would not change existing shading of streams. The smaller (<1/4 acre) wildlife clumps (snags/CWD) would be predominately located adjacent to intermittent streams, on the north side of perennial streams, or greater than one site tree from streams where there is little to no shading influence. No wildlife clumps would be located within the primary shade zones of streams. The few wildlife clumps located south, east or west of a perennial stream would be a minimum of 100 feet from the stream where harvest of the inner portion of the secondary shade zone would also be avoided and these clumps would be widely dispersed.

The thinning in the RR outside the no-harvest buffers would vary between action alternatives. Alternative 2 would have wider spacing of leave trees than the other action alternatives in the Matrix stands and wider than Alternative 3 in the three LSR stands. The initial post-harvest canopy cover would be approximately 45% to 50% with a return to pre-harvest canopy cover percentages in about two to three decades. Alternative 4 would be intermediate in terms of canopy cover and length of time in the Matrix stands (55% to 65% canopy cover, 1 to 2 decades) and similar to Alternative 2 in the three LSR stands (40% to 45% canopy cover, 2-3 decades). Alternative 3 would retain a greater number of live trees per acre than the other action alternatives and the thinning effect would last the shortest amount of time (60% to 70%, 1 to 1-1/2 decades).

ACS No. 5: *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate and character of sediment input, storage and transport.*

Measures:
Sediment regime maintained, restored or retarded by considering:

- Existing road (miles), with sediment delivery potential, which are decommissioned at the conclusion of the project.
- Reduction in stream crossing failure risk from culvert removal (cubic yards).
- Percent increase (% of sub-watershed background rate) in short-term sediment delivery due to an increase in timber haul (i.e. existing yearly rate versus increased yearly rate due to increased haul) as a percent of sub-watershed background rate.
- Percent decrease (% of sub-watershed background rate) in long-term sediment delivery due to the addition of cross drains, asphalt surfacing, and/or decommissioning (i.e. existing yearly rate versus post haul yearly rate (with improvements) as a percentage of sub-watershed background rate).
- Reduction in sediment delivery to streams from haul route: 0

Alternative 1 – No Action

Under Alternative 1, the sediment regime would be maintained in the short term. There would be no BLM increase in road use from haul, so there would be no associated increases in sedimentation. The road segments that currently deliver sediment would continue to deliver at the existing rate. The sedimentation rate would vary based on the extent of use, the conditions of the road sediment delivery segments at the time of use and the connectivity of the road segments to streams.

Regular BLM actions associated with road maintenance and replacement of severely damaged stream culverts would continue to occur under this alternative. The only BLM-controlled stream culverts on the haul route are located in Wild Fish Unit 1.

The risk of culvert failure would be higher under this alternative than under the action alternatives in Wild Fish Unit 1 until the existing stream crossing culverts are replaced (upgraded) or removed. Fill failure or stream crossing failures could contribute many cubic yards of sediment to the streams in the vicinity of Wild Fish Unit 1 (see ACS 3 discussion above) which would retard the attainment of ACS objective 5 at the site scale. Because of the location of these culverts, distance to the upper limits of coho habitat downstream (3,300 and 2,750 feet respectively), channel configuration, and sediment capturing in stream structure, most sediment recruited into the channel from potential culvert failures would be distributed from the failed culverts to downstream reaches above the barrier culvert at Highway 126. Cutthroat trout residing in this sediment capture zone would suffer from temporary gill irritation, would likely reduce feeding levels to near zero while turbidity levels were highest and possibly migrate to reaches downstream that contained lower turbidity levels.

The cross drain culverts (approximately 30) on the proposed haul routes that have at least a moderate risk of reduced performance or failure in the next decade or two would not be replaced. Failure to replace some of these culverts could eventually lead to road failures that might contribute sediment to the stream system.

ALTERNATIVES 2, 3, AND 4

Activities proposed under all the action alternatives that would affect the sediment regime:

Increases (short term) in sediment delivery would be caused by (see Table 15 for estimated unit totals):

- Removing existing stream crossing culverts (Wild Fish Unit 1 only).
- Renovating or improving road segments that have existing sediment delivery potential.
- Increased road use from timber hauling and related activities on existing road segments that have sediment delivery potential.

Decreases (long term) in sediment delivery would be caused by:

- Replacing or removing cross drain culverts to reduce chronic and catastrophic fill failure risk.
- Adding cross drains to eliminate existing road segments that deliver sediment.
- Upgrading (adding rock or asphalt) existing road segments with sediment delivery potential.
- Removing existing stream crossing culverts (Wild Fish Unit 1 only).
- Decommissioning existing road segments that currently deliver sediment (Wild Fish Unit 1 only).
- Reduction in sediment delivery to streams from haul route: 0.48

Table 15: ACS Objective 5 Measures by unit (same for all action alternatives).

Measures	Wild Fish Units		Pataha Ridge Units			Eames Swing Units		Burnt Bottle	Territorial
	1	2	1	2	3	1	2	1	1
Reduction in stream crossing failure risk from culvert removal (cubic yards)	490	0	0	0	0	0	0	0	0
Reduction (miles) of road miles that deliver sediment (from adding cross drains)	0.31	0.17	0	0	0	0	0	0	0
Existing roads with sediment delivery potential - decommissioned at conclusion of project (miles)	0.6	0	0	0	0	0	0	0	0
Percent increase in short term sediment delivery due to increase in timber haul (% of sub-watershed yearly background rate)*	-0.3	<0.4	<0.1	<0.1	0	<1.5	<0.7	0	0
Percent decrease in short term sediment delivery due to addition of cross drains, drain dips, asphalt (% of sub-watershed yearly background rate)†	0.9	0.2	0	0	0	0	0	0	0
Road renovation and improvement road segments with sediment delivery potential (miles)	0.6	0.5@	0.1	0.1	0	3.8@	1.1+	0	0

Assumptions:

*** -** This is a short term yearly increase in sediment delivery on the proposed haul routes compared to yearly natural background rates for the sub-watersheds that the units are in. The increase is temporary during the duration of increased haul. Analysis is based on road inventory surveys (2011) and the proposed haul route. Assumes cross drain culvert additions and road surfacing improvements are made prior to haul on BLM-controlled roads. This assumes heavy traffic use during active logging. Assumes less than 1 year haul on Wild Fish Unit 2, Eames Swing Unit 1, and Eames Swing Unit 2 (i.e. the values for these units are based on the yearly rate adjusted to the estimated amount (percentage) of a year that would have increased traffic). Negative values represent a decrease from existing rates because of road improvements (surfacing and culvert additions) that decrease road miles that deliver sediment.

† - This is the estimated sediment reduction on the potential haul routes. The reduction is due to the addition of cross drains and road decommissioning and is a long term (permanent), yearly decrease on the proposed haul route. This assumes a return to existing (pre-project) traffic use with an upgraded road drainage system or decommissioning of existing road segments.

@ - Most of these road miles are under private control; therefore, road renovation and improvement is determined as needed by the owner as part of their normal maintenance activities. No proposed road renovation or improvements of these roads by BLM except for one cross drain addition to the haul route to Wild Fish Unit 2 (privately-controlled portion). Approximately 0.94 miles of the total delivery miles for the haul route to Eames Swing Unit 1 is under BLM control.

+ - Lane County-controlled roads: Road renovation and improvement determined by Lane County personnel as needed or as part of their normal maintenance activities. No proposed road renovation or improvement of these roads by BLM.

Road and culvert factors were determined using the information from the 2011 field road/culvert survey of the projected access routes. Road surveys were completed on the entire proposed haul route. The haul routes and culvert removals, replacements and additions are identical for all action alternatives.

Road renovation and/or improvement could include clearing vegetation, upgrading road surfacing and culverts, grading and/or widening the road grade. These activities could increase sediment delivery, in the short term, to streams where road segments are connected directly (via stream crossing culverts) or indirectly via cross drain culverts near (typically < 200 feet) a channel. Sediment delivered indirectly is usually a small fraction (approximately 10%) of direct delivery because most of the sediment gets filtered out on the forest slopes before it reaches a channel (WFPB, 1997). The proposed design features and adherence to BMPs would minimize sedimentation from these activities. Upgrading road surfacing and culverts would have a long term beneficial effect of reducing sediment delivery. Road sediment delivery segments would be reduced by 0.31 miles for Wild Fish Unit 1 and 0.17 miles for Wild Fish Unit 2 from the addition of cross drain culverts.

The road segments with sediment delivery potential on the haul route to Wild Fish Unit 2 are privately-controlled. The road segments with sediment delivery potential to Eames Swing Unit 2 are controlled by Lane County. Road renovation and/or improvement activities for these road segments would be determined and performed by these entities as part of their normal maintenance activities. The BLM would not perform road renovation activities or improvements on these segments with the exception of adding one cross drain on the haul route of Wild Fish Unit 2 to reduce sediment delivery to the stream crossing.

There would be no change in sediment delivery for Burnt Bottle, Territorial and Pataha Ridge Unit 3 as these units have no road/stream connectivity.

Increased road use for timber haul and associated activities would cause road surface erosion and would increase the short term (generally <1 year to 3 years) delivery of sediment to streams. This sedimentation would only occur where a road segment is connected (directly or indirectly) to the stream system.

The haul route roads are predominately rock surfaced. Existing haul route road miles are approximately 73% rock, 7% bituminous, and 20% native surface. Road improvements made before timber haul occurs would increase the percentages of aggregate (87%) and bituminous (7%) surfacing and decrease the amount of native surface road (6%). Research has shown that rock roads (6 to 8 inches depth) usually have much lower (75% to 97%) road-related sediment production rates than native surface roads (Burroughs et al., 1985) (Burroughs and King, 1989) (Swift, 1984). Bituminous roads have an even lower potential for sedimentation from tread delivery (WFPB, 1997).

The road inventory indicated that about 81% of the haul route roads (in miles) were not “connected” to streams via cross drains or stream crossings. These segments have no potential to deliver sediment to the streams from road surface erosion and timber haul. About 19% (15% direct delivery and 4% indirect delivery) of the haul route roads had the potential to deliver sediment to streams via road surface erosion.

Proposed road improvements (cross drain additions, surfacing) made prior to haul would reduce direct delivery segments to 14% of total haul route miles. The majority (>80%) of these direct delivery road segments would be restricted to dry season haul as a mitigation measure to reduce the potential sedimentation from these roads. The haul routes to Eames Swing Unit 1 and the east half (rock portion) of Eames Swing Unit 2 would be dry season use only. The increased haul rates would have negligible impacts to tread erosion and sedimentation from the road delivery segments that have bituminous surfacing.

A modified version of the road surface model from the Washington Standard Methodology for Conducting Watershed Analysis-Washington Forest Practices Board (WFPB, 1997) was used for this analysis. This model was used to determine the road segments with the greatest sediment production potential and to prioritize areas for road improvement (surfacing, culvert replacements and culvert additions) and to determine restrictions in haul season (all season haul vs. summer haul only).

Future culvert removals that may affect critical coho habitat have been consulted on and are allowed under the Aquatic Restoration Biological Assessment (ARBA) and related biological opinion (USDC, 2008). Culvert removals and barrier replacements beginning in 2013 or later will be covered under a revised biological assessment/opinion (ARBA II).

Direct sediment pulses are possible from removing stream crossing culverts at the four stream crossing sites (plus one site above stream 33-12) in Wild Fish Unit 1. The estimated sediment release would be one cubic yard or less for each instance based on previous field experience with these activities (USDI-BLM,

2003). This represents less than 1% of the estimated yearly background sediment rate in the sub-watershed. The controlled removal of the crossing fills would eliminate the risk of release of about 490 cubic yards of sediment in the Upper Wildcat sub-watershed if these sites were to catastrophically fail.

The risk of sedimentation to fish-bearing streams from yarding and timber harvest activities would be minimal because appropriate BMPs (USDI-BLM 1995, USDI-BLM, 2011) would be applied and no-harvest stream buffers (75-120 feet wide) would be designed to minimize sedimentation risk. Buffer widths of at least 10 meters have been shown to be an effective measure to prevent sediment delivery to streams in most cases (Rashin, et al., 2006). The no-harvest stream buffer widths would be based on yarding method and on-site conditions to mitigate the risk of sedimentation from yarding and to provide adequate shading to avoid stream temperature increases.

The minimum stream buffer width would be 75 feet on all streams (intermittent and perennial) within the project area. Cable yarding across stream channels would only be necessary in a few locations on streams 33-1 and 33-9 on Wild Fish Unit 1. Full suspension of logs across the streams and stream banks would be required. Ground based yarding would be limited by soil type, topography, soil moisture and extent. The units have existing trails that could be utilized to greatly minimize the creation of new trails. Machine trails would be located a minimum of 75 feet away from the outer edge of any no-harvest stream buffer. The yarding methods, buffer widths, unit acreage, mitigation measures and BMPs would be identical for all action alternatives.

Table 15 shows modeled increases in sediment delivery from haul on the projected haul routes over existing conditions. The base line represents existing traffic use with existing cross drain culverts and existing surfacing. The change represents a percent increase in cubic yards of sediment delivery on a yearly basis as a fraction of the yearly background rate (by sub-watershed). There would be no haul- related sediment increases for Burnt Bottle, Territorial or Pataha Ridge Unit 3 as these units have no road/stream connectivity.

The modeled change assumes that additional cross drain (relief) culverts are installed prior to timber haul on the haul routes to Wild Fish Units 1 and 2. This is to reduce the potential increase in sediment delivery prior to heavy haul use and to lower long-term sediment delivery rates below pre-project conditions as these segments return to normal traffic use.

A comparison among action alternatives indicates that the impacts to ACS Objective 5 would be very similar for these alternatives. The proposed haul routes, mitigation measures and BMPs to the project areas are identical for the action alternatives. There is no modeled difference in sedimentation from haul among the action alternatives since mitigation measures and BMPs would be implemented. The projected timber volume, amount of truck loads and duration of haul would be approximately 50% higher under Alternative 2 than under Alternative 4. Alternative 4 would be slightly lower (less than 5%) for these factors than Alternative 3.

Sediment increases from activities associated with installing cross drains, yarding, road renovation/ improvement and decommissioning, and removing stream crossing culverts would have a minor effect on total sediment delivery. The estimated sediment pulses from adding, removing, or replacing culverts represent less than one percent of the natural background rates in any of the sub-watersheds under any of the alternatives.

The sediment regime from these activities would be maintained under the action alternatives. The sediment increases would occur intermittently over the one-half year to three year span of the projects.

In the long term, there would be some restoration of the sediment regime. The proposed road and culvert upgrades and the removal of existing stream crossing culverts would result in lower levels of sedimentation (post haul) than existing conditions. The removal of the stream culverts would remove the long term risk of chronic or catastrophic fill failure from these sites. The decommissioning of roads that have a high risk of sediment delivery to streams would further reduce the potential for sedimentation.

Sub-Watershed/Watershed Effects:

ACS Objective 5 would be maintained at the sub-watershed and watershed scales. The removal of the five crossings on Wild Fish Unit 1 unit would eliminate the potential risk of about 490 cubic yards of fill failures in the Upper Wildcat Sub-watershed (Wildcat Creek Watershed) under all action alternatives. There would be no change in the number of stream crossing culverts removed or reduction in fill failure risk (stream crossing

sites) in the remaining eight sub-watersheds and three watersheds in which the proposed projects would occur.

Harvest and yarding activities would take place in eight sub-watersheds (see affected environment section) but primarily (81%) in the Upper Wildcat and Upper Wolf Sub-watersheds under all action alternatives. Less than 10 acres of yarding would occur in each of three of the sub-watersheds (Fern Ridge Lake, Lower Wildcat and Dogwood Creek). Less than 60 acres would occur in each of the other three sub-watersheds (Siuslaw Falls, South Fork Siuslaw and Lower Wolf Creek). The yarded areas would represent less than one-half percent of sub-watershed acres except for the Upper Wolf and Upper Wildcat Sub-watersheds (approximately 1% and 3% of these sub-watersheds, respectively). Sedimentation from harvest and yarding is expected to be negligible at a sub-watershed scale due to the project design features, the relatively small amount of area harvested and the filtering effects of the no-harvest areas.

Timber haul would occur in nine sub-watersheds but only three of the sub-watersheds (Upper Wildcat, Upper Wolf and Lower Wolf) would have road segments with sediment delivery potential under the action alternatives. The sediment rates from road use would go up in the short term for all three sub-watersheds, would decrease in the Upper Wildcat sub-watershed (post-harvest) in the long term, and would return to pre-project levels in the Upper Wolf and Lower Wolf sub-watersheds. The anticipated changes would be small at a sub-watershed scale. Approximately 0.60 miles of road with sediment delivery potential would be decommissioned in the Upper Wildcat sub-watershed.

ACS No. 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.*

Alternative 1 – No Action

ACS No. 6 would be maintained under this alternative as there are no potential impacts to threatened OC Coho or resident fish species related to altered stream flows. Existing conditions that affect low flows and peak flows would remain on the current trajectory. Low, late summer stream flows may be improved (restore objective) in coming years in Wolf Creek reaches adjacent to the Eames Swing Unit 2. Instream restoration work here in 1993 created pool habitats that can improve ground water charging in the hyporheic zone and potentially increase late summer flows (Crispell, 2008). The factors that affect evapotranspiration, interception, snow accumulation/snow melt and compaction would be subject to future BLM actions and actions planned by other entities. There would be no beneficial reduction of road/stream connectivity from adding cross drains and road decommissioning as in the action alternatives.

Alternatives 2, 3 and 4

Most studies of small drainage basins in the Pacific Northwest have shown that summer low flows usually increase in the short term following a reduction in forest or other vegetative cover (EPA 1991). Increases in summer flow can be beneficial to aquatic systems because greater flow can maintain cooler stream temperatures and retain more habitats during the warm summer months. The majority of the studies involve the effects from clear cut logging. The effects from thinning are likely to be lower because of less removal of overstory vegetation.

A reduction in vegetative cover reduces evapotranspiration and interception and can increase low flows (Ziemer, 1981) (Harr, 1976). These increases in low flows typically do not effect channel form or move sediment (Grant, et al., 2008). The creation of gaps and wildlife clumps under Alternatives 2 and 3 would also reduce forest overstory vegetation and these areas would remain open for a longer period than the thinned and untreated areas.

The gaps and wildlife clumps represent a very small percentage of the overall project area acreage. Wildlife clumps would total about 30 acres or less for any action alternative and would be scattered over six sub-watersheds. Wildlife gaps would total about 12 acres or less for any action alternative and would be scattered over five sub-watersheds for Alternative 3 and three sub-watersheds for Alternative 2. Gaps and wildlife clumps would represent 4% or less of unit acreage except for Pataha Ridge Unit 3 and Eames Swing Unit 1 under Alternatives 2 and 3 and Burnt Bottle under Alternative 3. The gaps and wildlife clumps for these LSR units would be 12% to 22% of unit acreage under Alternatives 3 and 0% (Burnt Bottle) to 18% under Alternative 2 (see wildlife section for estimated openings for each unit (by alternative)). Alternative 3 would have slightly more acreage in openings than Alternative 2. There would be no gaps or wildlife clumps under Alternative 4.

Alternative 2 is likely to have the largest response to low flows for the Matrix units at the site scale because the fewest number of existing trees would be retained. Alternatives 2 and 4 would retain a similar number of trees in the three LSR units and would have a similar response to low flows. Alternatives 2 and 3 would include thinning and the creation of gaps in the LSR units. Alternative 4 would retain a slightly lower number of trees than Alternative 3 in the Matrix units. Alternative 3 would retain the most trees for all of the units with the smallest departure from existing conditions. All action alternatives would maintain low flows with a possible short term (a few years to less than one decade) benefit of an increase in low flows at the site scale.

The types of management activities that can influence the size of peak flows include compaction (reduction of infiltration rates and soil moisture storage); change in evapotranspiration and interception (removal of forest canopy); increased snow accumulation and snowmelt (increased openings); and changes in the timing of flows (synchronization or de-synchronization of flows).

Watershed studies indicate that peak flows can be increased, decreased or remain unchanged from harvest activities depending on what part of the hydrologic system is altered and the degree and permanency of the alteration (Harr et al., 1979).

Compaction from roads and landings can reduce the infiltration of the soil and cause overland flow – potentially changing the timing and/or magnitude of flows. Increases to peak flow have been found where impermeable surfaces occupied more than 12% of a catchment watershed (Harr et al., 1975) (Harr, 1976). Existing compaction in the five sub-watersheds in which the majority (99%) of harvest is proposed is about 3% to 4% for existing roads and landings. None of the action alternatives would involve the construction of new roads so no new road compaction would occur. Existing landings from the previous harvests appear to be adequate for yarding so the construction of new landings and additional compaction from these activities would also be unlikely.

Existing yarding trails/roads would be utilized where feasible, and skid roads would be limited to 10% or less of ground based acres. Ground based yarding would also be limited to gentler slopes (<35%) and would only occur under dry soil conditions. Design features and BMPs would limit the added compaction to 2% or less of the area that is yarded with ground based equipment. The increase in compaction from skid trails is estimated to be less than 0.2% of unit acres for all units except for Eames Swing Unit 2 (<2.0% of unit acres), Pataha Ridge Unit 2 (<0.7% of unit acres), and Pataha Ridge Unit 3 (<0.5% of unit acres). New compaction from skid trails would likely be low because existing trails in these units would primarily be utilized.

Road connectivity to streams via stream crossings or cross drain culverts in close proximity to streams can influence the timing of water runoff and cause increases or decreases in peak flows (Wemple, 1994) (Grant et al., 2008) (Harr, 1989). There is no road/stream connectivity within six (Pataha Units 1, 2 & 3, Burnt Bottle and Territorial) of the nine units in the project area. There would be no increase in road/stream connectivity under any action alternative for any of the proposed project areas because new roads would not be constructed. Road/stream connectivity would be reduced by approximately 0.31 miles on the haul route to Wild Fish Unit 1 and about 0.17 miles on the haul route to Wild Fish Unit 2 because of the addition of cross drain culverts under any of the action alternatives. This would be beneficial at a site scale and would reduce road stream connectivity miles. This helps to restore the timing influence on flows (generally peak flows) that occur when flow is quickly routed down the road ditch line into a stream system versus more natural routing (slower) with sub-surface flow. The addition of the cross drains would place the ditch flow for these segments back on to the hill slope, thus restoring the flow regime towards more “natural” (or pre-road) conditions.

There would be minimal changes in the risk of peak flows occurring due to increased snow accumulation and snow melt under any of the action alternatives. Snow is not a significant contributor to annual precipitation but can occasionally occur at any elevation within the project areas. The areas that are most susceptible to rain-on-snow events in this area of the Oregon Coast Range are above 2,000 feet elevation (Greenberg and Welch, 1998). All of the harvest areas within the project area are lower than 1,800 feet elevation. The project areas are predominately located in the lowland and the rain dominated hydrologic zones due to the relatively low elevations.

Removal of vegetation from forest harvest decreases evapotranspiration and canopy interception losses in the short term. The effect is thought to be roughly linear to the amount of vegetation removed (Rothacher 1973) (Harr, 1976). The effect would gradually diminish (< 1 decade to 3 decades) as tree crowns grow and

occupy the new openings in the thinned areas. The thinning prescription (thin from below) for all units under all action alternatives would favor the retention of larger trees with fuller crowns.

The effect on flows from evapotranspiration reduction is most common in the smaller storms associated with late autumn and early winter. Once soil moisture recharges from these late autumn/early winter storms then the effect on flows typically disappears (Grant et al., 2008). In the rain-dominated areas in the project areas the largest storms usually occur in December, January or February when the differences in evapotranspiration demands between an unthinned stand and a thinned stand are at the lowest.

The reduction in interception from canopy removal can increase soil moisture levels and increase peak flows (Reid and Lewis 2007) and can occur in any season, although the fraction of moisture lost to evaporation decreases as storm magnitude and intensity increase (Rothacher 1963) (Spittlehouse ,1998). In rain dominated areas the interception loss effect is greater in the summer than winter (Rothacher, 1963).

The comparison of low flow effects due to changes in evapotranspiration and interception presented above would be similar in terms of effects on peak flows. The number of thinned acres would be the same for all the action alternatives, with different levels of retention based on alternative. Alternative 2 and Alternative 4 would retain the fewest number of existing trees of the action alternatives in the LSR units so changes to evapotranspiration and interception are potentially higher than for Alternative 3. Alternative 2 would also retain the fewest number of trees in the Matrix units. Alternative 4 would retain a slightly lower number of trees than Alternative 3 in the Matrix units; therefore, evapotranspiration and interception effects are expected to be similar.

Large peak flows (return intervals greater than six years) do not appear to be significantly affected by logging or roads in the small catchment studies in the region (Rothacher, 1973) (Harr 1976) (Grant et al., 2008). The potential for peak flow effects can vary for different stream types (Grant et al., 2008). The cascade and step pool channel types have a relatively low risk of channel response to peak flow changes (Grant et al., 2008). These channel types make up the overwhelming majority of stream types in the project areas. Hydrologic impacts such as peak flow increases are presumed to decrease with intensity of treatment (100% clear cut having the greatest impact and thinning treatments having the lowest impact) although the studies in the Pacific Northwest did not fully examine the differences (Grant et al., 2008). Changes in the size of peak flows typically decline in magnitude in a downstream direction because of a dilution effect (lack of change in other tributaries).

All alternatives under this plan would maintain the flow regime for peak flows. All action alternatives would be a low risk for change due to peak flows under the Washington Forest Practices Board (WFPB, 1997) and Oregon Watershed Enhancement Board (Watershed Professionals Network, 1999) methodologies.

Alternatives 2, 3, or 4 would have no effect on fish populations found in active stream reaches associated sale units due to protections provided by designated 75 foot minimum stream buffers. No-harvest buffers would maintain hyporheic flow levels at current levels which support salmonid and other aquatic species in project area streams.

Potential impacts to listed “Threatened” Oregon Coast Coho salmon and resident cutthroat trout embryo incubation within the near-surface hyporheic zone (Tonina, D. and Buffington, J. M., 2005) in reaches adjacent to the Eames Swing Unit 2 would not be expected to occur under the action alternatives.

Stream flow volume in adjoining riffle and pool habitats within action area riparian zones are influenced by hyporheic flow patterns (Winter et al, 1998). These stream habitat flows would be expected to be maintained because of the no-harvest stream buffers.

Sub-Watershed/Watershed Effects:

ACS 6 would be maintained at the sub-watershed and watershed scale. Almost all (99%) of the proposed harvest would occur in five (Upper Wildcat, Upper Wolf, South Fork of the Siuslaw, Siuslaw Falls and Lower Wolf) of the sub-watersheds and three of the watersheds (Wildcat Creek, Wolf Creek and Upper Siuslaw River). Harvest in three (Lower Wolf, Siuslaw Falls and South Fork of the Siuslaw) of these five sub-watersheds would occur on a relatively small number of acres (representing less than 0.3 of the respective total sub-watershed areas). The few acres harvested in the remaining three sub-watersheds (Lower Wildcat Creek, Dogwood Creek and Fern Ridge Lake) represent less than 0.1% of the respective sub-watershed areas. In the short term, relatively small increase in low flows would not be measureable at either of these scales.

The reduction in road/stream connectivity of about 0.5 miles in the Upper Wildcat sub-watershed would have a beneficial, long term cumulative effect, but the change to flows would be small at these scales. There would be no net change in road/stream connectivity for any of the other sub-watersheds that surround the project areas.

There would be no new road construction under any of the action alternatives so there would be no net increase in compaction from roads. The increase in compaction from construction of skid trails would be less than 0.01% of any of the sub-watershed total acres following implementation of BMPs which would likely result in negligible effect to flows at these scales. It is unlikely that there would be differences in effects between the action alternatives at these scales for these factors.

WILDLIFE

ISSUE 2: <u>What are the effects of management actions on late-successional and early seral habitat and forest habitat quality?</u>

An objective for thinning, gap creation and dead wood creation is to improve the quality/diversity of forest habitats, especially late-successional and early seral habitats, by reducing overstory canopy cover. These treatments encourage tree growth, multi-layered and multi-species canopy development, and dead wood habitats which are important components of late-successional forest and forest habitat quality and benefit spotted owls and their prey species. These treatments, especially gap creation, also encourage understory development of shrubs, grasses and forbs which are important for species that are dependent on early seral habitat, including prey species for the spotted owl.

Measures:

- Acres of gap treatments in LSR and RR lands.
- Quantity and quality of snags and CWD being created.

ALTERNATIVE 1 – NO ACTION

Forest habitat would continue to develop mostly as dense single story Douglas-fir monocultures. Although trees would grow, the attributes of high quality forest habitat such as multi-layered, multi-species canopies with large conifers and a mix of hardwood trees would develop at rates slower than natural stands have historically achieved for the same type of habitat (Organon: Hann et al., 2010) (Tappeiner, Huffman, & Marshall, 1997) (Poage, Weisberg, Impara, Tappeiner, & Sensenig, 2009).

Individual trees in young forests would continue to compete for limited resources, especially light. Trees would grow taller as they strive to obtain sufficient sunlight, but diameter growth would continue to slow in response to loss of crown and reduced ability to photosynthesize. The trees would remain susceptible to insects, disease and windthrow as inter-tree competition intensifies over time. The abundance of understory grasses, forbs, shrubs or hardwoods would remain very low. Inter-tree competition would result in the mortality of the most severely suppressed conifers and provide snags and eventually down wood over several years (50 to 100 years).

A study in the Oregon Coast Range found the following conditions in unthinned stands: live crown to bole length and crown ratios are continually dropping; diameters are still increasing but at progressively much slower rates than adjacent thinned plots; available understory light remains less than 5%; and understory brush and shrub abundance remain very low (Chan, et al., 2006). As over story canopy cover increases above about 70% to 80%, the majority of under story plant species succumb to the darkness, and habitat quality is drastically reduced. The density of spotted owl prey species would remain low, especially those associated with early seral habitats such as woodrats, rabbits and chipmunks, and the cover needed by foraging spotted owls (i.e. canopy cover 20-40 feet above the ground) would remain low.

The need to protect people from wildland fire will continue to reduce the potential for the most common natural disturbance. Fire which is a major factor in the development of high quality forest habitat or creation of early seral habitats through natural processes. Industrial forestry on private land would not compensate for the lack of early seral habitats on public land because the quality of early seral habitats on private timberland is very low, primarily due to the low abundance of grasses, forbs or deciduous vegetation on the majority of private timberlands.

ALTERNATIVES 2, 3, AND 4

Alternatives 2 and 3 would create openings (gaps) in the overstory canopy through harvest and dead wood creation (clumps). Openings would vary in size from 1/5 to 1 acre immediately after thinning. Although they would shrink over time as the crowns of surrounding over story trees expand, these created openings would persist for many decades. About fifty years after their creation 1/4 acre openings in the overstory crowns would be 20% smaller and one acre openings 10% smaller. Alternative 4 would not create openings with gaps or by clumping dead wood creation (see Table 15 for acres and percentages of gaps and clumps created within land use allocations). Alternative 3 would create the most gaps and clumps of all alternatives.

The types of plants thriving in openings would generally vary. Larger openings would have more species that thrive in more direct light and smaller openings would have more species that thrive in low to moderate amounts of direct light. The amount of shading from adjacent trees would increase over time as overstory trees grow taller; therefore the abundance of plants that thrive in direct light would initially increase and then gradually decrease in created openings. Grasses, forbs and shrubs would initially dominate openings, and then hardwood and conifer trees would increase dominance as they grow and intercept more and more light. Sensitive species that are associated with grass/forb, shrub, sapling and hardwood habitats would benefit from gap treatments in LSR and RR land use allocations. Species such as olive sided flycatchers and rufous hummingbirds would benefit from these types of habitat.

Thinning also benefits grass/forb, shrub and seedling/sapling habitats. Although created openings would affect much fewer acres than thinning (only 4% of acres thinned), the open conditions from created openings would persist longer than the open conditions in thinned areas. Gap creation would have greatest long term benefit on grass/forb, shrub and seedling/sapling habitats followed by moderate thinning, and then light thinning.

Table 16: Acres and percentages of gaps and clumps in land use allocations by unit.

Land Use Allocations (LUA)	LUA thinning acres	Alternative 2			Alternative 3			Alternative 4		
		Gap acres	Clump acres	Openings: % of LUA thinning acres	Gap acres	Clump acres	Openings: % of LUA thinning acres	Gap acres	Clump acres	Openings: % of LUA thinning acres
GFMA	257	0	0	0%	0	0	0%	0%	0%	0%
Riparian Reserve (adjacent to Matrix)	267	0	16	6%	0	12	5%	0%	0%	0%
LSR	226	11	12	10%	14	20	15%	0%	0%	0%
All LUAs	750	11	28	5%	14	32	6%	0%	0%	0%

Dead wood (snags and down wood) is another habitat element that is important to forest habitat quality. Dead wood creation would reduce overstory canopy cover and provide habitat for animals that require snags or down wood for their survival. Snag and down wood creation is proposed in LSR and RR land use allocations. The amount and distribution of dead wood creation varies by alternative. Tolerance levels defined in DecAID (Mellen, et al., 2012) were used to guide the amount and distribution of dead wood creation.

Dead wood would be clumped in Alternatives 2 and 3 and well distributed in Alternative 4. Tolerance level is the same in RR next to Matrix in all action alternatives. Tolerance levels are varied in LSR; 50% in Alternatives 2 and 4 and 80% in Alternative 3.

Table 17 shows the amount of trees that would be used to create dead wood for different distribution strategies.

Table 17: Amount of trees that would be used to create dead wood.

	Alt 2 clumped	Alt 3 clumped	Alt 4 well distributed
Trees for snags & down wood	1,200 (no CWD in Burnt Bottle)	1,900	9,500

The size and number of clumps that could fit in the units where intent was 50% or 80% tolerance levels were limited by 1) the goal to create openings (gaps) without dead wood, 2) the constraints applied to

minimize potential adverse effects to ESA-listed species northern spotted owl and marbled murrelet, and 3) the need to constrain opening size near streams to maintain water quality. Spotted owl constraints limited the size of clumps to less than about one acre in all areas, and marbled murrelet constraints limited the size of clumps to <1/4 acre within one site tree (220 feet) of potential nest trees. Opening size was limited to less than 1/4 acre within one site tree of streams to help maintain water quality.

Therefore, where possible, clumps <1/4 acre would be grouped over approximately 1-1/2 to 2 acre areas in order to approximate 50% tolerance level. If clump sizes or number of clumps needed for 80% tolerance levels would not fit spatially, then 50% tolerance levels were substituted as much as possible.

Although Alternative 4 would have more trees converted to snags, the ability for certain animals to use all of this good habitat is limited by territorial behavior regardless of how many snags are present (i.e. downy woodpeckers will defend a territory of about five acres and prevent other downy woodpeckers from using snags in their territories, thus snags excess to the needs of a territorial pair of these woodpeckers would not be used by other downy woodpeckers). Although more acres of dead wood habitat would be created in Alternative 4, high densities of snags across entire units are not needed to attain species persistence goals for animals that depend on dead wood for their survival. The higher the tolerance level of snag patches as in Alternatives 2 and 3 (50% to 80% tolerance level) the more species of snag users are likely to benefit and thrive within these stands, creating pockets of high diversity in otherwise homogenous stands.

ISSUE 3: <u>What are the effects of management actions on northern spotted owl habitat?</u>

Spotted owl foraging habitat is defined as forest with sufficient open space below the canopy for northern spotted owls to fly and canopy closure greater than 60% (generally stands >40 years of age). Habitat quality improves where habitat elements increase, such as old forest, hardwood patches, multi-layered multi-species canopies, number of trees >31 inches dbh and amount of snags and down wood >20 inches dbh. Nesting/roosting habitat is defined as foraging habitat with a high incidence of large live trees with various deformities (i.e. large cavities, broken tops, mistletoe infections and other evidence of decadence). Conifer forests above 40 years of age with minimum 40% canopy closure are considered dispersal habitat for spotted owls.

Forest stands proposed for thinning are low quality foraging habitat less than 80 years of age with a few large remnant trees. Thinning would impact spotted owl habitat and analysis of this issue allows for comparison of the effects of thinning treatments between alternatives.

Measures:

- Acres of spotted owl foraging and dispersal habitat thinned.
- Acres of spotted owl proposed critical habitat impacted.

Alternative 1 – No action

Habitat for spotted owls would be maintained however, the stands would remain of poor quality because many large remnant trees or their unique structures would die from competition. Development of high quality forest conditions from young overstocked monoculture stands would take much longer to develop under the No Action alternative. Additionally, restoration of early seral habitats (grass, forb, shrub and hardwood trees) and large dead wood would likely be delayed for many decades in these stands.

Alternatives 2, 3, and 4

Development of diverse high quality forest habitat requires controlling the density of overstory trees (Chan, et al., 2006). High overstory conifer canopy cover means low habitat quality for the majority of species that use conifer forest habitats, including the northern spotted owl. Canopy cover with multi-layered canopies provide high quality forest habitat, especially if hardwood trees are a major component. For example, two of the most important prey species for the spotted owl are strongly associated with multi-layered canopies and deciduous trees or shrubs; these species include the flying squirrel (Wilson, 2010) (Smith, 2007) (Carey A. B., Kershner, Biswell, & Dominguez De Toledo, 1999) and the woodrat (Carey, Maguire, & Biswell, Distribution and Abundance of Neotoma in Western Oregon and Washington, 1999).

Stands proposed for thinning are considered low quality foraging habitat because many important components of foraging habitat are missing from these stands (see Table 13 in the affected environment). However, resident spotted owls are known to use these stands. These stands also function as spotted owl dispersal habitat. The stands do not have adequate potential nest trees to classify these stands as nesting habitat.

All action alternatives would reduce canopy cover, which may reduce the security for spotted owls in the low quality foraging habitat proposed for thinning. This reduction in foraging security may increase as canopy cover decreases. Although spotted owls may not use some thinned areas for a period of time, the expected increase of prey abundance in thinned areas would provide more prey for owls at the edge of thinned areas where canopy cover remains high, such as un-thinned riparian buffers and adjacent stands. (Olson, et al., 2004) (USDI-FWS, Revised Recovery Plan for the Northern Spotted Owl, 2011, pp. A-11) concluded that while mid-seral and late-seral forests are important to spotted owls, a mixture of these forest types with younger forest and non-forest may be best for spotted owl survival and reproduction in the Central Oregon Coast Range.

Furthermore, short-term adverse effects are not certain to occur from reducing canopy cover to approximately 50% because available science that could be used to help determine effects is conflicted. Information from the Oregon Coast province (Meiman, 2003) found owls avoided recently thinned stands. Conversely, two landscape scale studies indicate owls should continue to use thinned stands if greater than 40% canopy cover is retained. These landscape studies, one in northern California (Zabel, 2003) and the other in the Oregon Klamath province and in the Western Oregon Cascades (Dugger, et al., 2004) (USDI-FWS, Revised Recovery Plan for the Northern Spotted Owl, 2011, p. A11) found owls using stands with canopy covers as low as 40%. Other studies that incorporated stands with less than 60% canopy cover include a number of post-fire studies, and these found “Spotted owls have been observed foraging in areas burned by fires of all severity categories” (Clark, 2007) (Bond, et al*.,* 2009) (USDI-FWS, Revised Recovery Plan for the Northern Spotted Owl, 2011, p. A11).

Additionally, a spotted owl pair (Alsea River) on the Siuslaw Resource Area nested and produced young in 2012 in a nest patch and core area that were thinned in the previous two years to 50% to 65% canopy cover in about 40% of the nest patch and 65% of the core area. The nest patch also includes about 30% nesting habitat (old growth) and 25% non-habitat (recent clear cut on private land), and the core area also includes about 10% nesting habitat (old growth) and 25% non-habitat (private) clear cut. In other words, a resident pair of spotted owls successfully nested in a core area where over 80% of the suitable habitat was thinned to 50% to 65% canopy cover in the previous two years.

Moderate thinning in Alternative 2 and portions of Alternative 4 would have the greatest amount of reduction to spotted owl security compared to light thinning in Alternative 3. However, moderately thinned areas would improve canopy density 20-40 feet above the ground, thus security for spotted owls would improve faster than lightly thinned areas because the more open conditions of moderately thinned areas would develop multi-layered conditions faster.

For recovery of the northern spotted owl, improving habitat quality is probably more important than potential short-term adverse effects from canopy cover reduction because more high quality habitat could help the spotted owl survive its competition with the barred owl.

Each alternative would affect the same acres; however, effects to spotted owls could vary due to different thinning intensities. There would be potential for more short-term adverse and more long-term beneficial effects from Alternative 2 in the LSR portions of Alternative 4 than Alternative 3 and non-LSR parts of Alternative 4. Adverse effects would be from reducing canopy cover below 60%, to about 50%. Alternatives 3 and non-LSR portions of Alternative 4 would have less short-term adverse and less long-term beneficial effects.

For example, 10% of the spotted owl habitat in the core area of the Cedar Creek spotted owl site would be affected by treatments in all action alternatives. However, each action alternative could have different effects to this site. Moderate thinning of Alternative 2 and portions of Alternative 4 in foraging habitat of Pataha Unit 3 may reduce the potential for Cedar Creek owls to use this 10% of their core area for about a decade. Light thinning of Alternative 3 and most of Alternative 4 is less likely than Alternative 2 to reduce the potential for spotted owl use of this area because light thinning maintains >60% canopy cover. However, 20 to 30 years after this treatment, moderate thinning would have created higher quality habitat for spotted owls than light thinning.

Thus, Alternative 2 is the best alternative for restoring high quality foraging and nesting habitat for the northern spotted owl is the alternative with the most potential short-term adverse effects to spotted owl habitat. Alternative 3, with its higher canopy cover retention, would have less short-term adverse effect to spotted owls, but it would also have less long-term benefits to diameter growth and habitat quality.

Critical habitat for the northern spotted owl

All units are within the designated 2012 critical habitat for the northern spotted owl except Territorial and Wildfish unit 2.

Units that are located in 2012 critical habitat are in the ORC 3 sub-unit which consists of approximately 72,420 acres on Siuslaw Resource Area. The proposed action considers thinning within approximately 617 acres or 1% of the suitable habitat in this critical habitat area.

The potential for adverse effects to critical habitat are measured at multiple scales, the scale of of spotted owl territories, at the 500 acre scale, and at the sub-unit scale. The USFWS determines effects to critical habitat at the sub-unit scale, which in this case is the Oregon Coast critical habitat unit ORC 3.

Alternative 2 and those portions of Alternative 4 that would thin to canopy cover of about 50% are likely to adversely affect (LAA) the demographic value of critical habitat ORC 3 because of the adverse effects to northern spotted owl territories in critical habitat from reducing canopy cover to below 60%. However, this is a short term effect; canopy cover will recover from about 50% to over 60% in approximately 5 to 10 years. Only one of these territories –Doe Creek- is reasonably certain to be active, and the project only affects a small portion of territories in critical habitat. Therefore *this project will not appreciably reduce the likelihood of these areas to continue to fulfill their intended conservation purpose because of the relatively small area affected in the Oregon Coast Range critical habitat (USDI-FWS BO 01EOFW00 2013F, 2013, pp. 138-141).*

Light thinning of alternative 3 and portions of Alternative 4 may affect but are not likely to adversely affect (NLAA) critical habitat because light thinning would not downgrade low quality foraging to dispersal habitat; post-thinning canopy cover would remain above 60%.

Alternative 2 or the LSR portions of Alternative 4 would not adversely affect critical habitat at the 500 acre scale because none of the units would reduce the amount of suitable habitat (foraging or nesting/roosting) below 50% at roughly the 500 acre scale.

Potential adverse effects are not likely to appreciably affect Siuslaw Resource Area's ability to support spotted owl recovery. The overall effects from thinning within a small portion of owl territories and within 1% of suitable habitat in critical habitat ORC 3 sub-unit will have minimal effects at the sub-unit scale and this project is not likely to appreciably reduce the ability of this sub-unit to contribute to the recovery of the species at the larger range wide scale (USDI-FWS BO 01EOFW00 2013F, 2013, p. 141).

Over the long term the action alternatives are expected to have beneficial effects to the spotted owl and its critical habitat, and the areas treated with moderate thinning are expected to have the greatest benefits. Moderate thinning of Alternative 2 as well as the LSR and RR portions of Alternative 4 would affect some aspects of foraging habitat, resulting in short term adverse effects because canopy cover may be reduced below 60% and long-term beneficial effects by improving the quality of habitat at the stand scale. At larger scales these areas may affect but are not likely to adversely affect proposed critical habitat because of the relatively small amount of area affected (< 1% of the critical habitat sub-unit affected) by short term canopy cover reductions, and long term beneficial effects. Alternative 3 and Matrix portions of Alternative 4 may affect but are not likely to adversely affect proposed critical habitat because these areas would retain at least 60% canopy cover.

BOTANY/INVASIVE SPECIES

ISSUE 4: What are the effects of management activities on the spread of invasive species?

Management actions such as thinning that cause a decrease in canopy closure, and road and landing work, generally lead to an increase in invasive non-native and noxious weeds, as reported in published literature and from field observations within the Eugene District.
Analysis of this issue will determine the increase of non-native and noxious weed cover resulting from ground disturbing activities and decreases in canopy closure proposed in the action alternatives.

Measure:
Acres with probable cover of noxious weeds caused by thinning, road work and landings.

Weed infestation is likely under the action alternatives, and would persist for at least 20-30 years in thinning units although in gradually decreasing amounts. Thysell and Carey (2001) found about 10.2% cover of exotic species (9.4% higher than controls) one year after thinning in the Puget Trough region. Thinned stands on mostly BLM lands in western Oregon had 0.01% to 0.3% exotic species cover, measured 10-25

years after thinning (Muir et al., 2002). Resulting weed cover in the project area is hard to predict due to local conditions and the vagaries of seed dispersal and establishment.

Non-native and noxious weed abundances were modeled based on acres of disturbance in the alternatives, and the resulting weed cover. Resulting weed cover was estimated from current observations in the timber sale units and observations of nearby recently thinned (3-14 years ago) areas (see Table 18). Only roadside weed cover adjacent to and within 100 feet of timber sale units was considered because most increase in weed cover would be expected on these roadsides due to a more open canopy after thinning. Changes in roadside weed cover further from the units are expected to be minimal.

A model was used to estimate the dispersed acreage of weeds. The model multiplies the acres of disturbance by the percent cover expected after thinning and road work (Table 18). This acreage represents the total amount of weeds scattered over the thinned area. Dispersed acreage is the best way to compare the result of different treatments (i.e. a large area of less intensive disturbance compared to a small area of more intensive treatment). For example, 100 acres at 5% cover and 10 acres at 50% cover would both calculate to five acres of weeds.

The largest accumulations of weeds in Table 18 are blackberries in Burnt Bottle, followed by Scotch broom in Wild Fish Unit 2, blackberries in Territorial and weeds in general in the very large Wild Fish Unit 1. Roads seem to have a disproportionate effect for their area. Alternative 2 generally would produce the most weeds, due to the heavier thinning. Alternative 2 also has gaps, which Alternative 4 does not. Features in Alternative 2 that mitigate the possible rapid spread of blackberries include not creating gaps in the Burnt Bottle unit and limiting the snag patches to less than 1/5th of an acre located more than 200 feet from existing blackberry infestations. Alternatives 3 and 4 would have fewer dispersed acres of weeds than Alternative 2 due to the lighter thinning prescriptions, even though mitigation measures for the Burnt Bottle Unit would not occur.

Table 18: Estimated dispersed acres of weeds under the alternatives.

	Noxious Weeds Dispersed Acres		Non-native Total Dispersed Acres	
	Roadsides	**Off-Road**	**Roadsides**	**Off-Road**
Alternative 1 (current condition and no action)	7	16	18	27
Alternative 2 (heavier thinning; gaps and snag clumps)	18	58	29	90
Alternative 3 (lighter thinning; gaps and snag clumps)	15	43	27	65
Alternative 4 (lighter thinning; but more snag creation)	15	47	27	67

*Dispersed acres of weeds represents the infested acres multiplied by the percent cover in those acres. Noxious weed cover is included in the non-native total.

Cumulative effects and long term trends

Studies indicate that noxious weeds are generally spreading on federal lands (Asher and Mullahey, Weed Science Society of America Congressional Briefing, 1997). The Eugene District's weed treatment program counteracts this spread to some degree. The Eugene District has an active weed control program, and manual methods are used on certain ODA listed noxious weeds. Hoeing or grubbing, if repeated, appears effective on false brome and knapweeds. Scotch broom can be cut, but seed banks are prodigious which contribute to continued infestations after removal. Himalayan blackberry is also sometimes cut, but re-sprouts quickly, and is widely dispersed by birds. Most weed species decline as forest shade increases, which would occur under all the action alternatives. Exceptions would occur where false brome or other shade tolerant weeds obtain a foothold, possibly holding sites indefinitely.

Mitigation is prescribed by the risk assessment in BLM Manual 9015 – Integrated Weed Management. The assessment considers the likelihood and consequence of spread (level of effects) to come up with a risk rating. For areas with a high risk rating, control of existing infestations prior to and after project activity is prescribed. For the large blackberry and Scotch broom populations, and scattered false brome sites, pre-project control is expected.

Blackberry Control

Control measures for blackberries in Alternative 2 would include cutting blackberries before and after thinning, slash piling and burning after the thinning and continued blackberry cutting as necessary. Seeding with native grass and tree planting to provide for competitive exclusion would occur after pile burning.

The treatment methods proposed in Alternative 2 would be particularly effective for blackberry control because the piling and burning of slash would occur in strategically placed areas. Any blackberry plants underneath burn piles should be killed. Alternative 2 also includes planting native grass and trees throughout the units. The grasses should help suppress blackberry seedlings and root sprouts, while the planted trees should eventually suppress the overall growth of blackberries by providing increasing shade in the long term.

In Alternatives 3 and 4 blackberries would be cut and some grubbing may occur. These treatments would not be as effective as treatments proposed in Alternative 2.

In all action alternatives, if necessary, blackberry cutting may occur twice per year, in June or July and September or October, or only once if adequate control is obtained to preclude fruiting or vegetative spread, and possibly to reduce the extent of infestations. Grubbing out of blackberry root crowns is effective and may also be employed in some areas, but this measure is generally not considered practical on a large scale. Herbicides are not approved for use on the Eugene District at this time but might possibly be used at a later time.

HAZARDOUS FUELS

ISSUE 5: What are the effects of management activities such as thinning on the amount of hazardous fuels in the Wildland-Urban Interface (WUI)?

The units being considered for thinning are identified as WUI by the Lane County Community Wildfire Protection Plan, where wild fire is of particular concern. Proposed management activities such as thinning may alter the amount of slash (hazardous fuels) within the WUI, thereby affecting the risk of catastrophic loss of property and resources both on BLM lands and adjacent private lands, should a fire occur. Analysis of this issue allows for comparison of the risk of fire occurrence among alternatives.

Measure:
Hazardous Fuel Models in WUI over time.

ALTERNATIVE 1

There would be no immediate impact on fuels, but within an estimated 5 to 20 years, increased conifer mortality would occur. This would result in the fuels moving from a TU2 to a TU5 (see Table 18 for descriptions of fuel models), increasing the potential for a high intensity stand replacing fire, including crown fires, than if the stands were thinned. Those units which are currently experiencing competition mortality, including Eames Swing Unit 1 and Pataha Ridge Unit 3, are expected to transition to the TU5 fuel model within the next 5 years. Those units with the lowest relative densities, including Pataha Ridge Unit 2 and Wild Fish Unit 2, are expected to transition to TU5 within 20 years.

ALTERNATIVE 2

The forest stands being thinned but not underburned (all units except Burnt Bottle and Territorial) would convert from the current TU2 fuel model to a SB2, increasing the potential for a high intensity stand replacing fire. The potential for crown fire would be low due to reduced crown bulk-density. As the slash decomposes and is replaced by live fuels over 7-9 years, it will transition back to a TU2 fuels model.

The Burnt Bottle Unit would convert from a TU2 to a SB2 when thinned, then immediately convert to a TL1 when underburned. This would eliminate the potential for a high intensity stand replacing fire for the next several years. Depending upon the success of the subsequent grass seeding, the unit may transition to a GS3 fuel model. This grass-shrub fuel (GS3) produces moderate flame lengths and a high rate of spread, but it is much less resistant to control compared to TU2 and SB2. The GS3 fuel model would be maintained as long as the unit is underburned every 2-3 years. It the absence of fire, it would transition back to TU2 after 3 years.

ALTERNATIVES 3 AND 4

For all the action alternatives, the forest stands being thinned using ground based yarding and cable yarding methods in Matrix and LSR land use allocations would convert from the current TU2 fuel model to a SB2. As the slash decomposes and is replaced by live fuels over 7-9 years, it would transition back to a TU2 fuel model.

Table 19: Fire characteristics by fuel model under 90th percentile conditions.

Fuel Model	Description	Flame Length (feet)	Rate of Spread (feet/min)
TU2	Moderate load, humid climate timber-shrub	3.5	12
TU5	Very high load, dry climate timber-shrub	7.5	10
SB2	Moderate load activity fuel	6.2	16
TL1	Low load compact conifer litter	0.6	1
GS3	Moderate load, humid climate grass-shrub	6.7	26

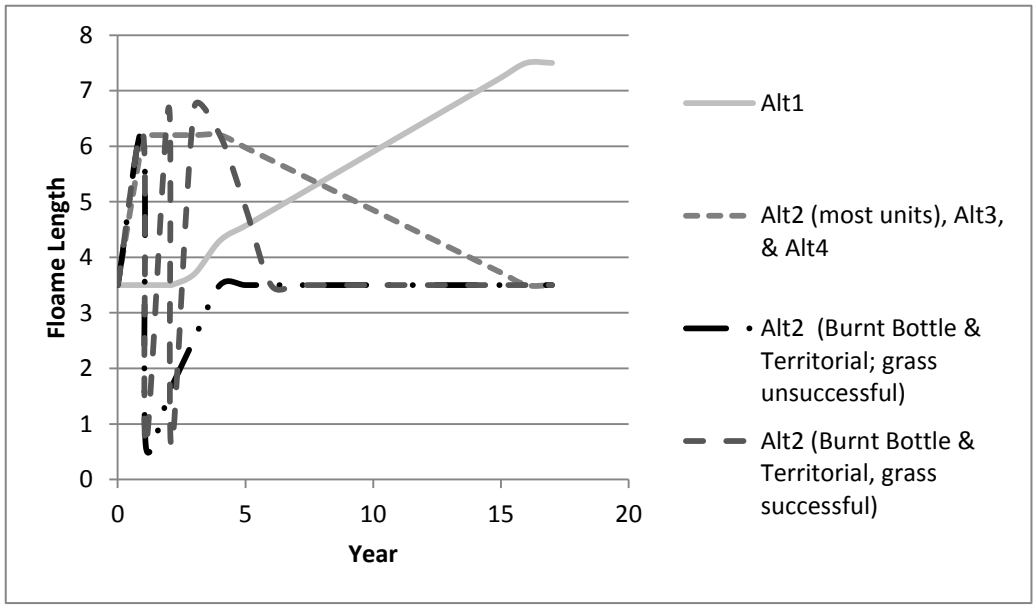

Figure 1: Potential flame length by alternative and success of grass establishment

CONSULTATION AND COORDINATION

List of Preparers The alternatives were developed and analyzed by the following interdisciplinary team of BLM specialists.

Name	Title
Steve Steiner	Hydrologist
Karin Baitis	Soil Scientist
Randy Miller	Wildlife Biologist
Leo Poole	Fish Biologist
Doug Goldenberg	Botanist
Peter O'Toole	Silviculturist
Crystal Perez-Gonzalez	Logging systems
Justin Pattison/Luis Palacios	Engineer
Eric Johnson	Deputy Fire Staff
Tom Jackson	GIS
Sharmila Premdas/Dana Wilson	NEPA Planner, EA author

U.S. FISH AND WILDLIFE SERVICE (USFWS)

ESA CONSULTATION

Consultation with the USFWS is required because the northern spotted owl and the marbled murrelet are found in the action area and management actions may have effects on these species. Both are currently federally listed threatened species.

Northern Spotted Owl: Consultation is completed with the service within the 2013-2014 programmatic consultation documents (USDI-FWS LOC-01EOFW00-2012-I-0214, 2013) (USDI-FWS BO 01EOFW00

2013F, 2013). Alternatives 2 and 4 would likely adversely affect northern spotted owl habitat in the short term due to moderate thin prescriptions. This may cause the habitat to function as dispersal habitat rather than low quality foraging habitat for a few years before gaining characteristics of well-functioning foraging habitat. Moderate thin prescriptions would occur in Matrix, LSR and RR land use allocations for Alternative 2. In Alternative 4 the creation of large numbers of CWD and snags within LSR units and RR would result in short term adverse effects on northern spotted owl habitat. In the long term both alternatives are likely to benefit spotted owl habitat because of the creation of high quality habitat attributable to the actions proposed for implementation. Alternative 3 would be not likely to adversely affect northern spotted owl habitat because a lighter thinning would be applied in all thinning units that maintains >60% canopy cover in foraging habitat.

Marbled Murrelet: All action alternatives would not likely adversely affect marbled murrelet habitat by maintaining 40% canopy closure and by maintaining the function of marbled murrelet nesting structure within the thinning units.

The Biological Opinion states (p. 143): "it is the Service's biological opinion that the activities, as proposed, are not likely to jeopardize the continued existence of the spotted owl or murrelet, and are not likely to adversely modify spotted owl or murrelet critical habitat."

NATIONAL MARINE FISHERIES SERVICE (NMFS)

ESA CONSULTATION

The proposed thinning actions may affect, but are not likely to adversely affect, coho salmon and their designated critical habitat in the Wolf Creek 5th-field watershed. Therefore, the BLM will conduct informal consultation with NMFS prior to reaching a decision on the proposed action for Eames Swing Units I and II. The proposed thinning actions occurring in the Wildcat Creek and Upper Siuslaw 5th-field watersheds as described and analyzed in this environmental assessment would have no effect on coho salmon and their designated critical habitat in the Wildcat Creek and Upper Siuslaw 5th-field watersheds. Burnt Bottle, Territorial, Wildfish and Pataha Ridge are located in the Wildcat Creek and Upper Siuslaw 5th field watersheds.

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) under the Act. The proposed thinning action as described and analyzed in this environmental assessment would be not likely to adversely affect coho salmon and their critical habitat for Eames Swing Units I and II and would have no effect on the Wild Fish, Pataha Ridge, Bottle Creek and Territorial units.

TRIBAL COORDINATION

The Bureau of Land Management Siuslaw Resource Area sent scoping letters to the Confederated Tribes of Siletz, the Confederated Tribes of the Grand Ronde and the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians during the scoping period. No response was received. Copies of the EA will be mailed to them for public comment.

CULTURAL RESOURCES

The planning area is located in the central Oregon Coast Range. Cultural survey techniques are based on those described in Appendices A and D of the Protocol for Managing Cultural Resource on Lands Administered by the Bureau of Land Management in Oregon. Each project would be evaluated by the cultural resource specialist to determine which appendix is appropriate to use for conducting cultural surveys. A large part of the planning area falls within the Coast Range Province and is covered by Appendix D, which mandates post-project surveys in high potential zones (typically slopes of 10% or less) as well as some post-project surveys in moderate potential zones (typically slopes of 20% or less that are associated with specific topographic or cultural features). Pre-project background research has determined the high potential for a historic railroad grade existing within the Pataha Ridge project area. Prior to project execution archaeologists will attempt to locate, thoroughly record and evaluate the historic resource and determine its eligibility for the National Register of Historic Places. If determined to be eligible, mitigation measures would be implemented in order to avoid impacting the feature. If during or prior to project implementation any pre-

historic, historic or paleontological resources were discovered, all project activities would cease until the archaeologist can assess the significance of the discovery.

PUBLIC PARTICIPATION

SCOPING

A scoping letter was mailed out in August 2011 to local businesses, environmental groups, government agencies and individuals, announcing that BLM was seeking feedback about issues or concerns regarding the Re-Thin EA. Three comments were received. Comments were generally in support of commercial thinning, no new roads, economic viability and socio-economic benefits, snag creation, adequate stream buffers and retention of un-thinned areas with treatments to encourage multiple species.

EA REVIEW

This Environmental Assessment and preliminary Finding of No Significant Impact statement are being made available for public review and comment for a 30 day period. The EA will be sent to interested groups, businesses, agencies and individuals. In addition the EA will be posted on the Eugene District website.

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APPENDIX I
Alternatives Table

	Alternative 1 No Action Alt	Alternative 2 Long term wildlife benefits, less frequent disturbance	Alternative 3 More frequent disturbance	Alternative 4 Minimal disturbance
Matrix and associated riparian reserves	Maintain current conditions	Thin from below to ~RD of 25 to 27	Thin from below to ~RD of 30 to 38	Thin from below to ~RD of 30 to 38
LSR and associated riparian reserves	” “	Thin from below to ~RD of 25 to 27	Thin from below to ~RD of 30 to 38	Thin from below to ~RD of 30 to 38
LSR	” “	Small gaps <1acre No gaps in Burnt Bottle unit	Small gaps <1acre	No gaps
LSR CWD/snags (including riparian reserves associated with LSR)	” “	▪ Clumped (50% tolerance level) ▪ 2.9 tpa; 29 trees per clump (18 snags, 11 CWD) ▪ One clump per 10 acres ▪ Clump size ~6/10ths of an acre Burnt Bottle unit: ▪ 30% tolerance level with clumps. ▪ 1.2 tpa; 6 snags per clump, no CWD ▪ Three clumps located >200 ft from blackberry patches ▪ Clump size ~1/5 acre	▪ Clumped (80% tolerance level) 6 tpa; 60 trees per clump (36 snags, 24 CWD); One clump per 10 acres Clump size ~1 acre	▪ Well distributed (50% tolerance level) 18 snags per acre 11 CWD per acre
Riparian Reserves (Matrix) CWD/ snags	” “	▪ 30% tolerance level – clumped ▪ 1.9 tpa; 9.5 trees per clump (6 snags, 3.5 CWD) ▪ one clump per 5 acres ▪ Clump size ~1/4 acre	▪ 30% tolerance level – clumped 1.9 tpa; 9.5 trees per clump (6 snags, 3.5 CWD) one clump per 5 acres Clump size ~1/6 acre	▪ 30% tolerance level – well distributed 6 snags per acre 3.5 CWD per acre
Blackberry treatments	” “	Control blackberries including prescribed fire, planting hardwoods and conifers in Burnt Bottle and Territorial Units	Control blackberries without prescribed fire in Burnt Bottle and Territorial Units	Control blackberries without prescribed fire in Burnt Bottle and Territorial Units
Road renovation/improvement	” “	As needed	As needed	As needed
New road construction	” “	None	None	None
Streamside No-Treatment Buffer	” “	75-120 feet	75-120 feet	75-120 feet

APPENDIX II

Summary of actions for roads located within unit

Sale	Unit	Road No.	Action	Approx. Distance (feet)
Wild Fish	1	17-7-33.5	grading, brushing, spot scarification	2,470
Wild Fish	1	17-7-33.8	grading, brushing	470
Wild Fish	1	17-7-33.2	grading, brushing	520
Wild Fish	1	17-7-34.2 p1	grading, brushing	505
Wild Fish	1	17-7-33.7	grading, brushing, spot scarification	1,820
Wild Fish	1	17-7-33.9	grading, brushing	370
Wild Fish	1	17-7-33.6	paving, grading, brushing, spot scarification	7,565
Wild Fish	1	17-7-33.10	grading, brushing, spot scarification	1,920
Wild Fish	1	17-7-33.11	grading, brushing, spot scarification	220
Wild Fish	1	17-7-33.12	grading, brushing, spot scarification	1,700
Wild Fish	1	17-7-34.2 p2	grading, brushing, spot scarification	1,670
Wild Fish	1	17-7-34.1	no prescribed maintenance	N/A
Wild Fish	2	17-7-34	no prescribed maintenance	N/A
Wild Fish	2	17-7-34.3	grading, brushing, spot rock after section line	3,700
Wild Fish	2	18-7-3.1	grading, brushing, spot scarification, reestablish ditch	6,700
Wild Fish	2	18-7-3.2	grading, brushing, scarification	1,670
Territorial	1	20-4-31.3	grading, brushing	1,200
Territorial	1	20-4-31.6	grading, brushing	1,200
Territorial	1	20-4-31	grading, brushing	500
Territorial	1	Spur A	grading, brushing	200
Territorial	1	20-4-31.4	grading, brushing	150
Pataha Ridge	3	19-6-9.1	no prescribed maintenance	N/A
Pataha Ridge	3	18-6-21.3	no prescribed maintenance	N/A
Pataha Ridge	3	18-6-21	no prescribed maintenance	N/A
Pataha Ridge	3	Spur A	grading, brushing, scarification	650
Pataha Ridge	3	Spur B	grading, brushing, scarification	315
Pataha Ridge	3	18-6-21.2	grading, brushing	250
Pataha Ridge	1	18-6-21	no prescribed maintenance	N/A
Pataha Ridge	1	18-7-23.1	no prescribed maintenance	N/A
Pataha Ridge	1	18-7-22.2	grading, brushing, scarification	4,250
Pataha Ridge	1	Spur A	grading, brushing, scarification	300
Pataha Ridge	1	Spur B	grading, brushing, scarification	250
Pataha Ridge	2	18-7-23.1	no prescribed maintenance	N/A
Pataha Ridge	2	18-7-21.2	grading, brushing, scarification, re-align intersection	1,880
Pataha Ridge	2	18-7-15	grading, brushing, scarification	350
Burnt Bottle	1	20-6-4	grading, spot brushing	8,448
Burnt Bottle	1	20-6-3	grading, spot brushing	5,808
Burnt Bottle	1	20-6-3.3	grading, brushing	885
Eames Swing	2	19-6-13.4	brushing	830
Eames Swing	2	19-5-18.4	grading, brushing, scarification	750
Eames Swing	2	19-5-18.9	grading, brushing, scarification	400
Eames Swing	2	Spur B	grading, brushing	900
Eames Swing	2	Spur C	grading, brushing, scarification	N/A
Eames Swing	1	Spur A	grading, brushing, scarification	770
Eames Swing	1	18-6-31	grading	530
Eames Swing	1	19-6-7.1	grading, spot scarification	13,992
Eames Swing	1	19-7-12	grading	5,280
Eames Swing	1	19-6-9	no prescribed maintenance	N/A

APPENDIX III

Special Status species in addition to birds protected under the Migratory Bird Act

Species	Presence in the Eugene District – Habitat Associations	
Federally-listed Threatened, Endangered and Proposed Species		
Marbled murrelet *Brachyramphus marmoratus*	**Present** – Nests only in structurally-complex conifer forest stands; nesting structure occurs within 50 miles of the coast and below 2,925 ft. in elevation, is one of four species (Western hemlock, Douglas-fir, Sitka spruce or western red cedar), is ≥ 19.1 in. (dbh) in diameter, > 107 ft. in height, has at least one platform ≥ 5.9 in. in diameter, nesting substrate (*e.g.,* moss, epiphytes, duff) on that platform, and an access route through the canopy that a murrelet could use to approach and land on the platform, and it has a tree branch or foliage, either on the tree with potential structure or on a surrounding tree, that provides protective cover over the platform	Present; not likely to have adverse effects from habitat modification and disturbance and beneficial long-term effects from habitat modification
Northern spotted owl *Strix occidentalis caurina*	**Present** – Occupies young, mature, or structurally-complex conifer forest stands with snags and/or downed wood; occupied stands generally have a mean tree diameter of ≥ 11in. and a canopy cover ≥ 40 percent; lives in forests characterized by dense canopy closure of mature and old-growth trees, abundant logs, standing snags and live trees with broken tops; although known to nest, roost and feed in a wide variety of habitat types, prefers older forest stands with variety: multi-layered canopies of several tree species of varying size and age, both standing and fallen dead trees, and open space among the lower branches to allow flight under the canopy; typically, forests do not attain these characteristics until they are at least 150 to 200 years old	Present; adverse short-term from habitat modification (canopy cover reduction) and disturbance and beneficial long-term effects from habitat modification
Sensitive Species		
Salamander slug *Gliabates oregonius*	**Possible** – One record (1959) from Lane County; leaf litter under bushes in mature conifer forest on east side of Long Tom River at 600 feet elevation	Yes; beneficial effects from habitat modification that increases amount of shrubs.
Tillamook westernslug *Hesperarion mariae*	**Present** – Inhabits moist, mature forest with deciduous tree/shrub layer; coastal fog forest	Yes; beneficial effects from habitat modification that increases deciduous vegetation.
Spotted tail-dropper *Prophysaon vanattae pardalis*	**Possible** – Inhabits mature forest with deciduous layer in the coastal zone; sensitive to logging activities; little known about habitat associations	Yes; short-term adverse from logging and long term beneficial effects from habitat modification that increases deciduous vegetation.
Roth's blind ground beetle *Pterostichus rothi*	**Possible** – Restricted to cool, moist, closed-canopy conifer forests with well-drained, deep, coarse-crumb structure soils; not found on alluvial soils on floodplains; prefers ground covered by duff; found throughout year under embedded rocks and logs; not found in disturbed sites, meadows or ecotones associated with grassy areas	May occur in project area because appropriate forest conditions do exist in the project area and appropriate soil conditions may exist. Short-term adverse effects could occur due to drier microclimate for about 5-10 years after thinning.
Bald eagle *Haliaeetus leucocephalus*	**Present** – Nest and roost in large trees, late-seral forest stands within 1 mile of lakes, rivers and large streams; nest site selection varies widely from deciduous, coniferous and mixed-forest stands; nest trees are usually large diameter trees characterized by open branching and stout limbs; nests are in dominant or co-dominant trees often located near a break in the forest such as a burn, clearcut, field edge (including	Unlikely to occur in the project area.

Species	Presence in the Eugene District – Habitat Associations	
	agricultural fields), or water; the majority of nest sites are within 1/2 mile of a body of water such as coastal shorelines, bays, rivers, lakes, farm ponds, dammed up rivers (i.e., beaver dams, log jams, etc.) and have an unobstructed view of the water; habitation occurs primarily in undeveloped areas with little human activity; winter foraging areas are usually located near open water on rivers, lakes, reservoirs, and bays where fish and waterfowl are abundant, or in areas with little or no water (i.e., rangelands, barren land, tundra, suburban areas, etc.) where other prey species (e.g., rabbit, rodents, deer, carrion) are abundant; communal roost sites contain large trees (standing snags and utility poles have also been used) with stout lower horizontal branches for perching and may be used at night by three to greater than one hundred bald eagles, as well as during the day, especially during inclement weather; perch trees used during the day possess the same characteristics as roost trees but are located closer to foraging areas; conspicuous birds and most use areas in the Eugene District are known	
Harlequin duck *Histrionicus histrionicus*	**Present** – In the District known to breed only in the Cascades: McKenzie River and Middle Fork of the Willamette River; not know to occur on the valley floor or in the Coast Range; inhabits forests generally within 50 m of 1st- 5thorder streams from March to August; winters in the ocean	Unlikely to occur in project areas,
Lewis'woodpecker *Melanerpes lewis*	**Present** – Associated with open woodlands including Oregon white oak woodlands, Ponderosa pine woodlands and mixed oak/pine woodlands; more common in woodlands near grassland-shrub communities; winter resident in West Eugene Wetlands	Yes, snag creation treatments could be beneficial.
Oregon vesper sparrow *Pooecetes gramineus affinis*	**Present** – Associated with grasslands, fields, prairies and roadsides; not associated with forests	Yes; treatments that increase grasses or forbs would be beneficial, especially on roadsides.
Purple martin *Progne subis*	**Present** – Snags in early-seral stands, openings and burns; commonly associated with rivers, marshes and open water, especially when snags are present, both for nesting and foraging	Yes; beneficial effects from snag creation near early-seral areas.
Oregon slender salamander *Batrachoseps wrighti*	**Present** – Fully terrestrial, not obligated to riparian habitats; strong affinity for cool, moist conifer stands with large amounts of large down logs in advance decay and large snags; nests associated with stumps, downed logs and talus Range maps show Oregon Cascade Range, not coast range.	Unlikely to occur in project areas or to be affected by proposed activities
Foothill yellow-legged frog *Rana boylii*	**Present** – Perennial, low-gradient, medium-sized streams (4th – 6th order) or side channels of larger creeks or rivers with rock, gravel or sand substrate	Possibly; design features for water quality and fish will prevent unacceptable adverse effects.
Northwestern pond turtle *Clemmys marmorata marmorata*	**Present** – Associated with both terrestrial and aquatic habitats from sea level to 5000 ft.; lentic water (ponds, slow reaches of rivers); nests in open areas within 150 m of water; overwinter within 500 m of live/open water.	Yes; potential for beneficial effects from thinning that increases light and heat to forest floor.
Painted turtle *Chrysemys picta*	**Possible** – Inhabit freshwater that is quiet, shallow, and has a thick layer of mud; slow-moving shallow waters of ponds, marshes, creeks and lakes with soft, muddy bottoms,	Unlikely to occur in project areas

Species	Presence in the Eugene District – Habitat Associations	
	with suitable basking sites and ample aquatic vegetation. There are no known sightings of this species in the Eugene District and this species has no known historical population here. The District is at the southern edge of this species' range and it is unlikely that there are any populations of these turtles on the Eugene District. Given the habitat associated with this species, any populations of this species on the District would likely be found within the West Eugene Wetlands area.	
Pallid bat *Antrozous pallidus*	**Possible** – Associated with desert areas in Oregon; west of Cascades restricted to drier interior valleys of southern portion of state, including Lane County, where it occurs at low elevations and along the valley floor; usually found in brushy and rocky terrain but has been observed along edges of coniferous and deciduous woods and open farmlands; crevice dweller associated with rock crevices, snags, large hollow trees and human structures used for day roosting	Yes; beneficial effects from increasing snags and deciduous vegetation (prey increased). Adverse effects from thinning without creating snags in Matrix.
Townsend's big-eared bat *Corynorhinus townsendii*	**Present** – Cave obligate; day roosts in mines, caves, tree cavities and attics of buildings	Yes; beneficial effects from increasing snags and deciduous vegetation (prey increased). Adverse effects from thinning without creating snags in Matrix.
Fisher *Martes pennanti*	**Present** – Forest stands, both conifer and conifer-hardwood mix, with large down logs, live trees and snags for denning; in Oregon fishers occurred historically throughout the Coastal and Cascade mountains; currently the range is severely reduced; despite extensive surveys conducted in forested regions of Oregon, records dating from 1954 to 2001 show that the remaining populations of fishers are in two separate and genetically isolated populations in southwestern Oregon; one in the northern Siskiyou Mountains and one in the southern Cascade Range. Both populations appear to be slowly increasing.	Possible; beneficial effects from increasing quality of forest habitat by increasing the amount of deciduous vegetation and dead wood.
Fringed myotis *Myotis thysanodes*	**Possible** – Crevice dweller associated with large snags and live trees, abandoned buildings, mines and caves, some bridges; forage in openings, and late- and mid-seral forests	Yes; beneficial effects from increasing snags and deciduous vegetation (prey increased). Adverse effects from thinning without creating snags in Matrix.
Birds of Conservation Concern (not already listed above)		
Northern goshawk *Accipiter gentilis*	**Present** – Inhabits a wide variety of forest ages, structural conditions and successional stages; for hunting habitat, the northern goshawk prefers the transitional zones from bog to forest and forest to shrubland; riparian zones and mosaics of forested and open areas are also important hunting habitats; uses stands of old-growth forest as nesting sites; nests in both live trees and snags.	Yes; beneficial effects from increasing deciduous vegetation and opening stands enough to provide flight corridors. (see IM OR-2009-018)
Black swift *Cypseloides niger*	**Present** – Breeding swifts are restricted to two main habitat features – sea caves or cliffs along the Pacific coast, and adjacent to or near wet cliffs in montane canyons; inland nests are usually located near dripping water sources, waterfalls, or turbulent water sprays; foraging habitat is poorly known; during warm, clear weather, foraging is presumed to occur at high altitudes where blooms of aerial insects are available, from 1000 to 2000 feet above ground during the day to within 100 feet of the ground during the late afternoon	Possible; beneficial effects from increasing deciduous vegetation (prey increased). Nesting habitat would be protected by design features for water and fish.

Species	Presence in the Eugene District – Habitat Associations	
Rufous hummingbird *Selasphorus rufus*	**Present** – Inhabits forest edges near riparian thickets, meadows and other openings; found in forests, on seed-tree harvest units, riparian shrub, and spruce-fir habitats; during the winter it lives wherever flowers are present	Yes, beneficial effects from increasing deciduous shrubs (see IM OR-2009-018)
Olive-sided flycatcher *Contopus borealis*	**Present** – Inhabits mixed conifer and hardwood-conifer forests; abundant in landscapes containing fragmented late-seral forests with pronounced ecotones; frequent coniferous forests, especially with tall standing dead trees. They prefer spruce, fir, balsam, pine, or mixed woodlands near edges and clearings, wooded streams, swamps, bogs, edges of lakes or rivers	Yes, beneficial effects from increasing deciduous vegetation. (see IM OR-2009-018)
Purple finch *Carpodacus purpureus*	**Present** – Inhabits coniferous and mixed forests, as well as park-like areas, breeding throughout western Oregon; nests are most often found far out on horizontal branches in conifers and are made of concealing material; food consists mostly of seeds, buds, blossoms, and fruit, usually taken from the outer branches of trees and occasionally from the ground; purple finches display strong site fidelity to breeding areas, but in winter, flocks may range widely depending on local food supplies and a wider variety of habitats are used	Yes, beneficial effects from increasing deciduous vegetation and vigor of conifer trees (see IM OR-2009-018)

All decommissioning measures would be completed during the dry season.

(aa) Decompact all natural surfaced roads and landings with decompaction equipment, such as a track mounted excavator with a thumb that is capable of moving logging slash.

(bb) Construct drainage dips, waterbars and/or lead-off ditches, and remove all culverts and cross drains.

(cc) Place logging slash on surfaces where available.

(dd) Block at entry points using stumps, slash, and/or cull logs, or earthen barricades.

Wildfish Unit 1

								Natural Surface Road				Rock Road		
		RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Stream Crossing culvert removal	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
17-7-33.5	native		yes	X	gated	yes	opt to not rock	X	X		X			
17-7-34.2	rock		yes	X	gated	yes	opt to not rock					X		X at sec line
17-7-33.6	rock	33-2 33-1	yes	X	gated	yes	opt to not rock					X		X at -34.2 jct
17-7-33.7	native		yes	X	gated	yes	opt to not rock	X	X		X			
17-7-33.8	rock		yes	X	gated	yes	opt to not rock					X		
17-7-33.1	rock	33-3	yes	X	gated	yes	opt to not rock					X		
17-7-33.11	rock		yes	X	gated	yes	opt to not rock					X		
17-7-33.12	rock	33-9 33-12	yes	X	gated	yes	opt to not rock					X		
17-7-34.2	rock		yes	X	gated	yes	opt to not rock					X		

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking. Asphalt will be placed on the delivery segments over the 33-2 and 33-1 streams (approx. 0.25 mile length). According to Hdyro-road sedimentation GIS map.
Pull stream crossing culverts as noted above, re-contour, place erosion control on banks.
Pull all relief culverts, pull back asphalt and move asphalt to upland location away from streams.
False brome/scotchbroom has been identified throughout the unit on roads. Native grass seed will be spread along roads.

Wildfish Unit 2

							Natural Surface Road				Rock Road		
	RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
18-7-3.1	native	yes	X	gated	yes	opt to not rock	X	X		X	X		X
18-7-3.2	native	yes	X	gated	yes	opt to not rock	X	X			X		

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.
Scotchbroom throughout unit.

Pataha Ridge Units 1 and 2

							Natural Suface Road				Rock Road		
	RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
18-7-21.2	native	yes		gated	yes	opt not to rock		X	X	X at jct	X		X at jct
18-7-15	native	yes		gated	yes	opt not to rock		X	X		X		
18-7-22.2	native	yes		gated	yes	opt not to rock		X	X	X at jct	X		X at jct
Spur A	native	yes		gated	yes	opt not to rock		X	X		X		
Spur B	native	yes		gated	yes	opt not to rock		X	X		X		

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking. Potential to use all these roads for future management to thin stands from both units. Block roads at mainline junctions.

Pataha Ridge Unit 3

							Natural Surface Road				Rock Road		
	RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
Spur A	native	yes	X	gated	yes	opt to not rock	X	X		X	X		X
Spur B	native	yes	X	gated	yes	opt to not rock	X	X		X	X		X
18-6-21.2	rock	yes		gated	yes	opt to not rock					X		X

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.
False brome is present. Road will be seeded with native grass.

Eames Swing Unit I

							Natural Surface Road				Rock Road		
	RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
Spur A	native	yes	no	gated	no	no	X	X	X	X			

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.

Eames Swing Unit 2

								Natural Surface Road				Rocked Road		
		RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	OHV issue	Storm Proofing[1]	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
19-6-13.4	rock	yes	no			yes	yes					X		
Spur B	rock	yes	yes			no						X		X
Spur C	native	yes	yes			no		X	X	X	X			
19-5-18.9	native	yes	yes			no		X	X	X	X			
19-5-18.4	native/Pvt	yes	private [2]			no								
19-6-13	rock	yes	private [2]			no						X		

[1]Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.
[2]Terms and conditions negotiated with private owner.

Burnt Bottle

								Natural Surfaced Road				Rock Road		
		RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	OHV issue	Storm Proofing	Weed Issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
20-6-3.3	native	no	yes	Black-berries		yes	opt to not rock		X			X		

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.
Road No. 20-6.3.3 accesses private lands.

Territorial

							Natural Surface Road				Rock Road		
	RATIONALE						(aa)	(bb)	(cc)	(dd)	(bb)	(cc)	(dd)
Road Number	Current Surfacing	Storm Proofing	Weed issue	Fuels	Winter Haul Available	Road Rocking	Decompact	Drainage	Logging Slash	Blocking	Drainage	Logging Slash	Blocking
Spur A	rock	yes			yes	opt to not rock					X		X
20-4-31.6	rock				yes	opt to not rock					X		
20-4-31.3	rock				yes	opt to not rock					X		
20-4-31	rock				yes	opt to not rock					X		
20-4-31.4	rock	yes			yes	opt to not rock					X		X

Storm proofing roads and placing them in a self-maintaining condition consists of site-specific measures to stabilize roadside slopes, prevent erosion of soil and/or sediment delivery to streams by reducing the concentration of water on the road prism and ditchlines, before blocking.
Blackberries present.