

Environmental Assessment
For
Upper Project Area
Mt. Hood National Forest
Clackamas River Ranger District

Lead Agency: USDA Forest Service

Responsible Official Roberta A. Molten
Forest Supervisor
Mt. Hood National Forest
16400 Champion Way
Sandy, OR 97055
(503) 668-1700

For more information, contact: Mike Malone
Clackamas River Ranger District
595 NW Industrial Way
Estacada, OR 97023
(503) 630-6861

UPPER PROJECT AREA

TABLE OF CONTENTS

CHAPTER I. Purpose and Need for Action

Introduction	1
Land Allocations	1
Desired Future Conditions	2
Purpose and Need for Action	3
The Proposed Actions	3
Scoping	4
Issues	5

CHAPTER II. Alternatives Considered

Alternative A - No Action	6
Alternative B - The Proposed Action	6
Alternative B Map	8
Alternative C	9
Alternative C Map	10
Alternative D	11
Alternative D Map.....	12
Seasonal Restrictions	13
Comparison of Alternatives Chart	14
Summary of Environmental Consequences	15

CHAPTER III. Environmental Consequences

Water Quality and Fisheries Habitat (Significant Issue #1)	16
Economics (Significant Issue #2)	19
Sedimentation (Issue #3)	21
Scenery (Issue #4)	23
Stream Temperatures (Issue #5)	25
Economics - Indirect Effects	26
Wildlife	28
Fisheries and Water Quality	35
Plants	41
Soils	44
Air Quality	45
Heritage Resources	46
Consumers, Civil Rights, Minorities, and Women	46
Prime Farmland, Rangeland and Forest Land	46
Floodplains and Wetlands	47
American Indian Rights	47

Recreation	47
Irreversible and Irretrievable Commitments	48
Inventoried Roadless Areas	48
Federal, Regional and State Laws	48
Environmental Justice	48
CHAPTER IV. List of Preparers	49
CHAPTER V. Consultation with Others	50
APPENDIX A. Clackamas River Ranger District Standard Mitigation and Design Criteria....	51

Chapter I - Purpose and Need for Action

INTRODUCTION

This environmental assessment (EA) responds to a proposed action by the Clackamas River Ranger District to promote movement of resource conditions toward the desired future conditions (DFCs) and management goals for the area as defined by the following direction: Mt. Hood Land and Resource Management Plan (10/90) [hereafter referred to as the “Mt. Hood Forest Plan”], the Record of Decision (ROD) for the Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl - - Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (4/94) [hereafter referred to as the “Northwest Forest Plan], and the North Fork Clackamas River Watershed Analysis.

This EA describes and documents the analysis of each management alternative and discloses the environmental consequences of the proposed activities. This document is used by the responsible official as a basis for selecting a proposed alternative that would best meet the objectives , goals, and desired future conditions set forth by the Mt. Hood Forest Plan and the Northwest Forest Plan.

This EA has been prepared in accordance with the regulations established by: 1) the National Environmental Policy Act (NEPA) of 1969, 2) the Mt. Hood Forest Plan, 3) the Northwest Forest Plan, 4) Record of Decision, signed by the Regional Forester, USDA Forest Service, 12/8/88, for the Final Environmental Impact Statement (FEIS) for “Managing Competing and Unwanted Vegetation,” Pacific Northwest Region, and the Mediated Agreement (supplement to the FEIS) signed 5/24/89, and 5) the Pacific Yew Final Environmental Impact Statement and Record of Decision (9-93).

The Upper Project Area is located within the Upper North Fork Clackamas River sub-watershed, which is a tributary of the North Fork Clackamas River. This drainage is west of Mt. Hood in north central Oregon, approximately 13 miles southeast of Estacada. The project area is on the Clackamas River Ranger District, Mt. Hood National Forest (see Map 1 - Vicinity Map). Elevations range from 2400 to 3800 feet. Estimated average annual precipitation is 70-80 inches, falling in the form of rain or snow.

Detailed descriptions of the affected environment and existing conditions of lands within the project area are included in Chapter III of this document and in the Upper Project Area Analysis File. The legal description of the project area is: Sections 16, 17, and 20, T.4S., R.6E., WM, Clackamas County Oregon.

LAND ALLOCATIONS

The Northwest Forest Plan identifies seven categories of land allocations (see Northwest Forest Plan, p.s. 6-7). The Upper Project Area contains two of these land allocations; Matrix and Riparian Reserves (RRs). Matrix land includes all lands that occur outside of the other six categories. Project-specific Riparian Reserve boundaries are discussed under Chapter II. These Northwest Forest Plan allocations overlay two separate Mt. Hood Forest Plan allocations: C1 Timber Emphasis, and B7 General Riparian Area.

In addition, the North Fork of the Clackamas River is eligible for designation by Congress as a Wild and Scenic River, with fisheries as the Outstandingly Remarkable Value. Until a final eligibility study is completed, management direction includes retention of the 1/4 mile interim boundary on both sides of the river. Within this boundary, the Visual Quality Objectives (VQO) specified in the Mt. Hood Forest Plan is retention in the foreground for a Scenic segment of an eligible river.

DESIRED FUTURE CONDITIONS

The desired future conditions for the project area have been established in the Northwest Forest Plan, the Mt. Hood Forest Plan, The Aquatic Conservation Strategy, and the North Fork Clackamas Watershed Analysis. The following statements describe desired future conditions that have been identified for the project area:

- ◆ Forest Health: Forests should have low levels of disease, damaging insect populations, and storm damage (Mt. Hood Forest Plan, pages Four-92/FW-382 and Four-292/C1-022).**
- ◆ Growth: Stands are healthy and vigorous, and have growth rates commensurate with the site's potential (a rate at which the mean annual increment has not culminated). Mt. Hood Forest Plan, Four - 5, #44; and Four - 86, FW - 306; and Four - 91, FW - 372; and Four - 90, FW - 361.**
- ◆ Scenery: The forest is visually appealing with a wide variety of natural appearing landscape features. Forest stands and openings are blended with natural land forms and existing vegetation, and have natural shapes, edges, patterns, and sizes. This applies throughout the landscape with increased emphasis for areas seen from sensitive viewing points (Mt. Hood Forest Plan, pages Four 218, goal Four-113, FW-558, and Four-108).**
- ◆ Eligible Wild, Scenic, and Recreational Rivers: Maintain free-flowing nature and outstandingly remarkable fisheries values (Mt. Hood Forest Plan, Four-100).**
- ◆ Riparian Reserves: Riparian Reserves provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. They contain diverse vegetation and supply amounts and distributions of course woody debris sufficient to sustain physical complexity and stability. Riparian Reserves provide mature forest connectivity (Northwest Forest Plan, page B-11).**

- ◆ **Aquatic: Streams have diverse structures with course woody debris sufficient to sustain physical complexity and stability. Streams have spatial and temporal connectivity within and between watersheds. The streams provide chemically and physically unobstructed routes to areas critical to fulfilling life history requirements of aquatic and riparian-dependent species (Northwest Forest Plan, page B-11).**
- ◆ **Roads - The Forest contains a network of roads which provide safe access. The roads meet Aquatic Conservation Strategy (ACS) objectives in terms of fish passage and minimum sediment delivery.**
- ◆ **Forest stands are structurally diverse, containing dispersed large green trees, snags, and large woody debris (LWD), as well as provide forage for deer and elk habitat.**

PURPOSE and NEED for ACTION and PROPOSED ACTION(S)

Existing conditions in the project area were compared to the desired future conditions listed above. From this comparison, proposed actions were identified that would begin moving the land within the project area towards the desired future conditions. The following section describes the need for action, the purpose of the proposed action, and the details of the proposed action(s).

Action 1 - Thinning and Fertilization in C1/Matrix Lands

- Need:** Approximately 194 acres within the Matrix are currently overstocked and lack diversity (i.e., down wood, snags, forage openings and optimal cover). If no action is taken, this overstocked condition would result in the continued reduction of net annual growth and stands with reduced vigor and increased mortality. Current levels of forage and optimal cover in deer and elk habitat, as well as snags and down woody debris (DWD) levels, would remain below those recommended in the Mt. Hood Forest Plan.
- Purpose:** The objective is to improve health and vigor and enhance growth of forest stands while meeting both visual quality objectives and deer and elk habitat requirements.
- Proposed Action:** Commercially thin and aerially fertilize approximately 194 overstocked acres within the Matrix/C1 land allocations using skyline, helicopter, and ground-based systems. Design thinning prescription to create irregularly shaped openings to encourage wildlife forage production while meeting foreground Retention and middleground Partial

Retention in the scenic segment of eligible Wild and Scenic River (WSR) (as seen from the North Fork Clackamas River). Approximately 0.1 mile of temporary road, and 0.75 mile of long-term road would be constructed to facilitate thinning. Maintenance and minor reconstruction would occur on existing roads.

Action 2 - Thinning in Riparian Reserves

Need: Approximately 35 acres of second growth within Riparian Reserves located in the Upper North Fork of the Clackamas River are currently overstocked. If no action is taken, this overstocked condition would result in stands with reduced vigor and growth, and a delay in the development of structural diversity. These stands would have reduced capability to produce the size and quantity of large woody debris sufficient to sustain the physical complexity and stability of the Riparian Reserve.

Purpose: The objective is to improve health, vigor, and to enhance growth. This would improve riparian conditions by accelerating development of mature forest characteristics, including larger trees that would provide future large woody debris recruitment and snag habitat.

Proposed Action: Commercially thin approximately 35 overstocked acres within the Riparian Reserves. Areas would be harvested using skyline and helicopter systems.

Action 3 - Riparian Enhancement Project

Need: Approximately one mile of The North Fork Clackamas River, within the project area, is below Mt. Hood Forest Plan Standards and Guides for in-stream large woody debris. Adequate levels of large woody debris are needed to establish and maintain stream channel form and function. If the large wood component is not increased, the aquatic habitat would remain below standards until the adjacent riparian stand conditions naturally contribute to the stream channel by windthrow, disease, or the achievement of late seral conditions.

Purpose: The objective is to increase the amount of large woody debris within the stream to establish and maintain stream channel form and function until adjacent riparian stands progress to late seral conditions.

Proposed Action: The placement of large woody debris by helicopter would occur on approximately one mile of stream within the North Fork Clackamas River. Logs

would average 24 to 30 inches in diameter and 30 feet in length. Approximately 50 logs would be placed in the stream by a walking excavator or helicopter.

SCOPING

An interdisciplinary team approach, combined with input received from the public during the scoping process, was used to identify issues related to the proposed action. A scoping package consisting of maps and descriptions of desired future condition, purpose and need for action, and the proposed actions was sent to the Clackamas River Ranger District public involvement mailing list which contains approximately 175 names and addresses of other agencies, interest groups and private citizens. Notice of this project was also included in the Fall, 1997 edition, and the Winter, 1998 edition of *Sprouts*, the quarterly project scoping newsletter of the Mt. Hood National Forest. Please refer to Chapter IV for more detailed discussion of input received during the scoping process.

OTHER RELATED ENVIRONMENTAL ANALYSIS

The initial scoping letter mentioned above listed a proposed action that would address access to 280 acres of private land that is adjacent to the Upper Project Area in Section 16. In order to better coordinate with the private landowner, this proposal has been excluded from the Upper Project proposals, and will be addressed under a separate environmental assessment titled "Private Access to Section 16."

ISSUES

The planning process is guided by the issues developed by the interdisciplinary team (IDT) and the public scoping process. Analysis of these issues aided in formulating and evaluating alternatives, and defining project design criteria to meet resource management objectives. Issues were studied in detail and were classified as "significant issues" or "other issues" dependent on their intensity or magnitude. Significant issues were used by the IDT to develop specific management alternatives (Chapter II). Each significant issue was evaluated and compared to the alternatives to provide a clear understanding of environmental consequences (Chapter III). "Other issues" were addressed by incorporating various projects and mitigation measures into the alternatives.

Significant Issues

1. Water Quality and Fisheries Habitat - Thinning in Riparian Reserves may pose a risk to water quality and fisheries habitat by delivering sediment to streams.
2. Economics - Helicopter thinning proposed in Units 5, 6, and 7 may be uneconomical under certain market conditions due to the small size, low volumes per acre and low value of the material to be removed.

Other Issues

3. Sedimentation - Road construction and thinning in Matrix land may pose a risk to water quality and fisheries habitat by delivering sediment to streams.
4. Scenery - Thinning and road construction could degrade the scenic quality of the North Fork Clackamas River, which is an eligible Wild and Scenic River, by altering the forest canopy and introducing skyline cable corridors
5. Stream Temperatures - Thinning could reduce shade along streams, which could elevate stream temperatures

Chapter II - Alternatives Including the Proposed Action

INTRODUCTION

Chapter II describes the management alternatives considered under this environmental assessment. A range of management alternatives was developed by the IDT based on the purpose and need for the proposed actions, issues identified, management direction, objectives, and the desired future conditions described in Chapter I. Each action alternative addresses one or more of the significant issues. All of the action alternatives address the “other issues” identified in Chapter I.

The alternative descriptions below describe how the alternatives differ, the projects specific to each alternative, and mitigation measures specific to the alternatives. Summary tables at the end of this chapter compare the alternatives and the consequences of the environmental effects of each alternative. A detailed discussion of the environmental consequences of the alternatives are analyzed and disclosed in Chapter III.

A. Alternative A - No Action

No management activities are proposed with the No Action alternative. “Custodial” activities would occur, including but not limited to road maintenance, data gathering, fire suppression, and activities approved by other plans or documents. All of these custodial activities would also occur with any of the other alternatives.

B. Alternative B - The Proposed Action

Alternative B corresponds to the proposed actions on pages 3 and 4, and includes the following projects:

Action #1

Thin and Fertilize in Matrix Land

Commercially thin and aerially fertilize approximately 194 overstocked acres within the Matrix/C1 land allocations using skyline, helicopter, and ground-based systems. Design thinning prescription to create irregularly shaped openings to encourage wildlife forage production while meeting the visual quality objectives (VQOs) of foreground Retention and middleground Partial Retention for the North Fork Clackamas River. Landing slash would be concentrated and burned.

Road Construction

- * Approx 600 feet of temporary spur roads to access proposed Unit 3.**
- Temporary roads
would be revegetated upon completion of sale.**

- * **Approx 4000 feet of Level One Specified road to access proposed Units 1 and 2.**

Reconstruct (Prehaul Maintenance and Minor reconstruction)

- * **Outside fillslope on Forest Roads 4610 and 4610150**
- * **Spot rock portions of Forest Roads 4610130, 4610150, and 4610151 to reduce sedimentation.**
- * **Blade, brush, ditchline cleaning, and culvert cleaning on existing travelway system.**
- * **Strengthen Boyer bridge approach and repair guardrail.**
- * **Light brushing and spot surfacing on Forest Road 4613 (identified as alternate haul route).**

Action #2

Thinning in Riparian Reserves

Commercially thin approximately 35 overstocked acres within the Riparian Reserves (within Units 1, 3, 5, 6, and 7). Long term recruitment of LWD would be accomplished within Riparian Reserves through timber harvest activities using skyline and helicopter systems. No cut areas of 30 feet would be established along non-fish bearing streams (no Riparian Reserve thinning would occur next to fish-bearing streams). No cut areas along seeps, springs and wet areas that are less than 1 acre, would extend to the outer limits of riparian vegetation (i.e., devils club, salmonberry, skunk cabbage etc) and includes the first row of coniferous trees. Seeps, springs or wet areas greater than 1 acre in size would extend 30 feet around the surface water perimeter or wetland edge.

Action #3

Riparian Enhancement Project

The placement of large woody debris would occur on one mile of stream within the North Fork Clackamas River (T4S, R6E, SEC 17). Approximately 50 logs would be placed in the stream by a walking excavator or helicopter. Logs would average 24 to 30 inches in diameter and 30 feet in length.

C. Alternative C

This alternative addresses Significant Issue 2: Economics. This alternative is the same as Alternative B, with the exception that skyline thinning would be utilized in place of helicopter thinning. To provide access for the skyline system and tractor systems, additional roads would be constructed. The road reconstruction project, and the riparian enhancement project are the same as described under Alternative B.

This alternative would construct 9000 feet of Level One specified road, of which approximately 25 feet would enter the outer, dry portion of a Riparian Reserve. The portion of the road within the Riparian Reserve would be approximately 190' from the stream. Approximately 2900 feet of temporary road would be constructed to access Units 3, 5, 6, and 7. At the close of the thinning project, slash from proposed units 5, 6, and 7 would be backhauled to an accessible area for firewood cutters, and the entrance to the road would be closed.

D. Alternative D

This alternative addresses Significant Issue #1, and is the same as Alternative B, with the exception that trees within the Riparian Reserves would be thinned using methods such as girdling, blasting, topping and felling. Trees would not be removed. Actions 1 and 3 listed for Alternative B are the same for this alternative.

E. Seasonal Restrictions

- 1. Soils: No operation of ground-based yarding equipment would be permitted between October 1 and June 30. Also applies to ground-based equipment used for temporary road obliteration, erosion control, site preparation, and fuels treatment. This restriction may be waived if soils are dry.**
- 2. Riparian: To protect smolts, no landing construction, road construction or reconstruction, or skyline yarding would be permitted between October 1 and May 31, where these activities take place within Riparian Reserves. This restriction may be waived if soils are dry.**
- 3. Stream Work: To protect smolts, no culvert replacement, modification, or fisheries in-stream habitat work is permissible from September 1st until July 14th. Exceptions may be allowed after September 1st if the Oregon Department of Fish and Wildlife concurs.**

F. Mitigation Measures and Design Criteria Specific to Upper Project Area

- 1. The implementation of the Fisheries Habitat Enhancement Project along the North Fork of the Clackamas River would include coordination with other Resource Specialists when equipment entry points are determined.**
2. Within thinning units, no-cut areas of 30 feet would be established along non-fish bearing streams. **The location of the no-cut boundary and the degree of thinning in the Riparian Reserve would be designed to achieve aquatic conservation strategy objectives by maximizing tree size, and minimizing the potential for sediment delivery to aquatic systems and to adequately protect the zone of shade influence along perennial streams.**
3. There would be no thinning in the Riparian Reserve along the north and east boundary of Unit 6 and along the west boundary and northwest corner of Unit 1. The Silviculturist and Botanist would consult in the field on the determination of these unit boundaries.
4. No cut areas along seeps, springs and wet areas that are less than 1 acre, would extend to the outer limits of riparian vegetation (i.e., devils club, salmonberry, skunk cabbage etc) and includes the first row of coniferous trees. Seeps, springs or wet areas greater than 1 acre in size would extend 30 feet around the surface water perimeter or wetland edge.
5. Flight paths for helicopter logging would be coordinated with district wildlife biologists to ensure that they would not interfere with raptor eyries.

G. Standard Mitigation Measures (See Appendix A for Standard Mitigation Measures and Design Criteria)

F. Alternative Comparison Chart

Proposed Action	Alternative A (No Action)	Alternative B (The Proposed Action)	Alternative C	Alternative D
<i>Thin & Fertilize Matrix Lands</i>	No action would occur	Thin and fertilize 194 acres using helicopter, skyline and ground based systems	Thin and fertilize 194 acres using skyline and ground based systems	Same as Alternative B
<i>Road Construction</i>	No action would occur	Construct 4000' of new road (none within RR) Construct 600' of temporary road	Construct 9000' of new road (25' would be within a RR) Construct 2900 of temporary road	Same as Alternative B
<i>Road Reconstruction</i>	Limited "custodial" road maintenance would occur	Spot rocking, bridge repair, and "custodial" maintenance	Same as Alternative B	Same as Alternative B
<i>Thinning in Riparian Reserves</i>	No action would occur	Thin 35 acres within Riparian Reserves using skyline and helicopter logging systems	Thin 35 acres within Riparian Reserves using skyline logging systems	Thin 35 acres within Riparian Reserves using methods other than timber harvest such as girdling, blasting, topping and felling. Trees would not be removed.
<i>Riparian Enhancement Project</i>	No action would occur	Place 50 logs along 1 mile of stream within the North Fork of the Clackamas using a helicopter and walking excavator	Same as Alternative B	Same as Alternative B

G. Summary of Environmental Consequences

The following table summarizes the probable effects of implementing each alternative. The effects are measured and compared in relation to the two Significant Issues identified in Chapter I.

Significant Issue	Unit of Measure	Alternative A (No Action)	Alternative B (The Proposed Action)	Alternative C	Alternative D
<i>Water Quality and Fisheries Habitat</i>	Qualitative analysis of projected impacts to water quality and fisheries habitat	No projected impacts to water quality or fisheries habitat. DFCs for Riparian Reserves would be delayed	No measurable increase in sedimentation is expected. DFCs for Riparian Reserves would be met sooner than Alt. A	Same as Alternative B, though there would be an increased risk of sedimentation due to road construction in stand 4. DFCs for Riparian Reserves would be met sooner than Alt. A	Same as Alternative B. There would be less risk of sedimentation since no harvesting within Riparian Reserves would occur. However, there would be an increased risk of excessive tree mortality due to insect infestation which may have an effect on the riparian habitat
	Acres of treatment within Riparian Reserves	0 acres of thinning	35 acres of thinning	35 acres of thinning	35 acres of thinning using non-conventional methods.
<i>Economics</i>	Risk of receiving no bids in today's market	N/A	Moderate-Low risk	Low risk	Moderate-Low risk

Chapter III - Environmental Consequences

This chapter discloses the environmental consequences of implementing the four alternatives defined in Chapter II. The direct, indirect, and cumulative effects on resources as a result of implementing each alternative are described in detail, as well as irreversible and irretrievable commitments of resources. References are included for each resource to indicate where it is discussed in various documents such as the Northwest Forest Plan, and the Mt. Hood Forest Plan.

This chapter provides the analysis and evaluation upon which a decision may be made. Issues are evaluated in order of appearance in Chapter I. Detailed analysis reports (Biological Evaluation, Silvicultural Report, etc.) are included in the Upper Project Area Analysis File.

1. **Water Quality and Fisheries Habitat** - Thinning in Riparian Reserves may pose a risk to water quality and fisheries habitat by delivering sediment to streams. (**Significant Issue #1**)

Mt. Hood Forest Plan References

Forestwide Riparian Standards and Guidelines - FW-80 to FW-136, page Four-59
Forestwide Water Standards and Guidelines - FW-54 to FW-79, page Four-53
Forestwide Fisheries Standards and Guidelines - FW-137 to FW-147, page Four-64
General Riparian Standards and Guidelines - B7-28 to B7-39, page Four-257
See Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167
Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69
See FEIS pages IV-76 and IV-90

Northwest Forest Plan References

Riparian Reserves - page A-5
Aquatic Conservation Strategy - pages B-9 to B-34
Riparian Reserves Standards and Guidelines - pages C-30 to C-38
Watershed Analysis - pages E-4, E-20 to E-21
Consultation - Endangered Species Act - page A-2
Standards and Guidelines Common to All Alternatives: Exceptions - page C-3

Northwest Forest Plan FSEIS References

Chapters 3&4: Affected Environment and Environmental Consequences - pages 205-258

The proposed Upper Resource Management Project Area is located within the North Fork Clackamas River watershed. This watershed is approximately 20,636 acres in size and encompasses seven sub-watersheds. It is located immediately within the Upper North Fork sub-watershed which is the largest of seven, comprising 4,925 acres. The project area consists of

both Matrix and Riparian Reserve lands, designated by the Northwest Forest Plan. Streams within the project area consist of the North Fork Clackamas River, which is perennial, and several small first and second order intermittent streams that drain north into the North Fork Clackamas River. All intermittent streams are non-fish-bearing but provide habitat for many other aquatic and semi-aquatic organisms such as amphibians and macro-invertebrates. The North Fork Clackamas River provides habitat for both anadromous and resident fish. A 50 foot falls at river mile 2.4 is a migration barrier for anadromous fish. The proposed project area is approximately 8 miles above this barrier. Resident rainbow and cutthroat trout occupy the reach within the project area.

Alternative A - No Action - The project area would remain unchanged. Water quality and sediment input to streams would remain the same. Early to mid seral stands within Riparian Reserves would continue to move toward late seral stand conditions, however competition and over-stocking of conifers would reduce diameter growth and increase the recruitment time for these stands to reach late seral stand conditions. Desired future conditions for Riparian Reserves would be delayed, and stream channels would continue to lack adequate form and function due to the lack of in-stream large woody debris. It is estimated through modeling that the recruitment time to reach late seral stand definitions would increase by approximately 25 years if thinning within Riparian Reserves is not achieved.

Alternatives B - This alternative would use both skyline and helicopter systems to thin approximately 35 acres within Riparian Reserves. Basic water quality values would be maintained. Although some short term sediment may be produced, no measurable amount is expected, and effects would be little different from the No Action alternative. The design of the thinning project includes protection measures such as a no-cut buffer of 30 feet, implementing thinning via low impact methods to retain a forest canopy (i.e., using helicopters/skyline yarders), and restrictions to limit ground disturbance to dry seasons. These and other best management practices (BMP's) would allow for very little erosion or transport of sediment to area streams. Thinning of second growth timber typically results in a large amount of branches, needles, and fine organic debris covering the ground. This material greatly reduces erosion potential and transport by acting as mulch/groundcover.

Thinning would reduce tree stocking and increase height and diameter growth of Riparian Reserve trees. This would accelerate the desired development of Riparian Reserve forest stands, into stands having late seral forest characteristics that would benefit area stream habitat. These benefits would include future potential to contribute large coarse woody debris to streams, and stability from large down logs which are objectives supported by the Aquatic Conservation Strategy under the Northwest Forest Plan.

Alternative C - This alternative differs from Alternative B by the thinning systems used in Units 5, 6, and 7. Under Alternative B, these units would be thinned with a helicopter system. Under Alternative C, the Riparian Reserve areas would be thinned with a skyline system. Skyline thinning has the potential to cause slightly more ground disturbance than helicopter thinning, therefore there is a correspondingly higher risk of sediment transport. Also, a 25 foot segment of new road would be constructed in the outer, dry edge of the Riparian Reserve to access Unit 5, 6, and 7. This portion of road is approximately 190 feet from the nearest stream or wet area. The design of the thinning project and road construction includes mitigation measures and seasonal restrictions (see Chapter II and Appendix A). Basic water quality values would be maintained.

Although some short term sediment may be produced, no measurable amount is expected, and effects would be little different from Alternative B or the No Action alternative.

Alternative D - Under this alternative 35 acres are again identified for thinning within Riparian Reserves but it would not accomplish the thinning via commercial timber harvest. Trees would be girdled, have tree tops blasted, or be felled and left, in order to reduce tree stocking and increase tree diameter and height growth.

These methods would accelerate Riparian Reserve objectives for LWD, however, they may also lead to adverse effects within the Riparian Reserve by providing **favorable breeding habitat for Douglas fir bark beetles. Favorable breeding habitat exists when the cambial layer of a windthrown, cut, damaged, or weakened tree retains favorable moisture long enough for the beetles to complete their life cycle. A bark beetle outbreak would lead to additional mortality of standing green trees which may degrade riparian habitat quality and stream shading.**

Following the girdling treatment, there would be a delay in the growth response of the residual trees because the girdled trees would take some time to die. In addition, there would be a prolonged period of time in which these weakened trees are susceptible to bark beetle infestation, thereby contributing to a bark beetle population build-up. Blasted trees should take less time to die thereby allowing the residual stand to respond to the available growing space sooner. Exposure to bark beetle susceptibility would be shorter than with girdling. Felling and leaving trees would have the most positive effect in terms of growth response time because the trees would be removed immediately from competition with residuals. However, the amount of fresh, moist, and shaded material on the ground would increase the risk of severe beetle attack.

Any one of these methods increases the potential for severe insect outbreaks to varying degrees. This would result in unplanned openings and possible excessive thinning in desired areas (e.g., riparian, sensitive plant sites, etc.) A combination of two or all methods scattered throughout the project area over a period of time (i.e., several entries) may increase damage to residuals by maintaining a beetle population if fresh cut or killed trees are continuously provided during a population cycle of 3 years.

Effects Common to Alternatives B, C, and D - Thinning would accelerate recruitment of large woody debris into stream channels, and move the project area closer to attaining the desired future conditions listed in Chapter I. Thinning would provide long term benefits to aquatic habitat by providing large wood during the interim until the forest stands progress to late seral conditions. Adverse impacts to water quality and fisheries habitat from sediment delivery

would be eliminated or substantially reduced by the use of Best Management Practices, seasonal restrictions, and mitigation measures (see Chapter II and Appendix A). Aquatic Conservation Strategy objectives and State water quality standards for turbidity would be met.

2. **Economics** - Helicopter thinning proposed Units 5, 6, and 7 may be uneconomical under certain market conditions due to the small size, low volumes per acre and low value of the material to be removed. (**Significant Issue #2**)

Mt. Hood Forest Plan References

Forest Management Goals - 19, page Four-3
See FEIS page IV-112

The Principal Laws Relating to Forest Service Activities (1993)

Twenty-Five Percent Fund, page 16
Expenditures from Receipts, page 23
Knutson-Vandenberg Act, page 123

“No-bid” timber sales have become a regional issue in the last few years. No-bid timber sales can result during certain market conditions when an expensive harvest system such as helicopter is planned for relatively low-value second growth timber. Potential timber sale purchasers may not bid on the project for fear that the costs of delivering the timber to the mill may exceed the value of the timber, or that the profit margins could be very low.

Three types of harvest systems would be utilized for thinning second growth stands in the Upper Project Area: Skyline (cable), Tractor, and Helicopter. Alternatives B and D would utilize all three, while Alternative C would only use Skyline and Tractor systems. In general, tractor harvesting is the most cost efficient; skyline harvesting is the second most cost efficient; and helicopter harvesting is the most expensive.

Since helicopter harvesting is proposed for Units 5, 6, and 7 under the proposed action, economics was identified as a Significant Issue. If the projects proposed under the action alternatives resulted in a no-bid timber sale, few if any of the project objectives would be accomplished.

The high costs associated with helicopter logging Units 5, 6, and 7 would also have indirect effects to the sale as a whole, the local economy, and money returned to Clackamas County to fund schools and road repairs. These indirect economic effects are discussed later in this chapter beginning on page 26.

The following factors serve to compare the economic effects of the alternatives.

(1) Present Net Value (PNV) - PNV is the total estimated discounted revenues generated by the timber, minus the estimated discounted costs of planning, preparing, administering, harvesting the timber, and implementing resource projects necessary for timber harvest mitigation.

(2) Benefit/Cost Ratio (B/C) - B/C is derived by dividing the estimated discounted revenues by the total estimated discounted costs; producing a ratio. A benefit-to-cost ratio greater than 1.0 indicates a positive net difference between revenues and costs for the alternative. A benefit-to-cost ratio less than 1.0 indicates a negative net difference between revenues and costs (i.e., costs exceed revenues). A benefit/cost ratio of 1.5 would mean that for every dollar spent, \$1.50 would be returned. A benefit/cost ratio of 0.75 would mean that for every dollar spent, \$0.25 (25 cents) would be lost.

(3) Risk of receiving No Bids - A ratio calculated by dividing the estimated “advertised rate” of a sale by the sale “base rate.” Advertised rate is the estimated rate a timber sale would be advertised based on current market conditions and similar sales sold within the last twelve months. Base rate is the value that is necessary to cover “essential” KV projects (plus \$0.50 per MBF); or the minimum rate listed in Forest Service Handbook 2431.42. The following advertised rate/base rate ratios are used to evaluate the risk of a “no-bid” sale in this analysis:

Risk of Sale Receiving No Bids

- 0-3 = High
- 3-5 = Moderate-High
- 5-8 = Moderate
- 8-10 = Moderate-Low
- 10> = Low

Economic Comparison by Alternative

Unit of Measure	Alternative A (No Action)	Alternative B (The Proposed Action)	Alternative C	Alternative D
<i>Present Net Value (PNV) estimated for current project</i>	-\$101,191 (Approximate dollars invested for planning, public scoping and environmental analysis which would be lost)	\$9492	\$42,198	-\$135,737 This negative PNV indicates that under current market conditions, a below-cost sale is likely to result. This is due to the high costs of implementing thinning in Riparian Reserves by methods such as girdling, blasting, topping and felling. Also, timber thinned by these methods would not be harvested and sold.
<i>Benefit/Cost Ratio (B/C) estimated for current project</i>	0	1.04	1.14	0.61
<i>Risk of receiving no bids in today's market</i>	N/A	Ratio of 9.6 equals Moderate-Low risk	Ratio of 12.0 equals Low risk	Ratio of 9.2 equals Moderate-Low risk

3. **Sedimentation** - Road Construction and thinning in Matrix land may pose a risk to water quality and fisheries habitat by delivering sediment to streams. **(Other Issue #3)**

Mt. Hood Forest Plan References

<p>Forestwide Riparian Standards and Guidelines - FW-80 to FW-136, page Four-59 Forestwide Water Standards and Guidelines - FW-54 to FW-79, page Four-53 Forestwide Fisheries Standards and Guidelines - FW-137 to FW-147, page Four-64 General Riparian Standards and Guidelines - B7-28 to B7-39, page Four-257 See Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167 See FEIS pages IV-76 and IV-90</p>

Northwest Forest Plan References

--

Riparian Reserves - page A-5

Aquatic Conservation Strategy - pages B-9 to B-34

Riparian Reserves Standards and Guidelines - pages C-30 to C-38

Watershed Analysis - pages E-4, E-20 to E-21

Standards and Guidelines Common to All Alternatives: Exceptions - page C-3

Northwest Forest Plan FSEIS References

Chapters 3&4: Affected Environment and Environmental Consequences - pages 205-258

Alternative A - No Action - The project area would remain unchanged. Sediment input to streams would remain the same. Early to mid seral stands would continue to move toward late seral stand conditions, however competition and over stocking of conifers would reduce growth diameter and increase the recruitment time for these stands to reach late seral stand conditions.

Alternatives B and D - Proposed road construction consists of a permanent extension of forest road 4610-151 by 4000 feet. This extension would create 1.83 acres of impervious road surface, and would be constructed on a dry ridge that does not cross streams or wet areas and is located outside of Riparian Reserves. In addition, 600 feet of temporary road (also outside of streams, wet areas, or Riparian Reserves) would be constructed to access Units 3 and 4. After the sale has closed, temporary roads would be closed and revegetated.

The design of the thinning project and proposed road construction includes mitigation measures and seasonal restrictions (see Chapter II and Appendix A). These and other best management practices (BMP's) would allow for very little erosion or transport of sediment to area streams. Thinning of second growth timber typically results in a large amount of branches, needles, and fine organic debris covering the ground. This material greatly reduces erosion potential and transport by acting as mulch/ground cover. Aquatic Conservation Strategy objectives and State water quality standards for turbidity would be met. Effects would be similar to the No Action alternative.

Alternative C - In addition to the roads described under Alternatives B and D, another 5000 feet of permanent road, and 2300 feet of temporary road would be constructed to access Units 5, 6, and 7. These temporary roads would be closed and revegetated after the sale has been completed. The construction of the permanent road would create 2.3 acres of impervious road surface. These roads would be located primarily on dry ridges, and would not cross streams or wet areas, and are outside of Riparian Reserves with the exception of the first 25 feet of road that enters unit 5. The 25 foot portion of road within the Riparian Reserve is located in the outer dry portion of the Riparian Reserve and is approximately 190 feet from the nearest stream or wet area.

Effects of thinning and road construction would be similar to Alternatives B and D. Instead of thinning with a helicopter system, as in Alternatives B and D, this alternative would accomplish thinning in Units 5, 6, and 7 by skyline and tractor systems. Skyline and tractor systems have the potential to cause more ground disturbance than a helicopter system. Also, the additional road construction in this alternative has the potential to deliver more sediment to streams than would be

delivered under Alternatives B and D. However, as with Alternatives B and D, because of the design of the thinning and road construction, along with seasonal restrictions and mitigation measures (see Chapter II and Appendix A), no measurable amounts of sediment would be produced, and effects would be little different from the No Action Alternative.

4. Scenery - Thinning and road construction could degrade the scenic quality for the North Fork Clackamas River, which is an eligible Wild and Scenic River, by altering the forest canopy and introducing skyline cable corridors (Other Issue #4)

Mt. Hood Forest Plan References

Forestwide Visual Resource Management Standards and Guidelines - FW-552 to FW-597, page Four-107, Four 8-9 Eligible Wild and Scenic River Standards and Guidelines - Four-103 and FW 497 Scenic Viewsheds Standards and Guidelines - B2-12 to B2-42, page Four-221 See Mt. Hood FEIS pages IV-127, IV-131, IV-142, and IV-155 to IV-167
--

The existing visual condition of the Upper Project Area is evaluated by the FS Visual Management System (VMS) process. Under the VMS, visual quality objectives are set for each Forest Plan land allocation as viewed from sensitive viewer positions. The VQO from the North Fork River is Retention in the foreground and Partial Retention in the middleground. Management direction for Retention and Partial Retention specifies a “natural appearing forest landscape with little evidence of human alteration” and that “management activities repeat form, line, color, and texture common to the characteristic landscape”. In addition, the Desired Future Condition for the foreground retention area within 0.5 mile of the North Fork River specifies target tree diameters for mature trees in the western hemlock zone of 32 inches diameter at breast height. The VQO for the C1/Matrix allocation is modification which means that “management activities are blended with natural landform and existing vegetation with natural shapes, edges, patterns, and sizes.”

The existing visual condition within the Upper Project Area currently meets Forest Plan Standards and Guidelines. The forested stands are positioned on steep slopes which round off to gently sloping

narrow ridges. The forest has an uniform, unbroken canopy with no variation from management activities from the existing natural shapes, edges, patterns, or forms found in the surrounding landscape. There are relatively few rock outcrops, cliffs, and meadows within the project area.

Alternative A - No Action - There would be no change to scenery from timber harvest under this alternative.

Effects Common to all Action Alternatives - The silvicultural prescription for all units in all proposed action alternatives is intended to enhance both tree size as well as structural diversity which could have a positive benefit to the scenery. This includes those parts of Units 3, 4, 5, and 6

which fall within the interim boundary of the eligible Wild and Scenic River. In general, effects to scenery from the proposed thinning should be minor depending on the post harvest canopy density and the logging system employed. Alternatives B, C, and D propose thinning the forest stands down to 50% of the existing forest canopy. Although changes to color and texture can occur from crown and understory disturbance, such effects should be temporary until the understory and the canopy begins to regrow.

The most persistent landscape impacts to scenery can be expected from the logging systems. In general, helicopter logging is anticipated to have only temporary, minor scenic effects to the color and texture of the affected forest stands compared to adjacent stands. Proposed units which employ tractor logging on relatively mild slopes and ridgetops should exhibit effects similar to helicopter units. Skyline cable corridors, however, generally introduce straight lines perpendicular to the contours of the landform which do not “borrow from naturally established form and line” of the surrounding landscape (FSM 2382.2). These lines can be both visible and persistent over time and can have a negative effect on scenic integrity.

Effects from Specific Alternatives

Alternatives B and D - The prescription for all units is intended to enhance both tree size as well as structural diversity which could have long term positive benefits. Because these alternatives have more acres in helicopter logging than Alternative C, it is anticipated that they would have fewer effects to scenery than Alternative C. Parts of Units 3 and 4 are located within the interim Viewshed of the Scenic River and is proposed for skyline thinning. Although the prescription should cause only minor, temporary effects to scenery, the skyline corridors could be visible from the river which could have a negative effect to the scenic integrity. New road construction in Unit 1 is located on a ridge top and should not be visually apparent. The primary difference between the thinning of 35 acres of Riparian Reserves using alternative methods like tree topping as opposed to conventional harvest techniques is only a minor amount of skyline corridor not present in Alternative D.

Alternative C - This alternative would utilize skyline thinning systems in Units 5, and 6 instead of helicopter harvest, and is expected to create the most change to the scenic resource.

5. Stream Temperatures - Thinning could reduce shade along streams, which could elevate stream temperatures (Other Issue #5)

Mt. Hood Forest Plan References

Forestwide Riparian Standards and Guidelines - FW-80 to FW-136, page Four-59
Forestwide Water Standards and Guidelines - FW-54 to FW-79, page Four-53
Forestwide Fisheries Standards and Guidelines - FW-137 to FW-147, page Four-64
General Riparian Standards and Guidelines - B7-28 to B7-39, page Four-257
See Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167

Northwest Forest Plan References

Riparian Reserves - page A-5
Aquatic Conservation Strategy - pages B-9 to B-34
Riparian Reserves Standards and Guidelines - pages C-30 to C-38
Watershed Analysis - pages E-4, E-20 to E-21
Standards and Guidelines Common to All Alternatives: Exceptions - page C-3

In the early and mid 1900s, stand replacement fires swept through much of the North Fork Watershed. The intensity of the fires coupled with salvage logging left very few remnant structures (e.g., trees, down wood) in the existing Riparian Reserves. Today, Riparian Reserves in the watershed are composed of 8% early seral, 80% mid seral, and 12% late seral stands (North Fork Clackamas River Watershed Analysis, 1996). Stands within the Riparian Reserves consist of predominantly mid-seral Douglas-fir,

western hemlock, and western redcedar. **These stands provide shade that help keep water temperatures below the maximum levels recommended by the State of Oregon (maximum stream temperatures should not exceed 17.8 degrees Celsius).**

Alternative A - No Action - There would be no changes to stream temperatures.

Alternatives B, C, and D - Removal of streamside vegetation can cause an increase in direct solar radiation to surface waters elevating stream temperature. This commercial thinning project is not expected to further reduce streamside shade along intermittent streams within or adjacent to proposed units in any action alternative. Established "no cut areas" listed in the mitigation measures of Appendix A would provide adequate shade along the non-fish bearing streams. There would be no changes to stream temperatures.

OTHER EFFECTS

This section discusses effects to resources and issues that were not covered under the specific issues identified for the Upper Project Area.

1. Economics - Indirect Effects

Mt. Hood Forest Plan References

Forest Management Goals - 19, page Four-3
See FEIS page IV-112

The Principal Laws Relating to Forest Service Activities (1993)

Twenty-Five Percent Fund, page 16
Expenditures from Receipts, page 23
Knutson-Vandenberg Act, page 123

The production of wood products and harvesting of resources from National Forest land has direct and indirect effects on funding for resource projects within the Upper project area, local communities and the general public. These effects include providing wood products for commercial and personal use, employment, and revenues generated by timber sales that go to local counties to fund schools and road improvements. In addition to predicted economic benefits, there are future monetary benefits that cannot be calculated in the present. For example, fisheries and riparian enhancement projects would affect the local economy by providing increased numbers of fish and wildlife, which would result in more recreational use of the area.

The following factors will serve as indicators to compare the indirect economic effects of the alternatives:

- (1) Revenue returned to Clackamas County for school and road funding - The Twenty-Five Percent Fund Act of 1908 (Public Law 60-136) requires that 25 percent of all money received during any fiscal year from each National Forest, be available to fund public schools and county roads. These funds go to counties from which the National Forest proceeds were derived.

- (2) Revenue returned to fund National Forest roads and trails - The Expenditures from Receipts Act of 1913 (Public Law 62-430) requires that ten percent of all money received from the National Forests during each fiscal year be available to fund construction and maintenance of roads and trails within the National Forests in the States from which the proceeds were derived.

- (3) Projects planned for Knutson-Vandenberg (KV) Funding that are not Adequately Funded - The Knutson-Vandenberg Act of June 9, 1930 (Public Law 71-319) provides for money to be set aside for the purpose of essential reforestation and other activities (non-essential KV) to protect and improve the resources within the timber sale area. Non-essential KV projects are funded after essential reforestation work, purchaser road credits, and payments to states and counties are funded. The actual available KV funds are determined at sale closure and are based on gross receipts from the sale of the timber.

Summary of General Economic Effects

--	--	--	--	--

Unit of Measure	Alternative A (No Action)	Alternative B (The Proposed Action)	Alternative C	Alternative D
<i>Revenue returned to Clackamas county for school and road funding (estimated for current project)</i>	0	\$74,692	\$98,379	\$59,764
<i>Revenue returned to fund Forest Service Roads and Trails (estimated for current project)</i>	0	\$29,877	\$39,351	\$23,906
<i>\$\$\$ Amount for KV projects without adequate funding (estimated for current project)</i>	N/A	All planned KV projects necessary for timber harvest mitigation would be funded by revenues generated	All planned KV projects necessary for timber harvest mitigation would be funded by revenues generated	\$154,593 worth of planned non-essential KV projects necessary for timber harvest mitigation do not have funding

Alternative A - No Action - This alternative would not return revenues to the local economy, Clackamas County, or provide funding for National Forest roads and trails. Approximately 4423 CCF (1 CCF equals 100 cubic feet) of timber in need of thinning would be unavailable to aid in meeting the public demand for wood products. In addition, loss of potential growth by not treating these forest stands would contribute to a future loss of federal timber receipts.

Alternatives B and C - All planned KV projects necessary for timber harvest mitigation would likely be funded. The economy of the local area would benefit by opportunities for employment.

Alternative D - This alternative would yield poor economic returns, and is the only alternative that would likely not generate enough funds to cover all planned non-essential KV projects that are necessary for timber harvest mitigation.

2. Wildlife

Mt. Hood Forest Plan References

Forestwide Diversity Standards and Guidelines - FW-162, page Four-68
Forestwide Wildlife Standards and Guidelines - FW-187 to FW-214, page Four-71
Deer and Elk Winter Range Standards and Guidelines - B10-12 to B10-28, page Four-274
Deer and Elk Summer Range Standards and Guidelines - B11-9 to B11-25, page Four-278
Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69
See FEIS pages IV-76 and IV-90

Northwest Forest Plan References

Protection Buffers - pages C-19 to C-21
Matrix Standards and Guidelines - pages C-39 to C-61
Consultation - Endangered Species Act - page A-2
Critical Habitat for Northern Spotted Owl - page A-3
Standards and Guidelines Common to All Alternatives: Exceptions - page C-3
Survey and Manage Standards and Guidelines - pages C-4 to C-6
Known Spotted Owl Activity Centers - pages C-10 and C-45
Protection Buffers - pages C-19 to C-21, C-45 to C-48
Additional Protection for Bats - page C-43
Survey and Manage Species List - pages C-49 to C-61

Northwest Forest Plan FSEIS References

Chapters 3&4: Affected Environment and Environmental Consequences - pages 205-258

The proposed Upper project area provides habitat to a relatively large number of wildlife species. Included in this area are species that require management through survey and management Standards and Guidelines (C3) as outlined in the Northwest Forest Plan, those that require protection buffers for specific rare and locally endemic species (such as Great Grey owl, bats, and Black-backed woodpecker), and other species in the upland forest matrix as well as several big game species.

Threatened, Endangered, Sensitive, C-3 Survey and Manage Species, and Protection Buffer Species - (Animals)

A. C3 SPECIES

Survey and Manage species, also referred to as C-3 species, are species which require survey and management standards and guidelines as outlined in the Northwest Forest Plan. Two

animal species, one mammal and one amphibian, are of concern to the Clackamas River Ranger District. Direction from the Northwest Forest Plan requires that each of these species be managed under survey strategy #2.

Red Tree Vole - The red tree vole, a highly specialized tree-dweller, depends on Douglas fir trees for nesting and foraging. Its nests are built 6-150 feet off the ground and it feeds on resin ducts of Douglas fir needles. Current management direction requires surveys be done; these surveys were conducted the summer of 1997. Primary and potential habitat is scattered throughout the proposed project area. Surveys found 4 potential nests within the proposed stands.

All four potential nests were inspected and found to not be red tree vole nests. Given the results of the survey and the nature of the project (thinning), effects to red tree voles and their habitats are likely to be minimal.

Larch Mountain Salamander - No habitat exists within the project area. Under all alternatives, impacts to this species or its habitat are not expected as a result of this proposed project.

B. PROTECTION BUFFER SPECIES:

Protection buffers are additional standards and guidelines for specific rare and locally endemic species and other species in the upland forest matrix.

Great Grey Owl - No potential habitat for great grey owls exists within the project area, and they have not been documented on the Mt. Hood National Forest. No impacts to great grey owls are expected as a result of the proposed project.

Bat Species - Bat habitat in the form of snags and large green trees may be found throughout the project area but no structures (caves, mines, bridges, buildings) are present. No impacts to bats are expected as a result of the proposed project.

Black-backed Woodpecker - No habitat exists within the project area.

C. THREATENED, ENDANGERED, AND SENSITIVE SPECIES

1. Threatened or Endangered Species

Northern Spotted Owl - Late-successional and old-growth coniferous forest is the preferred nesting, roosting, and foraging habitat for spotted owls in Oregon.

Consultation with the U.S. Fish and Wildlife Service was completed on September 30, 1997. After reviewing the current status of the spotted owl, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is their biological opinion that the FY 1998 Habitat Modification Projects in the Willamette Province (which this project is a part of) are not likely to jeopardize the continued existence of the spotted owl or result in the adverse modification of spotted owl critical habitat.

The proposed project area does not contain any Critical Habitat areas and consists only of dispersal habitat. All proposed units fall within 1.2 miles of a Resident Single owl (number 5292Q90R) but none are within 0.25 mile so a seasonal restriction is not necessary. See the Biological Evaluation in the Upper Project Area Analysis File for additional information.

Alternative A - No Action - Selection of the No Action alternative is not expected to have any affect on spotted owls. The proposed project area would continue to provide dispersal habitat.

Alternatives B, C, and D - Under these alternatives, approximately 194 acres of Matrix and 35 acres of Riparian Reserve lands would be thinned, resulting in a downgrade of about 229 acres of dispersal habitat. These downgraded acres would continue to provide dispersal habitat. However in the long term, larger trees would result in improved nesting habitat.

Peregrine Falcon (*Falco peregrinus anatum*) - Peregrine falcons nest on sheer cliffs ranging height from 75 to 2000 feet. The Upper project area does not contain suitable nesting habitat for peregrines nor is there an active nest site within a 3 mile radius.

Alternative A - No Action - Selection of the No Action alternative is not expected to have any affect on peregrine falcons or their habitat.

Alternatives B, C, and D - No effects to peregrines or their habitat are expected as a result of the proposed project. However, it is recommended that the flight pattern used in helicopter logging be designated to ensure that it does not disturb nesting peregrines in adjacent areas.

Bald Eagle (*Haliaeetus leucocephalus*) - The proposed project area may provide

dispersal habitat but nesting habitat is not present. Affects to bald eagles or their habitats are not expected as a result of the proposed project.

2. Sensitive Species

Red-legged Frog (*Rana auroa*) - Known to inhabit moist forests and valley riparian areas, this frog has been found in terrestrial and aquatic habitat up to 5000 feet elevation. Breeding waters vary but they are most commonly found in water having little or no flow. Although not common on the west side of the northern Oregon Cascades, documented sightings have occurred in the project area.

Alternative A - No Action - Selection of the No Action alternative is not expected to impact red-legged frogs or their habitats.

Alternatives B, C, and D - The thinning of the riparian habitat is not expected to impact red-legged frogs as a 30 foot no treatment buffer would be placed along all treated streams. No fertilization would occur in Riparian Reserves.

Executive Summary - Threatened, Endangered, and Sensitive Species

The four step Biological Evaluation process for T.E.S. animal species which may occur within the proposed project planning area is summarized below.

SPECIES	SUITABLE HABITAT	SPECIES PRESENT	CONCLUSION OF EFFECTS BY ALTERNATIVE			
			B	C	D	
THREATENED SPECIES (T or E)						
Northern Spotted Owl	Dispersal Only	Yes, within 1.2 miles but not within proposed units	BE	ME-LAA		
Merriam's Golden Eagle	No	No	BE	NE	NE	NE
Golden Eagle	No	No	BE	NE	NE	NE
SENSITIVE SPECIES						
Red-legged Frog	Yes	Yes	NI	NI	NI	NI
Cope's Giant Salamander	Yes	No	NI	NI	NI	NI
Harlequin Duck	No	No	NI	NI	NI	NI
White-footed Vole	No	No	NI	NI	NI	NI
Wolverine	No	No	NI	NI	NI	NI
Greater Sandhill Crane	No	No	NI	NI	NI	NI
Pacific Western Big-eared Bat	No	No	NI	NI	NI	NI
Spotted Turtle	No	No	NI	NI	NI	NI
Western Pond Turtle	No	No	NI	NI	NI	NI
Spotted Frog	No	No	NI	NI	NI	NI

NE = No Effect

BE = Beneficial Effect

ME-LAA = May Effect. Likely to Adversely Effect

ME-NLAA = May Effect, Not Likely to Adversely Effect

NI = No Impact

MIIH = May Impact Individuals or Habitat, But Would Not Likely Contribute to a Trend Towards Federal Listing or Loss of Viability to the Population or Species

Deer and Elk (Indicator species)

Habitat Availability - Roosevelt elk and black-tail deer inhabit the proposed project area as summer range. The project area lies within the fixed analysis area Summer Range 30 (SR30). The SR30 analysis area encompasses 5,657 acres. Due to past fire history, the landscape is primarily second growth which does not meet optimal cover requirements. No harvest is proposed in the 10% existing optimal cover. Existing cover/forage type availability and road density information for the entire SR30 analysis area are displayed below.

COVER TYPE	Minimum S/G	Pre-harvest (Existing Condition)	Post-harvest (Alternatives B, C, & D)
Optimal	20%	10%	10%
Combined Optimal/Thermal	30%	73%	69%
ROAD DENSITY	Maximum S/G	Pre-harvest	Post-harvest
	5 mi/sqmi	2.1 mi/sqmi	2.1 mi/sqmi

Alternative A - No Action - Selection of the No Action alternative would result in stands that continue to be overstocked with reduced diameter/height growth. A lack of forage would continue due to the dense nature of the stands. Road densities would remain the same. Forest Plan Standards and Guidelines for combined optimal and thermal cover would be met but optimal itself would not.

Alternatives B and D - Thinning in both Matrix and Riparian Reserves has the potential to increase the amount of optimal, thermal, and forage available in the proposed project area. Thinning would allow for increased diameter/height growth as well as improve stand vigor. In the short term, hiding cover may be reduced as the stand is opened up. However, understory vegetation is expected to begin re-establishment within approximately 5 years. Opportunities to enhance forage exist as the canopy is opened up and shrubs and grasses are allowed to grow. Forage may also increase as rehabilitated roads are seeded and fertilized with palatable species.

Aerial fertilization is not expected to have a negative effect to deer and elk. Fertilization has the potential to accelerate growth of forage and/or cover habitats.

Road construction, reconstruction, and rehabilitation all have the potential to affect deer and elk in regards to road densities. Road building activities associated with the proposed project consists of a 4000 foot extension of road 4610-151 in proposed Unit 1 and 600 feet of temporary road construction in proposed Units 3 and 4. Although road densities in the short-term would increase, long-term densities are expected to remain as they were prior to implementation of the proposed project (see existing condition). The proposed stands do not fall within winter range or calf rearing areas so no seasonal restrictions are required.

Alternative C - Alternative C poses the same effects as alternative B except for the increase in miles of road constructed, reconstructed, and rehabilitated. Alternative C proposes 9000 feet of new road construction, of which 25 feet would be within a riparian reserve, and 2900 feet of temporary road construction. The 9000 feet of new road would be in proposed stands 1, 2, 5, 6, and 7 and the 2900 feet of temporary construction would be located in Units 3, 4, 5, 6, and 7 (see Alternative C map). The temporary roads would be closed and revegetated, and the permanent roads would be behind locked gates. The long-term road densities are not expected to increase.

Pine Marten and Pileated Woodpecker

Currently one B5 Pileated/Pine Marten area exists to the north of the proposed project area. The North Fork Watershed Analysis recommended this B5 allocation be removed as late successional reserves and other land allocations are expected to provide habitat for these species. Portions of the proposed harvest units provide marginal habitat for pine marten and pileated woodpeckers. The action alternatives would likely increase available snag habitat, especially in riparian reserves.

Snags and Down Woody Debris

A. Snags - Snags are an important structural component in forest communities. In forests of Western Oregon, snags provide feeding, nesting, roosting, and breeding habitat for nearly 100 species of wildlife, of which at 53 are cavity dependent. The absence of snags can be a major limiting factor for some snag dependent wildlife species. The proposed stands in the Upper Resource Management Project Area all have snags scattered throughout. However, many of the existing snags are either in the later stages of decay (class 4-6) and/or fail to meet the size/age class preferred by users. Overall recruitment potential is low.

Alternative A - No Action - Selection of the No Action alternative would result in a continued lack of snags in the area. The potential for quality recruitment would remain low as stands would continue to be overstocked with reduced diameter/height growth.

Alternatives B and C - The proposed thinnings, both in Matrix and Riparian Reserves, have the potential to increase the amounts of snags found within the area. Increased levels of snags are expected due to compliance with the Mt. Hood Forest Plan, The Northwest Forest Plan, and mitigation measures/design criteria set forth in this document. Each of the plans require that specific amounts of snags be maintained upon treatments. The Mt. Hood Forest Plan requires that at least 60% Biological Potential be met, this equates to 2.7 snags/acre in this area. Increases are also expected over the long term as snag recruitment potential is enhanced through the creation of snags, especially within riparian reserves. Aerial application of fertilizer has the potential to enhance growth of future snags and is not likely to effect existing snags.

Alternative D - Alternative D has the potential to significantly increase the numbers of snags within the project area. Additional snags would be created within Riparian Reserves by girdling, blasting, and topping. This would also provide for a potential Douglas fir bark beetle infestation, which would create more snags.

B. Down Woody Debris - Down woody debris plays an important role in nutrient cycling, natural forest regeneration, creation of diversity among habitats, and in providing foraging, breeding, and nesting habitat for many species. **Existing down woody debris is present within the proposed stands. However, it too is in the later stages of decay. Although logs in this stage provide a needed component to the stands, hard logs and future recruitment are needed to provide for all users of down wood.**

Alternative A - No Action - Selection of the No Action alternative would result in a continued lack of down woody debris. The potential for quality recruitment would remain low as stands become overstocked with reduced diameter/height growth. Some recruitment would be expected through blow down events and natural mortality.

Alternatives B, C, and D - Thinning, both in Matrix and Riparian Reserves, has the potential to increase amounts of down woody debris currently within the project area. Increases are expected due to compliance with the MT. Hood Forest Plan, The Northwest Forest Plan, and the mitigation/design criteria set forth in this document. Each of these plans require that specific amounts of down material be left on the ground. Increases are also expected over the long term as recruitment potential is enhanced through the creation of snags which

eventually become down material. Thinning in the riparian reserves would be an immediate benefit as placement/retention of logs would effectively increase structural diversity and improve water quality. Aerial fertilization has the potential to enhance growth of future down material and is not expected to effect the existing down woody debris.

3. Fisheries and Water Quality

Mt. Hood Forest Plan References

Forestwide Riparian Standards and Guidelines - FW-80 to FW-136, page Four-59
Forestwide Water Standards and Guidelines - FW-54 to FW-79, page Four-53
Forestwide Fisheries Standards and Guidelines - FW-137 to FW-147, page Four-64
General Riparian Standards and Guidelines - B7-28 to B7-39, page Four-257
See Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167
Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69
See FEIS pages IV-76 and IV-90

Northwest Forest Plan References

Riparian Reserves - page A-5
Aquatic Conservation Strategy - pages B-9 to B-34
Riparian Reserves Standards and Guidelines - pages C-30 to C-38
Watershed Analysis - pages E-4, E-20 to E-21
Consultation - Endangered Species Act - page A-2
Standards and Guidelines Common to All Alternatives: Exceptions - page C-3
Survey and Manage Standards and Guidelines - pages C-4 to C-6
Protection Buffers - pages C-19 to C-21, C-45 to C-48
Survey and Manage Species List - pages C-49 to C-61

Northwest Forest Plan FSEIS References

Chapters 3&4: Affected Environment and Environmental Consequences - pages 205-258

Threatened, Endangered, Sensitive, C-3 Survey and Manage Species - (Fish)

A. Lower Columbia River Coho, Lower Columbia River Spring Chinook, Lower Columbia River Cutthroat Trout

Alternative A - No Action - The project area would remain unchanged.

Alternatives B, C, and D - These alternatives merit a "**May Effect not likely to Adversely Affect**" determination for Lower Columbia River Steelhead, and a "**May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal Listing or cause a loss of viability to the population or species**" determination for Lower Columbia River Coho, Lower Columbia River Spring Chinook, and Lower Columbia River Cutthroat Trout. The short term ground disturbing activities proposed in Alternatives B, C and D include thinning in Riparian Reserves, new road construction, temporary road construction/obliteration and the riparian enhancement project all of which have the potential to cause some minor soil erosion or runoff. The new specified roads would meet the Aquatic Conservation Strategy objectives and be mainly ridge top roads located outside Riparian Reserves with the exception of 25 feet of road that enters unit 5 in Alternative C. All temporary roads would be located outside Riparian Reserves and would be closed and revegetated after use. The riparian enhancement project would place structures by helicopter into a one mile section of the North Fork Clackamas River. These structures would then be positioned by a walking excavator. Mitigation measures listed in Appendix A such as "No cut areas" within the Riparian Reserves, distance above the anadromous fish habitat (project area is 8 miles above the barrier falls) and adherence to General Best Management Practices would eliminate or substantially reduce the impacts of soil disturbance and runoff on water quality. The long term benefits of these projects would enhance the aquatic habitat by accelerating the growth of mid seral stands to reach late seral stand conditions, thus improving channel complexity by increased large woody debris recruitment potential and habitat development.

B. Propose Bull Trout, Lower Columbia River Fall Chinook, Lower Columbia River Fall Chum, Redband Trout

Alternative A - No Action - The project area would remain unchanged.

Alternatives B, C, and D - A "**No Effect**" determination is expected for bull trout. Bull trout are considered "functionally extinct" in the Clackamas River system. The effect analysis for fall chinook, fall chum and Redband trout is "**No Impact**". Fall chinook spawn below River Mill Dam, the fall chum historically have inhabited the lower portion of the Clackamas River but no current records are available to confirm any chum presence within the Clackamas River and Redband trout do not occur in the Clackamas River or its tributaries.

C. Sensitive Aquatic Macro invertebrates: (Mt. Hood Primitive Caddisfly, Farulan Caddisfly, Cascades Apatanian Caddisfly, and One Spot Caddisfly)

Alternative A - No Action - The project area would remain unchanged.

Alternatives B, C, and D - Any impacts to water quality or riparian habitat could have potential effects to any or all of these species. Short term sediment production could occur during thinning of Riparian Reserves, new road construction, temporary road construction/obliteration and the riparian

enhancement project in Alternatives B, C and D. The potential for impacts to these species is very low because the intermittent streams in the project area are lacking cold spring fed habitat and the area is below the optimum elevation range of 4000-5000 feet.

The following table summarizes effects to Proposed Threatened and Sensitive fish by species and alternative.

Species	Suitable Habitat Present	Species Present	Conclusion of Effects by Alternative			
			A	B	C	D
Proposed Threatened						
Lower Columbia River steelhead trout (<u>Oncorhynchus mykiss</u>)	Yes	No	NE	MENLAA	MENLLA	MENLLA
Columbia River bull trout (<u>Salvelinus confluentus</u>)	NO	NO	NE	NE	NE	NE
Sensitive						
Lower Columbia River coho salmon (<u>Oncorhynchus kisutch</u>)	YES	NO	NI	MIIH	MIIH	MIIH
Lower Columbia River spring chinook (<u>Oncorhynchus tshawytscha</u>)	NO	NO	NI	MIIH	MIIH	MIIH
Redband trout(<u>Oncorhynchus mykiss</u>)	NO	NO	NI	NI	NI	NI
Lower Columbia River fall chinook (<u>Oncorhynchus tshawytscha</u>)	NO	NO	NI	NI	NI	NI
Lower Columbia River fall chum (<u>Oncorhynchus keta</u>)	NO	NO	NI	NI	NI	NI
Lower Columbia River cutthroat trout (<u>Oncorhynchus clarki</u>)	YES	YES	NI	MIIH	MIIH	MIIH
Mt. Hood primitive caddisfly (<u>Eobrachycentrus gelidae</u>)	NO	NO	NI	NI	NI	NI
Mt. Hood Farulan caddisfly (<u>Farula jewetti</u>)	NO	NO	NI	NI	NI	NI
One-spot caddis-fly (<u>Rhyacophila unipunctata</u>)	NO	NO	NI	NI	NI	NI
Cascades Apatanian caddisfly (<u>Apatania tavalala</u>)	NO	NO	NI	NI	NI	NI

NE = No Effect

MENLAA = May Effect, Not Likely to Adversely Affect

MELAA = May Effect, Likely to Adversely Affect

NI = No Impact

MIH = May Impact Individuals or Habitat, but would not likely contribute to a trend towards Federal Listing or cause a loss of viability to the population or species. but not likely to cause a trend to Federal Listing or loss of viability

Effects to Aquatic Systems and Recreational Fishing

The North Fork watershed supports recreational fishing. Although there are native winter steelhead, spring chinook and coho, which occupy the lower 2.4 miles of the North Fork Clackamas River below the barrier falls, current regulations do not allow fishing for these species. The sport fishery includes native rainbow and cutthroat trout, hatchery run summer steelhead, and stocked rainbow trout. Recreational fishing within the proposed project area consists of native rainbow and cutthroat trout. The North Fork watershed can provide the angler with a primitive fishing experience. Except for a few road crossings, access to most of the streams involves hiking which helps isolate and protect fish from human harassment and increased angling pressure as well as provide a primitive setting.

Alternative A - No Action - The North Fork Clackamas River within the proposed project area would continue to support populations of rainbow and cutthroat trout for recreational fishing. The recovery of the aquatic habitat would continue but at a much slower pace without implementing the proposed projects.

Alternatives B, C and D - By implementing thinning within Riparian Reserves and the Riparian Enhancement Project this would provide for the long and short term recruitment of LWD until the adjacent stands could reach late seral conditions. By improving fish habitat the quality of fish can be improved for recreational fishing.

Effect to Fisheries and Water Quality from Fertilization in Matrix Lands

Alternative A - No Action - There would be no effects to Fisheries habitat or water quality. No fertilization would occur.

Alternatives B, C, and D - Approximately 194 acres of Matrix land would be aerielly fertilized to improve health and vigor and enhance growth of forest stands. **Although no fertilization is proposed for riparian areas, aerial application of urea fertilizer has the potential to enter the aquatic environment and may result in increased nitrogen levels in streams. The most common routes that urea enters water is through direct application and drift. Direct application is avoided by using a "no application buffer" to avoid application near streams and areas of surface water for protection of fish and other aquatic organisms. Drift is similar to direct application but the fertilizer is carried by wind and the peak concentrations are usually lower and probability of stream organisms being affected is reduced. Drift is avoided by limiting aerial application to days with little to no wind.**

The only chance for approaching or possibly exceeding standards and thresholds would be in the case of an accidental spill. If this were to happen, the District spill

containment plan would be implemented immediately with proper state and federal agencies notified. Based on past District monitoring of forest fertilization activities, the risk of adverse impacts to water quality and fisheries habitat is very low. Effects to Fisheries Habitat and the Eligible Wild and Scenic River from the Riparian Enhancement Project

Mt. Hood Forest Plan References

**Forestwide Eligible Wild, Scenic, and Recreational Rivers Standards and Guidelines - FW-467 to FW-551, page Four-100
FEIS, Appendix E - Wild and Scenic River Eligibility**

Forest Service Manual

FSM 2354.21, 1/86 Amend 96, 2354.75, Section 7 determination

The existing forest stands in the Riparian Reserves are not of sufficient diameter or height to function as large woody debris (LWD) recruitment. This can result in the reduction of aquatic habitat quality and affect the natural stream channel functions such as nutrient routing, regulation of sediment transport and storage rates, cover, organic material to create pools, regulation of bedload movement, and stream channel complexity. According to the 1996 stream survey report, the North Fork Clackamas River is below the Forest Plan Standards and Guidelines (FW-094, FW-095, FW-090, and FW-091) for LWD and pools, including the portion within the project area.

Alternative A - No Action - **Selection of the No Action alternative would result in a continued lack of large woody debris in stream channels. The potential for quality recruitment would remain low until the forest stands progress to late seral conditions.**

There would be no effects to the free flowing nature of the Eligible Wild and Scenic North Fork Clackamas River.

Alternatives B, C, and D - The placement of in-stream structures would accelerate recruitment of large woody debris into stream channels. This would enhance aquatic habitat and provide for short term function of large woody debris during the interim until the adjacent riparian stands progress to late seral conditions. These activities would move the project area closer to attaining desired future conditions listed in Chapter I. During structure manipulation with the excavator, sediment may enter the stream channel causing a short term reduction in water quality. These effects would be eliminated or substantially reduced by the use of Best Management Practices, seasonal restrictions, and mitigation measures listed in Appendix A of this document. Aquatic Conservation Strategy objectives and State water quality standards for turbidity would be met.

The North Fork Clackamas River has been identified as an Eligible Wild and Scenic River. The Mt. Hood Forest Plan includes Standards and Guidelines designed to protect the free-flowing nature and outstandingly remarkable values of the river. An evaluation of this project's effects under FSM 2354.76, Section 7, is available in the Upper Project Area Analysis File. The riparian enhancement project would not effect the free flowing nature of

the river, nor would it withdraw or store water. The riparian enhancement project is expected to enhance the outstandingly remarkable values of fish habitat in the North Fork Clackamas River.

Cumulative Effects to Forest Hydrology - Alternatives B, C, and D

The Aggregate Recovery Percentage Model (ARP) is used to measure cumulative changes to forest hydrology from such practices as timber harvest and road construction. It evaluates the risk of increased peak flow from rain-on-snow events. In forested stands with full canopy closure, the canopy intercepts snow which reduces snow accumulation on the ground. During periods of rain, the canopy intercepts rain and insulates the snow on the ground which slows the rate of snow melt. The ARP model assumes that different canopy closures represent different levels of hydrologic recovery and uses data about vegetation to calculate an overall ARP value.

According to the North Fork Clackamas River Watershed Analysis all subwatersheds are currently above the Mt. Hood Forest Plan standards of 65 percent. This means that at least 65 percent of the watershed would be in a hydrologically recovered condition. The ARP value for the Upper North Fork subwatershed is currently at 86 percent. With implementation of this project it would be reduced by 1.3 to 1.4 percent depending on the alternative. Using the ARP model to evaluate watershed recovery, the thinning of 229 (194 acres of Matrix Land and 35 acres of Riparian Reserve land) acres of mid seral stands would have a small degrading effect on the overall watershed recovery in the Upper North Fork subwatershed.

Aggregate Recovery Percentage Model Summary

<u>Alternatives</u>	<u>Current Conditions</u>	<u>After Project Implementation</u>
A	86%	86%
B	86%	84.7%
C	86%	84.6%
D	86%	84.7%

4. Plants

Mt. Hood Forest Plan References

Forestwide Forest Diversity Standards and Guidelines - FW-148 to FW-169, page Four-67

Noxious Weed and Integrated Pest Standards and Guidelines FW-299 to FW-301, page Four-82; FW-382 to FW-385, page Four-92

Northwest Forest Plan References

Survey and Manage Standards and Guidelines - pages C-4 to C-6
Protection Buffers - pages C-19 to C-21, C-45 to C-48
Survey and Manage Species List - pages C-49 to C-61

Threatened, Endangered, Sensitive, C-3 Survey and Manage Plant Species, and Protection Buffer Plant Species

The Upper Project Area includes habitat with the potential to support nineteen species of sensitive plants. The area has a high potential for the occurrence of two Sensitive riparian species, a moderate potential for the occurrence of two Sensitive riparian species, and a low potential for the occurrence of eleven Sensitive riparian species. There is a moderate potential for the occurrence of three Sensitive forested mesic species, and a low potential for the occurrence of one Sensitive rocky upland species.

Previous surveys within and adjacent to the project area have indicated the occurrence of two listed Sensitive plant species. The species, Huperzia occidentalis (fir club moss) and Corydalis aquae-gelidae (cold water corydalis) are found in association with riparian habitats such as forested seeps, streams, and mainstem channels. Surveys within the Upper Project Area include a documented site of Corydalis aquae-gelidae along a stream flowing into the North Fork of the Clackamas River adjacent to proposed Unit 6. The area has experienced a number of windstorms with subsequent tree blow down over the years since the original sites were documented. One population along the stream bank has disappeared perhaps due to increased sunlight and species competition. The remaining population is in poor condition.

Riparian Reserves within the Upper Project Area serve as habitat for many plants and other botanical species of interest. They provide specific light, temperature, moisture, and substrate regimes. Micro habitats, which are characterized by the distribution of certain organisms, are found within these reserves. These distributions may be quite localized because of specific differences in degrees of change to substrate, temperature, moisture, and other conditions such as slope and aspect. Organisms such as vascular plants, bryophytes, fungi, and lichens, may occupy specific niches within these micro habitats.

The Northwest Forest Plan contains a species list and survey strategies. These species, referred to as C-3 species, include vascular plants, bryophytes, lichens, and fungi and are generally associated with late-successional forests. Habitat for some of these species may exist in older second growth stands and may provide areas for recruitment of new individuals. Known sites of C-3 Strategy 1 species would be managed according to protocol. Corydalis aquae-gelidae, a C-3 Strategy 1 & 2 vascular plant species site exists in the Upper Project Area. Hydnum repandum, Hydnum umbilicatum, two C-3 Strategy 3, and Cantharellus formosus, a C-3 Strategy 3 and 4 fungi species also are found within this planning area. Hypogymnia oceanica, a C-3 Strategy 1 & 3 lichen species was found east of the proposed units 1 & 2.

Effects of Implementation

Harvest activities, road construction, and in stream channel projects have the potential to adversely affect Threatened, Endangered, Sensitive, C-3, and Protection Buffer plant species and their habitats. These activities may alter light, temperature, substrate, and moisture gradients or their habitat or cause direct disturbance to the existing site with ground disturbing equipment.

Alternative A: No Action - There should be no adverse effects to TES plant species and bryophytes, fungi, or lichens with the implementation of this alternative.

Alternatives B, C, and D - The implementation of these alternatives would include thinning within the Riparian Reserves. Identified risks to the plant populations and associated habitat includes potential ground disturbance and the reduction of canopy within the Riparian Reserves with the implementation of the proposed thinning project adjacent to Unit 6 and Unit 1. A mitigation measure that includes no thinning in the Riparian Reserve along the north and east boundary of Unit 6 and the north and west boundary of Unit 1 would provide protection to the habitat. A mitigation measure would also be implemented to include consultation by the Silviculturist and Botanist in the field on the determination of this boundary.

The risk to the habitat of TES and C-3 species would be low with the implementation of these mitigation measures. The proposed project activities would not result in an impact that causes an adverse effect on the sensitive species over its range.

Noxious Weed Species

Noxious weed species within the Upper Project Area include Cytisus scoparius (scotch broom), Cirsium arvense (Canada thistle), Cirsium vulgare (bull thistle), Senecio jacobaea (tansy), and Hypericum perforatum (St.Johnswort).

The spread of additional noxious weeds into the project area could occur through ground disturbance. These weedy species have the potential to be introduced to areas through seed transport by machinery and equipment used during project implementation. These projects include timber harvest activities, road construction, road obliteration, and in-stream channel projects. Noxious weed seed can also establish on a site through the use of uncertified seed mixes used in revegetation and erosion control projects.

Noxious weed invasions can reduce bio-diversity through the displacement of plant species necessary for wildlife and aquatic habitat diversity. They can also adversely affect visual quality, reforestation, and recreational activities. A weed infestation leads to an increase in treatment costs including removal through mechanical, biological, or chemical means, increased fertilization to compensate for loss of nitrogen fixing plant species, and erosion control measures that might be necessary.

Alternative A - There would be no effects regarding the introduction and spread of noxious weeds into the area. The Mt. Hood National Forest maintains a Cooperative Program with the Oregon Department of Agriculture regarding prevention and control of weeds. Previously approved

activities to prevent and control the spread of weed species would continue with this alternative.

Alternatives B, C, and D - These alternatives have a higher potential to increase the spread of noxious weeds, as they propose a large number of acres of ground disturbance (including road construction) and stand openings. Mitigation measures which require the use of native plant species, certified grass seed, and weed-free straw or hay would minimize the potential spread of noxious weeds.

5. Soils

Mt. Hood Forest Plan References

Forestwide Soil Productivity Standards and Guidelines - FW-22 to FW-38, page Four-49

Forestwide Geology Standards and Guidelines - FW-1 to FW-21, page Four-46

Earthflow Standards and Guidelines - B8-28 to B8-41, page Four-264

See Mt. Hood FEIS pages IV-11, and IV-155 to IV-167

Northwest Forest Plan References

Coarse Woody Debris Standards and Guidelines - page C-40

Soil Disturbance Standards and Guidelines - page C-44

Modify Fire and Pesticide Use, Minimize Soil and Litter Disturbance Standards and Guidelines - page C-44

Fire and Fuels Management Standard and Guideline - page C-48

Soil Resource Inventory - Mt. Hood National Forest

Interpretations - pages 208-223

The landform, soils, geology, and physiographic characteristics within the project area are generally uniform. The Mt. Hood Soil Resource Inventory (SRI) portrays the location, distribution, and extent of soil types existing within the project area as well as identifying pertinent soil properties and interpretations. Field verification reveals that the soil mapping of this area is generally accurate and useful for land management planning. Soils in the Upper Project Area are classified in the Mt. Hood Soil Resource Inventory as mapping units 107 (Units 1 and 2); 312 (Units 5, 6, and 7); and 313 (Units 2, 3, and 4). These soil types are good producers of timber. Slopes in the project area vary from 0 to approximately 60 percent. There were no soil movement events resulting from the 1996 flood within or in close proximity to the project area.

Effects of Alternatives

Alternative A - No Action - The No Action alternative is representative of the existing soil condition in the project area. There would be no direct, indirect, or cumulative effects.

Action Alternatives - Proposed harvest units were examined and determined to be suitable for timber management in terms of soil productivity. Potential soil disturbances that have been considered during project design for mitigation or avoidance include compaction from heavy equipment, displacement of soil and organic matter by harvesting and site preparation equipment, and erosion. Other factors considered were the potential effects from fire, effects to mycorrhizae, and effects to long-term site productivity. Mitigation and other design criteria (see Appendix A) have been incorporated into project design to minimize detrimental effects to the soil resource from harvest activity, road construction and reconstruction, and site preparation.

Impacts to soils in all action alternatives are expected to be low. Alternative D would have slightly less effect on soils than Alternatives B and C due to the exclusion of yarding activity within the 35 acres of Riparian Reserves. Proposed projects have been designed to meet standards and guidelines contained in the Northwest Forest Plan, the Mt. Hood Forest Plan, and the Vegetation Management FEIS for soil resource protection.

6. Air Quality

Mt. Hood Forest Plan References

Forestwide Air Quality Standards and Guidelines - FW-39 to FW-53, page Four-51 See Mt. Hood FEIS pages IV-19, and IV-155 to IV-167

Alternative A - No Action - There would be no effects to air quality with the no action alternative.

Alternatives B, C, and D - Burning landing slash may temporarily affect local air quality. Prescribed burning has the potential to degrade air quality for short periods of time. The principal impact to air quality from prescribed burning is the temporary visibility impairment caused by smoke to the recreational Forest users. Past experience has shown that significant air quality declines are limited in scope to the general burn area and are of short duration. Most significant impacts occur under strong, persistent inversions or stale air masses. Both of these conditions do not comply with management direction to minimize adverse effects. The effects on air quality should be minimal due to the burning being scheduled in the spring (March - June) or fall (October - December) or during periods of inclement weather.

Areas of highest concern for possible impacts to air quality are:

- Portland-Vancouver Metropolitan Area
- Mt. Hood Wilderness
- Bull of the Woods Wilderness

Salmon-Huckleberry Wilderness
Mt. Jefferson Wilderness
Clackamas River Wild and Scenic River Corridor

To protect visibility in Class I areas, prescribed burning would be restricted from July 4 weekend to September 15. All prescribed burning would be scheduled in conjunction with the State of Oregon to comply with the Oregon Smoke Implementation Plan to minimize the adverse effects on air quality. Burning would be conducted when smoke dispersion conditions are favorable to minimize the potential for adverse effects.

Human Health Effects from Smoke

Health risks are considered greater for those individuals (workers and others) in close proximity to the burning site. Particulate matter is measured in microns and calculated in pounds per ton of fuel consumed. Particulate matter that is 10 microns or less in size are those which create the greatest health risk. At this size the material can move past normal pulmonary filtering processes and be deposited into lung tissue. Particulates larger than 10 microns generally fall out of the smoke plume a short distance down range.

Members of the public are generally not at risk. Few health effects from smoke should occur to Forest users due to their limited exposure. Warning signs and public notices should serve to notify Forest users of areas with activity so they may avoid those areas. Due to the distance involved and the season of the burn, strong inversions are unlikely to develop and hold a dense smoke plume to adversely affect residents.

7. Heritage Resources

Mt. Hood Forest Plan References

Forestwide Timber Management Standards and Guidelines - FW-598 to FW-626, page Four-118
See FEIS page IV-149 and IV-155 to IV-167

Alternative A - No Action - Since no management activities are planned, there would be no impacts to heritage resources.

Alternatives B, C, and D - Heritage resource surveys were conducted in the project area and no sites were discovered. There should be no effect to any listed or eligible heritage resource by project implementation. A copy of the Project Review for Heritage Resources has been forwarded to the State Historic Preservation Officer.

9. Consumers, Civil Rights, Minorities, and Women

Secretary Memorandum 1662, Supplement 8 and OMB Circular A-19, see also FSM 1730

None of the alternatives would have direct effects on minority groups, women, or civil rights. Indirect effect of the action alternatives would provide opportunities for consumers and employment. Conversely, no opportunity for consumers, or employment would be provided by the no action alternative.

10. Prime Farmland, Rangeland and Forest Land

The Mt. Hood National Forest does not contain prime farm lands or rangelands. “Prime forest land” is a term used only for non-federal land and does not apply to lands within the National Forest system.

11. Floodplains and Wetlands

None of the alternatives would have an effect on floodplains or wetlands.

12. American Indian Rights

Public involvement included scoping letters sent to the Confederated Tribes of Warm Springs, the Confederated Tribes of Grande Ronde, and the Yakima Indian Nation. None of the alternatives would affect the rights of American Indians or the American Indian Religious Freedom Act.

13. Recreation

Mt. Hood Forest Plan References

Forestwide Dispersed Recreation Standards and Guidelines - FW-453 to FW-466, page Four-98

Forestwide Eligible Wild, Scenic, and Recreational Rivers Standards and Guidelines - FW-467 to FW-551, page Four-100

Northwest Forest Plan References

Manage Recreation Areas to Minimize Disturbance to Species Standard and Guideline - page C-6

Recreation within the Upper Project Area includes mainly dispersed camping (camping at non-developed sites), hunting, gathering forest products,

recreational driving, and fishing. There are no maintained hiking trails within the planning area.

Alternative A - No Action - would not change the current conditions for recreational users of this area.

Alternatives B, C, and D - Under Alternatives B and C, some short-term travel delays could be experienced along local forest roads in areas where logging is occurring. Sites for dispersed camping would still be available in the area. Opportunities for firewood gathering would increase for a few years following timber harvest which is important as opportunities for firewood gathering are declining throughout the entire Mt. Hood National Forest.

14. Irreversible and Irretrievable Commitments

Mt. Hood Forest Plan References

See Mt. Hood FEIS page IV-163

The use of rock for road surfacing is an irreversible resource commitment.

An irretrievable commitment is the loss of production or loss of use of a resource due to its allocation for a specified purpose. Alternative A, the no action alternative, would result in reduced wood fiber production as stand growth and vigor declines.

15. Inventoried Roadless Areas

Mt. Hood Forest Plan References

Appendices A-I, FEIS; Map C-9, Appendix C-51

Since the project area is not within an inventoried roadless area, there would be no effects to roadless areas.

16. Federal, Regional, and State Laws

There are no conflicts between the proposed action and the objectives of Federal, Regional, State, laws and local land use plans, or policies.

17. **Environmental Justice**

Executive Order 12898. Projects would not disproportionately adversely affect minority or low-income populations.

Chapter IV - List of Preparers

An Interdisciplinary Team approach was used in the development of this Environmental Assessment. Interdisciplinary Team (IDT) members and consultants included:

Mike Malone, IDT Leader, Logging Systems, Economics

Glenda Goodwyne, Silviculture

Lynne Cady, Wildlife Biologist

Sue Helgeson, Fisheries Biologist

Gale Masters, Botanist

Don Chase, Engineering

Tom Turner, Engineering

Pat Greene, Landscape Architect

Cliff Denning, Geology

Cari Kreshak, Archaeologist

Terry Brown, Fire Management

Steve Rheinberger, Economics

Chapter V- Consultation with Others

A summary of the public involvement and consultation with others for the Upper Project Area Environmental Assessment appears in Chapter I. As a result of the public involvement efforts, seven different letters were received. These letters are also in the Upper Project Area Analysis File. Several of the comments expressed concerns about water quality, road construction, thinning, fisheries, and the designation by Congress of the North Fork Clackamas River as an eligible Wild and Scenic River. These comments were considered during the development of the issues, alternatives and mitigations. A complete synopsis of the comments and responses will be included in an appendix to this EA after the completion of the 30-day comment period.

Following is a list of the agencies and governments consulted during scoping. The complete Clackamas River Ranger District mailing list with the names of agencies, groups, and individuals consulted is in the Upper Project Area Analysis File.

List of Other Agencies and Governments Consulted

U.S. Fish and Wildlife Service	City of Estacada
National Marine Fisheries Service	City of Gresham
Oregon Historic Preservation Office	City of Lake Oswego
Confederated Tribes of Warm Springs	City of Gladstone
Confederated Tribes of Grande Ronde	City of West Linn
Yakima Indian Nation Tribal Council	City of Oregon City
Bonneville Power Administration	Clackamas County
Northwest Power Planning Council	Oregon Department of Transportation
Clackamas River Water	Oregon State Parks
South Fork Water Board	Oregon Department of Forestry
Oak Lodge Water Board	Oregon Department of Fish and Wildlife
Mt. Scott Water District	Oregon Division of Lands
Clairmont Water District	Oregon Marine Board
Metro	Eagle Creek National Fish Hatchery
Clackamas River Basin Council	Environmental Protection Agency
Bureau of Land Management	Oregon Department of Environmental Quality
	Oregon Army National Guard
	Oregon Marine Board
	City of Portland

Appendix A. Clackamas River Ranger District Standard Mitigation and Design Criteria - Upper Project Area

1. To reduce erosion, bare soils would be revegetated. Grass seed, fertilizer and mulch would be evenly distributed at appropriate rates to ensure successful establishment. Biodegradable erosion control mats would be used at stream crossing reconstruction sites and steep, unstable slopes. Effective ground cover would be installed prior to October 1 of each year.
2. Native plant species would be used to meet erosion control needs and other management objectives. Appropriate plant and seed transfer guidelines would be observed. Non-native species may be used if native species are unavailable and the non-natives are either 1) Early European introduced species which are naturalized and are judged not to invade undisturbed native plant communities, or 2) short-lived annuals or perennials that are both non-persistent and non-invasive.
3. Grass seed would preferably be certified by the states of Oregon or Washington or grown under government-supervised contracts to assure noxious weed free status. In certain cases non-certified seed may be used if it is deemed to be free of State of Oregon listed noxious weeds.
4. When straw or hay is used as mulch, it would preferably originate from the state of Oregon, if the certification program is in effect at the time of straw/hay purchase. If the certification program is not in effect, these products would originate from State of Oregon or State of Washington certified grass seed fields or from Forest contracts to assure noxious weed free status. If no straw hay is available from any of the proceeding sources, obtain these products from fields judged to be free of State of Oregon listed noxious weeds.
5. All Threatened, Endangered, and Sensitive (TES) plant and animal species and their habitats would be protected, including those found during project implementation. Should any TES species/habitat be located or found during project implementation, project activities would be halted and appropriate site specific mitigation measures would be determined.
6. Avoid fertilizer use in close proximity to live streams and wetlands. Generally a 10 foot buffer would be used for manual application and a 100 foot buffer would be used for aerial applications, but this would be adjusted based on site specific conditions.
7. To minimize surface erosion and sediment delivery; road reconstruction, landing construction, and log haul would not occur during periods of prolonged wetness.
8. No new landing construction would occur within Riparian Reserves if it involves road cut or fill-slope preparation. Avoid log landing within Riparian Reserves if at all

possible. If not, existing landings may be used within a Riparian Reserve if it is located at least 125 feet from streams.

9. Avoid road construction within Riparian Reserves. If not possible, roads would be located in a manner which minimizes impacts to aquatic resources.
10. Trees would be directionally felled away from Riparian Reserve to minimize yarding disturbances.
11. Avoid cutting of hardwoods in Riparian Reserves, unless deemed necessary to meet project objectives.
12. To reduce erosion, temporary roads, landings, skid trails, and skyline corridors would have water bars installed prior to October 1.
13. Avoid ground disturbance within Riparian Reserves by using techniques such as full log suspension in skyline units. (If not feasible, one-end log suspension may occur within the dry portions of the Riparian Reserves.) For tractor units, skid trails would generally be located outside of the Riparian Reserve and trees would be directionally felled and winched.
14. Avoid yarding corridors through Riparian Reserves where possible. When harvest occurs within Riparian Reserves, yard away from streams. Logging systems for each unit would be designed in a manner to minimize the total number of yarding corridors and landings within Riparian Reserves. Parallel settings with spacing approximately 150 feet between corridors and corridor width less than 15 feet are preferred over radial settings. The types of settings need to be weighed in relation to the number of landings needed to log the unit while affording the most protection to Riparian Reserve values.
15. Retain snags where safety concerns allow.
16. Snags would be retained at the level of 2.7 per acre, unless otherwise prescribed. If a post-contract review of snag levels indicates that harvested areas do not meet this level, blasting or girdling of live trees would create sufficient snags. Snags would be greater than 22 inches in diameter and 40 feet tall.
17. In partial cutting harvest units, retain a minimum of 100 linear feet of down woody debris per acre.
18. Avoid the use of ground based operations (tractors, skidders, etc.) on slopes greater than 20%. Skid trails for ground-based equipment would be designated to meet Mt. Hood Forest Plan standards for soils. Existing skid trails would be used where possible. Restrict ground-disturbing activities to non-saturated soil areas.

19. Retain effective ground cover on approximately 60% of each unit for soil erosion protection.
20. Maintain a minimum of 25 tons per acre of dead and down woody material evenly distributed throughout the harvest unit.
21. Harvest units where more than 15% of soils are in an impaired condition would be restored to a level of less than 15% impaired. Restoration would be through deep soil tillage using an approved forest cultivator.
22. Following harvest activity, the contractor would remove or chip slash created by harvest operations in units within 100 feet of mainline or secondary roads as shown in the Access and Travel Management Plan.
23. All prescribed burning would be done in accordance with state and local air quality regulations. To protect visibility in Class I areas, burning would generally not occur from July 4 to Labor Day.
24. When slash is piled in harvest units, one pile per acre would be retained unburned for use by wildlife.
25. When manual slash treatments, manual competing vegetation treatments, or other manual labor projects are considered, projects would be designed to reduce the exposure of workers to hazardous conditions.
26. Firewood would be made available to the public at landings where feasible.