Environmental Assessment

Huckleberry Enhancement

United States Department of Agriculture

Forest Service

2011

Clackamas River Ranger District, Zigzag Ranger District,
Mt. Hood National Forest, Clackamas County, Oregon

The project is located in T.4 S., R.8 E.; T.5 S., R.8 E.; T.4 S., R.8½E.; T.6 S., R.8 E.; T.6 S., R.8½ E.; T.7 S., R.7 E.; and T.8 S., R.7 E.; Willamette Meridian.

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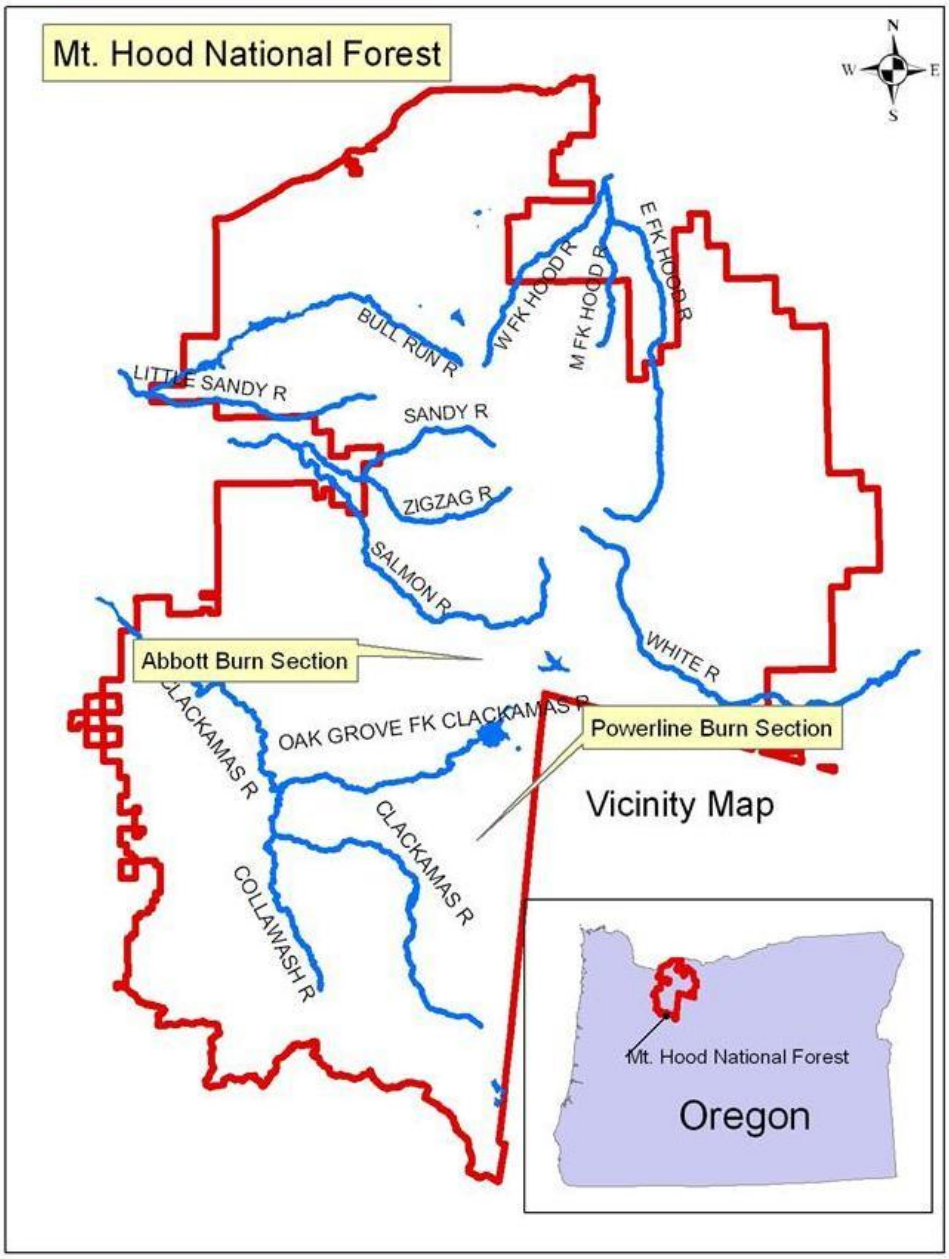
1.0 SUMMARY

The project is located in the Clackamas River Ranger District and the Zigzag Ranger District, Mt. Hood National Forest, Oregon. The Mt. Hood National Forest proposes to enhance huckleberry production by thinning overstory trees to open up the canopy and allow more sunlight to the huckleberry plants. The Mt. Hood National Forest is referred to as 'the Forest' in this document.

The proposed action is to thin and harvest wood fiber from approximately 2,300 acres of matrix land. Refer to section 2.3 for greater detail.



2.0 INTRODUCTION

2.1 Document Structure

The Forest Service has prepared this document in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This document discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. This document uses a section number system. This paragraph for example is in section 2.1 and may be referred to as s. 2.1. The document is organized into the following parts:

- *Summary*
- *Introduction:* This section includes the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This discussion also includes design and Best Management Practices. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Alternatives:* This section provides a description of alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the public and other agencies. Finally, this section provides a comparison of the environmental consequences associated with each alternative.
- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource. Within each section, the existing situation is described first, followed by the effects of the alternatives. The no-action alternative provides a baseline for evaluation and comparison of the other alternatives.
- *Consultation and Coordination:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *References and Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

  Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Estacada Ranger Station in Estacada, Oregon.

2.1.1 Decision Framework

The deciding official, the Forest Supervisor, will review this document in order to make the following decisions and determinations:

- What the optimal method of accomplishing the purposes and needs for this project should be;

- Whether or not a Forest Plan amendment is necessary, or whether exceptions are appropriate for standards and guidelines;

- Whether the selected alternative should be modified in any way;
- What design criteria or mitigating measures should occur;
- Whether this action is in compliance with the Forest Plan as amended and Forest Service policies and procedures.

2.2 Purpose and Need for Action

Huckleberry Enhancement

The purpose of this project is to enhance huckleberry production.

This purpose is primarily driven by the Forest's recognition of Tribal treaty rights on usual and accustomed huckleberry harvesting lands. It is the Forest's intent to fulfill our responsibilities as land stewards in partnership with the Confederated Tribes of Warm Springs for managing the huckleberry resource. Huckleberry gathering by the general public is also recognized as an important activity.

This action is needed because stands are growing denser over time creating too much shade for optimal huckleberry production. If no action is taken, huckleberry production would continue to decline.

While achieving the primary goal of huckleberry production, there would be other benefits and opportunities including the social benefits provided by the utilization of timber, firewood or other products. Thinning timber harvesting can be used as a tool to enhance huckleberry production.

The following sections (s. 2.2.1 to s. 2.2.3) elaborate on the purpose and need and explain how it was derived from Forest Plan goals and desired future conditions that are not being met. These sections set the stage for understanding the rationale for and development of the proposed action.

2.2.1 Background

The Huckleberry Ecology and Use report is in the analysis file and is incorporated by reference. It contains details of huckleberry biology, ecology and use from scientific literature, local research and local knowledge. Section 2.2.4 has a summary of this report. Huckleberries are a major component of the understory vegetation in certain high elevation coniferous forests of the Mt. Hood National Forest. Several species are present in the project area but *Vaccinium membranaceum* or big huckleberry is the variety most often harvested.

Most Forest visitors delight at finding ripe huckleberries. Some come specifically to harvest. Those who have picked for many years have noticed the decline of huckleberry production.

Most popular huckleberry picking areas originated from uncontrolled wildfires that were common in the Northwest before modern fire protection and control techniques were applied. After a large wildfire, huckleberries resprout, become fully productive in 10 to 15 years and remain productive for many years. However, with fire exclusion, trees grow up and eventually produce too much shade. The bushes survive in the shade for many years but fruit production drops off until bushes are fruitless (Minore 1979). The stands targeted for huckleberry enhancement have grown up after wildfires. These stands have huckleberry bushes that are unproductive because the stands have grown to the point where they provide too much shade for optimal berry production.

American Indians have had a long tradition with huckleberries (Richards 2006). Several tribes picked in these areas including those represented by the Confederated Tribes of the Grande Ronde Community and the Confederated Tribes of the Warm Springs Reservation. In 1997, a Memorandum of Understanding (MOU) between the Forest and the Confederated Tribes of Warm Springs set a framework for a working relationship for managing huckleberry resources.

Beginning in 2000, several Harmony Workshops have been held at Warm Springs Reservation to bring land managers from several National Forests and Bureau of Land Management together with the Confederated Tribes for a solid grounding in the history and culture of the Confederated Tribes. In June 2008, the Northwest Huckleberry workshop was sponsored by Confederated Tribes of Warm Springs Reservation, Confederated Tribes of Siletz Indians, Forest Service and Oregon State University Extension Service.

At these workshops, managers learned about the cultural importance of huckleberries as ‘first foods’ and their decline across the landscape as traditional harvesting areas have been shaded out by conifers. The

Treaty of 1855 guarantees the Confederated Tribes of Warm Springs Reservation the right to gather huckleberries on ceded lands and their usual and accustomed gathering grounds which includes the Mt. Hood National Forest. Popular picking areas are in high elevation burned areas.

More information about huckleberries can be found at http://www.reo.gov/ecoshare/huckleberry/.

The Confederated Tribes of Warm Springs Reservation and the Mt. Hood National Forest have been discussing, planning, implementing and monitoring huckleberry enhancement projects. The Tribes have implemented over 600 acres of treatments, http://www.reo.gov/ecoshare/huckleberry/jimenez.pdf. To test and monitor enhancement practices, a 60 acre treatment on the Forest called Summit Thinning was completed in 2007. Another project called Salmonberry was completed in the Sherar Burn area to enhance huckleberries and test summer logging techniques. These efforts showed immediate results: bushes that had few berries before treatment now have abundant crops due to the increase in sunlight reaching the plants.

The Summit Thinning is a good example of the types of stands and huckleberry conditions in the planning area. This pair of photos taken in mid August 2009 show an example of what the stands currently look like with a close-up of bushes with few berries.

The photo to the right was taken on the same day, a short distance away in the Summit Thinning project area where berries are now plentiful. The Summit Thinning treatment involved a thinning where trees were skidded over snow to protect existing huckleberry bushes and slash was piled at landings so that walking through the stand would not be impeded by debris.

The photo to the left shows how the Summit Thinning project looks after project completion. This is a 70-year-old stand of Douglas-fir and lodgepole pine that grew up after a large wildfire. Huckleberry plants were protected and the increased sunlight has resulted in bountiful crops of berries.

At this time, the Forest and the Tribes seek to build on these early efforts by implementing similar projects on a larger scale. The Forest's current proposal involves thinning approximately 2,300 acres of second-growth stands that have huckleberry bushes but little fruiting due to the lack of sufficient sunlight.

Two areas are being considered: the Power Line Burn section near the Summit Thinning, and the Abbott Burn section. These sections were once key picking areas that have abundant huckleberry plants but fruit production has declined due to tree growth and shading.

This photo shows a popular picking area at Wolf Camp in the Sherar Burn taken in 1953.

2.2.2 **Management Direction** – The proposed action has been designed to meet the goals and objectives of the documents listed below. This assessment is tiered to the Environmental Impact Statements and the listed plans are incorporated by reference.

- The Mt. Hood National Forest Land and Resource Management Plan Record of Decision and Final Environmental Impact Statement (USDA 1990a) and Standards and Guidelines (USDA 1990b), as amended, are referred to as the **Forest Plan**. The FEIS discusses environmental effects for Forest-wide programs and sets the stage for project level analysis. The Forest Plan contains standards and guidelines applicable to this project. Consistency is addressed in each resource topic of section 4.0.
- The Forest Plan was amended by the Northwest Forest Plan Record of Decision and Final Supplemental Environmental Impact Statement (USDA, USDI 1994a) and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. (USDA, USDI 1994b) (hereafter referred to as the **Northwest Forest Plan** or NFP). The NFP contains standards and guidelines for Matrix, Riparian Reserves and Late-Successional Reserves. Consistency is addressed in certain resource topics of section 4.0.
- The Forest Plan was amended by the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA, USDI 2001).
- The Forest Plan was amended by the 2005 Record of Decision for Preventing and Managing Invasive Plants (USDA 2005), and Site-Specific Invasive Plant treatments for Mt. Hood National Forest and Columbia Gorge Scenic Area in Oregon (USDA 2008). Consistency is addressed in section 4.9.

2.2.2.1 **Maps** – In addition to the vicinity map in s. 1.0, Appendix A contains maps showing the proposed actions, land allocations and other details.

2.2.2.2 **Land Allocations for Huckleberry Enhancement**

Allocation	Approximate Acres
C1 – Timber Emphasis	1,142
B2 - Viewsheds	917
B11- Deer and Elk Summer Range	124
B12 – Backcountry Lakes (Summit Lake)	117
Late-Successional Reserve	0
Riparian Reserve	0

Thinning to enhance huckleberries is permitted and desired in these land allocations (C1-016, B2-034, B11-020, B12-018).

2.2.2.3 **Forest Plan goals, standards and guidelines related to huckleberries**

The Forest Plan contains, at its core, management goals and desired future condition statements that direct how the Mt. Hood National Forest is to be managed (p. Four-1 to Four-44). It also contains a multitude of standards and guidelines that were designed to guide projects to meet management goals and move the landscape toward the desired future condition.

- The following sections address management goals, desired future conditions and standards and guidelines that relate to huckleberries. Page numbers are from the Forest Plan unless otherwise noted.

  Honor treaty rights and privileges of Native Americans. Protect and preserve Native American ceded rights and privileges to access and use the Forest for traditional religious values. (#2, page Four-2)

  The treaty rights and privileges of Native Americans shall be honored. Treaty rights and privileges should supersede other management direction. (FW-630 & 631, p. Four-121)

  The Forest should not deny access to Native Americans for any area confirmed as traditionally used in connection with tribal ceremonial or traditional rites. (FW-636, p. Four-121)

  The primary purpose of this project is to honor treaty rights as they relate to huckleberry gathering.

- Dispersed recreation opportunities shall be provided and encouraged. Hiking and trail use, driving for pleasure, hunting, wildlife viewing, berry picking, cross-country skiing, the use of off-road vehicles, and cultural resource interpretation are examples of possible activities. (C1-001, p. Four-291)

This project is consistent with the goal of enhanced dispersed recreation through better huckleberry gathering opportunities.

- Each resource heading in section 4 contains a discussion of management goals and standards and guidelines applicable to that resource. The Forest Plan describes the process for documenting exceptions to "Should" standards and guidelines (p. Four-45). The Forest Plan does not require a Forest Plan amendment for project level exceptions to these standards and guidelines. Where exceptions are appropriate to achieve Forest goals, the interdisciplinary project planning environmental analysis would document the rationale.

  For this project an exception is proposed for soil standards and guidelines (s. 4.7.3.1).

2.2.2.4 **Desired Future Conditions**

The following is a discussion of desired future conditions relevant to this proposal. They are derived from the Forest Plan **(**as amended). Page number and standard and guideline numbers are from the Forest Plan. Section numbers indicate where further detail can be found in this document. The italicized text describes where the DFCs are not met or how the project relates to that resource.

Huckleberry	Huckleberry picking opportunities are plentiful across a broad landscape. Four-121, FW-630 & 631. *Huckleberry production has declined and picking opportunities are not plentiful across the landscape. The project would thin overstory trees to reduce shade and boost berry production.* (s. 2.2.1, s. 2.2.4)
Health and Growth	Forest stands have low levels of disease, damaging insect populations and storm damage. Four-92, FW-382; and Four-292, C1-22. Forest stands are healthy and vigorous, and have growth rates commensurate with the site's potential. Four-5, #44; and Four-86, FW-306; and Four-91, FW-372; and Four-90, FW-361. *The project was not specifically proposed to enhance stand health or growth. However, thinning to enhance huckleberries would also give trees the room they need to grow, improving vigor and the trees ability to withstand damaging agents.* (s. 2.2.4.)
Landscape Health	Landscapes are healthy and productive and provide a mix of forest and non-forest habitats to support diverse populations of desired plant and animal species. An appropriate fire suppression response would protect these values. Four-2 to 5. *While the project is within an area where high-intensity stand-replacement fires are expected, this is not the desired condition for this landscape at this time. The landscape is managed for many human values such as scenery, clean air, forest products, recreation and huckleberries. It is also managed to provide habitats for species such as spotted owls and threatened fish. The project was not specifically*

	proposed to address fire hazard, however; the thinning and the post treatment fuel reduction would result in stands where fire intensity would be lower than in untreated stands. The project is not within a wildland-urban interface. (s. 3.3.1)
Forest Products	Forests are sufficiently healthy and productive to sustainably provide forest products now and into the future. Forests provide the products needed by society and create employment for local and regional economies. Four-86 & Four-289 & NFP ROD pages 2 & 3. *Thinning to enhance huckleberries would result in the production of forest products consistent with the Northwest Forest Plan goal of maintaining the stability of local and regional economies.* (s. 2.3)

2.2.3 **Purpose and Need Summary**

- Current conditions in historic berry picking areas are no longer conducive to the production of berries. Overstory trees dominate historic picking areas. Where trees dominate the overstory, huckleberry bushes are commonly present but berry production is at greatly reduced levels.
- The Treaty of 1855 guarantees the Confederated Tribes of Warm Springs Reservation the right to gather huckleberries on ceded lands and their usual and accustomed gathering grounds which includes the Mt. Hood National Forest. The Forest recognizes the cultural importance of huckleberries as 'first foods' and their decline across the landscape as traditional harvesting areas have been shaded out by conifers. This project has been developed in cooperation with the Tribes.
- Thinning to enhance huckleberries has been successfully done before.
- Enhancing huckleberries is one of the goals of the Forest Plan.
- Thinning to enhance huckleberries would move the landscape toward the desired future condition.
- Both thinning and huckleberry enhancements are consistent with the direction of the applicable land allocations: C1 – Timber Emphasis, B2 – Viewsheds, B11-Deer and Elk Summer Range, B12 – Backcountry Lakes.

2.2.4 Huckleberry Ecology and Use

The Huckleberry Ecology and Use report is in the analysis file. Sections 2.2.1 and 4.1 have additional detail on the purpose and need and the effects of the alternatives. The Silvicultural Diagnosis is also in the analysis file and is incorporated by reference. It contains additional analysis and descriptions of both huckleberry productivity and stand health and growth.

There are six species of the genus ***Vaccinium*** present on the Forest. ***Vaccinium membranaceum*** is the most common and is the species most commonly harvested.

Huckleberry species are rhizomatous. Rhizomes are generally relatively shallow with most being within 4-6 inches of the soil surface although some may go as deep as 9 inches. After disturbance, and depending upon the type and intensity of disturbance, resprouting can be quite rapid with significant increases in the number of new stems.

Historically, fire is believed to be the primary disturbance agent. American Indians intentionally set fires to control or eliminate competition from regenerating trees while other fires may have ignited from abandoned cooking fires or drying fires (Mack 2003). Fires from lightning have also played a role. If fires burn during the driest season they can burn with high intensity and heat killing the shallow rhizomes leaving only deeper rhizomes to provide new shoot regeneration. After such fires, bush populations and berry production tend to be lower and bushes more clumpy (Brown 2000). When the above ground stems are burned, berry production commonly takes 10-15 years before full production resumes and may take longer depending upon the severity of the disturbance and site conditions (Barney 1999).

In terms of berry production, plants need sunlight to produce fruit. The most productive areas tend to be open or at least predominately open. However more consistent production occurs in areas where there is at least partial shade. Production tends to be more consistent over time due to the moderating effects provided by overstory vegetation.

Current conditions in historic berry picking areas are no longer conducive to the production of berries or the maintenance of bush productivity (Minore 1979). Overstory trees almost without exception, dominate historic picking areas. Where trees dominate the overstory, huckleberry bushes are commonly present but berry production is at greatly reduced levels. If stands are dominated by species with denser and/or deeper crowns, berry production is extremely limited or non-existent.

Huckleberries compete for growing space, sunlight, nutrients and moisture with trees and other plants such as rhododendron, chinquapin and bear grass. These species and others tend to be aggressive competitors and under certain conditions may outcompete or eventually exclude huckleberries.

2.2.5 **Watershed Analysis** – The project is covered by the Oak Grove Watershed Analysis (1996) and the Salmon River Watershed Analysis (1995). These documents are incorporated by reference. These documents provide summaries of the resource conditions found in the watersheds and make recommendations for management to meet the goals of the Forest Plan.

The Salmon River Watershed is a key watershed (this is not a land allocation). The watershed analyses address huckleberry management (Salmon River - page 7-13, Oak Grove – page 32).

A portion of the project (281 acres of units) lies in the Warm Springs Watershed. A watershed analysis has not been completed for this watershed. The Northwest Forest Plan indicates that projects can proceed without watershed analysis if they are not in Key Watersheds, are not in Inventoried Roadless Areas and are not in Riparian Reserves. The huckleberry enhancement areas are not in these three designations. The treatment areas are near the crest of the Cascades which, is a broad gently sloping ridge. The stands on either side of the watershed boundary are similar and it is appropriate to use the guidance from the Oak Grove watershed for the nearby stands in the Warm Springs watershed.

2.2.5.1 **Riparian Reserves**

This project has adopted the concepts for riparian reserve delineation described in the watershed analysis. The site-potential tree height for this project is 160 feet. While streams, rivers, ponds, wetlands and certain unstable geological features were shown on maps in the watershed analysis, they were conceptual based on data available at the time with limited field verification. For this project, maps were refined based on field inspections and stream surveys. For example, some streams shown on the watershed analysis maps were found to not be there and some streams that showed fish presence were found to be small intermittent streams with not fish. This field-verified information was used to create a more accurate riparian reserve map. This new map is not considered a change to the recommendations put forward in the watershed analysis or the Northwest Forest Plan but simply a more accurate refinement of the intent of those documents. Huckleberry enhancement is not proposed in riparian reserves.

2.2.6 **Roads Analysis** – A Forest-wide Roads Analysis was completed in 2003 (USDA 2003. Section 4.11 discusses roads for this project and how they relate to the Forest-wide analysis.

2.2.7 **Other Relevant Laws and Direction**

National Environmental Policy Act

The National Environmental Policy Act of 1969 establishes the process and content requirements of environmental analysis and documentation. Implementing regulations are outlined in 40 CFR Parts 1500-1508 and Forest Service Handbook 1909.15. This document has been prepared in accordance with these regulations.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973, as amended, requires federal agencies to review actions authorized, funded, or carried out by them, to ensure such actions do not jeopardize the continued existence of federally listed species, or result in the destruction or adverse modification of listed critical habitat. Consultation has

been completed where required. Listed species are addressed in sections 4.4, 4.6 and 4.8.

National Forest Management Act

The National Forest Management Act (NFMA) of 1976 requires that the Agency develop land management plans. It also requires the Forest to determine the suitability of a specific land area for timber management and contains other requirements that are built into Forest Plan standards and guidelines. The proposed action was developed to be in full compliance with NFMA via compliance with the Forest Plan, as amended. This document contains numerous references as to how this project complies with Forest Plan, as amended, and the Silvicultural Prescription in the Analysis File contains a discussion of compliance with NFMA's requirement to identify lands unsuited for management.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires federal action agencies to consult with the Secretary of Commerce (NMFS) regarding certain actions. Consultation is required for any action or proposed action authorized, funded, or undertaken by the agency that *may adversely affect* essential fish habitat (EFH) for species identified by the Federal Fishery Management Plans. See s. 4.6.5.2.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 requires documentation of a determination of whether each undertaking would affect historic properties. The Forest operates under a programmatic agreement between the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation for consultation on project determination. Consultation with SHPO was completed for this project. See s. 4.14.

Wild and Scenic Rivers Act

Section 7(a) of the 1986 Wild and Scenic Rivers Act prohibits agencies of the United States from assisting in any water resources project that "…would have a direct and adverse effect on the values for which such a river was established…" Section 7 provides authority to the Secretary of Agriculture to evaluate and make a determination on water resources projects that affect wild and scenic rivers. The authority for that determination for projects on National Forest System lands is delegated to the Forest Supervisor (Forest Service Manual 2350). The project is not in a Wild and Scenic River corridor. See s. 4.3.1.8.

Clean Water Act

The Clean Water Act of 1977 (CWA) and subsequent amendments established the basic structure of regulating discharges of pollutants into waters of the United States. The Environmental Protection Agency (EPA) has the authority to implement pollution control programs and to set water quality standards for all contaminants in

surface waters. The EPA delegated implementation of the CWA to the States; the State of Oregon recognizes the Forest Service as the Designated Management Agency for meeting CWA requirements on National Forest System lands. The proposed action is in compliance with the Clean Water Act as described in s. 4.6.3.3.

Clean Air Act
The Clean Air Act (CAA) as amended in 1977 addresses the air quality in Wilderness areas. All planned ignitions are conducted according to the Operational Guidance for the Oregon Smoke Management Program (OSMP). The Operational Guidance contains the direction for meeting the terms of the OSMP. The Environmental Protection Agency has approved the OSMP as meeting the requirements of the Clean Air Act, as amended. The OSMP, which is administered by the Oregon State Forester, regulates the amount of forestry related burning that could be done at any one time. Also, in compliance with the Clean Air Act, the Forest Service is operating under the Oregon Administrative Rule (OAR) 629-43-043. The proposed action is in compliance with the Clean Air Act as described in s. 4.12.

2.3 Proposed Action (Alternative B)

The Forest proposes a thinning project in mid-seral stands to enhance huckleberry production. The proposed action is to thin and harvest wood fiber from approximately 2,300 acres of matrix land. Implementation would begin as soon as possible but would likely take several years for completion.

Two areas are included: the Power Line Burn section and the Abbott Burn section. These areas were once key picking areas that have abundant huckleberry plants but fruit production has declined due to tree growth and shading.

Trees would be retained at 85 – 95 square feet of basal area (outside of skips).

Skips (unthinned patches) would be created that would vary in size and number and would add up to 10% of each unit. Skips may be placed where there are special features such as clumps of minor species, legacy trees, down logs or key snags, or at locations of rare or uncommon species or where there are gaps in huckleberry distribution. Sites of Malone's jumping-slug would have circular skips with a 30-meter radius (or greater if these are combined with other skip acreage).

2.3.1 **Unit Table**

Unit	Acres	Unit	Acres	Unit	Acres
2	49.4	24	27.4	48	58.7
4	139.6	26	125.8	50	34.1
6	239.1	30	128.9	52	3.4
8	29.4	32	321.0	54	43.3
10	173.2	34	71.9	56	20.8
12	16.2	36	52.0	58	11.1
14	36.2	38	18.7	60	20.3
16	116.3	40	62.7	62	47.6
18	70.6	42	103.0	64	47.6
20	11.1	44	124.7	66	8.6
22	34.9	46	35.0	68	10.2

2.3.2 **Riparian Reserves** – This project does not include the thinning of riparian reserves. For this project, riparian reserve widths are 160 feet for non-fish-bearing streams and 320 feet for fish-bearing streams.

2.3.3 **Roads**

Temporary roads are roads that are built by timber operators to access landings and are closed upon completion of logging until they are needed again. They are not considered part of the Forest's system of permanent roads. The units proposed for thinning have never been logged and some temporary roads would be constructed to access landings. Approximately **1.4 miles of existing temporary** roads would be reused. Approximately **4.7 miles of new temporary roads** would be constructed. All of these roads would be restored upon project completion.

After use, temporary roads would be bermed at the entrance, water barred, decompacted and roughened with the jaws of a loader or excavator, and debris such as rootwads, slash, logs or boulders are placed near the entrance and along the first portion of the road. Some of the temporary roads would be treated in a way that leaves walking access for huckleberry picking while blocking motorized access.

2.3.4 Monitoring

Huckleberry response would be monitored over time and additional follow-up treatments would be implemented as necessary such as removal of competing brush or small encroaching trees.

Temporary road restoration would be monitored to make sure vehicles are kept out while allowing reasonable walk-in access. Additional treatment may be necessary to

more effectively block vehicles or to more effectively control erosion.

2.3.5 Best Management Practices (BMPs) and Design Criteria

These are practices that are part of the proposed action. The effects and benefits of these practices are included in the analyses of effects in s. 4. In some cases they are standard practices that are used in all similar projects and in other cases they are specifically tailored to this project based on site-specific factors such as the underlying land allocation and associated standards and guidelines.

1. **Seasonal restrictions**

1a **Soils:** No operation of off-road ground-based equipment would be permitted between November 1 and May 31 unless soils are frozen or snow covered. *This is a BMP and implements Forest Plan standards and guidelines FW-022 and FW-024.*

1b **Northern Spotted Owl:** No owl restrictions are needed for this project.

1c **Deer and Elk Summer Range:** No harvest operations, road construction, or use of motorized equipment would be permitted in the B11 winter range land allocation between April 1st to July 30th. This applies to units 34 and 38.

2. **Snags & wildlife trees:** To enhance diversity, variable-density thinning would include the retention of key snags and wildlife trees.

2a Key snags would be retained in all units where safety permits. Dead lodgepole pine trees are small in size and are very common in this area; they are not considered key snags. If key snags must be cut for safety reasons they would be left on site.

2b To increase the likelihood that key snags would be retained, they may be included in skips.

2c Certain live trees would also be selected as leave trees that have the "elements of wood decay" as described in the DecAID advisor. This may include trees with features such as dead tops, broken tops and heart rot. They may be retained in skips.

2d Some live trees would be treated to provide future snags and future cavities. Techniques would vary and may include but would not be limited to topping and inoculation with fungus. **One to two trees per acre would be treated.**

3. **Down Woody Debris:**

3a Old down logs currently on the forest floor would be retained. Prior to harvest, contract administrators would approve skid trail and skyline locations in areas that would avoid disturbing key concentrations of down logs or large individual down logs where possible.

3b Additional down woody debris would be generated by thinning. This would include the retention of cull logs and any snags that would be felled for safety reasons.

3c Some trees would be felled or girdled to provide future habitat. **Two to three trees per acre would be treated.** *This implements Forest Plan standards and guidelines as amended.*

4. **Riparian Reserves –** This project does not occur in riparian reserves. For this project, riparian reserve widths are 160 feet for non-fish-bearing streams and 320 feet for fish bearing streams. (Units 34 and 36 are the only place where a 320-foot riparian reserve touches units.)

5. **Harvest Systems and Roads**

5a Ground based harvest systems would be used.

5b Harvest operations would protect most huckleberry plants. The goal is to have at least 85% of the mature plants intact after logging. The preferred strategy is to log in the winter over snow. With this technique, there would be some impact to plants caused by roads, landings and primary skid trails. It is recognized that there are times when winter logging is not feasible due to factors such as low levels of snow. If operations are considered for the summer season, operators would submit a plan of operation for approval that would demonstrate how they would sufficiently protect huckleberry plants and rhizomes. Summer operations have been successful elsewhere using techniques such as careful planning of skid trail spacing, small landings, directional felling and locating skid trails and landings where there is brush or other gaps in huckleberry distribution.

5c Slash would be treated by yarding tops to the landing to minimize fire hazard and to maintain walking access for huckleberry picking. If mechanical harvester/processor machines are used some of the slash would be crushed in the harvester paths.

5d Snow plowing on haul roads would be done in a way that allows continued snowmobile use.

6. **Pacific Crest Trail**

The following measures would minimize impact to trail users:

6a. Thinning unit boundaries would be 100 feet or farther from the trail. Boundary signs and tree paint would face away from the trail to the extent practical.

6b. Trees to be cut in the units would be directionally felled so they do not fall outside of units.

6c. Trees (including small understory trees) and shrubs between the trail and unit would be protected as a visual screen.

6d. No temporary roads or skid trails would cross the trail. Landings would be as far away from the trail as practical.

7. **Erosion:** To reduce erosion from project activities, bare soils would be revegetated or covered with slash or other debris. Grass seed and fertilizer would be evenly distributed at appropriate rates to ensure successful establishment. Mulch may be used on slopes greater than 20%. Effective ground cover would be installed prior to October 1 of each year. *This is a BMP and implements Forest Plan standard and guideline FW-025.*

7a **Native plant** materials are the first choice in revegetation of bare soils, [e.g., *Elymus glaucus* (blue wildrye), lupine (*Lupinus latifolius*)]. Non-native, non-invasive plant species may be used if native plant materials are not available or as an interim measure designed to aid in the re-establishment of native plants.[e.g., *Lolium multiflorum* (annual ryegrass), Madsen sterile wheat.] Non-native invasive plant species would not be used. *This implements Forest Plan standard and guideline FW-148 and standard 13 of the Regional Invasive Plants Record of Decision.*

7b **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 Oregon State Class A & B noxious weeds. *This implements Forest Plan standard and guideline FW-148.*

7c When **straw and mulch** are utilized, it would be certified by the State of Oregon, or would originate from fields which grow State of Oregon certified annual ryegrass seed, or originate from Willamette Valley Oregon fields which grow only annual ryegrass seed for seed production. In place of straw, wood fiber mulch may be used. *This implements Forest Plan standard and guideline FW-148, and standard 3 of the Regional Invasive Plants Record of Decision.*

8. **Invasive species:** *This implements Executive Order 13112 dated February 3, 1999, and standards and guidelines of the Regional Invasive Plants Record of Decision.*

8a All off-road equipment is required to be free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds prior to coming onto

National Forest lands. Contracts would include provisions to minimize the introduction and spread of invasive plants. These provisions contain specific requirements for the cleaning of off-road equipment.

8b Gravel or rock used for roads would come from weed free sources.

8c Road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants would be conducted in consultation with invasive plant specialists.

9. Contracts would contain provisions for the protection of **heritage resource** sites found during project activities. In the event that sites are located during implementation, project activities would be halted until consultation with the Forest Archeologist can determine appropriate site-specific mitigation. Protection measures would be developed in consultation with the Oregon State Historic Preservation Officer (SHPO), appropriate Tribes, and, if necessary, the Advisory Council on Historic Preservation.

   Unless otherwise specified, the linear features below would be protected by flagging all blaze trees and retaining them as leave trees and the inclusion of an equipment exclusion buffer. The buffer would be 25 feet wide on each side of the feature. Huckleberry enhancement would occur and trees would be cut in this zone but ground based equipment would be excluded except at approved routes or crossings. There would be no restrictions for equipment operating over snow.

9a Archaeological site 665EA227 (Skyline Trail) is located within harvest units 64 and 66.

9b Archaeological site 665EA246 (Summit Lake Telephone/Insulator Line) is located near and within unit 44. This site consists of a 10-foot wide by 1,882-foot long corridor. There are approximately 1,238 feet of 9 gauge telephone wire and one white insulator lying on the ground. The majority of this site is located along the southwest boundary of unit 44 with approximately 650 feet of the corridor heading east into the center of the unit. The southwest boundary of unit 44 would be located 25 feet away from this line. The remaining site area that comes into the unit would have the standard equipment exclusion buffer.

9c Archaeological site 665EA247 (Rock Spring Trail) is near and within proposed units 30 and 32. The site consists of both candle stick and single blazed trees along its length (1.27 miles). The trail tread has been used as a road.

9d Archaeological site 665EA249 (Sheep Springs Trail South) is in unit 38. The site consists of both candle stick and single blazed trees with a visible trail tread and corridor along the trails length.

9e Archaeological site 665EA250 (Sheep Sky Drive Trail) is in unit 64. This trail begins at the Skyline trail and heads in a northeastern direction exiting onto the Warm Springs Reservation.

9f Archaeological site 669EA252 (Clear Lake/Dry Meadow Drive Trail) is within units 18, 22 and 24.

9g Archaeological site 669EA253 (Basin Point Trail) is within units 16 and 18.

9h Archaeological site 669EA254 (Dinger Lake Trail) is within units 4 and 6.

9i Archaeological site 669EA255 (Jackpot Meadow/Blackwolf Mdw. Tr.) is a drive trail that has both candle stick and single blazed trees with visible trail tread. This site is in units 4 and 6.

9j Archaeological site 662EA47 (Summit Camp) is adjacent to unit 30. This site would have a 30-foot no-cut buffer around its perimeter.

10. **Firewood** would be made available to the public at landings where feasible. *This is an opportunity to contribute to Forest Plan - Forest Management Goal #19, and provide forest products consistent with the NFP goal of maintaining the stability of local and regional economies.*

11. **Monitoring**: *This Implements Forest Plan and NFP monitoring requirements.*

    Prior to advertisement of a contract, the provisions of the contract and other implementation plans would be reviewed to insure that required elements are properly accounted for.

    During implementation, Contract Administrators monitor compliance with the contract which contains provisions for resource protection including but not limited to: seasonal restrictions, snag and coarse woody debris retention, stream protection, erosion prevention, soil protection, road closure and protection of historical sites.

    Post harvest reviews would be conducted where needed prior to post harvest activities such as slash treatment and firewood removal. Based on these reviews, post harvest activities would be adjusted where needed to achieve project and resource objectives.

    Monitoring of noxious weeds and invasive plants would be conducted where appropriate to track changes in populations over time and corrective action would be prescribed where needed.

Monitoring is also conducted at the Forest level. For example, water quality is monitored for both temperature and turbidity at several locations across the Forest. Monitoring reports can be found on the Forest's web site at http://www.fs.fed.us/r6/mthood under Forest Publications.

2.4 Public Involvement

A scoping process to request public input for this project was conducted. A letter describing the proposed project and requesting comments was sent out on September 15, 2009. The Forest publishes a schedule of proposed actions (SOPA) quarterly. The project first appeared in July 2009, and in subsequent issues. Several public field trips were conducted to visit the project area and discuss the purpose and need and issues. The legal notice for the 30-day comment period for this project was published in the Oregonian on June 6th 2010. Responses to substantive comments are included in Appendix B. A list of persons and organizations that were sent notice is in the analysis file along with a list of commenters and the complete text of comments.

Issues

Some positive comments were received from folks in favor of the project. However lengthy letters were received from both BARK and Oregon Wild who are not supportive of the project. They suggest that if huckleberries need to be enhanced it should be done with fire or in plantations but certainly not by logging native forests. Issue statements at s. 2.4.1 through s. 2.4.3 describe some suggested ways to enhance huckleberries. These are also addressed in the alternative sections in s. 3.3. The other issue statements at s. 2.4.4 through s. 2.4.8 describe the other reasons why commenters don't like the project. Since the No-Action Alternative addresses these issues, separate alternatives were not developed for each of these comments.

Key Issues

No key issues were identified to generate fully developed alternatives to the proposed action.

Other Issues and Concerns

The following are non-key issues or concerns raised during scoping and the 30-day comment period. The italicized text represents a brief summary of the agency response. Greater detail on the response to these can be found in the referenced sections and in Appendix B.

2.4.1 Plantations

A public comment suggested that thinning treatments in mid-seral forests recovering from fire could negatively impact ecosystems. The comment suggested that huckleberry enhancement should only occur in plantations.

The opportunities to do this type of treatment are very limited: huckleberries grow at high elevations, road access to some plantations for picking is limited, and there are many other overriding management goals such as in Late-Successional Reserves where it would not be appropriate. By eliminating thinning in mid-seral stands in the historic berry picking areas, only 100 to 200 acres would be available for huckleberry production. The District has adopted the practice of adjusting the treatment in some young stand thinning contracts in plantations to enhance huckleberry production where appropriate (s. 3.3.3). Since the treatments in plantations are already authorized, the no-action alternative addresses this suggestion and thus this issue was not further considered. See section 3.3.3.

2.4.2 Reintroduction of Wildland Fire Disturbance Processes

A public comment suggested that fire suppression is the root of the problem of declining huckleberry production. They said that if fires were allowed to burn, areas of high huckleberry production would move around the landscape in a shifting mosaic. They feel that natural disturbance processes like fire should be reintroduced.

The Forest Plan (as amended) requires an appropriate fire suppression response to protect important resources (s. 3.3.1). Also, it would be extremely difficult to predict when a fire would occur in the project area; therefore, we would not know when or where huckleberry production would be stimulated, nor would we know whether or not the fire would be intense enough to stimulate production, or if it may be so intense that it would inhibit production. I have considered allowing fire to restore huckleberry production, but found that allowing wildfires to burn in the project area is outside the scope of this analysis, thus this issue was not considered further. See also Other Alternatives Considered below.

2.4.3 Burning

A public comment suggested controlled burning instead of logging.

The preliminary analysis indicates that use of prescribed fire would have limited effectiveness in enhancing huckleberry production, which would not meet the need for restoring this traditional use area. In order to stimulate huckleberry production, fire must be intense enough to kill enough trees to open the canopy, but not so intense that it kills too many trees or damages rhizomes. Forest vegetation models indicate that it would be extremely difficult to use fire alone to stimulate huckleberry production, especially if the current condition cannot carry a fire of adequate intensity. This option was considered and is elaborated in s. 3.3.2.

2.4.4 Road Construction

A public comment suggested that constructing new roads would change the character of unroaded and undeveloped areas and would have many other undesirable impacts to the environment.

The impacts of temporary road construction are addressed in s. 2.3.3, s. 2.3.5-5&7, s. 4.2, s. 4.3.2, s. 4.4.4, s. 4.5.1.5, s. 4.6, s. 4.7, s. 4.9, and s. 4.11. Temporary roads are needed for this project to access the landings and to provide for feasible thinning treatment. Some short temporary roads are needed to get landings off paved roads and out from under power lines. Using only existing roads to reach units would result in approximately 950 acres being treated. This would not be enough to meet the need for huckleberry production. Temporary roads would be obliterated. Deleting temporary roads would eliminate most of the huckleberry enhancement opportunity and would not meet the need for huckleberries. The roads would occur on gentle topography and would not cross streams. The impact of temporary road construction was not found to be substantial. The No-Action Alternative addresses this issue.

2.4.5 Unroaded and Undeveloped Areas

A public comment suggested that logging in unroaded and undeveloped areas would change the character of these areas. The comment contained a map of several areas of concern. The commenters state that these areas should be protected to serve the unique ecological functions that are provided by the lack of human disturbances such as roads and logging. These include: water quality; healthy soils; fish and wildlife refugia; centers for dispersal, recolonization, and restoration of adjacent disturbed sites; reference sites for research; non-motorized, low-impact recreation; carbon sequestration; refugia that are relatively less at-risk from noxious weeds and other invasive non-native species, and many other substantial values.

The project does not occur in inventoried roadless areas. The impacts to unroaded and undeveloped values are addressed in s. 4.2. The deletion of unroaded and undeveloped areas from huckleberry enhancement would eliminate most of the huckleberry enhancement opportunity and would not meet the need for huckleberries. The unroaded and undeveloped areas do not contain key patches of intact old growth. The impact of thinning to enhance huckleberries in unroaded and undeveloped areas was not found to be substantial. The No-Action Alternative addresses this issue.

2.4.6 Single Species Management

A public comment suggested that the project would favor single species management over ecosystem management. The commenters suggest that huckleberry enhancement in large concentrated areas is an example of prioritizing one plant species over another in a landscape that cannot function without diversity. This

would cause future management concerns similar to plantations; invasive species encroachment, excessive predation and an unnatural presence of edge habitat.

The project is emphasizing huckleberry management on a relatively small portion of the range of the plant and a small portion of the areas that were once key huckleberry gathering areas. Abundant huckleberries are part of a diverse landscape (s. 2.2.4). The No-Action Alternative addresses this issue.

2.4.7 Decadence (dead trees, down logs and trees with disease)

Public comments suggest there should be greater attention paid to the value of dead and down trees. They suggest that healthy ecosystems should have an abundance of large decaying live trees, large snags and coarse woody debris.

Snags and down logs would be retained in the units where safety permits. Recruitment of snags and down logs would also occur in skips and adjacent riparian reserves. They also occur in across a broad landscape outside of units. Skips and riparian reserves would have processes where mortality would create an abundance of snags and down wood. Snags and down logs are addressed in s. 4.5.5. Due to fire history, the project does not contain large snags or large down logs but has small size snags and down logs that have come from second-growth trees. Standards and guidelines for snags and down logs would be met by the proposed action. Retaining greater levels of snags and down logs would not be consistent with the objective of huckleberry enhancement because they would interfere with pickers and their ability to move through stands to access huckleberry bushes. The No-Action Alternative addresses this issue.

2.4.8 Project Size

A public comment questioned why the Confederated Tribes of Warm Springs can't meet their huckleberry needs on their reservation and that the treatment of 2,300 acres on the Forest is too much. They can't possibly need that many huckleberries.

The Confederated Tribes of Warm Springs has done some huckleberry enhancement on the reservation and will likely do more. This project would provide huckleberries for members of many tribes as well as the general public. This project is emphasizing huckleberry management on a relatively small portion of the range of the plant and a small portion of the areas that were once key huckleberry gathering areas. Most of the acreage of the Reservation does not have huckleberry habitat and most of the historic huckleberry picking areas are on the Forest. For these reasons, the Forest developed a proposed action of 2,300 acres.

3.0 ALTERNATIVES

This chapter describes and compares the alternatives considered for this project. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. The Proposed Action is described in s. 2.3 and is sometimes referred to as Alternative B.

3.1 Alternative A - No Action

Under the No-Action Alternative, current management plans would continue to guide management of the area. No huckleberry enhancement or other associated actions would be implemented to accomplish project goals.

3.2 Proposed Action

See detail in s. 2.3

3.3 Other Alternatives Considered

3.3.1 Using Wildfire - A public comment suggested that fire suppression is the root of the problem of declining huckleberry production. They suggest that if fires were allowed to burn, areas of high huckleberry production would move around the landscape in a shifting mosaic.

The natural fire regime for the project area is one where large stand replacing fires burn and kill most trees (Simonin 2000). However past fire suppression, insect mortality in lodgepole pine and the ingrowth of ladder fuels has created a situation where wildfires would burn intensely.

Large intense wildfire is not the desired condition for this landscape at this time. The landscape is managed for many human values such as scenery, clean air, forest products, recreation and huckleberries. It is also managed to provide habitats for species such as spotted owls and threatened fish. A series of large unchecked wildfires would likely burn through and damage nearby old growth, late-successional reserves, riparian reserves, wilderness areas, residential areas, ski areas and power lines. Smoke would create health issues in nearby recreation areas, residential areas and in more distant cities. Smoke would also result in visibility concerns and would impact Wilderness Class I airsheds. It would also burn up plantations and forests allocated for timber management. It could cross onto private or tribal lands.

Unchecked wildfire would burn through areas with and without huckleberries. Huckleberry bushes would be burned and if intense, it may also kill the underground rhizomes. Where fire burns with moderate to low intensity, new growth would sprout from the rhizomes but fruit production would be delayed approximately 10-15 years. A stand replacement fire would kill virtually all the trees and greatly reduce

resprouting of huckleberries (Simonin 2000), leaving the area exposed to total sunlight and the extremes of temperature and moisture. If a wildfire is hot enough, it can damage both the underground rhizomes and the mycorrhizae that coexist with huckleberries (Simonin 2000). The dead trees would eventually fall making access for picking very difficult.

This alternative has not been fully developed for several reasons. The Forest Plan as amended by the NFP requires an appropriate suppression response for all wildfires in this area to protect these values (Forest Plan, p. Four-25: NFP, p. C-18). The suggestion of allowing wildfires to burn is outside the scope of this analysis and would not likely be perceived as desirable by those that appreciate the resources the forest provides.

3.3.2 Using Prescribed Fire - A public comment also suggested using prescribed fire to enhance huckleberries. (Prescribed fires are intentionally ignited when moisture conditions and weather are expected to allow for a cooler burn. They are controlled and contained with fire lines and extinguished if conditions change.)

Using prescribed fire in the project area to achieve huckleberry objectives is possible but would be difficult and expensive (Minore 1977)(Minore 1979). The fire would have to be sufficiently intense to kill half of the trees (to open up the stand to get increased sunlight to huckleberry plants) without killing all of them (some live trees are desired as described in s. 2.2.4). This balance would be very difficult to achieve. If prescribed fire were attempted during the dry summer months there would be a high risk an escaped fire burning out of control becoming a crown fire that would need to be suppressed. However, during the normal prescribed fire season, stands with huckleberries are often too wet and there is insufficient fuel on the ground to carry an appropriate controlled ground fire (Minore 1977)(Minore 1979).

FVS modeling has shown that approximately 80 trees per acres would need to be felled and allowed to dry to provide sufficient fire intensity during the prescribed fire season to carry the fire, keep it on the ground, and kill enough of the standing trees. The final stand basal area target would be 85 to 95 square feet per acre of live trees. Many stands contain tree species such as lodgepole pine and hemlock which are readily killed by even low intensity fire making it difficult to retain sufficient numbers of live trees in those stand types. Tractor constructed fire lines would have to be constructed around the unit perimeters prior to ignition. Preparing and carrying out this type of treatment would cost approximately $500 per acre. There is no likely funding source for this type of burning.

Prescribed fire would result in smoke that would create health issues in nearby recreation areas, residential areas and in more distant cities. If the burn escapes containment, there would be additional suppression costs and some of the same impacts described in s. 3.3.1.

Prescribed burning would result in a delay of approximately 10-15 years to get full huckleberry fruit production (Barney 1999). Trees killed by the burn would eventually fall adding to the 80 felled trees per acre making access for picking very difficult. There are historic trail locations with blazed trees which would likely be damaged by burning.

Prescribed burning would have some potential benefits by avoiding the soil impacts associated with ground based logging and it would enhance diversity in some respects because it would result in an abundance of small snags and down logs. However it would not be possible to protect skips and minor species. Minor species such as cedar and hemlock would likely be killed and there would be no way to protect rare botanical species.

Prescribed burning may be an appropriate tool in some places but it is not part of the proposed action nor is it a fully developed alternative because of the costs and the difficulties and resource impacts addressed above. Prescribed burning does not fit the types of stands identified in the proposed action. If funding were available, burning could be tried in other stand types such as where fire resistant species are present in the overstory, where existing ground fuels are sufficient to carry the fire, and where slope, aspect and natural fire breaks make burning cost effective. None of these stand characteristics are known to occur in huckleberry habitat where land allocations permit prescribed burning.

3.3.3 **Plantations -** A public comment suggested using plantations to enhance huckleberry production (s. 2.4.1). A recent Decision Memo for precommercial thinning includes the concept of adjusting precommercial thinning prescriptions where appropriate to gain sufficient sunlight to enhance fruit production and to minimize impact to huckleberry plants and walk-in access for picking. These treatments would be included where appropriate in contracts that are developed for precommercial thinning.

There are many areas where this treatment would not be appropriate including plantations in late-successional reserves or Wilderness areas where other objectives predominate. The public comment suggested that most or all of huckleberry production needs could be met by treating plantations and that treatments in mid-seral stands would not be needed. The estimated acreage available for precommercial treatment is 100 to 200 acres which would not be sufficient to meet the need for huckleberry production.

3.4 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative and a comparison with the purpose and need.

	No Action	Proposed Action
Acres of Huckleberries Enhanced	0	2,300
Miles of Temporary Road Construction	0	4.7
Acres in Matrix	0	2,300
Acres in Late-Successional Reserve	0	0
Acres in Riparian Reserves	0	0
Acres in Inventoried Roadless Areas	0	0
Acres in Unroaded and Undeveloped Blocks	0	1,540
Miles of Temporary Road Construction in Unroaded and Undeveloped Blocks	0	3.5
Acres in Managed Owl Conservation Area (2008 Critical Habitat)	0	0
Acres of Dispersal Habitat in CHU (1992 Critical Habitat)	0	431
Acres of Dispersal Habitat in Owl Area of Concern	0	746
Acres of Owl Dispersal Habitat	0	1,445
Volume of Timber (MMBF)	0	20

4.0 ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

Cumulative Effects

4.0.1 A discussion of cumulative effects is included for each resource where appropriate. Cumulative effects are impacts on the environment that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. If the proposed action would have little or no effect on a given resource, a more detailed cumulative effects analysis is not necessary to make an informed decision.

4.0.2 The land area and the time scale used for cumulative effects analysis varies by resource.

4.0.3 The analysis considers the impact of activities on other ownerships where appropriate. Future logging on the Warm Springs Reservation is likely but details of location and timing are not known. Where appropriate, estimates are included in the analysis.

4.0.4 In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

The cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach:

- A catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), as well as by natural processes of growth and recovery since. Trying to isolate the individual actions that continue to have residual impacts would be nearly impossible.
- Providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions.
- Focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects.
- The Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.
- The cumulative effects analysis in this document is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives would add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable

> foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making. (40 CFR 1508.7)"

Each resource includes a discussion of how information on past projects was considered. For the reasons discussed above, the analysis of past actions is primarily based on current environmental conditions. Some resources utilize the current GIS vegetation layer which includes information on current condition of forest stands as they have been affected by events such as forest fires, past regeneration harvest and road construction as well as the growth that has occurred since.

4.0.5 Other Projects

The proposed Palomar pipeline does not cross the project area. However the proponent of the pipeline, as part of their planning process, is considering an alternative that would cross the Power Line section of the Huckleberry Enhancement project. If this route is selected, development of the pipeline would likely occur directly adjacent to the power line corridor and would remove trees on the 50-foot wide right-of-way. At this time, the likelihood of the Palomar pipeline being built in the project area is low. There is not sufficient certainty or site-specificity for the effects of this pipeline to be reasonably quantified in this EA. The appropriate time to conduct a cumulative effects analysis would be in an Environmental Impact Statement for the pipeline once proposed routes and alternatives are firmly developed. A pipeline in the project area would not negate the need for huckleberry enhancement. The proposed huckleberry enhancement would be viable with or without a pipeline.

The proposed Cascade Crossing power line project does not cross the project area. However the proponent of the power line, as part of their planning process, is considering an alternative that would cross the Power Line section of the Huckleberry Enhancement project. Do to the level of power flowing through the current lines, the alternative route would parallel but be constructed 1,000 or more feet away. At this time, the likelihood of a new power line being built in the project area is low. There is not sufficient certainty or site-specificity for the effects of this pipeline to be reasonably quantified in this EA. The appropriate time to conduct a cumulative effects analysis would be in an Environmental Impact Statement for the new power line once proposed routes and alternatives are firmly developed. A new power line in the project area would not negate the need for huckleberry enhancement. The

proposed huckleberry enhancement would be viable with or without a new power line.

The Forest has been planning and implementing the decommissioning of roads. Several miles of roads have been decommissioned recently in the Abbott area. The planning of future decommissioning in the Power Line area has not begun and no firm proposals exist that could be considered reasonably foreseeable.

Other types of projects or activities are also considered where appropriate including road maintenance, danger tree removal, grazing, gathering of special forest products, and recreational uses.

4.1 HUCKLEBERRY PRODUCTIVITY

The Huckleberry Ecology and Use report is in the analysis file. Section 2.2 contains additional detail. Two areas were examined for treatment: Power Line Burn and Abbott Burn.

4.1.1 **Power Line Burn Section**

This section is on a broad gently-sloping ridge that straddles the crest of the Cascades with part overlapping the Oak Grove Fork of the Clackamas River watershed and part overlapping the Warm Springs River watershed. Elevations range from 3900 to 4400 feet. It is near Summit Lake and is bisected by a power line corridor with two sets of high voltage towers. The primary access is via road 4200. The areas proposed for treatment are mid-seral stands; primarily lodgepole pine with patches of mixed conifer. The trees seeded in naturally after a wildfire and the stand age is now approximately 80. The project is adjacent to the Summit Thin project which was designed to test huckleberry enhancement techniques. The 60 acre unit was thinned in 2007 and huckleberry production was high in both 2008 and 2009.

4.1.2 **Abbott Burn Section**

This section is on a broad gently-sloping ridge that lies partly in the Oak Grove Fork of the Clackamas River watershed and partly in Salmon River watershed. Elevations range from 3800 to 4400 feet. It is near Fryingpan Lake. The primary access is via road 5800, also known as the Abbot road. (The Abbott Burn and the Abbot road are named after different people and are spelled differently.) The areas proposed for treatment are mid-seral stands; with lodgepole pine and mixed conifer. The trees seeded in naturally after a wildfire and the stand age is now approximately 90.

4.1.3 **Direct and Indirect Effects**

No-action would result in a continued decline in huckleberry productivity across the landscape. As time goes by, those that pick huckleberries would have less and less success finding the berries they need.

The proposed action would provide sufficient areas for people to pick berries. Design criteria would result in adequate protection of plants and rhizomes: they address equipment restrictions and slash removal. The project design would also minimize obstacles to walking and provides for maintenance.

The proposed action would show a serious commitment toward meeting American Indian treaty obligations. It would return an element of diversity to the landscape that has been gradually declining.

4.1.4 **Cumulative Effects**

The proposed action would not result in detrimental impacts to huckleberry production, therefore there would be no negative cumulative effects. Other projects across the landscape have also been designed to enhance huckleberries including the Summit Thinning and several treatments on the Warm Springs Reservation. Future projects include precommercial thinning in plantations, some of which would be designed to benefit huckleberries.

The projects described in s. 4.0.5 if implemented may temporarily impact huckleberry gathering on a small portion of the project area. The decommissioning or closing of roads is occurring across the Forest and this action blocks some access to huckleberry gathering because most pickers will only walk in a certain distance from a road before turning back. The proposed action may increase forage and attract cattle into the enhancement units but grazing would not likely be detrimental to huckleberry productivity.

4.2 UNROADED and UNDEVELOPED CHARACTER

American Indians have had a long tradition with huckleberries: first accessing the areas by trail and later by road as new roads were built into the Forest. Most popular huckleberry picking areas originated from uncontrolled wildfires that were common in the high elevation areas (4,000 - 6,000 feet) where huckleberries are abundant. Because burned over areas had few trees of merchantable size, they were passed over during the intensive logging and road building period that occurred on the Mt. Hood Forest between the 1950s and 1990s. Many of the historic picking areas are now in Wilderness Areas or are in areas of low road density.

4.2.1 Wilderness

The project is approximately 1,400 feet from the nearest Wilderness.

4.2.2 Inventoried Roadless Areas (IRAs) and Potential Wilderness

The proposed huckleberry enhancement project is not in or adjacent to any Inventoried Roadless Area. The nearest huckleberry enhancement unit is approximately 2,000 feet from the nearest Inventoried Roadless Area. Potential Wilderness is defined by FSH 1909.12 chapter 71. The project area does not meet Forest Service criteria for Potential Wilderness because the unroaded/undeveloped portions of the landscape are less than 5,000 acres in size, are not contiguous to existing wilderness, and are not self-contained ecosystems.

4.2.3 Unroaded and Undeveloped Character

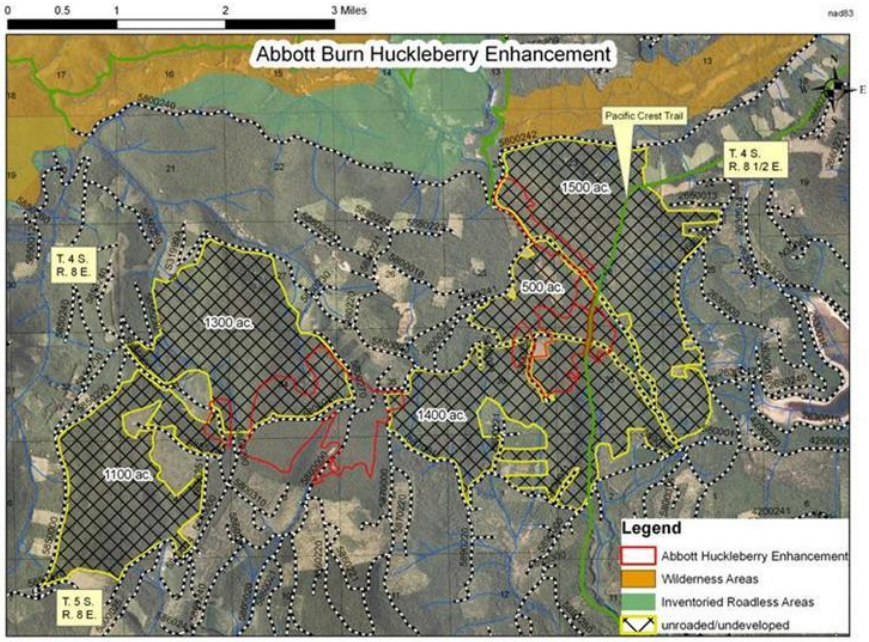
During public scoping, comments were received about unroaded and undeveloped areas; some with maps of areas that were of concern to the writers. The proposed action involves both thinning and temporary road construction in areas that are relatively 'undeveloped' and 'unroaded.' These terms have different meanings for different people: the absence of certain types of roads and certain types of logging activities may be considerations and sometimes a minimum size is considered. Both Oregon Wild and BARK raised this issue with slightly different emphases.

In this document, the terms "unroaded" and "undeveloped" are used to denote any areas that are not already Wilderness, an Inventoried Roadless Area or a Forest Service Potential Wilderness. Unroaded and undeveloped areas are portions of the landscape that do not contain forest roads (36 CFR 212.1). 'Forest roads' have been called system roads, classified roads or forest development roads: they are a part of the Forest's network of roads necessary to protect, administer, and use the national forest system and its resources. Refer to the glossary of the Forest-Wide Roads Analysis for more on these terms. http://www.fs.fed.us/r6/mthood/documents/current/forest-wide-roads-analysis/appendix-1-glossary.pdf Other roads may or may not be present such as temporary roads, user created roads, or old decommissioned roads. Unroaded and undeveloped areas generally do not contain developments such as rock quarries, camp grounds or clear-cut logging that have changed the character of the area.

The following section focuses on what is special about the unroaded and undeveloped parts of the project area. No minimum acreage size is used to exclude areas from this discussion.

4.2.3.1 Abbott Burn section

The Abbot Burn section is part of a large landscape that was burned by several very large wildfires in the early 1900s, most recently in 1920. This burned area includes much of the Salmon-Huckleberry Wilderness, the Roaring River Wilderness and the Abbott Burn area. The panoramic photographs below show the intensity of the fire. The fire burned intensely in some areas while skipping other areas. A large portion of the area that the fire skipped has been logged and roaded and no longer has unroaded or undeveloped character. The portion that burned intensely has regrown and is now a mid-seral forest of lodgepole pine and mixed conifer. These mid-seral areas were likely mid seral or younger before they burned because there is little evidence of charred large stumps or large down logs. The area is bisected by forest road 5800; the primary access to the Abbott Burn section. The proposed huckleberry enhancement units touch five separate unroaded and undeveloped parts of the landscape. The acreages are approximately 500, 1100, 1300, 1400 and 1500. These blocks are bounded by forest roads and old clear cuts. The analysis of cumulative effects below includes disturbances created by past harvest and road construction. There are no other current planned projects or any foreseeable future projects that would affect these blocks.



4.2.3.2 The following panoramic photos were taken in 1933 from High Rock near the Abbott Burn Section. They show the intensity and extent of wild fires in the area. No salvage logging took place in any of these burns.


High Rock Mt Hood N.F.
10-17-33 Sorlin


High Rock Mt Hood
10-17-33 Sorlin

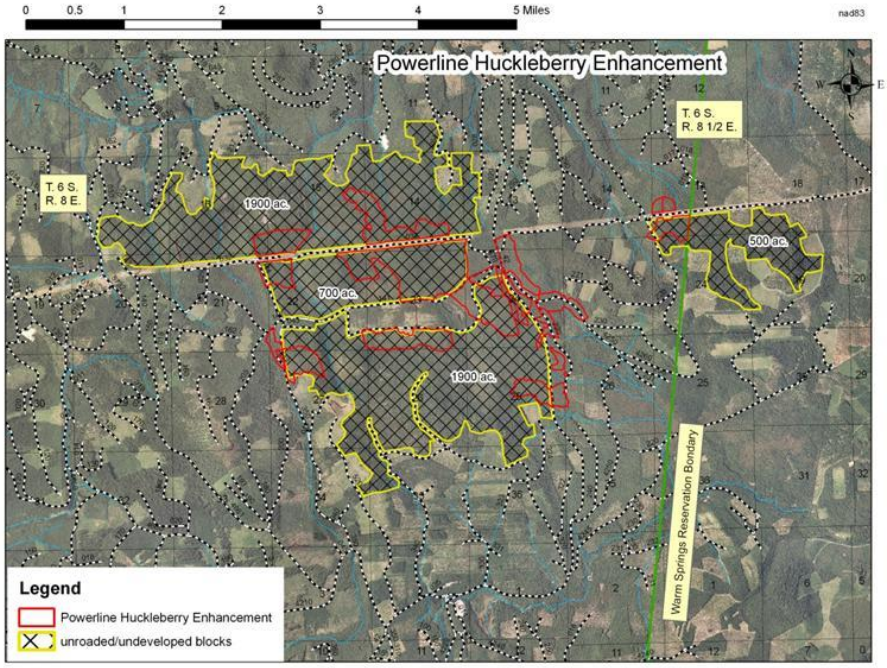

High Rock Mt Hood N.F.
10-17-33 Sorlin

4.2.3.3 The following statements describe the look and feel of the unroaded and undeveloped portions of the area and what recreational uses occur:

- The huckleberry enhancement units have relatively flat topography with no streams.
- There are no viewpoints or scenic vistas.
- The Pacific Crest Trail crosses the area near the huckleberry enhancement units.
- The area is used by hunters.
- There are no camp grounds or other developments in the project area.
- The area is heavily used by snowmobiles in the winter - both on forest roads and off roads including routes that traverse the unroaded and undeveloped blocks.
- Primitive roads cross the 500, 1300 and 1500 acre unroaded and undeveloped blocks. These are very old user created roads and are not considered Forest roads.
- The area receives some use by Off-Highway Vehicles (OHV) but is not considered a heavily used area. The terrain is gentle making it possible for the development of unauthorized user created routes. This area is not in a designated OHV area in the Forest's Off-Highway Vehicle Management Plan. This plan restricts OHV use in this area. Snowmobile use would still be permitted.
- Cattle are grazed in the project area.
- The forest stands are relatively uniform mid-seral lodgepole pine and mixed conifer stands that average approximately 12 inches in diameter.
- There is little old-growth in the unroaded and undeveloped blocks.
- The lodgepole pine stands in the project area are at an age where they are susceptible to attack by Mt. Pine Beetle. Some beetle mortality is occurring in the project area and is likely to continue killing trees as it spreads and expands in the project area. This beetle has caused substantial mortality in other portions of the Forest.
- The shapes of the blocks are shown on the map below. Some of the blocks have convoluted shapes as they wrap around forest roads and clear cuts. One way to describe the degree of convolution is comparing the ratio of the block area and perimeter to that of a square of similar acreage. If the block were square it would have a ratio of 1; the greater the ratio, the greater the convolution.

Block	Ratio
500 ac.	1.52
1100 ac.	1.86
1300 ac.	1.19
1400 ac.	2.36
1500 ac.	1.59

4.2.3.4 Power Line Burn section



The fire burned very intensely across this landscape sometime in the 1920s. No salvage logging occurred after the fire. The area has regrown and is now a mid-seral forest of lodgepole pine and mixed conifer. These mid-seral areas were likely mid seral or younger before they burned because there is little evidence of charred large stumps or large down logs. The area is bisected by forest road 4200; the primary access to the Power Line Burn section. The proposed huckleberry enhancement units touch on several separate unroaded and undeveloped blocks. The larger two are approximately 1,900 acres each and the smaller blocks south of the power line are approximately 500 and 700 acres in size. These blocks are bounded by the power line, forest roads and old clear cuts. One of the unroaded and undeveloped blocks extends onto the Warm Springs Reservation. The analysis of cumulative effects below includes disturbances created by past harvest and road construction. There are no other current planned projects or any foreseeable future projects that would affect these blocks other than those listed below.

4.2.3.5 The following statements describe the look and feel of the unroaded and undeveloped portions of the area and what recreational uses occur:

- The huckleberry enhancement units have relatively flat topography with no streams.
- There are no viewpoints or scenic vistas.
- The area is heavily used by snowmobiles in the winter - both on forest roads and off roads including routes that traverse the unroaded and undeveloped blocks.
- The area is used by hunters.
- Summit Lake is near but outside the unroaded and undeveloped blocks. There is a small campground adjacent to the lake.
- A primitive road crosses the unroaded and undeveloped blocks. This is a very old user created road and is not considered a Forest road.
- The area receives some use by Off-Highway Vehicles (OHV) but is not considered a heavily used area. The terrain is gentle making it possible for the

development of unauthorized user created routes. This area is not in a designated OHV area in the Forest's Off-Highway Vehicle Management Plan. OHV use in this area would be restricted.

- The area is bisected by a large power line with two sets of metal towers.
- The power lines create a crackling buzzing noise.
- The proposed Palomar pipeline does not cross the project area. However the proponent of the pipeline, as part of their planning process, is considering an alternative that would cross the power line area. If this route is selected, development of the pipeline would likely occur directly adjacent to the power line corridor and would remove trees on the 50-foot wide right-of-way, but this would not dramatically change the overall character of the area because it is directly adjacent to the already developed power line corridor. If the pipeline parallels south of the power line it would affect the 500 and 700 acre blocks. If the pipeline parallels north of the power line it would affect the North 1,900 acre block.
- The proposed Cascade Crossing power line project does not cross the project area. However the proponent of the power line, as part of their planning process, is considering an alternative that would cross the power line area. Due the level of power flowing through the current lines, the alternative route, if built, would have to be parallel but be constructed 1,000 or more feet away. If this route is selected it would cross through the North 1,900 acre block.
- The forest stands are relatively uniform mid-seral lodgepole pine and mixed conifer stands that average approximately 12 inches in diameter.
- There is little old-growth in the unroaded and undeveloped blocks.
- The lodgepole pine stands in the project area are at an age where they are susceptible to attack by Mt. Pine Beetle. Some beetle mortality is occurring in the project area and is likely to continue killing trees as it spreads and expands in the project area. This beetle has caused substantial mortality in other portions of the Forest.
- The shapes of the blocks are shown on the map below. Some of the blocks have convoluted shapes as they wrap around forest roads and clear cuts. One way to describe the degree of convolution is comparing the ratio of the block area and perimeter to that of a square of similar acreage. If the block were square it would have a ratio of 1; the greater the ratio, the greater the convolution.

Block	Ratio
500 ac.	1.94
700 ac.	1.2
1900 ac. N.	2.07
1900 ac. S.	2.06

4.2.4 **Direct and Indirect Effects**

The measure of change for this issue is the acres treated and miles of road constructed. The following table shows the actions that would occur in each block.

Section	Block	Acres of Huckleberry Enhancement	Miles of temporary road constructed
Abbott Burn	500 ac.	143	0.29
Abbott Burn	1100 ac.	17	0
Abbott Burn	1300 ac	225	0.35
Abbott Burn	1400 ac	150	0.43
Abbott Burn	1500 ac	98	0
Power Line Burn	500 ac.	42	0.05
Power Line Burn	700 ac.	352	0.95
Power Line Burn	1900 ac. N.	201	0.65
Power Line Burn	1900 ac. S.	313	0.76

The proposed action would alter some of the unroaded and undeveloped character of the project area. Cutting trees, disturbance from logging equipment, fuels treatment, landings and road construction would affect unroaded and undeveloped values. Several of the blocks would only be slightly diminished in size and may continue to provide unroaded and undeveloped benefits but others may no longer provide these benefits such as the 700 acre block which would lose half of its size.

The following analysis focuses on several key resources that are often considered well provided for in unroaded and undeveloped blocks and lacking in other parts of the developed landscape. Some of these topics relate to standards and guidelines that are documented in other sections.

4.2.4.1 High quality or undisturbed soil

Soils are addressed in s. 4.7. The soils were affected by intense fire. Road construction removes soil and clear cut logging can impact soils depending on the logging system and the intensity of site preparation. The design criteria would minimize impacts to soil productivity. Temporary roads and landings would result in some soil impact.

4.2.4.2 High quality water and sources of public drinking water

Water quality is addressed in s. 4.6. There are very few streams in the project area. The flat terrain and project design criteria such as no harvest in riparian reserves combine to minimize the risk that sediment would reach any stream.

Portions of the project are in the Clackamas Watershed which provides drinking water for many people. Water is removed from the Clackamas River more than 30 miles downstream. The project would enhance huckleberries on less than ½ of one percent of the watershed.

4.2.4.3 High quality air

Air quality is addressed in s. 4.12. The unroaded and undeveloped blocks are too small to have an airshed that would be unaffected by surrounding air pollution sources. Where the blocks are surrounded by aggregate or unsurfaced forest roads, dust from vehicles would penetrate into the unroaded and undeveloped blocks. The proposed action would result in tops piled at the landing. Operators would be encouraged to remove this material. If it is not removed it would be burned at landings resulting in some smoke during the late-fall burning season.

4.2.4.4 Diversity of plant and animal communities

Diversity is addressed in s. 2.2.4 and s. 4.5. The proposed action would leave some snags and down wood. Skips and riparian reserves would be retained untreated and minor species would be retained. Productive huckleberry plants are part of a diverse landscape; however their productivity has declined in recent decades as forests become too dense. The proposed action would enhance conditions so that huckleberry plants can thrive and produce abundant crops of berries.

4.2.4.5 Habitat for threatened, endangered, proposed, candidate, and sensitive species

Fish are addressed in s. 4.6. The proposed action would have no effect on threatened fish species.

Owls are addressed in s. 4.4. The proposed action would remove dispersal habitat for the threatened northern spotted owl but would not affect any suitable habitat. Forest roads do not generally impede the owl's ability to disperse across the landscape. The effects determination for the proposed action is the same as the effects determination for other recent projects that occur in roaded and developed portions of the landscape.

Botanical species are addressed in s. 4.8. No sensitive botanical species would be affected.

4.2.4.6 Habitat for those species dependent on large, undisturbed areas of land

Wildlife is addressed in s. 4.4 and s. 4.5. The edge effect of surrounding forest roads and clear cuts, and the noise generated by vehicles on adjacent forest roads reduce the habitat effectiveness of these unroaded and undeveloped blocks for species that need unfragmented mid-seral habitat and solitude. The proposed

action would reduce the size of the unroaded and undeveloped blocks. The convoluted nature of some of the unroaded and undeveloped blocks makes the core interior sections relatively small. Species that require large undisturbed areas of land would find similar forest types in nearby Wilderness Areas.

4.2.4.7 Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation

Recreation is addressed in s. 4.3. The project area is currently allocated to motorized uses. The unroaded and undeveloped blocks are relatively small and the surrounding forest roads and clear cuts, and the noise generated by vehicles on adjacent forest roads affects the opportunity for solitude. This would also be the case with no action. The proposed action would not change the allocated recreational uses of the area but it would restore huckleberry picking opportunities. For some this is a subsistence activity while others view it as recreational.

4.2.4.8 Reference landscapes

Similar landscapes are present in abundance on the Forest in places such as the Salmon-Huckleberry Wilderness, the Roaring River Wilderness and the Olallie Scenic Area. These areas have large expanses of mid-seral forest stands where huckleberry is also being shaded out. These areas provide opportunities for researching and experiencing these landscapes and are much larger than the unroaded and undeveloped blocks in the project area. The proposed action would provide a different reference landscape available for research or observation: one where open forest stands provide huckleberry production.

4.2.4.9 Natural appearing landscapes with high scenic quality

Scenery is addressed in s. 4.3. The power line that crosses the area and the checkerboard nature of clearcut blocks has affected the quality of scenery at the landscape scale. The proposed action would meet visual quality objectives. There are no viewpoints or scenic vistas. The unroaded and undeveloped blocks are not a large enough portion of the viewshed to create a sense of unbroken wildness. The proposed action is a thinning that would have the appearance of an open stand. Skips retained in the stands would create variability and diversity in the resulting scenery.

4.2.4.10 Traditional cultural properties and sacred sites

This is addressed in the Heritage Resource section 4.14, as well as the purpose and need section 2.2. American Indians have a long history with huckleberry gathering and want opportunities to harvest this traditional food. American Indians see these areas as changed by excessive tree growth that has crowded out open huckleberry fields changing them into dense forests where huckleberries are

unproductive. The Forest Service has been coordinating with tribes for years to achieve projects like the proposed action.

4.2.4.11 Other locally identified unique characteristics

No other unique characteristics have been identified.

4.2.4.12 Other topics raised during scoping

- Centers for dispersal, recolonization, and restoration of adjacent disturbed sites

  No key species are known to occur in the units that are necessary for restoration of adjacent land. The proposed action would enhance huckleberries on 14% of the unroaded and undeveloped areas analyzed here.

- Carbon sequestration

  Carbon sequestration is addressed in s. 4.13.

- Refugia that are relatively less at-risk from noxious weeds and other invasive non-native species

  Invasive species are addressed in s. 4.9.

4.2.5 **Cumulative Effects**

Past actions including road construction and logging have created the boundaries of the unroaded and undeveloped blocks. These blocks are used here as the boundary for cumulative effects analysis. See s. 4.0.5 for a description of potential energy corridors. If these corridors occur they would cross three blocks. The pipeline would only affect a small strip of land directly adjacent to the existing power line but the new power line would likely cut the 1,900 acre block in half. Most of the 500 acre Power Line block is on the Warm Springs Reservation. Future logging on the Reservation is likely but details of location and timing are not known and are not sufficiently foreseeable to predict effects. The current proposed action would reduce the 500 acre block by 42 acres. If future logging on the Reservation does occur in this block it would likely no longer provide any of the values described for unroaded and undeveloped landscapes.

No other foreseeable actions would occur in the unroaded and undeveloped blocks.

At the landscape scale, the Forest has approximately 315,000 acres of unroaded and undeveloped areas in Wilderness and another 35,000 acres in Inventoried Roadless Areas. This represents approximately 1/3 of the Forest. The values provide by

unroaded and undeveloped landscapes are well represented on the Forest.

4.2.6 Forest Plan Goals, Standards and Guidelines

There are no specific standards and guidelines for unroaded and undeveloped blocks. The blocks where huckleberry enhancement and road construction would occur have land allocations that allow and encourage thinning. (Refer to the following standards and guidelines: C1-016, B2-034, B11-020, B12-018.)

4.3 RECREATION and SCENERY

4.3.1 Existing Situation

The proposed huckleberry enhancement occurs in areas that are used for various types of recreation. The project area is seen by forest visitors on their way to recreational destinations, and viewing scenery is an important recreational activity. Generally, the area receives more roaded recreation and hunting, than other uses except where the Pacific Crest Trail crosses. Huckleberry harvesting is a subsistence activity for some and a recreational activity for others. The routes that take visitors to the huckleberry enhancement areas take travelers through a landscape that has been intensively managed for timber production with clear cuts and plantations of various ages.

On the landscape scale, there are some areas where a "patchwork" pattern exists and observers can see the difference in texture and line between plantations and adjacent forest stands. This pattern is subtle as seen from the most sensitive viewer positions but is much more noticeable from local forest roads. Power lines cross through the area creating a straight line effect. Some of the proposed treatment areas are directly adjacent to the power line right-of-way.

4.3.1.1 **Campgrounds** – Summit Lake is in the center of a B12 - Backcountry Lakes land allocation. It has a very small informal campground adjacent to it than can handle two or three vehicles.

4.3.1.2 **Trails** - The Pacific Crest National Scenic Trail is adjacent to the project. Approximately 3,000 feet of the trail crosses near the project on very flat terrain. There are some other unmaintained and user created routes present.

4.3.1.3 **Unroaded Recreation/Wilderness/Inventoried Roadless Area** – Section 4.2 has an in-depth discussion of this topic.

4.3.1.4 **Dispersed Recreation** - The primary use of the area is dispersed camping, hunting and snowmobiling. Fire rings are present at old landings and road junctions.

4.3.1.5 **Roaded/Motorized Recreation** - The Forest's OHV Management Plan designated areas for off-highway vehicles. None of the designated OHV areas are near this project. Currently, none of the proposed project areas get very much OHV use.

The area does get used by snowmobiles in the winter. The OHV plan would not restrict or change snowmobile uses. Snowmobile routes are groomed by local clubs. Some use occurs off groomed routes as well.

4.3.1.6 **Visual Quality Objectives**

Area	**Viewer Position**	**Visual Quality Objective ***
Timothy Lake	Lake, Road 57	Partial Retention – Mid & Back Ground (B2)
Salmon River	Salmon River	Partial Retention – Mid & Back Ground (B2)
Summit Lake	Campground, Lake Shore	Retention – Foreground (B12)
Pacific Crest Trail	Trail	Retention – near Foreground
All other areas	Local open roads	Modification

***** From Forest Plan

4.3.1.7 **Recreation Opportunities -** The project area crosses land with various recreational objectives. The Recreation Opportunity Spectrum (ROS) is a framework to inventory, plan, and manage recreational opportunities. The ROS objectives for the landscape are related to the visual quality objective unless the Forest Plan specifies otherwise. The ROS for the B12 – Backcounty Lakes is Roaded Natural (B12-001). The appropriate ROS for the near foreground of the Pacific Crest Trail would be Semi-Primitive Motorized. The appropriate ROS for the Partial Retention areas would be Roaded Natural.

4.3.1.8 **Wild and Scenic Rivers –** The project is not in a designated Wild and Scenic River Corridor.

4.3.2 **Direct and Indirect Effects**

The measure of change for recreation and scenery is described qualitatively and is based on achievement of visual and recreational objectives. Section 2.2.4 describes the recreational aspects of huckleberries. The project would result in increases in recreational picking. Currently the prime areas for picking (such as the Summit Thin Unit) are very limited and many pickers congregate in small areas. The proposed action would provide abundant huckleberries across a wider landscape providing a greater degree of solitude for pickers.

The following actions have the potential to affect recreation and scenery:

- Cutting trees would create stumps and would open up stands so that visitors could see farther into the forest.
- Branches and tops that turn brown and bare soil could be visible.
- Temporary road construction and restoraration – even after revegetation these routes would be visible.
- Burning would create smoke.

Project design elements such as leaving live trees, leaving skips, minimizing ground disturbance and the removal of most debris would result in open looking stands. These would help minimize the change to recreational opportunities and the visual dominance elements (line, form, color, and texture) that could result without these practices. Along the travel routes of roads 58 and 42, short temporary roads would be constructed to get the landings off the primary road and farther out of sight. No temporary roads or skid trails would cross the Pacific Crest Trail.

4.3.2.1 **Effects to recreation and scenery (as seen from sensitive viewer positions) -** Timothy Lake, Road 57, Salmon River, Pacific Crest Trail, and Summit Lake. The proposed huckleberry enhancement would not be seen from Timothy Lake, Road 57 or the Salmon River. Alterations to scenery if any would be very slight because of a combination of topographic screening, vegetative screening near the viewer position, the density of green trees retained, the distance (the project is approximately three miles away) and the viewer angle. These factors combined would result in no noticeable change to the casual observer; the viewer would not notice any dramatic changes in forest structure or see bare ground or slash.

Hikers on the Pacific Crest Trail may observe minor changes when they cross through the project area. There would be a 100-foot no treatment buffer between the trail and huckleberry enhancement units. In this buffer the terrain is very flat and there are abundant understory trees and shrubs that would screen the view of the enhancement units from hikers. Hemlock trees and rhododendron shrubs provide a long-term dense visual screen. No new roads or skid trails would cross the trail.

Campers at Summit Lake would have observed the huckleberry enhancement areas on their drive in to the lake. The lake would have a 320-foot no treatment buffer. This would screen viewers from the huckleberry enhancements. It is likely that campers during the late summer would pick and enjoy the huckleberries that would be plentiful after treatment.

4.3.2.2 **Effects to recreation and scenery (as seen from local roads) -** Local roads are generally roads that were built by loggers to access the forest for timber harvest. Drivers on these local roads would expect to see other roads and some evidence of logging. They would see a closer view of the "patchwork" pattern that exists and would see landings, stumps, skid trails and rock quarries.

Some changes to foreground views from local open roads would occur with the proposed action. Log landings and temporary roads would be noticeable in the short term. Landing size would be kept to the minimum size needed for safety and areas of bare soil would be seeded with grass for erosion control. Temporary roads would also be revegetated.

Similar huckleberry enhancements have been implemented and the results there confirm that this type of treatment has little effect to scenery. The project would meet visual quality objective of modification from these viewer positions because human activity is allowed to dominate the characteristic landscape but would utilize natural established form, line, color, and texture.

4.3.2.3 **Roaded/Motorized Recreation** – If the project is implemented in the winter there is the potential to impact snowmobiling. The previous huckleberry enhancement project was coordinated with local snowmobile clubs to ensure that potential issues were resolved. Snow plowing was kept narrow so that a groomed route was still available within the road right-of-way. This technique and other lessons learned during implementation of the previous project would be used with this project to minimize impact to both the contractor and the snowmobiling public. The proposed action is consistent with the Recreation Opportunity Spectrum objectives (s. 4.3.1.7) because of the retained leave trees and the design criteria that limit ground disturbance.

4.3.3 Cumulative Effects

The proposed action is designed to benefit huckleberry picking; and important recreational activity. However the removal of trees to achieve this would result in some impact to recreation and scenery. The area used for the analysis of recreation and scenery cumulative effects is the area within one mile of the enhancement units. This encompasses the areas that would have similar recreation activities and areas that would be seen in the same general views. Past, present and foreseeable future actions within this area have been included.

The analysis area is 24,325 acres in size and encompasses 1,191 acres of the Warm Springs Reservation. Approximately 31% of this area has been harvested altering the landscapes recreational potential and scenic quality. Some of the plantations are approaching an age and size where they are less visually evident to the casual observer. A large power line that crosses through the project area is very visually evident. Approximately 104 miles of roads have been built in this analysis area which is 2.7 miles per square mile. Approximately 7 miles of these roads have recently been decommissioned. The 97 miles of roads that remain provide driving or walking access for recreational uses of the Forest but they also contribute toward the degradation of scenery. The proposed action would add 4.7 miles of new temporary road but these would be obliterated after project implementation.

The Summit Thinning is described in section 2.2.1 including photos. It is directly adjacent to enhancement unit 32 and Road 42. It was developed to test and monitor huckleberry enhancement practices. In terms of recreational opportunities and scenery, this test has shown that the treatment both meets scenery objectives and provides an improved recreational experience for forest users. The fruit production in this area responded immediately attracting many pickers.

See s. 4.0.5 for a discussion of energy corridors. Other than road decommissioning and road closures there are no other foreseeable projects that would affect recreation or scenery. The analysis area crosses onto the Warm Springs Reservation. Future logging on the Reservation is likely but details of location and timing are not known and are not sufficiently foreseeable to predict effects.

At the landscape scale, road closures and decommissioning across the Forest reduces access for huckleberry gathering. Road decommission and closures across the Forests are gradually reducing the accessibility for huckleberry gathering. The Forest is committed to examining all of its watersheds for road decommissioning opportunities. Roaded recreation opportunities are gradually declining Forest-wide as decommissioning and other road closures occur. Huckleberry gatherers walk into stands to pick but the farther a stand is from an open road, the less utilization there is.

4.3.4 **Forest Plan Goals, Standards and Guidelines**

Forest Plan References
Forestwide Visual Resource Standards and Guidelines - FW-552 to FW-597, page Four-107
Scenic Viewsheds Standards and Guidelines - B2-12 to B2-42, page Four-221
Mt. Hood FEIS pages IV-127, IV-131, IV-142, and IV-155 to IV-167

FW-554, B2-012 & B12-013 Visual Quality Objectives

For the reasons described in s. 4.3.2.1 and s. 4.3.2.2, the project would meet visual quality objectives. Huckleberry enhancements involve thinning that would not dominate the natural character of the landscape. Vegetative screening along the shore of Summit Lake and a 320 foot wide riparian buffer would prevent views from the lake shore into the nearby huckleberry enhancement units and the visual quality objective of retention would be met. Recreational opportunities would not be negatively affected.

FW-584&585 Trail Visual Quality Objectives

As seen from the Pacific Crest Trail, the visual quality objective is retention in the near foreground (660 feet) and partial retention in the far foreground (second 660 feet).

The area has very flat topography and there are no vistas or view points from the trail into the huckleberry enhancement units. The stands vary from lodgepole pine to mixed conifer. There is an understory of hemlock trees and rhododendron shrubs which create a year-round visual screen.

Hikers on the Pacific Crest Trail may observe minor changes when they pass near the project but the area would remain naturally appearing in terms of line, form, color, or texture. There would be no treatment within 100 feet of the trail. The objective of

retention would be met because this buffer has abundant understory trees and shrubs to screen sight lines, and because the huckleberry enhancement treatment is a thinning. Project activities including landings, temporary roads, skid trails, bare soil, stumps and slash, would not be visually evident and the landscape would retain a natural appearance. No new roads or skid trails would cross the trail. For these same reasons, the objective of partial retention would be met in the far foreground areas farther away.

4.4 NORTHERN SPOTTED OWL

The northern spotted owl is listed as a threatened species under the Endangered Species Act and is a Management Indicator Species (MIS) under the National Forest Management Act.

A Biological Assessment has been prepared (USDA 2010). Formal consultation with U.S. Fish & Wildlife Service has been completed for this project. The Biological Opinion written by U.S. Fish & Wildlife Service is dated January 25, 2011 (USDI 2011). These documents are incorporated by reference.

The Biological Assessment was developed by wildlife biologists to document the effects on federally listed threatened and endangered species and on candidate species being considered for listing; and on designated or proposed critical habitat for the spotted owl. It is used to facilitate consultation with regulatory agencies.

A Biological Opinion documents the US Fish and Wildlife Service's findings on the effects on species listed as threatened or endangered and on candidate species being considered for listing; and, on designated critical habitat.

The project does not occur within Late-Successional Reserves (LSR); however, the LSR Assessment (USDA 1998b) identified areas outside the LSRs where there are concerns about connectivity. A portion of the project occurs within a Spotted Owl Area of Concern (AOC) as well as the Salmon River General Connectivity Area of Concern.

This project is consistent with the goals and criteria identified in final recovery plan for the northern spotted owl: It does not occur in Managed Owl Conservation Areas (MOCA) and does not alter mature forests. The analysis also discusses how the project affects the 1992 delineation of critical habitat (CHU).

Barred owls are known to be present on the Forest. Barred owls have been expanding into northern spotted owl territory from northeastern Canada since about 1900 and in some cases have been displacing spotted owls (Anthony 2004) (Courtney 2004) (USDI 2011). Barred owls may be expanding their range because of changes to forest structure from logging, wildfire or climate change. By casual observation and incidental surveying since 1994, barred owls do appear to be more common on the Forest than they were when surveying began on 1979. Since routine surveys have not been completed for owls since approximately 1994, it is unknown as to what extent their presence has affected the population of spotted owls on the Forest.

4.4.1 **Habitat Characteristics** - Habitat for the owl is split into suitable, dispersal and capable. Suitable is habitat used by owls for nesting, roosting and foraging (NRF). Generally suitable habitat is 80 years of age or older, canopy cover exceeds 60 percent, is multi-storied and has sufficient snags and down wood to provide opportunities for nesting, roosting and foraging. Many stands in the analysis area are over 80 years of age yet still have not attained the characteristics of suitable habitat due to slower growth rates at these elevations and the inclusion of lodgepole pine which rarely grow large enough.

Dispersal habitat is typically over 40 years of age of age with a canopy cover of 40 percent or greater and an average diameter of 11". Many stands in the analysis area are over 40 years of age yet still have not attained the characteristics of dispersal habitat due to slower growth rates at these elevations and the inclusion of lodgepole pine which rarely grow large enough. Spotted owls use dispersal habitat to move between blocks of suitable habitat and juveniles use it to disperse from natal territories. Dispersal habitat may have roosting and foraging components, enabling spotted owls to survive, but lack structure suitable for nesting. Owls can also disperse through suitable habitat. In this document, the term dispersal habitat is used to describe the stands that provide for dispersal but are not suitable unless otherwise noted. Sometimes the term total dispersal habitat is used to include the sum of dispersal only habitat and suitable habitat.

Capable habitat is other forested lands with the potential to eventually grow and become dispersal or suitable habitats. Young plantations fit this category. Some lodgepole pine stands are also mapped as capable because they do not fit the criteria for dispersal habitat. In the absence of disturbance, lodgepole pine stands could someday become dispersal habitat, however because of the physiology of lodgepole pine and its relationship with mountain pine beetle and fire, this is unlikely without a conversion to some other species.

4.4.2 **Analysis Area - Noise Disturbance**

The U.S. Fish and Wildlife Service has concluded that noise can result in a disruption of breeding, feeding, or sheltering behavior of the spotted owl such that it creates the potential for injury to individuals (i.e. incidental take in the form of harassment). For a substantial disruption of spotted owl behavior to occur, the disturbance and spotted owl(s) must be in close proximity.

A spotted owl that may be disturbed at a roost site is presumably capable of moving away from a disturbance without a substantial disruption of its behavior. Since spotted owls forage primarily at night, projects that occur during the day are not likely to disrupt its foraging behavior. The concern about noise is with breeding behavior at active nest sites.

In the late breeding period, potential effects from disturbance decline because juvenile spotted owls are increasingly more capable of moving as the nesting season

progresses. The critical breeding period is March 1st through July 15th. After July 15th, most fledgling spotted owls are capable of sustained flight and can move away from most disturbances.

The U.S. Fish and Wildlife Service has developed disruption distances based on interpretation of best available information. The proposed actions for this project that generate noise above the local ambient levels are heavy equipment and chainsaw use. Normally the analysis area for noise around known nest sites would be 35 yards for heavy equipment use, and 65 yards for chainsaw use. However for historic activity centers that have not been verified recently, 300 meters is used.

4.4.3 **Analysis Area – Habitat**

The project proposal involves the temporary removal of dispersal habitat for spotted owls. While the degradation or removal of suitable habitat is usually the greatest concern, the temporary loss of dispersal habitat by thinning may also result in impacts to owls. The removal of dispersal habitat may affect spotted owls that have an established activity center, either by causing them to abandon their current site or reducing foraging opportunities. To evaluate the likelihood of owls using habitat for nesting, roosting or foraging, the analysis considers the entire home range for affected pairs. Since there are few recent surveys for spotted owls that show the locations of active nest sites, historical spotted owl information was used. Historical activity centers are used because studies show nest sites are used for many years. In addition, predicted owl sites are used. These are areas that may be able to support resident spotted owls (i.e. a potential breeding pair) as determined by the USFWS et al. (2007) northern spotted owl occupancy template. This is used for determining effects to spotted owls where survey data is insufficient.

For the Willamette Province the home range is a 1.2 mile radius circle (2,955 acres) centered on the activity center. Incidental take would be presumed to occur when suitable habitat is removed from a home range and if suitable habitat is less than 40% of the home range.

A core area has been defined as the area within a home range that receives disproportionately high use (503 acres or 0.5 mile radius circle). Incidental take would be presumed to occur when suitable habitat is removed from a core and if suitable habitat is less than 50% of the core.

The nest stand is a 300-meter radius circle around the activity center.

The proposed project is within six historical and one predicted pair's home range.

In addition to using home ranges, the analysis includes acreage summaries and discussion of effects for Critical Habitat Units (CHUs) and Areas of Concern (AOC).

4.4.4 **Elements of Proposal Analyzed -** The following actions have the potential to affect spotted owls: actions that remove or kill trees to a level below 40% canopy cover and activities that make noise are considered to result in a greater risk of adverse effects. The actions for this project include thinning and trees removed for skid trail, landing and road construction. Other actions such as log haul or road reconstruction would not affect habitat but may create noise disturbance.

4.4.5 **Existing Condition of Proposed Huckleberry Enhancement Units**

The units range in age based on the mosaic pattern of burning from several fires and the time it took for stands to become reestablished afterward. Ages range from approximately 70 to 100 years. Approximately 846 acres are considered capable habitat for the spotted owl: they do not meet the size and canopy cover requirements of dispersal habitat because of the predominance of lodgepole pine with small diameters and narrow crowns. Approximately 1,446 acres are providing dispersal-only habitat. None of the units are considered suitable (i.e. nesting, roosting, and foraging) habitat because they lack a multi-storied structure, large diameter trees and appropriate levels of snags and down wood.

Snag and down woody debris are important components of spotted owl habitat. The majority of snags and down wood present in the units consist of small diameter lodgepole pine intermixed with other conifer species. The levels range from low to high, depending on the site conditions. Mountain pine beetle infestations have caused high levels of snags and course woody debris in pockets throughout the project area. There are scattered large diameter snags and down woody debris also present in the units.

The project area ranges from approximately 3,800 to 4,400 feet in elevation. This is approaching what is normally considered the upper range for owls. The highest historical nest site in the analysis area is at 4,120 feet. The highest nest site known on the district occurs at 4,900 feet near Sisi Butte.

4.4.6 **Critical Habitat Unit (CHU):** Some of the enhancement units (908 acres) are in the 1992 delineation of **c**ritical habitat (OR-11).

The CHU borders the western edge of the Warm Springs Indian Reservation along the crest of the Cascade Range (see map in Appendix A). This CHU provides nesting/roosting/foraging habitat and to support clusters of owl pairs.

4.4.7 **Spotted Owl Area of Concern:** Some of the enhancement units (1,069 acres) are in the Spotted Owl Area of Concern. The LSR Assessment (USDA 1998b) identified areas outside the LSRs where there are concerns about dispersal. This Spotted Owl Area of Concern lies between the Roaring River LSR, the White River LSR, the Warm Springs Indian Reservation and the Salmon-Huckleberry Wilderness.

There are several reasons this area of concern was delineated.

- Some of the stands in this area lack dispersal characteristics due to the abundance of lodgepole pine.
- Some areas have been intensively managed and are now young plantations.
- The area also has few riparian reserves. In other areas of Matrix between LSRs, riparian reserves are relied upon for their network of mature forest connectivity across the landscape. This area is relatively flat and dry with fewer streams than are typical on other landscapes. As a result, the network of riparian reserves does not provide the level of owl dispersal that is provided for in greater quantities in other landscapes.

4.4.8 **General Connectivity Area of Concern:** The LSR Assessment (USDA 1998b) identified areas outside the LSRs where there are concerns about connectivity. The delineation of this General Connectivity AOC is not only for spotted owls but addresses the broader need for species movement and connectivity. It overlaps the Spotted Owl AOC. This area is important for connectivity between the Salmon-Huckleberry Wilderness Complex and the White River LSR to the east. This area has little late-successional habitat but does have large amounts of dispersal habitat. Low levels of course woody debris may be a concern in some areas. Since this delineation has abundant dispersal habitat and the project would only affect a small quantity of it, the analysis below focuses instead on the Spotted Owl Area of Concern.

4.4.9 **Summary**

	Size (acres)	**Total Dispersal Habitat (acres)**	**Capable Habitat (acres)**	**Non Habitat (acres)**
Huckleberry Enhancement Units	2,292	1,446	847	0
Spotted Owl Area of Concern	40,557	22,620	15,474	2,454
CHU (OR-11)	50,157	29,521	20,056	580

4.4.10 **Spotted Owls as a Management Indicator Species**

The spotted owl was selected as a MIS because it represents old growth habitats. Since its selection as a MIS, it has been listed by the USFWS as a threatened species. Section 4.5 has more detail on MIS. A Forest-level analysis of the status of owls and their habitat was conducted in March of 2011 (project file). The US Fish and Wildlife Service monitors populations while the Forest manages the habitat. For a population to be viable, attributes such as species abundance, productivity, spatial structure, and genetic diversity are needed for the species to maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural

environment. All of these attributes are affected by habitat and other environmental conditions that influence species behavior and survival.

In spite of the protections provided by the Northwest Forest Plan, northern spotted owl populations have declined over the last 15 years. There are many factors contributing to this trend but one of the primary reasons is the expansion of the range of the barred owl. The barred owl is a much more competitive owl with more generalized prey and habitat requirements. The Northwest Forest Plan expected a decrease in population due to the reduction in habitat in the matrix but did not foresee the extent of barred owl competition. There may have also been some overestimation of the quality of habitat for the spotted owl since the analysis lumped mature forest habitat (80-200 years old) with the preferred old-growth habitat (over 200 years old). Section 4.4.1 describes the combination as suitable habitat. Old growth habitat that is over 200 years of age is selected 83% of the time for nesting by spotted owls (USDA USDI 1990).

Currently, at the Forest level there are approximately 309,600 acres of old-growth habitat. The proposed huckleberry enhancement units have no old-growth habitat.

The overall trend for spotted owl populations is declining. The recovery for the species is addressed in the U.S. Fish and Wildlife Service Final Recovery Plan for the Northern Spotted Owl. It contains demographic information for the spotted owl that is used to monitor the populations of the owl.

Because the Northern spotted owl is listed as a Threatened species the Forest consults on the effects to the species and its habitat with the U.S. Fish and Wildlife Service prior to making decisions on actions by the agency. The results of the consultation and analysis are listed in s. 4.4.14.

Since the listing of the spotted owl as threatened under the Endangered Species Act, and the creation of the Northwest Forest Plan, several factors have contributed cumulatively to a trend of improving habitat. While the species population has declined, habitat is gradually improving and may eventually provide sufficient habitat for recovery. The following have changed since the species was listed:

- The establishment of late-successional reserves and riparian reserves has resulted in the retention of late-successional stands and the enhancement of younger stands to accelerate the development of late-successional conditions.
- The development of the U.S. Fish and Wildlife Service Final Recovery Plan and the delineation of critical habitat.
- Many Wilderness Areas have been created.
- Timber harvest on the Forest even in Matrix has transitioned from reliance on regeneration harvest of mature stands to a program of thinning younger stands.
- The Forest has decommissioned several hundred miles of roads reducing disturbance.
- Hazardous fuels have been treated to minimize the impact of wildfire on owls.
- Trees have grown and stands have changed.

4.4.11 Direct and Indirect Effects

4.4.11.1 No Action

No short-term effects to the spotted owl would occur with this alternative. For the short term (0-10 years), the areas that are currently providing dispersal habitat would continue to function as dispersal habitat. Snag and down wood levels would gradually increase due to insects and diseases in the area.

Eventually the stands would start to differentiate to varying degrees and show a substantial increase in the levels of snags, down wood and understory development. Where these developments occurred, they would improve the dispersal habitat characteristics being provided within some stands. The quality of dispersal habitat would improve only somewhat in these stands due to the slow growth rates inherent in these high elevation stands. Stands with a large component of lodgepole pine may eventually succumb to mountain pine beetle and dispersal habitat would decline.

Most of the plantations currently providing capable habitat would grow into dispersal habitat in the next 30 years.

With no action there would be no noise related disturbance to owls.

4.4.11.2 Proposed Action

Treatment Area	Watershed	Activity	Total Project Acres	1992 CH (subset of total acres)	AOC (subset of total acres)	MOCA
Abbott	Salmon	Heavy Thinning-Dispersal	426	0	426	0
		Heavy Thinning-Non-habitat	183	0	183	0
Power Line	Warm Springs	Heavy Thinning-Dispersal	146	146	0	0
		Heavy Thinning-Non-habitat	136	136	0	0
Power Line	Oak Grove	Heavy Thinning-Dispersal	553	285	0	0
		Heavy Thinning-Non-habitat	388	341	0	0
Abbott	Oak Grove	Heavy Thinning-Dispersal	320	0	320	0
		Heavy Thinning-Non-habitat	140	0	140	0

4.4.11.3 **Summary of Effects**

The huckleberry enhancement treatment would reduce the canopy cover to below 40% making them no longer dispersal habitat. Approximately 1,446 acres that are currently dispersal habitat would be heavily thinned and would no longer be dispersal habitat.

The US Fish and Wildlife Service found that this reduction of dispersal habitat may affect spotted owls, but would not likely adversely affect them. Sufficient habitat would remain in the area to facilitate owl dispersal (s. 4.4.14.3).

As the stands grow they may eventually become dispersal habitat again.

4.4.11.4 **Effects Due to Noise Disturbance**

Smoke and noise above ambient levels could disrupt breeding behavior; however no seasonal restrictions are required because the no actions would occur within specified disruptions distances (USDI 2011).

Since surveys have not been conducted recently, there may be newer unknown activity centers. Proposed activities that occur within ¼ mile of unsurveyed suitable habitat have the potential to disrupt the normal behavior patterns of individual owls or breeding pairs. The potential is low that the unsurveyed suitable habitat adjacent to a proposed harvest unit would be occupied since suitable habitat is predicted to be occupied at a rate of only one nest site per 4,754 acres and because the project area is already covered by many historic home ranges. Effects of the proposed project would only be predicted to be adverse if the proposed activities occurred during the breeding season near an active spotted owl nest, and within the applicable disturbance distance for the activity. If logging occurs in the winter it would not affect breeding. Because adult owls are able to distance themselves from disturbances, adverse affects if any would be to breeding pairs when eggs or young are tended.

Adverse effects are possible but they are not reasonably certain to occur.

4.4.12 **Cumulative Effects**

This cumulative effects analysis focuses on dispersal habitat. Cumulative effects were also addressed in consultation with the US Fish and Wildlife Service which is summarized in s. 4.4.14.

Stands that have a canopy cover greater than or equal to 40 percent and conifer trees greater than or equal to 11 inches average diameter are considered dispersal habitat for spotted owls. As plantations grow, these conditions would be met at approximately age 40. Stands older than this would be considered functioning dispersal habitat and would not enter into this analysis unless their canopy has been reduced to less than 40%.

4.4.12.1 **Past, Present and Foreseeable Future Actions**

This analysis relies on current environmental conditions as a proxy for the impacts of past actions. This information comes from the current GIS vegetation, roads and activity layers which include data such as the current condition of forest stands and the age of plantations. These layers track forest vegetation and other features as they have been affected by events such as forest fires and past regeneration harvest as well as the growth that has occurred since. The analysis includes road construction, power lines and rock quarries. See s. 4.0.5 for discussion of energy corridor projects. There are no other foreseeable projects within the analysis area. Recently implemented projects such as the Summit Thin are included. The analysis considers the condition of stands on the Warm Springs Reservation. Future logging on the reservation is likely but details of location and timing are not known and are not sufficiently foreseeable to predict effects.

4.4.12.2 **Effects to Spotted Owl Home Ranges**

Many of the units are within the home range (1.2 miles) of historic activity centers. Research has shown that activity centers that have been utilized in the past are likely to continue to be utilized in the future.

A study by Meiman (2004) reports changes in spotted owl use following a commercial thinning in stands near core areas in Clatsop State Forest. Although sample sizes were not large, proportional use of the thinned area was substantially less during and after harvest operations than during the pre-harvest period. The nature of this effect is not clear, but it may include an influence on prey availability, microclimate conditions, or higher vulnerability to predation. In addition, home range expansion of one spotted owl was observed, and a shift of the core use area away from the thinned stand. These effects suggest that commercial thinning in proximity to spotted owl activity centers may have a short-term effect on home-range and habitat-use patterns of individuals.

The loss of dispersal habitat would affect the ability of owls to move through these stands. The removal or reduction of dispersal habitat could also change the habitat use and home-range of any spotted owls residing in or near the proposed treatment areas. Since many units are within the home range of a pair, the loss of habitat could alter the birds foraging habitats; or shift the core use area of an individual away from the thinned stand. Since suitable habitat in the owl circle analysis areas appear to be well below preferred levels thought required for survival of a spotted owl pair, dispersal habitat in these areas is predicted to be more important than dispersal habitat in other areas. However, suitable habitat is still the most important for owls in this area. Although negative impacts are possible with implementation of the proposed action, it is unlikely that the proposed harvest activities would substantially negatively impact the resultant survival of any birds residing close to the project area.

The following table displays the current condition and project effects to the nest stand, core area, and home range of each site. Incidental take thresholds for suitable habitat are 40% for the home range and 50% for the core. The **bolded** text indicates the pair is below the threshold. There is no threshold for dispersal habitat.

4.4.12.3 Effects to Owl Historic & Predicted Activity Centers

Owl Pair	Analysis Area	Current Suitable	Current Dispersal acres	Dispersal Removed acres
2016	Nest Stand	33%	56	-
	Core Area	**21%**	**379**	**-**
	Home Range	**15%**	**2161**	**38**
2018	Nest Stand	56%	30	**-**
	Core Area	**45%**	**152**	**-**
	Home Range	**31%**	**1958**	**48**
2273	Nest Stand	4%	39	-
	Core Area	**16%**	**349**	**-**
	Home Range	**22%**	**2161**	**53**
2190	Nest Stand	44%	26	-
	Core Area	**44%**	**328**	**7**
	Home Range	**38%**	**1845**	**379**
2192	Nest Stand	70%	0	-
	Core Area	52%	370	49
	Home Range	40%	1778	167
3722	Nest Stand	60%	52	-
	Core Area	**49%**	**338**	**-**
	Home Range	**33%**	**2189**	**128**
Pred-icted site	Nest Stand	69%	69	-
	Core Area	**34%**	**330**	**-**
	Home Range	**30%**	**1762**	**157**

Based on current conditions, six pairs are currently below take thresholds in either their core area or home range. Within all of these owl activity circles, dispersal habitat would be removed. Since these pairs are currently lacking in suitable habitat, the impact on dispersal habitat might have a greater effect on these pairs than in the others. The impacts of the proposed action are primarily in the outer parts of the home range with very little impact in the core area.

4.4.12.4 **Effects to Dispersal Habitat within Critical Habitat Unit**

Critical Habitat Unit	Proposed Acres Treated	Proposed Acres Treated in Dispersal Habitat	Proposed Acres Treated in Capable Habitat
MOCA (2008)	0	0	0
CHU (1992)	907	431	476

4.4.12.5 **Effects to Critical Habitat Unit**

CRITICAL HABITAT UNIT*	TOTAL DISPERSAL HABITAT (INCLUDES SUITABLE)				
	ACRES IN CHU	ACRES OF HABITAT	ACRES REMOVED	PERCENT OF CHU REMOVED	PERCENT OF HABITAT REMOVED
CHU(1992)	50,157	29,521	431	0.9%	1.5%

*****No acres would be affected in the 2008 delineation of Critical Habitat.

4.4.12.6 **Effects to Spotted Owl Area of Concern**

The Forest has identified an Area of Concern (AOC) in the vicinity of Timothy Lake: the entire Abbott Burn section is in this AOC. (See map in Appendix A.) The concern about dispersal habitat has been highlighted in the following documents: North Willamette LSR Assessment, Northern Spotted Owl Final Supplemental EIS, Scientific Assessment Team (SAT), Forest Ecosystem Management Assessment Team (FEMAT), and the Conservation Strategy for the Northern Spotted Owl.

Spotted owl dispersal habitat is limited due to past timber harvest in two portions of the Timothy Lake AOC: one is directly south of the lake and the other is to the east and just north of the lake. These areas have the potential to be biological bottlenecks for south/north and west/east movement. The area farthest north in the AOC has abundant dispersal habitat but its quality is marginal due to the quantity of lodgepole pine that grew up after wildfires.

The basis of the concern comes both from the existing condition of the forest as affected by past fires and timber harvest and the underlying land allocations. The concern about land allocation is based on the assumption that most dispersal habitat would eventually be harvested in the matrix. LSRs, Wilderness, riparian reserves, 15% green tree retention, other administratively withdrawn areas, and 100-acre LSRs should provide adequate dispersal habitat in most areas. However, in the case of the Timothy Lake AOC, there has been intensive regeneration harvest and there is a low density of streams and riparian reserves. Since the Area of Concern was delineated, several new Wildernesses have been created in areas that had previously been matrix.

Even so, dispersal habitat is likely to be a concern for the next 20 years until young plantations grow and become dispersal habitat.

The northern portion of the AOC has been affected by past wildfire. Most fire affected stands are currently dispersal habitat but these stands may never have optimal conditions for dispersal due to the amount of lodgepole pine and its typical characteristics of small diameter trees with narrow canopies. Lodgepole pine trees in nearby portions of the Forest are being killed by mountain pine beetle and it is likely that most of the lodgepole pine in the AOC would also be killed.

Approximately 746 acres of dispersal habitat within the project falls within the Timothy Lake AOC. The project would degrade this dispersal habitat to non-habitat. The proposed treatments would open up the stand to approximately 30-40% canopy cover. A side benefit of this treatment is that wildfire risk would be reduced, protecting adjacent dispersal habitat.

Since dispersal habitat is being removed, the proposed action is expected to adversely affect the Area of Concern. However, the proposed action would not remove suitable habitat or nest trees. It would not remove any habitat within the historic and predicted nest patches and core areas. It would remove 139 acres of dispersal habitat from the home ranges of three historic owl activity centers. The dispersal habitat being removed is of low to moderate quality with few opportunities for foraging or roosting.

The proposed action occurs in the northern part of the AOC where connectivity is currently adequate. After implementation, it is likely that there would continue to be adequate connectivity within the Timothy Lake AOC for owls to disperse from the Salmon-Huckleberry Wilderness/LSR complex to the Warm Springs Indian Reservation or from Wilderness complex to the White River LSR.

4.4.12.7 **Summary of Cumulative Effects and Viability**

The landscape pattern of vegetation has been affected by past timber harvest, fires, etc, substantially impacting the habitat for spotted owls. Some ecologically important features of landscape pattern are: amount of edge habitat, degree of fragmentation of late-successional forest, and amount of interior forest. As fragmentation of a landscape pattern increases, the amount of interior forest habitat decreases and the amount of edge habitat increases. As fragmentation increases, the amount of interior forest habitat decreases, impacting organisms that prefer large patches of interior habitat, such as the spotted owl.

The loss of dispersal habitat would affect the ability of owls to move through these stands. However, the ability of the owls to move across the landscape in the analysis area would still be adequate since adequate dispersal habitat still exists in the appropriate quantities and juxtaposition. Abundant dispersal habitat would remain in

the analysis area to allow the birds to adequately disperse between suitable habitat blocks.

The loss of dispersal habitat could change the habitat use and home range and could alter the bird's foraging habitats or shift the core use area of an individual away from the thinned stand. Since dispersal habitat would still be available in the analysis area in adequate quantities and distribution, it is unlikely that these actions would substantially impact the resultant survival of any birds residing within the analysis area.

While dispersal habitat has been emphasized in this analysis, particularly for the spotted owl area of concern, it is actually suitable habitat that is more limiting. The project would not affect suitable habitat.

Viability

The overall trend for spotted owl populations is declining. The project is consistent with the U.S. Fish and Wildlife Service Final Recovery Plan for the Northern Spotted Owl. The project would not affect old growth, would not affect suitable habitat and would not disturb nesting owls. The degree of effect to dispersal habitat for this project when combined with other projects that affect dispersal habitat would not contribute to a negative trend in viability on the Forest for the northern spotted owl.

4.4.13 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References
Forestwide Wildlife Standards and Guidelines – FW-170 to 186, page Four-69
Northwest Forest Plan - Matrix Standards and Guidelines - page C-9

The proposed action is consistent with the following standards and guidelines

FW 170 & 171	not applicable to individual projects
FW-174	Habitat for threatened, endangered and sensitive species has been identified and managed in accordance with the ESA (1973), the Oregon ESA (1987), and FSM 2670.
FW-175	Habitat for threatened, endangered and sensitive species is managed at the landscape scale. This standard and guideline is not applicable to individual projects.
FW -176	A Biological Evaluation has been prepared.
FW 177 & 178	Consultation with USFWS has been completed.
FW-179	The creation of Species Management Guides is not applicable to individual projects.
FW-180	The maintenance of lists of threatened, endangered and sensitive species is done but this standard is not applicable to individual projects.
FW-181	This document does not include location information.

4.4.14 Endangered Species Act Compliance

The Huckleberry Enhancement Project is covered by the Huckleberry Enhancement Biological Assessment (USDA 2010). Formal consultation with U.S. Fish & Wildlife Service has been completed for this project. The Biological Opinion written by U.S. Fish & Wildlife Service is dated January 25, 2011 (USDI 2011).

4.4.14.1 **Effects to critical habitat -** The effects determination for the proposed action on the 2008 critical habitat would be "No Effect" because it is not in a Managed Owl Conservation Area (MOCA) (USDI 2011).

4.4.14.2 **Effects to Home Ranges –** Six home ranges currently have sub-optimal levels of suitable habitat. The harvest of dispersal habitat may affect and is likely to adversely affect spotted owls due to the potential impairment to feeding of resident spotted owls. It is not likely that the project would cause take in the form of harm to occur (USDI 2011). See s. 4.4.12.3.

4.4.14.3 **Effects of Habitat Modification –** Dispersal habitat would be removed on 1,446 acres; parts of which are in an Area of Concern. Project activities may affect, but are not likely to adversely affect spotted owls by limiting dispersal opportunities. Sufficient habitat would remain in the area to facilitate owl dispersal (USDI 2011). See s. 4.4.12.6.

4.4.14.4 **Effects of Disturbance** – Smoke and noise above ambient levels could disrupt breeding behavior. Project activities may affect, but are not likely to adversely affect spotted owls (USDI 2011). See s. 4.4.11.4.

4.4.14.5 **Effects to spotted owl on the entire range of the species (Washington, Oregon, and California)**

The Northwest Forest Plan established a system of land allocations and a rate of timber harvest (probable sale quantity) that is considered to be consistent with maintaining viability for the northern spotted owl across its range (USDA, USDI 1994b). The proposed action would not substantially alter the landscape's capability to provide for the continued viability of the northern spotted owl on Federal Lands.

4.4.14.6 **Conclusion**

After reviewing the current status of the spotted owl, the environmental baseline for the action area, the effects of the proposed action on the spotted owl and its critical habitat, and the cumulative effects, it is the Service's biological opinion that the activities, as proposed, are not likely to jeopardize the continued existence of the spotted owl (USDI 2011).

4.5 MANAGEMENT INDICATOR SPECIES

This section also addresses other rare and uncommon species (s. 4.5.4), snags and down wood (s. 4.5.5), and migratory birds (s. 4.5.6).

The National Forest Management Act (NFMA) requires the Forest Service to manage wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." NFMA requires the Forest Service to identify Management Indicator Species (MIS) through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. The primary assumption of this process is that indicator species represent the habitat needs of other species because they have similar habitat requirements. Spotted owls, for example, indicate the needs of a variety of animals that use old growth forest. The state of Oregon, in concert with the regulatory agencies, manage populations while the Forest manages the habitat. For a population to be viable, attributes such as species abundance, productivity, spatial structure, and genetic diversity are needed for the species to maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. All of these attributes are affected by habitat and other environmental conditions that influence species behavior and survival.

Management Indicator Species for this portion of the Forest include northern spotted owl (s. 4.4.10), pileated woodpecker (s. 4.5.3,), American marten (s. 4.5.2), deer (s. 4.5.1), elk (s. 4.5.1), salmonid smolts and legal trout (4.6) (Forest Plan p. four-13). The analysis in these sections discusses the project's impacts to these species and their habitats.

MIS	Habitat Description	Habitat Present in Analysis Area	Species Present in Analysis Area
Northern Spotted Owl	Old Growth	Yes	Documented
Deer	Early Forest Succession Mature/Old Growth	Yes	Documented
Elk	Early Forest Succession Mature/Old Growth	Yes	Documented
Pileated Woodpecker	Mature/Over Mature	Yes	Documented
American Marten	Mature/Over Mature	Yes	Suspected
Gray Squirrel	Old Growth Ponderosa Pine Pine/Oak	No	Not Suspected
Wild Turkey	Old Growth Ponderosa Pine Pine/Oak	No	Not Suspected
Salmonids	Aquatic	See Fisheries Section	See Fisheries Section

With the selection of some of these species there was a special emphasis on mature, over mature, and old growth habitat. The selection was done at a time when timber harvest was planned to replace many older stands with younger more rapidly growing

stands: it was suspected that the mature and over mature stands would decline and the species associated with this habitat could be lost. Several species were selected to represent all of the species that required this type of habitat.

A Forest-wide analysis for Management Indicator Species has been conducted. It summarizes the Forest's consistency with the National Forest Management Act goal of managing wildlife habitat to "maintain viable populations of existing native and desired non-native vertebrate species. The Forest-wide analysis for Management Indicator Species describes population and habitat trends and is incorporated by reference. Summaries for spotted owls are summarized in s. 4.4.10 and fish in s. 4.6.0.1. The other affected species are summarized below. The Forest-wide analysis was conducted at a coarse scale using available GIS data. The project level interdisciplinary team took the Forest-wide data and refined it based on field examinations and local knowledge of habitat conditions.

Monitoring at the Forest scale has been documented in Annual Monitoring Reports available on the Forest's web site - http://www.fs.fed.us/r6/mthood in the Publications section. There is no requirement in the Forest Plan as amended to survey for or gather project-scale population data for management indicator species prior to implementing a site-specific project. The Forest Plan as amended provides habitat to maintain viable populations of these species. Land allocations near or adjacent to the project area that provide habitat for these species include Pileated Woodpecker and Pine Marten Habitat Areas (B5), Late-successional Reserves (LSR), and Riparian Reserves (RR) for pine marten, pileated woodpecker and the northern spotted owl; Winter Range (B10) and Summer Range (B11) for deer and elk; and Riparian Reserves (RR) for fish. Of these land allocations, only Summer Range (B11) overlaps the project area. There are also numerous Forest-wide standards and guidelines that pertain to these species. This project has been designed to minimize effects on management indicator species.

4.5.1 Deer and Elk Habitat

Deer and Elk were selected as management indicator species because they are economically important game animals. Deer and elk utilize early-successional habitat for foraging and were originally thought to require mature and old growth forest for thermal cover.

The Forest Plan Standards and Guidelines have minimum requirements for optimal and thermal cover habitat components, but no specific level for forage. During the 1980s and 1990s wildlife managers considered thermal cover to be important to elk survival and production. Over time, wildlife managers have questioned if elk required thermal cover. Currently, there is not much support from the elk research community for the necessity of thermal cover for elk. John Cook indicated at the Elk Modeling Workshop (April 2010) that telemetry data indicated that elk were negatively associated with cover. Cook indicated that openings are far more valuable

for elk than cover. With the reduction in regeneration timber harvest, the Forest now has abundant optimal and thermal cover but openings for forage are becoming scarce. Plantations that once provided forage have grown dense with trees that shade out forage.

Based on State and global rankings, deer and elk are common, widespread and abundant. The Oregon Department of Fish and Wildlife (ODFW) considers them a huntable species. The intent of having deer and elk as MIS species is due to their economic importance as game animals.

Forage is provided in natural meadows and in some riparian areas as well as in early-seral habitats. Early-seral habitats are young forests created by logging or fires that have not yet grown to the point where tree canopies shade out the grasses and forbs that deer and elk eat. There are approximately 69,226 acres of early-seral habitat on the Forest. This level is declining over time as plantations age. Forage in the project area is described in s. 4.5.1.8.

Deer and elk populations on the Forest are stable with a future anticipated trend of declines from a reduced amount of early-successional habitat due to reductions in harvest, differences in harvest methods, and low levels of wildfires. This is general consensus among biologist on the Forest and ODFW. There is limited data to support this because dense cover makes surveys too difficult to be reliable. At this time, there is no concern for viability of the species by ODFW. If viability becomes a concern, ODFW would close or limit the hunting season.

The proposed action would result in greater sunlight hitting the ground and increased forage and therefore would improve deer and elk habitat.

4.5.1.1 **Habitat Characteristics –** All the harvest units are located in summer range and affect thermal cover. Thermal cover is defined as a stand of coniferous trees at least 40 feet tall with an average crown cover of 70 percent or more. Optimal cover is found mainly in multi-storied mature and old-growth stands and would not be affected by this project. Elk herds exhibit a close association with riparian habitat in areas of gentle terrain and low road density. Forage is generally of low quality. The low quality of the forage, especially in winter range, and the lack of wetlands and permanent low-gradient streams within winter range are considered limiting factors for elk and deer.

High road densities can lead to harassment of elk herds. Harassed elk move more often than elk left alone and use of habitat decreases as road density increases (Witmer 1985). Elk within or moving through areas of high open-road density tend to move longer distances (Fiedler 1994).

4.5.1.2 **Elements of Proposal Analyzed -** For this proposal, the following actions have the potential to affect deer and elk (both positively and negatively): actions that remove or

kill trees to a level below 70% canopy cover would reduce thermal cover but would also increase forage availability. Activities that make noise may potentially affect deer and elk. These actions would include thinning, landing creation, trees removed for skid trails, trees removed for road construction, and trees killed for snags and down wood. Other actions such as log haul, road reconstruction, road repair or road closures would not affect habitat but would create noise disturbance. Erosion control seeding would increase forage availability.

Direct and Indirect Effects

4.5.1.3 **No Action –** There would be no change to thermal cover. No cover would be lost and no forage would be gained in this alternative. With no action, the stands would continue to provide forage at their current levels in the short term but forage would decline over time.

4.5.1.4 **Proposed Action**

The proposed thinning would remove 1,445 acres of thermal cover currently present in the stands. This habitat would be downgraded to non-cover for deer and elk but there would be an increase in forage. The increase in forage would be caused by increased sunlight reaching the forest floor as a result of opening up the canopy. Even though the huckleberry enhancement units would not be considered early-seral habitat, forage would be improved on 2,070 acres (all units minus 10% skips). This forage created by the thinning would be moderate/high in quality due to wide-tree spacing of the residual trees. Opening up the canopy to this degree allows abundant sunlight to reach the forest floor, promoting the development of understory vegetation. Usually this vegetation consists of shrubs and sometimes grasses highly palatable to deer and elk. Over time the forage quality may decline as stand canopy grows denser.

Because thermal cover is not limiting, the project would likely increase the quality of deer and elk habitat in the area because of the increased forage provided in the treated stands.

4.5.1.5 **Disturbance -** The logging and road construction/reconstruction activities could potentially disturb animals that happen to be in the area at the time of implementation. Approximately 4.7 miles of temporary road construction and 1.4 miles of old temporary road reconstruction are proposed with this alternative. The health of individuals could be impacted if the disturbance occurs near active calving sites. Units 34 and 38 occur within a key summer range area that is considered important for fawning, calving, and rearing. Logging and associated activities would be restricted from April 1st to July 30th. If logging occurs in the winter it would not disturb animals because they would not be present. However haul routes cross

through winter range where animals may be present. Winter haul would only occur on approved backbone roads to minimize the effect to deer and elk.

4.5.1.6 **Open-Road Density –** Approximately 4.7 miles of new temporary road construction and 1.4 miles of old existing temporary roads would be reopened. These roads would not be open to the public and the only disturbance occurring as a result of these roads being opened is their use by the loggers, truck drivers and associated Forest Service personnel required to accomplish the logging operations. After logging, the temporary roads that were constructed or opened would be closed and restored and open-road density would be back to the current level. There would be no increase in the long-term harassment of deer and elk with this alternative; effects would be short-term only. There would be no increase in the permanent roads open to the public, and therefore no increase in open-road density with this alternative.

Roads in this area are used for forest management, recreational driving, hunting and fire suppression.

4.5.1.7 Cumulative Effects

If the Palomar pipeline or the Cascade Crossing power lines are constructed in the project area, some habitat would be altered but this effect is considered speculative at this time. There are no other foreseeable future projects in this area.

There would be a measurable change in thermal cover within the deer and elk analysis areas. Since the proposed project is not in optimal cover, no cumulative effects would occur to this deer and elk habitat type. Due to past fire history the project area has relatively little optimal cover. The proposed project would only have minor impacts on disturbance/ harassment issues to deer and elk because temporary roads would be obliterated.

The area used for the analysis of deer and elk thermal cover and road density cumulative effects is the area within one mile of the enhancement units. This encompasses a large enough landscape for a meaningful analysis and is also relevant for disturbance effects that are measured by open-road density. Past, present and foreseeable future actions within this area have been included. The analysis area encompasses 1,191 acres of the Warm Springs Reservation. Roads on the reservation and the thermal cover present are included in the analysis. While there may be future logging or road construction on the reservation that would affect deer and elk, locations and timing are not known and are not foreseeable actions. The reservation represents 9% of the Power Line analysis area therefore, whatever happens there would not likely have a substantial cumulative impact on thermal cover or road density. While the roads present on the reservation were assessed as ‘open’ they are only open to Tribal members and managers and are not open to the general public.

Road decommissioning is occurring across the Forest. Many roads in the Abbott area have already been decommissioned. The planning for decommissioning in the Power Line area will likely begin within a year or two. There are other disturbance factors in addition to open-road density that affect deer and elk such as noise from logging equipment, road maintenance equipment, OHV use and hunting. Snowmobiling is a use that occurs in the project area but deer and elk are not present during the winter.

For thermal cover, the age and density of stands are relevant because stands change over time. Stands that consist of coniferous trees 40 feet or more tall with an average crown cover of 70% or more are considered thermal cover for elk. As plantations grow, these conditions would be met at an age of approximately 25 years. All of the stands within the analysis area are included in the analysis.

4.5.1.8 **Habitat Summary**

Analysis Area	acres	Total Thermal Cover * Existing Condition (percent)	Early-Seral Stands Existing Condition # (percent)	Acres of Thermal Cover Harvested in Proposed Action	Total Post-Harvest Thermal Cover *(percent)	Open-Road Density Existing Condition Mi/sq mi.
Abbott (summer range)	11,115	71	6	746	64	2.27
Power Line (summer range)	13,214	65	11	699	60	2.33
B11 (summer range)	2,396	71	11	87	69	1.3

*Optimal cover also provides thermal cover habitat. These columns represent optimal and thermal cover combined.
#While there would be some increase in the level of forage produced after thinning the stands would not be fully open and would not be considered fully productive forage openings. The post harvest status would not change.

Thermal cover is abundant in the project area. Forage availability is more of a limiting factor than thermal cover. The grazing of cattle in the Abbott portion of the project area results in a competition for a limited forage resource. Forage in the analysis areas is declining by approximately 1% per year. This project would add some quality forage in the project areas, in the thinned stands as well as the landings and skid roads that are seeded for erosion control. However this would not be sufficient to counter the landscape's trend of declining forage. The Forest Plan does not contain any specific requirements for forage quantity.

Viability

The current trend for deer and elk populations is stable (see Forest-wide analysis for Management Indicator Species). However, there is an anticipated future trend of declining populations due to the reduction in clear cutting in recent years and because

the trees in young plantations are growing rapidly shading out forage (USDA 2004c, p. 72). This project and other projects that enhance forage would not likely reverse this trend. They would however create some forage and ease the shortage. This project would not contribute to a negative trend in viability on the Forest for deer or elk.

4.5.1.9 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References
Forestwide Wildlife Standards and Guidelines – FW-187 to 214, page Four-71

The Forest Plan recognizes different categories of summer and winter range: 1/ The entire area used by deer and elk in the winter is often referred to as "inventoried" winter range. 2/ The rest of the Forest is often referred to as "inventoried" summer range. 3/ Special portions of the winter range are referred to as "designated" winter range and these areas have a land allocation (B10), and 4/ Special portions of the summer range are referred to as "designated" summer range and these areas have a land allocation (B11). Standards and guidelines for B10 and B11 only apply to those land allocations while the forest-wide standards and guidelines apply across all portions of the inventoried range.

The Huckleberry Enhancement project overlaps designated summer range (B11) and inventoried summer range. Forest Plan Standard and Guidelines FW-205 and B11-015 indicate that 30% of the analysis area should be total thermal cover. Section 4.5.1.7 indicates that all of the analysis areas would be well above 30%. While the project does not impact optimal cover, it may impact the stands' ability to grow into optimal cover over time. As shown in s. 4.5.1.7, 60% or more of each analysis area is available to grow into optimal cover.

There would be no increases in open-road densities with this proposed project. The proposed action does not add to the open-road network because temporary roads would be obliterated when complete. The standard and guideline FW-208 indicates that inventoried summer range should have open-road density at or below 2.5 miles per square mile and B11-034 indicates that open-road density should be at or below 1.5 miles per square mile. These standards are met (s. 4.5.1.7).

The proposed action is consistent with the following standards and guidelines.

FW-187	Key habitat areas such as wetlands would be protected.
FW-188	The Forest communicates with ODFW regularly and they are given an opportunity to comment on all projects. ODFW does not develop population objectives for each project planning area but for much larger regions. This standard and guideline is not applicable at the project scale.
FW-189	Natural meadows and openings are being protected.
FW-190	Logging slash would be yarded to landings. Experience in similar

	completed thinning has shown that any remaining slash is pressed down by snow and deteriorates quickly. The proposed action would not result in levels of slash that would impede deer or elk movements.
FW-191	Thinning design has incorporated skips.
FW-192 & 193	Not applicable
FW-194 to 197	Not applicable. The proposed action does not involve regeneration harvest.
FW-198 & 199	Forage would temporarily be increased. Grass and other plants seeded for erosion control would also enhance forage quality.
FW-200 & 201	Not applicable
FW-202 to 212	Thermal cover and road density levels would be met.

4.5.2 American Marten

This species (Martes americana) was formerly known as the pine marten. It was selected as a management indicator species because of its association to mature and over mature habitat and need for large snags and large amounts of down wood. Shrinking habitat and trapping pressure led to the concern for marten populations (USDA 1990a). American marten are found across Canada, Alaska, and down through the mountain areas of California. Locally they are found at higher elevations on the Forest especially around Mt. Hood.

Tracking records and remote camera work does not support the earlier belief that this species uses old-growth forest at low to mid elevations on the west side of the Cascades as was previously thought. Earlier sight records were most likely dispersing individuals.

The American Marten was selected as a MIS species because it required old growth and their numbers were declining. At the time the Forest Plan was developed, there was not a good understanding of the preferred habitat for American marten and habitat was over estimated. Scientists now understand the species' preference for higher elevation habitat in the Cascades.

A marten habitat distribution map was developed using habitat modeling.

American martens live in higher elevation sub-alpine stands and prefer older habitat with a highly complex component of dead trees and down wood with cavities (Buskirk 1998). Jack-strawed down logs provide denning sites and a higher abundance of prey species such as squirrels and chipmunks. Riparian areas are used for foraging and resting; they select resting sites in large trees or in piles of woody debris in riparian areas. Large coarse woody debris and canopy cover are important for martens during winter because they have limited energy reserves in winter.

Winter habitat requirements include more than 30% canopy cover. Under snow coarse woody debris concentrations provide resting areas and habitat for marten prey. Other resting sites or den sites include cavities in large snags, hollow stumps, and under logs (USDA USDI 1993).

Since the listing of the American marten as a management indicator species in the Forest Plan, several factors have contributed cumulatively to a trend of improving habitat. The following have changed since the species was listed:

- The establishment of late-successional reserves and riparian reserves has resulted in the retention of late-successional stands and the enhancement of younger stands to accelerate the development of late-successional conditions.
- The Northwest Forest Plan required the Forests to reassess the need for land allocations for American marten during Watershed Analysis. On the Forest, most of the B5 land allocations were removed during Watershed Analysis because the network of late-successional reserves, riparian reserves and other land allocations would provide for the species. One American marten management area remains in the Power Line area but no enhancement units are in it.
- Many Wilderness Areas have been created.
- Timber harvest on the Forest even in Matrix has transitioned from reliance on regeneration harvest of mature stands to a program of thinning younger stands.
- The Forest has decommissioned several hundred miles of roads reducing disturbance.
- Hazardous fuels have been treated to minimize the impact of wildfire on martens.
- There has been increasing scientific understanding of the habitat needs of the species.

4.5.2.1 **Existing Situation**

The Forest has approximately 21,553 acres of habitat that have a 30% or higher probability of supporting American marten. A home range of 173 acres was used in determining the number of home ranges on the Forest. There are approximately 63-125 home ranges for martens on the Forest. The original Forest Plan analysis for marten overestimated habitat at 231 home ranges. The current model is closer to predicting the actual population because it is supported by tracking information provided by Cascadia Wild (winter tracking data and camera stations). Home ranges may contain two adults and up to three young. The estimated population on the Forest is 310-625 martens.

The project units are mid-seral stands and do not contain mature forest habitats, large snags or large down logs. They do provide marginal foraging habitat particularly in the stands with lodgepole pine. Martens may utilize habitat in the project areas for movement but it is on the low end of the preference scale for the species.

4.5.2.2 **Direct and Indirect Effects**

No Action

There would be no affect to American martens.

Proposed Action

The project would result in little or no impact to American marten because the units do not contain suitable habitat. The proposed units have average habitat scores of 10% or less. The threshold for marginal habitat is considered 30%.

4.5.2.3 **Cumulative effects**

The area used for the analysis of cumulative effects is the area within one mile of the enhancement units. This encompasses a large enough landscape for a meaningful analysis and would incorporate several home ranges. Past, present and foreseeable future actions within this area have been included. The analysis area encompasses 1,191 acres of the Warm Springs Reservation. While there may be future logging or road construction on the reservation that would affect pileated woodpeckers, locations and timing are not known and are not foreseeable actions. The reservation represents 9% of the Power Line analysis area.

Due to past fire history the project area has relatively little mature habitat or complex accumulations of large snags and large down logs. Logging at high elevations has also impacted habitat. Other actions at higher elevations such as ski areas, snowmobile use and high elevation roads have the greatest potential to disturb American martens. Danger trees are often felled along roads as part of road maintenance for public safety. Road decommissioning would likely benefit martens. There are no other foreseeable future projects in the project area. The following table shows that there is very little habitat in the analysis area. See maps in Appendix A. Since the huckleberry enhancement project would have little or no effect to martens, there would not likely be any substantial cumulative effect.

Analysis Area	acres	Weighted Average Habitat Score *	High Score in Analysis Area	Highest Score inside Huckleberry Enhancement Unit
Abbott	11,115	9.7%	30%	18%
Power Line	13,214	10.1%	41%	20%

*100 % is the highest possible score and 0% the lowest.
The threshold of 30 % is used as a minimum for consideration as potential American marten habitat.

Viability

The current trend for American marten is stable (see Forest-wide analysis for Management Indicator Species). The huckleberry enhancement units do not contain any habitat above the 30% threshold therefore it is unlikely that martens would use this area. This project would not contribute to a negative trend in viability on the Forest for American marten.

4.5.2.4 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References
Management Area Standards and Guidelines – B5-001-B5-042, page Four-242

There are no applicable standards and guidelines because none of the proposed actions are within B5- Pileated Woodpecker/Pine Marten land allocation.

4.5.3 Pileated Woodpecker

The pileated woodpecker was chosen as an MIS because of its need for large snags, large amounts of down woody material for foraging, and large defective trees for nesting, roosting and foraging. They are listed as an indicator of mature and over mature habitat.

The pileated woodpecker is associated with forest habitats that have large trees, especially large snags (> 20 inches diameter) for nesting and foraging. It uses both coniferous and deciduous trees, but tends to be most common in old-growth Douglas-fir forests in western Oregon. The choose foraging habitats that contain high densities of lags and snags, dense canopies, and tall shrub cover. They may forage on small snags but prefer large snags (Schroeder 1982) (Csuti 1997). The pileated woodpecker was chosen as a management indicator species for its association to mature and over mature habitat.

Mellen (1992) found that the mean home range for pileated woodpeckers is 1,181 acres with approximately a 9-30% overlap (about 200 acres) between territories. Mellen et al. found that pileated woodpeckers selected habitat that was greater than 71 years of age. Therefore an average home range with overlap for pileated woodpeckers would be approximately 970 acres.

Since the listing of the pileated woodpecker as a management indicator species in the Forest Plan, several factors have contributed cumulatively to a trend of improving habitat. The following have changed since the species was listed:

- The establishment of late-successional reserves and riparian reserves has resulted in the retention of late-successional stands and the enhancement of younger stands to accelerate the development of late-successional conditions.

- The Northwest Forest Plan required the Forests to reassess the need for land allocations for pileated woodpecker during Watershed Analysis. On the Forest, most of the B5 land allocations were removed during Watershed Analysis because the network of late-successional reserves, riparian reserves and other land allocations would provide for the species. No pileated woodpecker land allocations remain anywhere near the project area.
- Many Wilderness Areas have been created.
- Timber harvest on the Forest even in Matrix has transitioned from reliance on regeneration harvest of mature stands to a program of thinning younger stands.
- The Forest has decommissioned several hundred miles of roads reducing disturbance.
- Hazardous fuels have been treated to minimize the impact of wildfire on pileated woodpeckers.
- Insects have killed many trees, particularly lodgepole pine that provide foraging habitat.

4.5.3.1 **Existing Situation**

There are 405,092 acres of pileated woodpecker habitat on the Mt Hood National Forest based on GIS query for 80 years and older habitat on the Mt Hood by Jamie Bradbury (02/28/2001). By dividing the acres of pileated woodpecker habitat by the average home range with overlap of 970 acres there are 418 potential home ranges on the Mt Hood National Forest. With an average clutch size of 4 (Marshall 2003) it would indicate that the summer population of pileated woodpeckers could be as high as 2508 birds including adults and fledglings.

The analysis area has 16,480 acres of pileated woodpecker habitat or potentially enough for 17 home ranges.

The current trend for habitat for pileated woodpeckers on the Forest is an increase in available habitat for the last 10 years because of greater levels of older forest as stands age, and increased levels of snags and down wood.

4.5.3.2 **Direct and Indirect Effects**

No Action

There would be no affect to pileated woodpeckers.

Proposed Action

The proposed treatments would remove potential nesting and foraging habitat for the pileated woodpecker. This removal of habitat would occur as a result of opening up the canopy to below 40%; as well as the potential loss of some snags. The resultant stands would likely become too open to provide habitat.

The removal of habitat could potentially adversely affect the local pileated woodpecker population in several ways. These include:

- Immediate displacement of the birds,
- Concentration of displaced woodpeckers into smaller, fragmented areas of suitable nesting habitat that may already be occupied,
- Increased competition for suitable nest sites,
- Diminished reproductive success,
- Diminished population due to declines in productivity and recruitment, and
- Reduction of future nesting opportunities.

In the project area, the mid-seral stands that are predominantly mixed conifer have potential nesting habitat; the lodgepole pine stands are not considered high quality habitat because they do not contain trees over 20 inches diameter. The project would remove no mature forest. It would however remove 1,445 acres of mid-seral stands that meet the minimum habitat requirements and an additional 855 acres of potential foraging habitat. Because the project would impact only 6% of the analysis area and 0.3% of the available habitat forest wide, it would not likely affect species viability.

4.5.3.3 **Cumulative Effects**

The area used for the analysis of cumulative effects is the area within one mile of the enhancement units. This encompasses a large enough landscape for a meaningful analysis and would incorporate several home ranges. Past, present and foreseeable future actions within this area have been included. The analysis area encompasses 1,191 acres of the Warm Springs Reservation. While there may be future logging or road construction on the reservation that would affect pileated woodpeckers, locations and timing are not known and are not foreseeable actions. The reservation represents 9% of the Power Line analysis area and only half of that is suitable nesting habitat. Whatever happens there would not likely have a substantial cumulative impact on habitat.

Due to past fire history the project area has relatively little mature habitat or large snags. If the Palomar pipeline or the Cascade Crossing power line are constructed in the project area, some snags may be removed during the construction phase. Danger trees are often felled along roads as part of road maintenance for public safety. Recent fires across the landscape have occurred creating new snags however no recent fires have burned in the analysis area. The mortality created by insects has increased across the landscape creating new snags in the smaller size classes. There are no other foreseeable future projects in this area that would affect mature habitat or large snags.

Analysis Area	acres	Mature Stands Existing Condition (percent)	Stands over age 80* Existing Condition (percent)	Acres of Mature Stands Harvested in Proposed Action	Acres of Nesting Habitat Harvested in Proposed Action	Post-Harvest Habitat (percent)
Abbott	11,115	19	71	0	746	64
Power Line	13,214	33	65	0	699	60

*this figure does not include pure stands of lodgepole pine which do not contain trees over 20 inches diameter.

Viability

The current trend for pileated woodpecker is increasing (see Forest-wide analysis for Management Indicator Species). The huckleberry enhancement units do not contain any mature forest. They would affect some marginal habitat from stands that are approximately 80 years old. While 80 years is considered the threshold for nesting habitat, the project is at relatively high elevation and the growing conditions do not result in optimal habitat at this age.

The analysis shows that only a small portion of the landscape's overall habitat for the species would be removed. The analysis area currently has sufficient habitat for approximately 17 home ranges and would have 15.5 home ranges after project implementation. This project would not contribute to a negative trend in viability on the Forest for pileated woodpecker.

4.5.3.4 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References
Management Area Standards and Guidelines – B5-001-B5-042, page Four-242

There are no applicable standards and guidelines because none of the proposed actions are within B5- Pileated Woodpecker/Pine Marten land allocation.

4.5.4 Sensitive Species and other Rare and Uncommon Species

A biological evaluation has been developed by wildlife biologists to address the potential effect of activities on sensitive species. The objective is to avoid a trend toward Federal listing under the ESA.

The following table summarizes effects to Sensitive Species from the Biological Evaluation which is incorporated by reference.

Species	Suitable Habitat Presence	Impact of Proposed Action*
Johnson's Hairstreak	No	No Impact
Mardon Skipper	No	No Impact
Oregon Slender Salamander	Yes	MII-NLFL
Larch Mountain Salamander	No	No Impact
Cope's Giant Salamander	No	No Impact
Oregon Spotted Frog	No	No Impact
Lewis's Woodpecker	No	No Impact
White-Headed Woodpecker	No	No Impact
Bufflehead	No	No Impact
Harlequin Duck	No	No Impact
Bald Eagle	No	No Impact
American Peregrine Falcon	No	No Impact
Townsend's Big-eared Bat	No	No Impact
Fringed Myotis	Yes	MII-NLFL
California Wolverine	Yes	MII-NLFL
Puget Oregonian	No	No Impact
Columbia Oregonian	No	No Impact
Evening Fieldslug	No	No Impact
Dalles Sideband	No	No Impact
Crater Lake Tightcoil	No	No Impact
Crowned Tightcoil	No	No Impact

* "MII-NLFL" = May Impact Individuals, but not likely to Cause a Trend to Federal Listing or Loss of Viability to the Species

Effects to the species listed above include changes to habitat as well as potential harm to individuals caused by physical impacts of logging equipment, falling and dragging trees, noise, fuels treatment, road construction, reconstruction, road restoration, log haul, snag creation, and down woody debris creation.

Oregon slender salamander

The species is currently known from the north Oregon Cascade Range and foothills, occurring west of the crest from the Columbia River to Highway 58, and occurring east of the crest from the Columbia River to the Warm Springs Indian Reservation. It occurs across a north-south range of close to 233 km (145 miles), from around 25 meters in elevation (at the northern end of its range in the Columbia gorge) to around 1,700 meters at the southern end of its range on the west side of the Cascade Range crest.

This terrestrial salamander is highly associated with down wood in forests. In the western Cascades, four habitat characteristics have a substantial positive association with Oregon slender salamanders: canopy closure, west and east aspects, decayed logs in the 20 to 30 inch diameter class, and snags. While it may be found in all seral stages when down wood is present, studies west of the Cascade Range have shown abundances are higher in late-successional forests. Habitat associations east of the Cascades or at the Cascade Crest are not well known; the species uses a variety of ground cover objects ranging from sloughed bark to down logs, and occur in younger and older forests. The proposed action could affect this species by altering canopy and disturbing down logs.

This species is sometimes found incidentally during mollusk surveys but none were found. It is likely that there is not sufficient habitat in the project units for this species.

Fringed myotis: Although the fringed myotis bat is found in a wide variety of habitats throughout its range, they seem to prefer forested or riparian areas. Their nursery colonies and roost sites are established in caves, mines, and buildings. The species is thought to forage by picking up food items from shrubs or the ground. It consumes beetles, moths, harvestmen, crickets, craneflies, and spiders. No breeding or roosting sites are known to occur in project area. The proposed action could affect this species by altering forest canopy. There is the potential for the project area to contain foraging habitat. Species would likely only occur in the project area during dispersal or possibly foraging.

California wolverine

It is likely that wolverines that have been sighted in Oregon in the last 50 years were vagrant animals that were dispersing from northern or eastern populations in Washington or Idaho. There are no recent records of wolverine in the project area.

Wolverine are habitat generalist and seem to be found where large deer and elk populations are found. They avoid locations where they would likely encounter many people. This species tends to be found at elevations higher than 7,000 feet in studies in Montana and Idaho.

Efforts to locate wolverines on the Forest have included snow tracking and remote camera traps. There have been no records in the last decade using these techniques.

If a wolverine were to come into the project area it would likely be for the purpose of dispersing to a better breeding habitat. The project area is lower than their preferred den habitat. The noise of project implantation including logging, hauling and fuels treatment would be short term. The project may affect the species but not adversely and would not cause the species to tend toward federal listing. Currently there is potential disturbance to wolverine in the form of dispersed recreation, snowmobiling and hunting. This level of disturbance would increase when people come to the area to pick huckleberries.

4.5.4.1 Other Rare or Uncommon Species

Terrestrial Mollusks: The Puget Oregonian, Columbia Oregonian, evening fieldslug and Crater Lake tightcoil, crowned tightcoil, Dalles sideband, Malone's jumping-slug, panther jumping-slug, and Oregon Megomphix, are mollusk species that may occur on the Forest. Malone's jumping-slug and Oregon Megomphix are two of these species that have suitable habitat in the project area. Surveys were conducted to protocol for terrestrial mollusks and the only species found was Malone's jumping-slug.

Malone's jumping-slug: The Malone's jumping-slug is a very common slug found throughout the west side of the Cascades on the Mt Hood National Forest.

During surveys several locations of Malone's jumping-slug were found. The Forest has many years of experience surveying for and finding this species. It is locally abundant and has been found in a variety of sites and habitats including very young stands, plantations, openings, disturbed sites and mature stands. At most sites it is associated with down wood.

While this species was once thought to be rare or uncommon, it is now known to be locally common and not dependant on late-successional habitat.

For this project, no-treatment buffers or skips would be placed around each known site (30-meter radius circle).

Due to its abundance and its use of many habitat types and seral stages, professional experience indicates that this project with skips around known sites would have very little affect on the persistence of this species at the site.

Red-tree vole: Habitat for this species is conifer forests containing Douglas-fir, grand fir, sitka spruce, western hemlock, and white fir. Optimal habitat for the species occurs in old-growth Douglas-fir forests. Large, live old-growth trees appear to be the most important habitat component. The proposed huckleberry enhancement units are mid-seral stands that contain mostly small diameter trees with some Douglas-fir. There are a few patches with larger legacy trees that would be retained in skips. Due to lack of mature forest habitats, it is highly unlikely a red-tree vole would be nesting in the project area. Surveys were not conducted for this species due to lack of habitat.

White-headed woodpecker, pigmy nuthatch, and flammulated owl: These three species are found generally in mature ponderosa pine habitat on the east side of the Cascades. The project area does not contain any ponderosa pine trees. No habitat present in project area for these species, therefore the standards and guidelines and management recommendations for these species do not apply.

Black-backed woodpecker: Habitat for this species is found in mixed conifer and lodgepole pine stands in the higher elevations of the Cascade Range. The project area has potential habitat for the species. A standard and guideline requires an adequate number of large snags and green-tree replacements for future snags be maintained in sufficient numbers to maintain 100 percent potential population levels. The 100 percent population potential for black-backed woodpeckers is 0.12 conifer snags per acre in the hard decay stage. These snags would be at least 17 inches diameter or largest available if 17 inch diameter snags are not available. The black-backed woodpecker also requires beetle infested trees for foraging. In the project area, beetle infested lodgepole pine are much smaller than 17 inches diameter. The proposed action would retain all large snags where safety permits. Patches of snags would be retained in skips. The 100 percent population potential level for black-backed woodpecker would be met in units and across the landscape because there would be an abundance of snags, particularly beetle infested lodgepole pine snags to meet the habitat needs for this species.

Great gray owl: Potential habitat for the great gray owl is stands of large diameter trees for nesting located within close proximity to foraging sites such as meadows. None of the units proposed for harvest are providing either foraging or nesting habitat for the species.

Canada lynx: This species is not known or suspected to occur on the Mt. Hood National Forest.

Bats: Caves, mines, abandoned wooden bridges and buildings that could provide roost sites for bats are not present within the project area.

Cumulative Effects for Sensitive, Rare and Uncommon Species

Since these species have different life requirements and some venture great distances, cumulative effects can result from a vast array of practices. Past vegetation alterations have been accounted for in the current condition and no specific projects have been identified as reasonably foreseeable. The project design criteria including snag retention and skips results in minimal effects. Where species are thought to be present there may be impact to individuals, but the project is not likely to cause a trend to federal listing or loss of viability to the species.

4.5.4.2 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References
Forestwide Wildlife Standards and Guidelines – FW-170 to 186, page Four-69

The proposed action is consistent with the following standards and guidelines

FW-176	Biological Evaluations have been prepared.
FW-186	None of the proposed actions would occur within ¼ mile of an active

	peregrine falcon nest between April 1 and July 31st.
Survey and Manage	The project is consistent with the applicable Survey and Manage standards and guidelines.

2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001 ROD) (USDA USDI 2001).

This project complies with the applicable species survey requirements and management provisions; specifically:

- No surveys were conducted for red tree voles or great gray owls because no habitat is present.
- Surveys were conducted to protocol for terrestrial mollusks (s. 4.5.4.1).
- Known sites that were found during project surveys or were known to occur prior to surveys (several sites for Malone's jumping-slug), would be managed according to the appropriate management recommendations (s. 4.5.4.1).
- Sufficient snags exist to meet the needs of black-backed woodpeckers.

See information on aquatic species (s. 4.6.4) and botanical species (4.8).

4.5.5 Snags and Down Wood

Existing Situation

Past fires have affected the vegetation in the project area. Most of the snags created by the fires have already fallen. There is a wide variation in the amount and sizes of course woody debris within and between units. Some of the stands have been affected by mountain pine beetle and currently have moderate to high levels of small lodgepole pine snags and down woody debris. Sizes of this course woody debris generally are 15" diameter and smaller. Dead lodgepole pine are less than 12 inches diameter with the average at approximately 9 inches diameter. It is likely that additional future mortality of lodgepole pine would result in an abundance of small snags and down woody debris.

Other stands have few lodgepole pine and are relatively healthy and have lower levels of snags and down wood. There is some large diameter coarse woody debris scattered throughout the project area.

The project area is primarily within the Pacific silver fir zone with some acreage in the mountain hemlock zone.

The primary and secondary cavity nesting species for the Pacific silver fir zone are: pileated woodpecker, northern flicker, hairy woodpecker, Williamson's sapsucker, red-breasted sapsucker, and the red-breasted nuthatch. Mid-seral stands in the project area in this zone have approximately eight snags per acre greater than 15 inches in diameter. The 100% biological potential level is four snags per acre at 15" diameter and larger (Austin 1995). The 60% biological potential level is 2.4 snags per acre in the Pacific silver fir zone.

The primary and secondary cavity nesting species for the mountain hemlock zone are: pileated woodpecker, northern flicker, hairy woodpecker, black-backed woodpecker, northern three-toed woodpecker, Williamson sapsucker, and red-breasted nuthatch. Mid-seral stands in the project area in this zone have approximately three snags per acre greater than 15 inches in diameter. The 100% biological potential level is 3.7 snags per acre at 15" diameter and larger (Austin 1995). The 60% biological potential level is 2.3 snags per acre in the mountain hemlock zone.

Many species in the Pacific Northwest evolved to use large snags and logs that were historically abundant in the landscape. If snags and logs are lost, biodiversity can be affected and potentially cause a loss of some function in the landscape such as control of forest insects.

4.5.5.1 DecAID Advisor

DecAID is a planning tool intended to advise and guide managers as they conserve and manage snags, partially dead trees and down wood for biodiversity (Mellen 2003). It also can help managers decide on snag and down wood sizes and levels needed to help meet wildlife management objectives. This tool is not a wildlife population simulator nor is it an analysis of wildlife population viability.

A critical consideration in the use and interpretation of the DecAID tool is that of scales of space and time. DecAID is best applied at scales of subwatersheds, watersheds, subbasins, physiographic provinces, or large administrative units such as Ranger Districts or National Forests. DecAID is not intended to predict occurrence of wildlife at the scale of individual forest stands or specific locations. It is intended to be a broader planning aid not a species or stand specific prediction tool.

DecAID does not use the same process as the modeling of biological potential. There is not a direct relationship between the statistical summaries presented in DecAID and calculations or models of biological potential.

Refer to the DecAID web site listed in the References section for more detail and for definition of terms. This advisory tool focuses on several key themes prevalent in recent literature:

- Decayed wood elements consist of more than just snags and down wood, such as live trees with dead tops or stem decay.
- Decayed wood provides habitat and resources for a wider array of organisms and their ecological functions than previously thought.
- Wood decay is an ecological process important to far more organisms than just terrestrial vertebrates.

4.5.5.2 Snags and Down Wood Levels Compared to DecAID Data

All of the units are located within the habitat type identified in DecAID as the mixed montane conifer and vegetation condition of "small/medium trees." Within this type, the DecAID advisor identifies the 30%, 50%, and 80% tolerance levels for these mid-seral stands (small/medium trees). They are described in the following table.

Montane Mixed Conifer/Small-Med. Tree Habitat Type	**30% Tolerance Level**	**50% Tolerance Level**	**80% Tolerance Level**
Snags ≥10" DBH	10 per acre	16.6 per acre	32 per acre
Snags ≥20" DBH	2.7 per acre	4.2 per acre	9.5 per acre
Down Wood Cover ≥5" diameter	2.5 percent	4 percent	8 percent

It is likely that most of the units within the Huckleberry Enhancement Project currently contain snag and down wood numbers at the 30% or greater tolerance level. Some areas affected by mountain pine beetle, may exceed the 50% level for the small snag category.

4.5.5.3 **Elements of Proposal Analyzed -** The following actions have the potential to affect snags and down logs. Since snags may be hazardous some of them may be felled adjacent to operations such as tree felling, landing use, skidding, road use, road construction, road repair, road closure and log haul. Existing down logs may be disturbed by yarding operations. Some aspects of the proposal are specifically designed to attempt to maintain snag dependent species and species that unitize down logs by the strategic placement of skips around snag and down wood patches as well as the placement of skid trails and landings. This can be found in design criteria 2 and 3.

Direct and Indirect Effects

4.5.5.4 **No Action –** The stands would continue to provide the current levels of snags and down wood. DecAID coarse woody debris tolerance levels would range from 30 to over 50%.

The project area would continue to experience mortality of lodgepole pine. Snag generally less than 20" diameter would substantially increase in numbers in these stands. This would eventually create a subsequent increase in the down woody debris.

Other species of trees in these stands would also be expected to succumb to a **certain** level of mortality from damaging agents such as insects and diseases. Snag and down wood levels in the non-lodgepole pine stands would increase over time at varying levels. Mixed conifer stands have the potential to grow larger trees and therefore larger snags and down wood.

Widespread lodgepole pine mortality could increase the risk of a large intense wildfire.

4.5.5.5 **Proposed Action**

Some snags are difficult to retain during logging and road construction because of their inherent instability and danger. It is likely that some snags would need to be cut down during harvest operations due to safety considerations and that some downed logs would be degraded through the process of logging. Other snags are not particularly hazardous. Experience with similar stand types has shown that many snags remain after project completion.

Design Criteria #2 would increase the likelihood that snags would be retained after timber harvest. It also addresses defective trees or those that have the elements of decay as described in the DecAID advisor. Hollow structures are created in living trees by heartrot decay organisms over many years. These hollow structures in living trees provide especially valuable habitat for a variety of wildlife, including cavity users. Trees that have heartrot decay present may include features such as openings in the bole, broken boles with bayonet tops, large dead tops or branches, punk knots, flattened stem faces, old wounds on the bole, crooks in the bole signifying previous breakage, and the presence of fruiting bodies. Defective trees with deformities such as forked tops, broken tops, damaged and loose bark or brooms caused by mistletoe or rust can also provide important habitat for a number of species.

Logs existing on the forest floor would be retained. Prior to harvest, contract administrators would approve skid trail in areas that would avoid disturbing key concentrations of down logs or large individual down logs where possible. The harvesting operations would also add small woody debris of the size class of the cut trees to the site. This would include the retention of any snags that would be felled

for safety reasons. Snags or green trees that fall down after the harvest operation would contribute to the down wood component of the future stand.

Currently tree sizes within the huckleberry enhancement area average 12 inches in diameter. The propose action would reduce the amount of natural selection that would have occurred through the process of stress and mortality. Some of the snags and downed logs that might have formed in the future from the death of the intermediate and suppressed trees would be removed through the timber harvest. As a result, the proposed action would delay the attainment of moderate-sized snags and down wood through natural process because of the reduction in density of the stands.

The removal of lodgepole pine may reduce the potential for concentrated areas of lodgepole pine snags. The proposed action would reduce this habitat component. However, there is an abundance of concentrations of lodgepole pine snags across the landscape, and it is expected to increase substantially with future mountain pine beetle outbreaks in the vicinity of the project.

The proposed action may result in some deduction of snags in the units. However, the treatment would leave the largest trees standing and some of these would eventually die. Some would eventually fall naturally to create large coarse woody debris as well.

4.5.5.6 **DecAID levels for snags and down wood:** Most stands meet at least the 30% tolerance level, while stands affected by the mountain pine beetle likely occur at the 50-80% tolerance level.

Leave trees damaged during the harvesting operation sometimes have the potential to become trees useful for wildlife species.

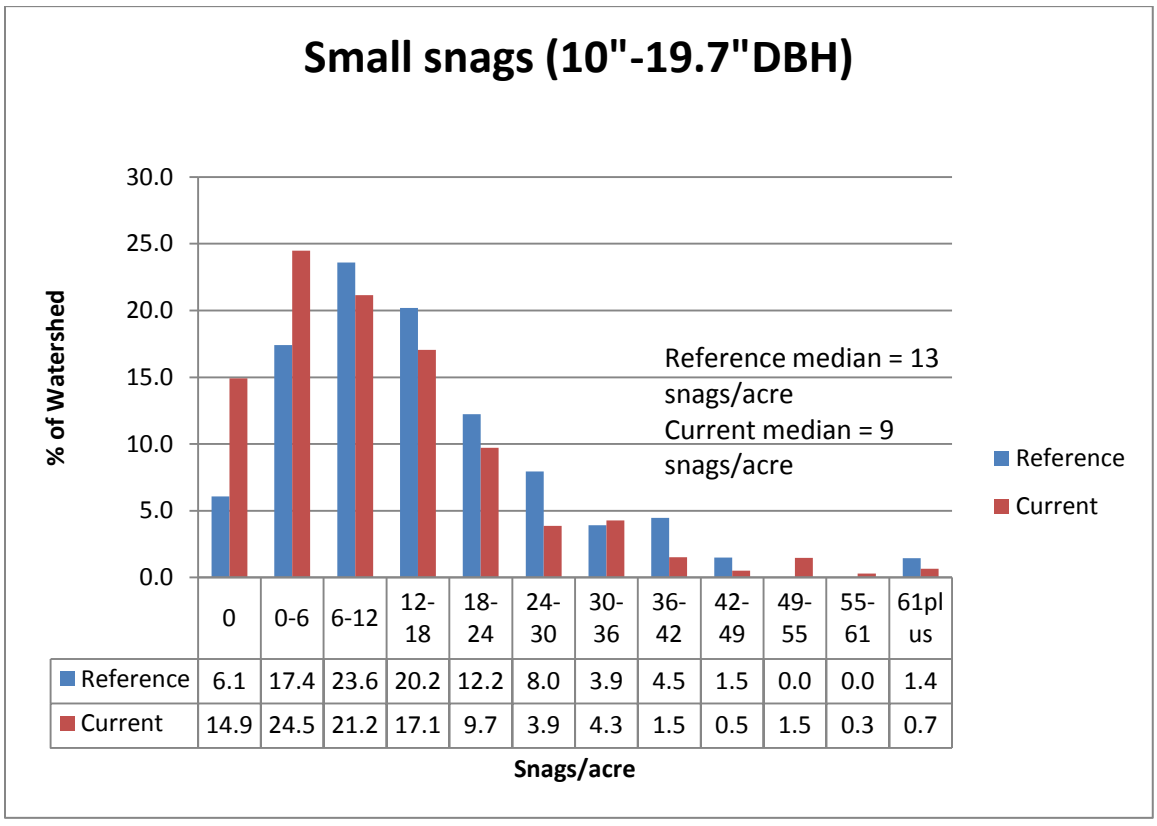
Tolerance levels would likely be reduced to 30% or below within units. Areas in skips should retain most of its snag and down woody debris component. Some skips would be placed around patches of snags. The project would not remove any existing coarse woody debris; although it would likely damage some of the pieces in decay class 3, 4, and 5, since the harvest method would be predominantly a ground-based system.

4.5.5.7 **Cumulative Effects –** Snags are utilized by species that have medium size home ranges so appropriate size analysis areas using topographic features have been developed to calculate cumulative effects for snags. Analysis areas have been developed for snags that roughly align with drainages.

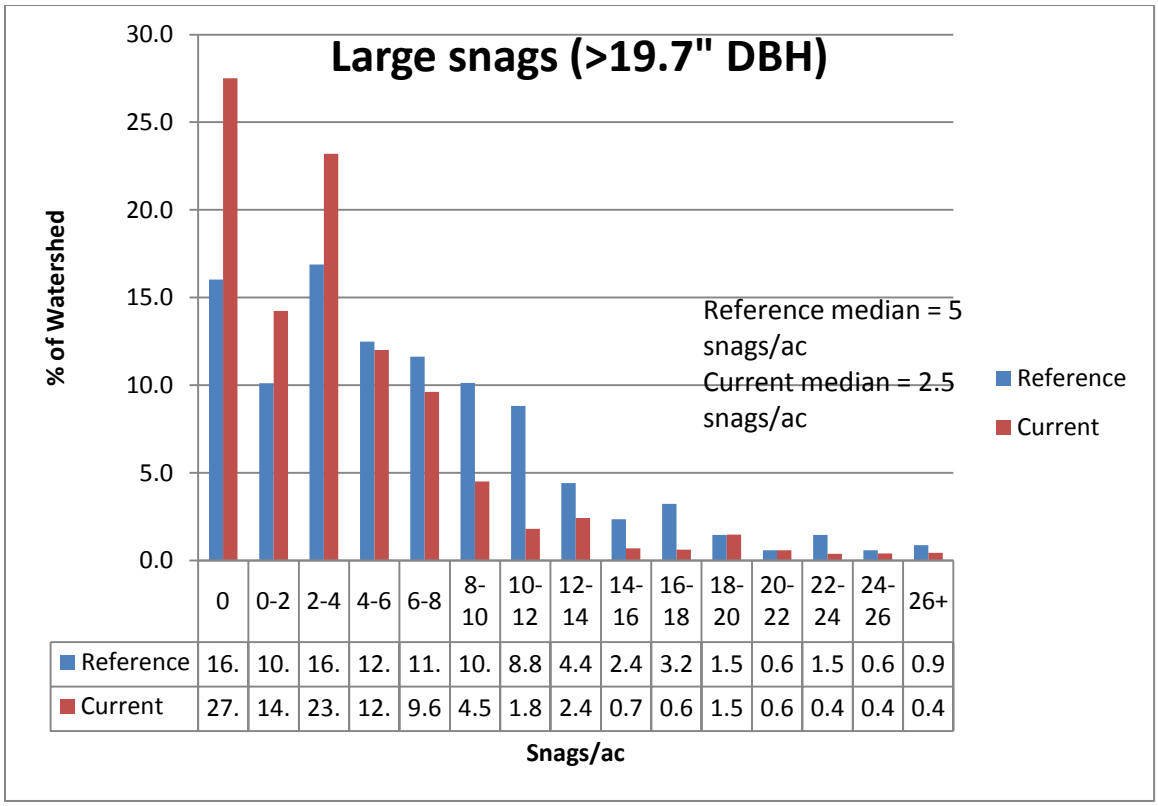
If the Palomar pipeline or the Cascade Crossing power line are constructed in the project area, some snags may be removed during the construction phase. Danger trees are often felled along roads as part of road maintenance for public safety. Recent fires across the landscape have occurred creating new snags and down wood. The mortality created by insects has increased across the landscape creating new

snags and down wood. There are no other foreseeable future projects in this area that would affect snags.

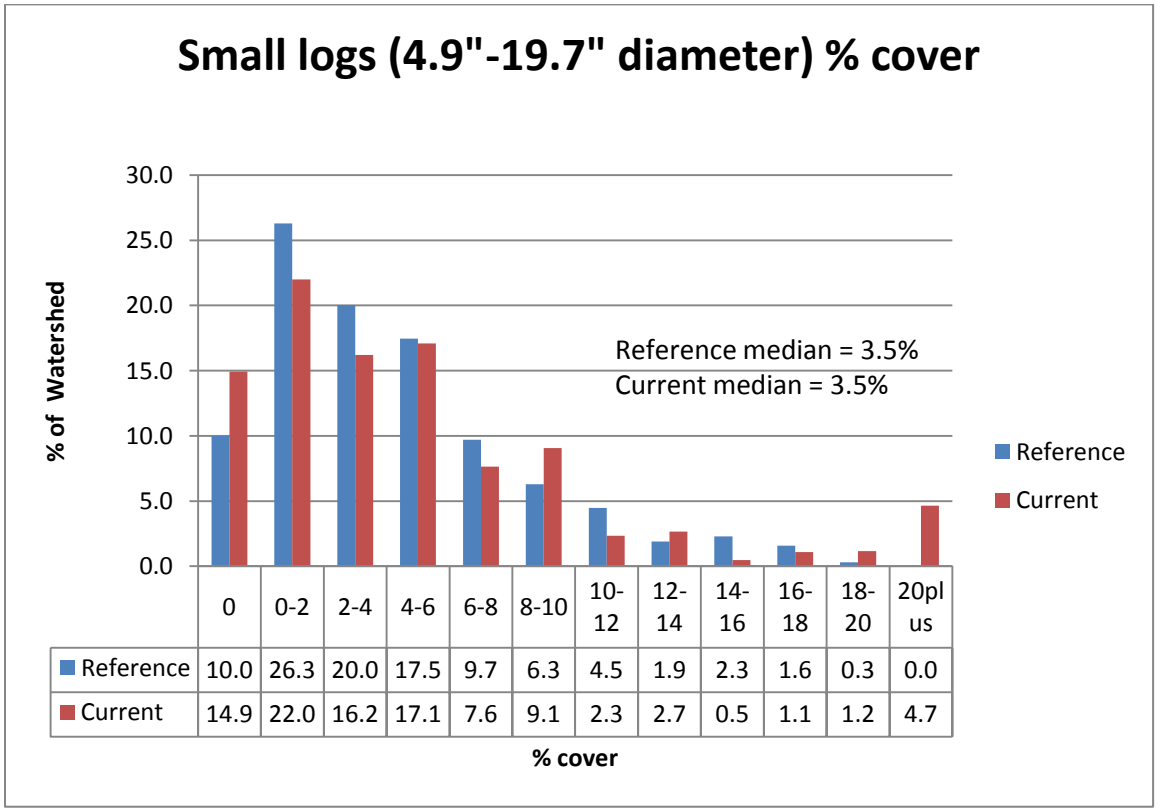
A distribution analysis compares the current condition to reference conditions as represented by the vegetation inventory distribution histograms in DecAID. These charts represent the current condition as affected by all past actions and events including timber harvest, road construction, danger tree removal, and forest fires. At the landscape scale there are fewer snags and down logs compared to the reference condition. To provide for safety, there may be some reduction of snags but down logs would be retained. The proposed huckleberry enhancement project represents approximately 2 percent of the broader landscape. The changes in these units would not likely be discernable at the landscape scale especially given the other changes such as insect mortality.



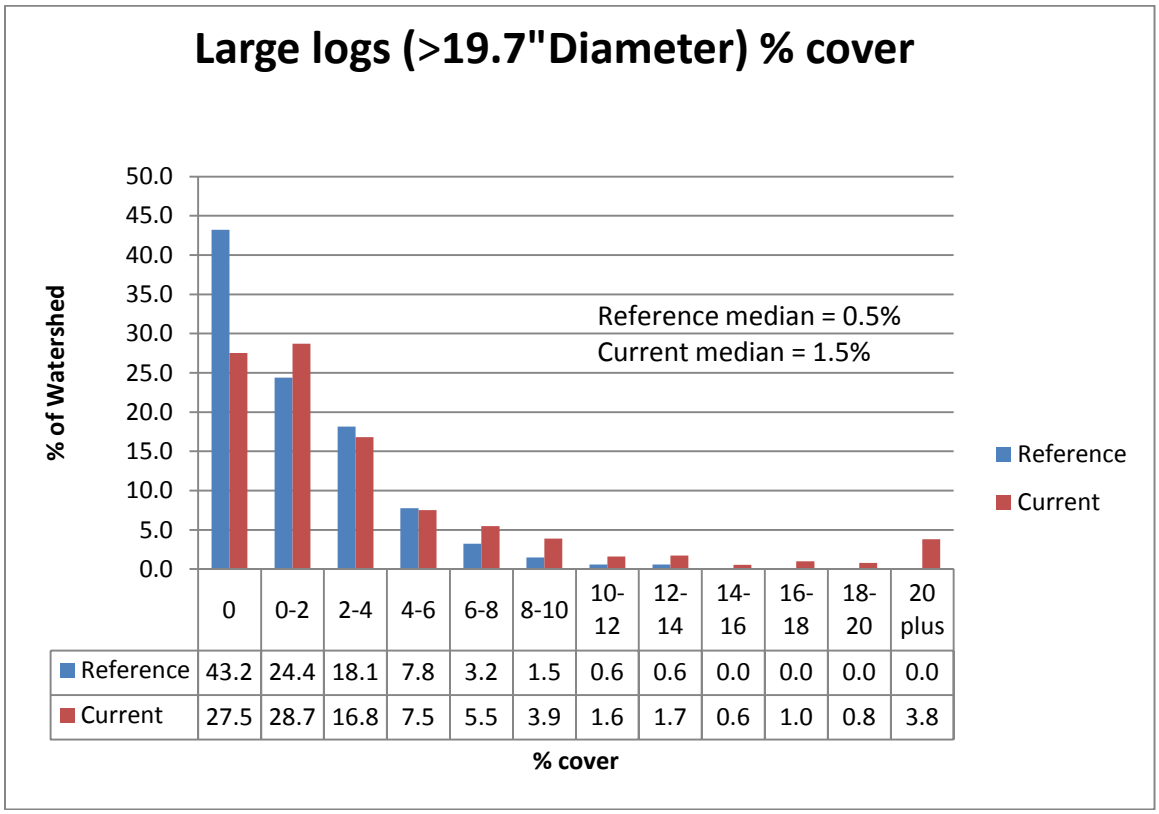
	0	0-6	6-12	12-18	18-24	24-30	30-36	36-42	42-49	49-55	55-61	61plus
Reference	6.1	17.4	23.6	20.2	12.2	8.0	3.9	4.5	1.5	0.0	0.0	1.4
Current	14.9	24.5	21.2	17.1	9.7	3.9	4.3	1.5	0.5	1.5	0.3	0.7



	0	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-26	26+
Reference	16.	10.	16.	12.	11.	10.	8.8	4.4	2.4	3.2	1.5	0.6	1.5	0.6	0.9
Current	27.	14.	23.	12.	9.6	4.5	1.8	2.4	0.7	0.6	1.5	0.6	0.4	0.4	0.4



	0	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20plus
Reference	10.0	26.3	20.0	17.5	9.7	6.3	4.5	1.9	2.3	1.6	0.3	0.0
Current	14.9	22.0	16.2	17.1	7.6	9.1	2.3	2.7	0.5	1.1	1.2	4.7



	0	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 plus
Reference	43.2	24.4	18.1	7.8	3.2	1.5	0.6	0.6	0.0	0.0	0.0	0.0
Current	27.5	28.7	16.8	7.5	5.5	3.9	1.6	1.7	0.6	1.0	0.8	3.8

The snag analysis presented in the table below is based on stand type and plant associations and was generated from field surveys completed by Forest inventory and ecology crews (see Existing Situation in the Snag and Down Wood Section). Weighted averages include the entire land base including all forest types, as well as all non-forest areas within the analysis area. The 100% biological potential would be between 3.7 and 4 snags per acre, respectively.

The analysis of snag habitat within the snag analysis areas includes all past and present projects including the Huckleberry Enhancement Project. For purposes of this analysis, it is assumed some snags would need to be felled for safety reasons in the Huckleberry Enhancement project. Past experience and monitoring indicate that there would likely be some snags remaining afterwards.

4.5.5.8 **Snag Habitat** (analysis areas that overlap Huckleberry Enhancement units)

Snag Analysis Areas	Total Acres	Snags/Ac. 15-21"	Snags/Ac. > 21"	Total Snags/Ac. Existing Condition	Stands Proposed for Treatment (Acres)	Proposed Action Snags/Ac. ≥15" *
Power Line Burn Project Area						
Peavine	7977	3.8	3.3	7.1	49	7.1
Stone Creek	5412	5.1	4.3	9.4	854	9.0
Upper Oak Grove	5148	4.0	4.3	8.3	38	8.3
Warm Springs	5050	3.9	4.8	8.7	281	8.6
Abbott Burn Project Area						
Draw Creek	4483	4.1	3.2	7.3	365	7.1
Dinger Creek	3823	3.0	2.3	5.3	48	5.3
Cooper Creek	3973	3.8	2.9	6.7	297	6.5
Crater Creek	5615	4.0	3.1	7.1	280	7.0
Upper Salmon	5056	4.5	3.4	7.9	79	7.9

* Presumes 2.0 snags per acre greater than or equal to 15 inches diameter were lost in harvest units.

The analysis shows that within the snag analysis areas, the snag levels after the past and present harvest activities would still be above the 100% biological potential level.

4.5.5.9 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References

Forestwide Wildlife Standards and Guidelines – FW-215 to 240, page Four-74.
Northwest Forest Plan - Matrix Standards and Guidelines - pages C-40 to 42.

Snags and Wildlife Trees - Forest Plan standards and guidelines FW-215, FW-216, FW-234 & FW-235

The standard and guideline from the Forest Plan (FW-215) for harvest units is 60% of the full biological potential, which translates into 2.4 snags and wildlife trees per acre in the medium to large size class for the units within the pacific silver fir zone and 2.3 snags and wildlife trees per acre in the mountain hemlock zone. Additionally, 0.12 snags per acres would be added to this number for black-backed woodpeckers as described in s. 4.5.4.1.

Currently most of the trees are not large enough to produce snags of the desired size, (FW-234 describes 22 inches diameter as the minimum snag size) but FW-235 allows the retention of smaller trees if the treated stand is too young to have trees of that size. In these cases, snags and green leave trees retained should be representative of the largest size class present in the stand.

Past experience and monitoring indicate that there would likely be sufficient snags remaining after harvest scattered through the units plus the snags retained in skips.

Current snags are relatively hard and stable. Retained wildlife trees with the elements of wood decay would add additional habitat for snag dependent species.

As described in s. 4.5.5.8 the huckleberry enhancement units average between 5 and 9 snags per acre. It is presumed that approximately 2 per acre would be lost as a result of project operations leaving between 3 and 7 snags per acre. Design criteria #2d indicates that 1 to 2 new snags per acre would be created. The resulting snag levels would meet these standards and guidelines.

FW-216 indicates that snags and wildlife trees at the landscape scale be at 40% of biological potential, which equates to about 1.5 in the pacific silver fir zone and 1.6 snags per acre in the mountain hemlock zone. The table in s. 4.5.5.8 shows that this level is being met across the landscape.

Down Logs - Forest Plan standards and guidelines FW-219, FW-223, FW-225 & FW-226

FW-219 and FW-223 indicate that stands should have six logs per acre in decomposition class 1, 2, and 3 and that they should be at least 20 inches in diameter and greater than 20 feet in length. Currently the trees are not large enough to produce down logs of the desired size. However, FW-225 and FW-226 indicate that smaller size logs may be retained if the stand is too young to have 20 inch trees. In these, cases, logs representing the largest tree diameter class present in the stand should be retained. No existing down logs would be removed and design criteria #3 would result in additional protection to down woody debris which would protect some of this habitat in the interim. These standards and guidelines would be met.

4.5.5.10 The proposed action is consistent with the following standards and guidelines.

NFP C-40	The amount of down logs left would reflect the timing of stand development cycles.
FW-215, 234 to 239	60% of maximum biological potential is currently being met in the proposed harvest units.
FW-216 to 217	40% of maximum biological potential is being maintained at the landscape level.
FW 218	All primary cavity nesting species indigenous to the site would be considered in the wildlife tree prescriptions.
FW-219 & 229	An average of six logs per acre in decomposition classes 1, 2, and 3 and in the appropriate size class would be retained in the proposed harvest units. This level meets the standards in the NFP C-40 because it reflects the timing of stand development cycles.
FW-230 to 231	Snag and wildlife trees would be well distributed. No 10-acre area in a unit would be devoid of wildlife trees.
FW - 232 & 233	The priority for wildlife tree retention would be Douglas-fir. Emphasis would be placed on retaining windfirm wildlife trees, such as western red cedar within riparian areas.

4.5.6 Migratory Birds

A Memorandum of Understanding (MOU) between the USDA-Forest Service and USDI – Fish and Wildlife Service has been developed to promote the conservation of migratory birds (USDA-USDI 2008). The MOU meets the requirements of the Executive Order 13186, January 17, 2001 on the responsibilities of federal agencies to protect migratory birds. The purpose of the MOU is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration between the Forest Service and the Fish and Wildlife Service, in coordination with state, tribal, and local governments. This MOU directs the Forest Service to protect, restore, enhance, and manage habitat of migratory birds, and prevent the loss or degradation of remaining habitats on National Forests land.

Existing Situation – Close to 30 species of migratory birds occur within project area, some of which are likely present within the project area during the breeding season. Some species favor habitat with late-successional characteristics while others favor early-successional habitat with large trees.

Direct and Indirect Effects

No Action - There would be no alteration of habitat for migratory birds. There would be no benefits to species that prefer thinned stands or negative effects to species that prefer un-thinned stands.

Proposed Action – Research has demonstrated that thinning enhances habitat for a number of migratory species and provides habitat for some species that are rare or absent in un-thinned stands. However, some species of migratory songbirds have been shown to decline following thinning. The effects of thinning in these stands would most likely have a combination of positive, neutral, and negative impacts on migratory bird use within the stands depending on which species are present. The following migratory species present in the watershed may benefit from thinning: Hammond's flycatcher, warbling vireo and western tanager. The following migratory species may be negatively impacted by thinning: hermit warbler, Pacific slope flycatcher, black-throated warbler and Swainson's thrush.

This project may have direct effects to some migratory birds, particularly those that rely on dense mid-seral forests for breeding habitat.

Cumulative Effects

Since migratory birds venture great distances and each species has a different range, cumulative effects can result from a vast array of practices such as conversion of forests and wetlands to farms or developments. The use of chemical pesticides can

affect birds. These practices and others can occur across both North and South America. Climate change also can affect migratory birds.

The proposed action covers only a small portion of the available breeding habitat for migratory birds that rely on dense mid-seral forest. Since mid-seral stands are relatively common on the Forest, (most of the Forest's Wilderness areas for example) a loss of habitat from the proposed action would not likely result in a substantial cumulative effect for migratory birds. There may be a redistribution of birds to other suitable habitats.

4.6 FISHERIES AND WATER QUALITY

Several fish are listed as a threatened species under the Endangered Species Act and salmonids are Management Indicator Species (MIS) under the National Forest Management Act.

The Huckleberry Enhancement Project lies in three watersheds: Salmon River, Oak Grove Fork Clackamas River and Warm Springs River.

These rivers originate from rainwater and snowmelt on the crest of the Cascades. Annual precipitation can be up to 100 inches in the form of rain and snow. The streams in the vicinity of the project in the Oak Grove Fork watershed are Peavine Creek, Stone Creek, Dinger Creek, Copper Creek and Crater Creek. The streams in the vicinity of the project in the Salmon River watershed are the Upper Salmon River and Draw Creek. The stream in the vicinity of the project in the Warm Springs watershed is Dry Creek.

The Salmon River is classified as Tier I, Key Watershed in the Northwest Forest Plan. Tier I watersheds have been identified as crucial refugia for at-risk fish species. A narrow portion of the Oak Grove Fork watershed along the river is also a Tier I Key Watershed but this not near the propose huckleberry enhancement.

These watersheds support populations of spring Chinook salmon, winter steelhead and coho salmon in their lower reaches. Stone Creek and the upper reaches of the Salmon and Oak Fork do not have anadromous fish present due to barriers existing downstream. They do support native resident cutthroat trout as well as small populations of introduced trout species. The portion of the Warm Springs River located downstream on the Forest and on the adjacent Warm Springs Indian Reservation is listed as Critical Habitat for Middle Columbia Steelhead.

For this proposal, the following actions have the potential to affect water quality and aquatic species or their habitats: timber felling, road construction, log yarding, log haul, and road restoration. The project would not occur in riparian reserves.

All of project/action area is located more than two miles from any anadromous habitat, and more than 320 feet from any fish bearing stream.

4.6.0.1 **Salmonids as Management Indicator Species**

Because of their relative sensitivity to change, salmonids were selected as "an indicator species group" for aquatic habitats. This group of species is especially important for their commercial and game values and because they occupy the spectrum of aquatic habitats on the Forest. These requirements are restricted enough that it is reasonable to assume that if the life history needs of salmonids are met, the rest of other fish species found on the Forest will be met. See s. 4.5 for additional discussion of management indicator species. Management Indicator Species for the Forest include the threatened anadromous species discussed in s. 4.6.5 (Chinook salmon, coho salmon and steelhead), and coastal cutthroat trout and rainbow trout. A Forest-level analysis of the status of these species and their habitat was conducted in March of 2011 (project file). The state of Oregon, in concert with the regulatory agencies, manages fish populations while the Forest manages the habitat. For a population to be viable, attributes such as species abundance, productivity, spatial structure, and genetic diversity are needed for the species to maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. All of these attributes are affected by habitat and other environmental conditions that influence species behavior and survival. Maps of the distribution of fish species for the Forest are located in the analysis file. The Forest-wide analysis was conducted at a coarse scale using available GIS data. The project level interdisciplinary team took the Forest-wide data and refined it based on field examinations and local knowledge of habitat conditions. For example, for fisheries, some of the maps of resident fish presence show fish in portions of streams that are known to be intermittent with no fish.

The Huckleberry Enhancement Project is designed to avoid fish habitat by locating all harvest units outside of riparian reserves. Maps are in Appendix A.

The Powerline Burn section of the project area has thinning units that are distributed at the headwaters of Peavine Creek, Stone Creek (Oak Grove Fork Watershed) and Dry Creek (Warm Springs River watershed). The thinning units near the headwaters of Peavine Creek (home to resident cutthroat trout) are over 1.5 miles away from the nearest fish-bearing stream. Dry Creek may support rainbow trout but this hasn't been confirmed. Areas of the Warm Springs River near its confluence with Dry Creek have been confirmed to support rainbow trout. The project units nearest Dry Creek are approximately 0.5 mile from the nearest fish habitat. In the vicinity of the Stone Creek headwaters, most units are 0.5 mile away or farther from the nearest fish habitat, except for units 34 and 36, just west of Stone Creek. Units 34 and 36 are adjacent to occupied fish habitat for resident coastal cutthroat trout but are located outside the riparian reserve (320 feet from the creek). The headwater sections of Dry Creek and Peavine Creek nearest the project area are mostly snow melt runoff channels that are dry for most of the year. Stone Creek has scattered sections of

stream that are intermittently ephemeral and dry most of the year, followed by sections that appear to be perennial. Most of the perennial stream habitat in Stone Creek is supporting coastal cutthroat trout populations. Stone Creek is a large tributary to the mainstem Oak Grove Fork. The mainstem Oak Grove Fork in the vicinity of Stone Creek supports a robust population of coastal cutthroat trout and is the only tributary of the Clackamas River where the Oregon Department of Fish and Wildlife (ODFW) allows harvest of coastal cutthroat trout (2011 ODFW Sport Fishing Regulations).

The Abbott Burn section has thinning units in the vicinity of the headwaters of Upper Salmon River, Dinger, Cooper, Crater, Draw and String Creeks and an unnamed creek draining out of Dry Meadow and into the Upper Salmon River. The Abbott Burn units are 0.3 - 1.0 mile or more from the nearest occupied resident fish habitat, which occurs in the above-named creeks. The nearest stream channels of the above-named creeks are ephemeral channels that are dry most of the year and mostly exist as drainage networks for snow melt runoff. Dinger, Cooper, and Crater Creeks are all southflowing tributaries into the Oak Grove Fork. Draw and String Creeks and the unnamed stream from Dry Meadow are all tributaries to the Upper Salmon River, and they support resident native coastal cutthroat trout where there is perennial stream flow. The nearest anadromous fish are located over five miles away from the Abbott section, and even further from the Powerline section.

Coastal cutthroat trout or rainbow trout are found in most west-side streams on the Forest and are among the most common salmonids encountered. Most tributary streams of the Salmon River and Oak Grove Fork fifth-field watersheds contain populations of cutthroat trout or rainbow trout. Information on these streams and fish populations came from Level II stream surveys (1994 Oak Grove Fork, 2009 Dinger Creek, 1997 Crater Creek, 1997 Cooper Creek, 1993 Dry Creek, 1994 Peavine Creek, 1991 Stone Creek, and 1992 Draw Creek). Additional information was also gathered by specialists during project planning on-the-ground inspections.

Summary of the Forest-wide Analysis of Salmonids

Several species were listed as threatened under the Endangered Species Act due to concerns for their population levels and the condition of habitat and other factors such as commercial fishing and hydroelectric dams. Since the creation of the Northwest Forest Plan, the following factors have contributed to a trend of stable or improving stream habitat on the Forest:

- In-stream restoration projects including the reconnection of side channels, and the addition of wood and boulders.
- Replacing undersized culverts with larger ones or bridges that allow improved fish passage and the ability to withstand larger flood events.
- Decommissioning several hundred miles of roads.
- Managing riparian reserves for shade, large wood recruitment, and the development of late-successional conditions.
- Managing Off-Highway Vehicle use to avoid erosion near sensitive streams.

- Managing stream diversions for irrigation to minimize effects to fish.
- Treating hazardous fuels minimize the impact of wildfire on riparian areas and fish.
- Removal of a dam that blocked fish passage.

4.6.1 Direct and Indirect Effects

4.6.1.1 No Action

There would be no direct or indirect short-term effects to water quality, peak flows, or fish species since there would be no ground disturbance or loss of forest canopy. Because there are no direct or indirect effects, there are no cumulative effects to water quality or fish species.

Proposed Action

4.6.1.2 Sediment from Road Construction, Road Restoration, and Road Maintenance

Activities: Road maintenance prior to log haul would help maintain the design drainage of the road surface and ditches. While this may result in short-term sediment input, keeping the road in a well maintained condition reduces the potential for larger sediment inputs that could occur on unmaintained roads.

The proposed action would re-use approximately 1.4 miles old temporary roads, and construct approximately 4.7 miles of new temporary roads. These roads would be restored after project completion.

Maintenance of the existing system roads includes the placement of new aggregate surfacing where necessary, blading, brushing out encroaching vegetation, removing berms, and ditch and culvert inlet cleanout where needed. Aggregate road surfacing and asphalt paving minimizes the amount of fine sediment from road surfaces entering streams following log haul, especially during and following rainfall events.

Road-related ground disturbing activities have been designed to minimize the risk of sediment being transported to streams from erosion or surface run-off. Road construction, repair and maintenance would occur in the dry season between June 1 and October 31.

The proposed temporary roads are not in riparian reserves, have no stream crossings and have no hydrologic link to streams. As a result, there would be a very low probability of any sediment from temporary road surfaces reaching streams. These roads would be constructed along ridgetops, benches or gentle slopes, where they would not cause an increase in the stream drainage network. Because of the distance of any proposed new or existing temporary roads to any live water source, and the fact that these roads do not cross any perennial streams, vegetative buffers would act

as an effective barrier to any sediment being transported into stream channels by surface erosion or runoff.

All temporary roads used would be restored and revegetated directly following completion of harvest operations to help reduce compaction, increase infiltration rates, minimize surface erosion and re-establish natural drainage patterns.

While there is a possibility of sediment entering streams due to these activities, most road-related sediment would be trapped and stored in the ditches or on the forest floor below cross drains. In the event that sediment was to reach stream channels, most fine particles would likely be trapped and stored in the small tributary streams before they are able to reach any habitat where ESA listed fish species are found. Any impacts from the minimal amount of sediment generated during these activities would be for a short-term duration, and undetectable at a subwatershed (6^{th} field) or watershed (5^{th} field) scale. The probability of any impacts to water quality or fisheries resources caused by sedimentation due to road construction, reconstruction, maintenance, or road restoration, is extremely low.

No measureable direct effect to water quality is expected to be associated with road maintenance, improvement, or temporary road construction or restoration. Because there would be no measurable direct effect to water quality from sediment generated from road work, there would be no measurable affect to any fish species within the project area. The potential for project activities to indirectly effect water quality and fish species from sediment is also very low, given the lack of hydrologic link to any streams, the lack of activity in riparian reserves, and the ability of the riparian areas to trap any sediment that may occur from surface erosion or runoff.

4.6.1.3 Sediment from harvest activities: Ground-based skidding has the potential to impact water quality. Any erosion produced from ground-based skidding would travel short distances before being trapped by duff, woody materials and other obstructions. The probability of overland surface runoff on uncompacted soil surfaces is low for the soils in the project planning area. The buffer created by riparian reserves and the gentle terrain would act as an effective barrier to any soil particles being transported into stream channels by surface erosion or run-off and would minimize the risk of any water quality impacts. Logging over snow would result in minimal ground disturbance.

Because of the ability of the riparian reserves to trap sediment and the minimal amount of ground disturbance associated with this project, there is a low probability that sediment from logging would enter any stream. Thus, the probability of any sediment related direct or indirect effects from logging activities to water quality or fish species would also be low.

4.6.1.4 Sediment from log haul: Log hauling along aggregate surface or native surfaced roads has the potential to introduce sediment in small quantities to streams. Traffic

breaks down surfacing material resulting in finer surface gradation and increased sediment transport from the road surface. Any fine sediment created by hauling traffic would more than likely be washed from the road surface in the first precipitation event that is sufficient to cause runoff from the road surface. Any input of sediment is expected to be minimal because most of the haul routes are asphalt or durable crushed rock. All native surfaced roads along the haul route are along ridge tops or gentle terrain, and have no hydrological connection to any streams. Road use however would be restricted to periods when road related runoff is not likely to occur and as such, little sediment is expected to leave the road bed and enter streams while haul is occurring. As described previously, because of the lace of connectivity to streams and the low likelihood of sediment being generated from log haul, the potential for direct and indirect effects to water quality and fish species is also low.

4.6.1.5 Water Temperature: There are few perennial streams in the vicinity of the project. No thinning would occur in riparian reserves. As such the existing riparian reserves would continue to provide shade and there would be no direct or indirect effect to stream temperatures in the project area.

4.6.2 Cumulative Effects and Peak Flows: Cumulative effects to fisheries, aquatic resources and water quality generally focus on changes in peak stream flows, fine sediment input into streams and the loss of stream shading.

The Aggregate Recovery Percentage (ARP) index is often used to estimate the potential for adverse cumulative effects related to past, present and foreseeable future actions. It is also a tool to determine compliance with Forest Plan standards and guidelines pertaining to cumulative watershed effects (Forest Plan, FW-061 to FW-065). By measuring the percent of an area in a hydrologically recovered condition, the ARP model evaluates the risk of increased peak flows from rain-on-snow events. In stands with little or no forest canopy cover within the transient snow zone, more snow accumulates than beneath a partially or fully hydrologically recovered forest.

The 4,200-foot elevation line is generally considered the threshold for the transient snow zone in this area. Approximately half of the proposed huckleberry treatment areas are above 4,200 feet. Areas above this would not likely affect peak flows. Stand alterations below the transient snow zone could result in more runoff from non-hydrologically recovered stands when there is rapid melting during rain-on-snow events (Christner 1982). The ARP model ranks recovery from 0 to 100 with 100 being fully recovered. The Forest Plan often refers to watershed impact area or threshold of concern which are the inverse of ARP with 0 being fully recovered.

Stands that have trees greater than eight inches in diameter and over 70% canopy cover are considered fully recovered in terms of hydrology (Forest Plan, FW-064). In the ARP model, stand age is used to determine whether stands meet these criteria. Forest hydrologists have developed recovery curves to model the changes to hydrology as

young stands grow as well as the effects to hydrology for projects such as thinning that remove only a portion of the trees in a stand.

The stands proposed for thinning are currently hydrologically recovered. Because there has been relatively little regeneration harvest in the past two decades, all of the drainages are currently between 85 and 90% recovered and are steadily moving toward full hydrologic recovery. The ARP values are increasing by approximately 1% per year in these watersheds as young plantations grow.

The effect of changes in estimated hydrologic recovery (ARP) are not measurable acre by acre or unit by unit, and therefore direct effects to peak flows or stream channel stability, if any, are not predicted with this model. The units of this project are dispersed over a wide landscape; they overlap parts of nine drainages in three different 5th field watersheds. The ARP analysis includes all of the huckleberry enhancement units and road construction even though some of them are above the rain-on-snow threshold of 4,200 feet. It also includes all past timber harvest, road construction, rock quarries, and other openings such as the power line. There are no other foreseeable future timber harvest actions to add within these drainages. Where drainages overlap the Warm Springs Reservation, the condition of the stands there are included. Future logging on the Reservation is likely but details of location and timing are not known and are not sufficiently foreseeable to predict effects.

Of the nine drainages, only four would have a change in ARP greater than 1%; Stone Creek, Draw Creek, Cooper Creek and Crater Creek. With the proposed action these drainages would change by approximately 2%. Since the drainages are currently at 85 to 90% recovered, it is very unlikely that the proposed huckleberry enhancement activities would cause stream channel instability or increases in peak flows during rain-on-snow events. The model also shows that after treatment, it would take approximately two years for the growth of plantations in the drainages to mitigate the 2% dip caused by the proposed action.

On the larger landscape scale, the 5th field watersheds are all experiencing steady recovery due to the rapid growth of older plantations. There have been few regeneration harvests in the past decade or more. As a result the watersheds are well above the threshold of 65% set in the Forest Plan, and thus the project complies with the Forest Plan for ARP. Effects to hydrology in terms of peak flow changes, if any, would not be considered measurable.

Water temperature and sediment may be affected by actions such as canopy removal, ground based logging systems, road maintenance, fuels treatment, OHV use, grazing, and dams. The proposed action would not likely contribute substantially to changes in temperature or sediment due to the design criteria, best management practices, and the protections provided by riparian reserve standards and guidelines. Because of the low potential for any direct or indirect effects to occur to water quality or fish habitat, the potential for any cumulative effect to water quality or fish habitat from ongoing

activities would be low. There are no reasonably foreseeable actions that would likely overlap in time or space with this activity to contribute to a cumulative effect.

4.6.2.1 **Viability**

For fisheries MIS, the direct, indirect and cumulative effects to water quality and the physical habitat for these species are low to immeasurable due to the lack of activity in riparian reserves, the distance from the activity areas to MIS fish populations, and the low potential for any sediment to reach streams where these species reside. As such, this project will not contribute to a negative trend in viability on the Forest for fisheries MIS.

4.6.3 Forest Plan goals, standards and guidelines

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
Mt. Hood FEIS pages IV-22, IV-47, IV-155 to IV-167
Northwest Forest Plan - Riparian Reserve Standards and Guidelines – pages C-31 to 38

4.6.3.1 Aquatic Conservation Strategy

The Aquatic Conservation Strategy of the Northwest Forest Plan was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems. Management actions incorporate the objectives of the Aquatic Conservation Strategy which are elaborated on page B-11 of the Northwest Forest Plan. The objectives are to maintain and restore nine key elements of watershed and aquatic ecosystems. There are several indicators that make up the elements of the Aquatic Conservation Strategy objectives; they are evaluated to determine if the project would restore, maintain, or degrade aquatic resources.

The following table displays the Aquatic Conservation Strategy objectives and the indicators that are used for each objective. All of the indicators that are checked for a particular objective should be evaluated together to determine whether the action maintains or enhances the specific Aquatic Conservation Strategy objective.

	Aquatic Conservation Strategy Objectives								
Indicators	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**
Temperature		X		X				X	X
Sediment				X	X	X		X	X
Chemical Contamination				X				X	X
Physical Barriers	X	X						X	X
Substrate			X		X	X			X
Large Woody Debris			X					X	X
Pool Frequency			X						X
Pool Quality			X						X
Off-Channel Habitat	X	X	X						X
Refugia	X	X						X	X
Width/Depth Ratio			X					X	X
Streambank Condition			X			X		X	X
Floodplain Connectivity	X	X	X				X	X	X
Peak/base Flows					X	X	X		
Drainage Network Increase					X	X	X		
Riparian Reserves	X	X	X	X	X	X		X	X

The following is a summary of the nine Aquatic Conservation Strategy objectives and how the proposed action would influence them:

1. **Distribution, Diversity and Complexity of Watershed and Landscape-Scale Features:** This project would meet this objective because of the protection that Riparian Reserves provide. The project would avoid Riparian Reserves. The project would have no new stream crossings.

2. **Spatial and Temporal Connectivity Within and Between Watersheds:** This project would meet this objective because of the protection that Riparian Reserves provide. Stream temperature would be maintained.

3. **Physical Integrity of Aquatic Systems:** This project would meet this objective because of the protection that Riparian Reserves provide. Design criteria #5 &7 would minimize erosion. The project would not alter shorelines, banks or bottom

configurations.

4. **Water Quality:** This project would meet this objective through design criteria and the protection provided by Riparian Reserves. Stream temperature would be maintained. Riparian Reserves also provide a place for entrapment and deposition of moving soil particles to minimize sedimentation. Design criteria #5 &7 would minimize erosion.

5. **Sediment Regimes:** This project would meet this objective through design criteria and the protection provided by Riparian Reserves. Riparian Reserves also provide a place for entrapment and deposition of moving soil particles to minimize sedimentation. Design criteria #5 &7 would minimize erosion.

6. **In-Stream Flows:** This project would maintain hydrologic recovery well above the levels identified in the Forest Plan. There would be no measurable change in peak flow.

7. **Timing, Variability and Duration of Floodplain Inundation:** This project would meet this objective because of the protection that Riparian Reserves provide. This project would maintain hydrologic recovery well above the levels identified in the Forest Plan. There would be no measurable change in peak flow. Meadows and areas with high water tables are excluded from units.

8. **Species Composition and Structural Diversity of Plant Communities in Riparian Areas and Wetlands:** This project would meet this objective through protection provided by Riparian Reserves.

9. **Well-Distributed Populations of Native Riparian-Dependent Species:** This project would meet this objective through protection provided by Riparian Reserves.

The no-action alternative maintains the current condition and as such, does not influence the Aquatic Conservation Strategy objectives.

4.6.3.2 Key Watersheds

Salmon River is a key watershed. In this watershed, approximately 550 acres of huckleberry enhancement would occur and approximately ¾ mile of temporary road would be constructed and then obliterated. The project would not build any new permanent roads and 28 miles of roads have already been decommissioned in the key watershed.

The Northwest Forest Plan (page B-19) indicates that roads should be decommissioned in key watersheds and that there should be no net increase in the amount of roads in key watersheds. There has been a net decrease in road mileage in this watershed.

4.6.3.3 The Clean Water Act and Best Management Practices

Sections 208 and 319 of the Clean Water Act of 1972, as amended (1977 and 1987), acknowledge land treatment measures as being an effective means of controlling nonpoint sources of water pollution and emphasizes their development. These land treatment measures are known as Best Management Practices (BMPs). BMPs are used to control or prevent nonpoint sources of pollution from resource management activities, and to ensure compliance with the Forest Plan, as amended, the Clean Water Act, as amended, the Oregon Administrative Rules (OAR Chapter 340-41-0004,0028, and 0036), Department of Environmental Quality (DEQ), and the Memorandum of Understanding between the Oregon DEQ and the USDA, Forest Service. General BMPs are described in the document General Best Management Practices, USDA Forest Service, Pacific Northwest Region (11/88). The BMPs are flexible in that they are tailored to account for diverse combinations of physical and biological environmental circumstances. The Forest has documented typical BMPs and assessed their effectiveness (USDA 2004).

There are no Oregon State Department of Environmental Quality 303d listed streams in the project area. The Salmon River, downstream of a portion of the project area was on the 303d list due to high water temperatures but it has been removed from the list because there is a Total Maximum Daily Load (TMDL) plan in place to reduce water temperature. The Forest's strategy for complying with the TMDL is implementing the standards and guidelines for riparian reserves. Project design criteria would ensure that no water temperature increases occur in the streams that are found in the project area: the project is consistent with the Clean Water Act.

4.6.3.4 Other Standards and Guidelines - FW-054 to FW-079, FW-080 to FW-136, FW-137 to FW-147, and B7-001 to B7-070.

The project is consistent with these standards and guidelines. Project design criteria would provide protection to fisheries and riparian dependent resources. Adherence to the project design criteria would maintain the existing aquatic complexity within and downstream of the project area. All of the environmental baseline indicators for habitat and watershed condition would be maintained or improved in the long-term by implementation of the project. These indicators include: stream temperature, sediment, pool habitat and quality, large woody debris, stream channel morphology, refugia, road density and riparian areas. The proposed action would meet hydrologic recovery standards and guidelines both at the drainage level and the watershed level (FW-63&64) see s 4.6.2.

4.6.4 Sensitive, Rare and Uncommon Species (Aquatic)

Special Status Species are those plant and animal species for which population viability is a concern. These species are addressed in the Biological Evaluation which is incorporated by reference. Special Status aquatic species that occur on the Forest include:

A biological evaluation has been developed by a fisheries biologist to address the potential effect of activities on sensitive species. The objective is to avoid a trend toward Federal listing under the ESA.

Interior Redband Trout *(Oncorhynchus mykiss spp.)*
Redband trout occur in streams flowing east from the crest of the Cascades including the Warm Springs watershed. None are known to occur in the project area.

Columbia Dusky Snail (*Colligyrus n. sp. 1*)
(Formerly identified as *Lyogyrus n. sp. 1.)* This species of aquatic mollusks has a very sporadic distribution in the central and eastern Columbia Gorge, Washington and Oregon. Known sites on the Mt. Hood National Forest occur in Clackamas, Multnomah, and Hood River counties. Colligyrus species have been identified in the Upper Clackamas, Lower Clackamas, and Oak Grove Fork watersheds. Their habitat consists of cold, well-oxygenated springs, which do not occur in the action area.

Basalt Juga (*Juga Oreobasis n. sp. 2*)
These small snails have only been found at two location within the Oregon portion of the Scenic Area: in Canyon Creek just west of the town of Hood River and in several small seeps just above (south) Interstate 84 about half-mile east of The Dalles Dam. Individuals have been found at several locations on the Washington side of the Scenic Area and east of the Scenic Area on both sides of the river. They have never been found in any survey conducted on the Forest, and they are not believed to reside in Forest streams. Their habitat requirements are similar to the Columbia Duskysnail: cold well oxygenated springs, seeps, and small streams.

Barren Juga (*Juga hemphilli hemphilli*)
Habitat for the barren juga is low elevation; cold, pure, well-oxygenated water in springs and small-medium streams. The project site is not adjacent to or likely to impact any springs or spring outflows.

Purple-lipped Juga (*Juga hemphilli maupinensis*)
Habitat for the purple-lipped juga is low elevation; cold, pure, well-oxygenated water in large streams. The project site is not adjacent to or likely to impact any springs or spring outflows.

Scott's Apatanian Caddisfly (*Allomyia scotti*)
Habitat for the Scott's apatanian caddisfly larvae is low to high elevation; cold, pure, well-oxygenated water in springs, and small creeks. The project site is not adjacent to or likely to impact any springs or spring outflows.

Direct, Indirect and Cumulative Effects

No harvest activity is proposed within riparian reserves, and as described previously, other connected actions are not likely to have any measurable effect to water quality or riparian reserves. Because of the lack of measurable effects, and the protections provided by riparian reserve standards and guidelines, there would be no impact to these sensitive species. There are no ongoing or reasonably foreseeable projects that would impact the habitat for these sensitive species and as such, there would be no cumulative effect from this project to sensitive aquatic species. There would be no effect to any of these species from the no-action alternative, as no activities would occur.

2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001 ROD) (USDA USDI 2001).

This project complies with the applicable species survey requirements and management provisions; specifically because:

No habitat is present for aquatic mollusks; as such, no surveys were required.

Additionally, the protections provided by riparian reserve standards and guidelines would result in no potential for any impact to occur to these species.

4.6.5 Endangered Species Act and Magnuson-Stevens Fishery Conservation and Management Act Compliance

4.6.5.1 Designated Critical Habitat

Critical habitat exists downstream in the affected watersheds for lower Columbia River steelhead, lower Columbia River chinook, upper Willamette River chinook, Columbia River bull trout, lower Columbia River coho salmon and middle Columbia River steelhead. The no-action alternative has no direct, indirect, or cumulative effect to any designated critical habitat, as no activities would occur. There would be no direct, indirect or cumulative effects from the proposed action to any listed or proposed fish or their habitat within or outside of the designated action area (see 4.6.1 – 4.6.2). The proposed action warrants a **"No Effect"** determination for these species. This effects determination is based on the following factors:

- The project is located outside of Riparian Reserves on gentle terrain. There is a very low probability that sediment would be transported into downstream reaches where species occur.

- The project is more than five miles from any occurrence of upper Willamette River chinook, lower Columbia River steelhead, or lower Columbia River coho salmon.

- The project is located over two miles from any occurrence of middle Columbia River steelhead.

- Lower Columbia River chinook occur over 35 miles downstream of the project area in the lower Clackamas River below River Mill Dam.

4.6.5.2 Essential Fish Habitat

Essential Fish Habitat (EFH) established under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) includes those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation). EFH includes all streams, lakes, ponds, wetlands, and other water bodies currently, or historically, accessible to salmon in Washington, Oregon, Idaho, and California. Three salmonid species are identified under the MSA, Chinook salmon, coho salmon and Puget Sound pink salmon. Chinook and coho salmon occur on the Mt. Hood National Forest in the Clackamas River, Hood River, and Sandy River basins. The proposed project is located more than five miles above any habitat that could be utilized by these species. The no-action alternative has no direct, indirect, or cumulative effect to EFH as no activities would occur. The proposed project would not have any effect on water quality or substrate essential to the life history of coho or chinook salmon that occur within any basin on the Mt. Hood National Forest. Therefore, implementation of the project would have **No Effect** on essential fish habitat for chinook or coho salmon.

This activity would not jeopardize the existence of any of the species of concern or adversely modify critical habitat and would not adversely affect Essential Fish Habitat as designated under the 1996 Amendment to the Magnuson-Stevens Act.

Based on the **No Effect** determination of this project proposal, consultation with USFW and NOAA Fisheries is not required.

4.6.5.3 Fish Stocks of Concern

The effects of the implementation of the project on fish stocks of concern is based on populations of ESA listed fish species and resident fish populations that are classified as management indicator species. These species occur within and downstream of the project area.

ESA listed species that occur within or downstream of the project area are Lower Columbia River steelhead, Upper Willamette River chinook salmon, Lower Columbia River chinook, Lower Columbia River coho salmon and middle Columbia River steelhead.

4.6.5.4 **Effects to Fish Stocks of Concern**

Project design criteria was developed in the planning process to minimize or eliminate any adverse impacts the proposed action might have on have on water quality, fisheries, and aquatic resources. The analysis of potential direct, indirect, or cumulative effects has determined that the probability of any impact to fish species of concern from the proposed action would be very low, of a short-term duration, and of a magnitude that would be immeasurable at the site-specific and watershed scale. There would be no measurable long-term effect to any habitat or watershed indicator where fish species occur. The no-action alternative has no effect to any species because no activities would occur. The effects determination for fish stocks is as follows:

Alternatives A and B
Lower Columbia River Steelhead – No Effect (NE)
Upper Willamette River Chinook - No Effect (NE)
Lower Columbia River Coho - No Effect (NE)
Lower Columbia River Chinook - No Effect (NE)
Middle Columbia River Steelhead – No Effect (NE)

4.7 SOILS

4.7.1 **Introduction**

The productivity and health of entire plant communities depend on the maintenance of healthy soils. The Mount Hood National Forest Soil Resource Inventory (SRI), (Howes, 1979), contains a general map of the soils associated with landforms in the analysis area. Each soil map unit (number) has been assessed for many risks and hazards called management ratings (e.g. erosion risk, compaction hazard, etc.). The SRI is most useful as an initial broad-scale planning tool to identify and display maps of possible soil concerns or sensitive areas. Interpretations are based on observations of soil characteristics at sites thought to best represent the entire soil mapping unit. Because of the scale of the SRI (1 inch per mile), soil properties can vary substatially within a mapping unit and on-site investigations are often required to refine or modify interpretations. Qualified soil scientists adjust management interpretations to reflect on the ground conditions and provide resolution to the soil map units at a site-specific scale.

4.7.1.1 **Methodology**

A five-step methodology was used to gather data needed for this effects analysis. In addition, previous field experience, personal observation and knowledge of how soils respond to the proposed types of management actions were used to predict impacts.

Review of existing data involved interpretation of 1974, 1995, and 2004 aerial

photos, topographic maps, and the SRI.

Revised soil mapping - Representative soil mapping units were visited for field evaluation and validation of SRI soil mapping. Appropriate map changes were made to reflect field observations. With updated and validated soil mapping, pertinent management interpretations should be more accurate and therefore provide high confidence when determining levels of risk.

Assessment of existing and potential soil disturbance condition - Representative stands proposed for treatment were visited during the summer and fall of 2009. The stands were assessed in the field for the percentage of area with existing soil disturbance. The degree of impact from over-snow logging was observed in the adjacent Summit Thin unit, a recent huckleberry enhancement project. Impact from summer logging was observed on adjacent plantations of the same soil types found in the treatment units.

Assessment of slope stability condition within the planning area was accomplished by a review of aerial photos, the landslide risk layer on GIS, and communication with the Forest geologist. Landslides are not a concern in the project area.

Areas of concern - specific soil concerns were checked, such as proximity of logging to riparian areas, to soils with high water tables, and to unsuitable ground due to high soil rock content.

4.7.1.2 **Measures**

For this analysis the following measures are used to assess impacts:

Erosion

Soil erosion can directly affect soil productivity by reducing soil depth and volume, resulting in a loss of nutrients and water holding capacity. An indirect affect from soil erosion occurs when runoff from bare areas carries soil particles to water bodies, where it becomes sediment. Sediment is also addressed in the Water Quality and Fisheries section. The hazard rating for erosion is based upon bare surface soil properties that affect detachability, such as soil texture, slope, etc. Soils with slight erosion risk that are compacted and bare can become erosive even on gentle slopes. Conversely, erosive soils occurring on steeper slopes may be stable for decades because of sufficient protective groundcover (tree needles, leaves, wood, rocks, vegetation, etc.).

Soil Disturbance

Soil productivity can be affected by compaction, puddling, displacement, erosion and severe burning. These conditions, if severe enough can result in soils that have low levels of porosity, reduced root penetration, increased runoff, reduced infiltration, reduced soil water storage capacity, reduced soil water availability, reduced nutrient availability, and reduced levels of mycorrhizae and other soil

organisms.

Organic Matter
Soil fertility and soil biological systems would properly function if certain components are present, such as appropriate levels of organic matter and coarse woody debris. Poor or non-functioning soil biological systems may lead to difficulties in revegetation efforts, or decline in existing desirable vegetation. Soil biology involves complex interactions occurring between organisms and their soil habitats, including physical and chemical characteristics.

4.7.1.3 Elements of proposal that could affect soil productivity

For this project, the following actions have the potential to affect soil productivity: actions that disturb soil such as skidding of logs, the use of harvesters (mechanical tree fellers), temporary road and landing construction, burning of logging debris on landings.

The analysis also considers restorative actions and the design criteria and Best Management Practices (BMPs) that minimize impact. For example: equipment would be restricted to appropriate slopes, and erosion control methods such as water bars, seed, fertilizer, and mulch would be used. Refer to section 2.3.5 for details.

4.7.1.4 Physiographic Factors

The maritime influenced climate of the area is typified by warm, but rarely hot summers and cool winters. Persistent freezing temperatures and winter snowpack are common. All the proposed units are located between 3,800 and 4,400 feet in elevation. Estimated average annual precipitation is 70 inches falling in the form of rain, snow, or rain-on-snow. Most of the precipitation falls during the fall and winter. Summer rainfall is light (Howes 1979).

In general, landforms in the project area are typical of terrain shaped by the alpine glaciers that occupied upper mountain slopes during the last ice age. The forested topography is typified by broad ridges, and gentle to moderately sloping upland hillslopes that are lightly dissected and have generally rounded shapes.

4.7.1.5 Soil Characteristics

Summary of the major soil types in the analysis area and associated management interpretations from the SRI.

Soil Map Unit	Acres of proposed treatment within Soil Mapping Unit	Compaction Hazard	Erosion Risk	
			Surface	Subsurface
Glacial deposits < 30% slope				
304		Low – Moderate	Slight	Low –Moderate

		1,499			
	320	1,010	Moderate	Slight	Moderate
Glacial deposits 30 to 60% slope					
	305	87	Low	Slight-Moderate	Moderate
	321,322	25	Low-Moderate	Moderate	Moderate - High
	337	11	Moderate	Moderate	Moderate - High

4.7.2 Direct, Indirect and Cumulative Effects

The current condition described in the analysis below incorporates all past actions that have occurred within the analysis areas which correspond to the proposed thinning unit boundaries. Minor soil impacts are present from past fire and trails. No logging or other soil disturbing projects have occurred within the proposed treatment stands.

The analysis areas for soil resources for cumulative effects are the boundaries of the units proposed for thinning. These are appropriate boundaries because actions outside the unit boundaries and adjacent areas would have little or no affect to soil productivity within the units, and the actions within and adjacent to the unit boundaries would have little or no affect to soil productivity elsewhere.

4.7.2.1 EROSION

Existing Condition
On glacial soils with gentle slopes, surface erosion potential is slight and subsoil erosion potential is moderate. On steeper slopes, surface erosion potential is moderate, and subsoil potential is moderate to high. Existing surface erosion is primarily occurring on unpaved road surfaces, cutbanks and ditches. Trails and grazing have resulted in minor levels of impact.

Direct and Indirect Effects

No Action
Erosion rates within the analysis area would remain as they are.

Proposed Action
Erosion would not occur where duff and other effective ground cover is retained. Therefore, practices which limit the amount of soil exposure, or which re-establish ground cover after soil is exposed, would result in less erosion. All thinning units would have a reduction in effective ground cover. Ground-based systems working over a snow-pack result in a lower amount of ground exposure than one operating without a cushion of snow. Proposed huckleberry treatments have gentle to moderate

slopes, therefore eroding materials would not move far before redeposition occurs. Design criteria and BMPs would result in a low potential for sediment to be delivered to streams. Gentle slopes, operating over an adequate snowpack, use of designated skidtrails, and establishing effective ground cover by applying seed, fertilizer, and straw mulch on the disturbed soils would aid in minimizing erosion.

Cumulative Effects
Past and present features and actions that continue to create erosion include roads, road maintenance, trails and grazing. Due to the gentle nature of the slopes in the project area, erosion does not move very far before redeposition occurs. Section 4.6.1 also addresses erosion. The proposed action with design criteria combined with past and present actions would result in 60% or more effective ground cover. This ground cover and the gentile slopes would result in minimal erosion.

4.7.2.2 SOIL DISTURBANCE

Soil disturbance, such as soil compaction, soil displacement and puddling, severe burning, accelerated erosion, excess removal of organic material, and aggravated mass wasting equate to an irretrievable loss of soil productivity (for definitions of listed impacts, see Forest Service Manual [FSM] 2521.1, Region 6 supplement 2500-96-2, effective 6/4/96). See Chapter 4, Soil Physical Properties: Importance to Long-Term Forest Productivity (Perry 1989) for a review of impacts and effects of compaction, surface soil disturbance, soil loss, and fire effects, and their relation to long term soil productivity.

Existing Condition
All areas were burned by wildfire in the early 1900's. None of the proposed treatment units have been logged. Soils have been affected by roads, trails and grazing.

Direct and Indirect Effects

No Action
Percent disturbed soil condition would remain the same at approximately 1%.

Proposed Action
The direct effect of all aspects of the proposed action would result in approximately 2% in disturbed soil condition if operated over snow compared to approximately 8% if logged in the summer.

Cumulative Effects
Past and present features and actions that continue to affect soils detrimentally include roads, trails and grazing. The cumulative effect of the proposed action with design criteria combined with past and present actions would result in approximately 3% in disturbed soil condition if operating over snow compared to approximately 9% if logged in the summer.

4.7.2.3 ORGANIC MATTER

Existing Condition
Duff layers are relatively thin, presumably due to the past wildfire history, and range from 0.5 to 3 inches. Generally there is a lack of course woody debris (CWD) on the forest floor in most units also presumably due to the past wildfire history. These levels are relatively low compared to most westside mature forests but they are very typical of mid-seral forests that have grown up after repeated wildfires on the crest of the Cascades. Repeated wildfires are evidenced by the lack of legacy snags or large down logs. Stands that have repeatedly burned and have thin duff and few down logs have lower inherent productivity.

Direct and Indirect Effects

No Action
Forest organic litter input, organic decomposition rates, duff layer development and soil fauna and microbe activity would continue as they are. Organic matter decomposition and nutrient cycling is influenced substantially by temperature and moisture. Organic materials would be subject to natural disturbances such as windthrow, insect outbreaks, fire, and natural climatic change.

Proposed Action
Logs existing on the forest floor would be retained. Skips would be located in areas that would maximize retention of existing down wood. The harvesting operations would also add small woody debris of the size class of the cut trees to the site. This would include the retention of branches, broken logs and any snags that would be felled for safety reasons.

Soil microbial populations would likely be reduced initially in areas of exposed or burned soils until soil organic matter and litter layers build back up. Leaving some slash and needles where trees are felled should help contribute to carbon and nutrient levels.

Duff disturbance would be minimal where over-the-snow ground based yarding occurs.

Cumulative Effects
Past and present features and actions that continue to affect organic matter include wildfires and firewood gathering. It is foreseeable that lodgepole pine trees would be dying over time and falling to create additional organic woody debris. The cumulative effect of the proposed action with design criteria combined with past and present actions would result in approximately 15 tons per acre.

4.7.3 Forest Plan Standards and Guidelines

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-016, page Four-46
See Mt. Hood FEIS pages IV-11, and IV-155 to IV-167
Northwest Forest Plan - Coarse Woody Debris Standards and Guidelines - page C-40
Soil Disturbance Standards and Guidelines - page C-44
Modify Fire and Pesticide Use, Minimize Soil Disturbance Standards and Guidelines - page C44

The project is consistent with the following standards and guidelines.

FW-22 to 23	Cumulative detrimental impacts would be less than 15%.
FW-24	Minimization of rutting would be achieved through the BT6.6 and CT6.6 or similar provisions in the contract.
FW-25	Ground cover would be maintained at the prescribed levels.
FW-28 to 30	Not applicable.
FW-31 to 34	Woody debris would be left on site including existing down logs and branches and trees felled to create coarse woody debris.
FW-037	Many aspects of the project include design features that limit disturbance to the soil's organic horizon.
NFP C-40	Existing coarse woody debris would be retained and levels are consistent with the stage of stand development.

4.7.3.1 Exceptions

An exception to Forest Plan standard and guideline FW-033 is proposed. See section 2.2.2.3 for discussion of exceptions. FW-033 suggests the retention of 25 tons of down woody material per acre on the westside of the Forest and 15 tons per acre on the eastside to provide for long-term productivity. The project area straddles the Cascade Crest with some on the eastside and some on the west. Due to its fire history, the area has relatively low levels of down material. The proposed action would retain all existing down logs and debris on the ground but would remove the tops of harvested trees to the landings for disposal. If these tops were left on site to achieve 25 tons per acre they would obstruct walking and would cover the huckleberry plants. FW-036 describes that it is appropriate to deviate from the prescribed level on sites that naturally produce less dead and down material.

It is estimated that approximately 15 tons per acre would remain after the huckleberry enhancement treatment. This level is appropriate for long-term site productivity in these stands and is consistent with the goal of huckleberry enhancement.

4.8 BOTANY

A biological evaluation has been developed by a botanist to address the potential effect of activities on sensitive species. The objective is to avoid a trend toward Federal listing under the ESA.

This section addresses rare or uncommon botanical species including fungi, bryophytes, lichens and vascular plants some of which are on the Regional Forester's Sensitive Species list. Invasive species are discussed in s. 4.9. The following is a summary of the Botanical Biological Evaluation which is incorporated by reference.

The following actions have the potential to affect rare or uncommon botanical species: actions that disturb soil such as skidding and yarding of logs, temporary road construction, landings, actions that harvest or kill trees and landing creation.

No federally listed endangered or threatened plant species, or plant species proposed for federal listing, are known to occur on the Mt. Hood National Forest (MTH).

Intuitive-controlled field surveys were conducted to protocol for rare or uncommon botanical species in 2009.

No special status or survey and manage botanical species were found in the proposed project area. Surveys to detect the presence of most fungi species are not considered practical because of the variability in fruiting-body production from year to year. Therefore, fungi (other than *Bridgeoporus nobilissimus*) were not targeted during field surveys.

4.8.1 Direct and Indirect Effects

Where field surveys determined the presence of suitable habitat for a particular species of fungi, it was presumed to be present. There are 31 species of rare or uncommon fungi identified as having potential habitat in the project area. For fungi that are on the Regional Forester's Sensitive Species list, the action would have an effects determination of **May Impact Individuals or habitat but not likely to lead to a trend toward federal listing.**

Where habitat is present for rare or uncommon species that were not found during field surveys there is still the potential to alter habitat. There are three species of vascular plants, five species of bryophytes, and 11 species lichens identified as having potential habitat in the project area. For species on the Regional Forester's Sensitive Species list, the action would have an effects determination of **May Impact Individuals or habitat but is not likely to lead to a trend toward federal listing.**

4.8.2 Cumulative Effects

The analysis areas for botanical species for cumulative effects are the huckleberry enhancement units and the areas directly adjacent including riparian reserves. These are appropriate boundaries because actions more than a few hundred feet outside the

unit boundaries would have little or no affect to botanical species within the units, and the actions within the unit boundaries would have little or no affect to species elsewhere. The Biological Evaluation has discussions of the rarity of species across the Forest and Region based on impacts from all past actions and habitat availability.

Botanical species can be affected by actions such as canopy removal, ground based logging systems, fuels treatment, OHV use, and grazing. The project also includes maintenance over time such as brush cutting that could affect botanical species. Because the project is designed to attract people into the area to pick huckleberries, there is the potential for trampling or actual picking of species on the ground such as mushrooms. The design criteria including the retention of live trees, snags, riparian reserves and skips would minimize impacts to rare and uncommon species. The proposed action would not likely contribute substantially to changes to species across their range and it is not likely to lead to a trend toward federal listing.

4.8.3 Forest Plan Standards and Guidelines

Mt. Hood Forest Plan References

Forestwide Threatened, Endangered and Sensitive Plants and Animals Standards and Guidelines - FW-170 to FW-186, page Four-69

The appropriate surveys and analysis has been conducted for sensitive species as described in FW-176.

2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001 ROD) (USDA USDI 2001).

This project complies with the applicable species survey requirements and management provisions; specifically:

- Surveys were conducted to protocol for botanical species.
- No species were found and no species were known to occur in the area prior to surveys.

4.9 COMPETING AND UNWANTED VEGETATION

This section addresses invasive plants and unwanted vegetation. Invasive plants are sometimes called noxious weeds.

Invasive plant management is covered by the 2005 Record of Decision for Preventing and Managing Invasive Plants (USDA 2005) that amended the Forest Plan. The Record of Decision and Mediated Agreement for the "Managing Competing and Unwanted Vegetation" Final Environmental Impact Statement (USDA 1998a) apply to unwanted native vegetation, brush control and fuel treatments.

4.9.1 Introduction

Non-native plants are species that have been introduced either intentionally or unintentionally to areas where they do not naturally occur. Most invasive non-native plants in the Pacific Northwest originate from Europe and Asia. The predators and diseases that control these plant species in their native habitats are not present in the habitats where they have been introduced. Unchecked by predators or disease, such plants may become invasive and dominate a site, displacing native plants and altering a site's biological and ecological integrity. For example, invasive plants can reduce biological diversity, displace entire native plant communities, decrease and degrade wildlife habitat, alter fire regimes, change hydrology, disrupt mycorrhizal associations, alter nutrient dynamics, and increase soil erosion. Invasive plants can also poison livestock and reduce the quality of recreational experiences.

The Record of Decision for the *FEIS for Site-Specific Invasive Plant Treatments for the Mt. Hood National Forest and Columbia River Gorge National Scenic Area* (March 2008) provides guidance for managing invasive plants on the Forest. It identified 208 areas to be treated manually, mechanically, or with herbicides and providing an early detection/rapid response strategy for treating new infestations quickly. None of the 208 priority treatment areas are near the huckleberry enhancement project.

4.9.2 Risk Assessment

The risk level for the introduction or spread of invasive plants/noxious weeds is high for this project. The following species are present in the project area.

Species Name	**Common Name**
Centaurea stoebe (=C. maculosa)	spotted knapweed
Centaurea diffusa	diffuse knapweed
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Cytisus scoparius	Scotch broom
Hypericum perforatum	St. John's-wort
Senecio jacobaea	tansy ragweed

The seven noxious weed species present in or nearby the proposed project area are included in the Oregon Department of Agriculture's (ODA) "A" or "B" List. These species are widely established regionally and management objectives are to control infestations on a case-by-case basis.

4.9.2.1 Spotted and diffuse knapweed populations are located along Highway 26 and Highway 35. The tap-rooted plants displace native vegetation and can form dense populations. The plants' distributions are spotty on the west side of the Cascade Range crest, but on the east side they can form dense populations that exclude native shrubs, forbs, and grasses.

Threats: Displaces native vegetation.

Mode of Establishment: Spreads by seed. Dispersal distances for the seed are short: seeds generally fall within a 3-12 dm radius of the parent plant. Movement over greater distances requires transport by rodents, livestock, vehicles, hay or commercial seed.

4.9.2.2 Canada thistle is a perennial weed distributed on the west side of the Cascade Range crest in areas with previous soil disturbance has occurred: e.g., roadsides, areas where timber harvest has occurred, plantations and manipulated forage openings. It is also present in some areas with little or no disturbance such as wet meadows.

Threats: This plant is a threat to agricultural lands and to native forest biodiversity.

Mode of Establishment: Spreads asexually via rhizomes (underground stems) or by wind, animals, and vehicles.

4.9.2.3 Bull thistle is a biennial weed with a short, fleshy taproot. It is not uncommon in areas with previous soil disturbance including roadsides, plantations, and manipulated forage openings.

Threats: This plant is a threat to agricultural lands and to native forest biodiversity.

Mode of Establishment: Spreads by wind, animals, and vehicles.

4.9.2.4 Scotch broom establishes in open areas with little tree cover and along roadways at low and moderate elevations, mostly west of the Cascade Range crest. Management priorities on the Forest are two-fold: east of the crest, control populations to keep them from expanding, with the long-term goal of eradication; west of the crest, where the species is well-established, active management is considered on a site-by-site basis where there are overriding resource concerns. Bio-control insects are established west of the crest and are relied on to depress Scotch broom infestations where resource concerns are not critical.

Threats: Where broom establishes, it can form a monoculture, outcompeting and displacing native trees, shrubs, forbs, and grasses; delaying forest development; and altering ecologic functioning. The hard, long-lived seed can persist in the soil for up to 75 years.

Mode of Establishment: Scotch broom establishes from seed that may be transported by vehicles carrying soil or plant parts.

4.9.2.5 St. John's-wort is distributed across the Forest along road shoulders, in rock storage areas, in quarries, and in other areas of soil disturbance. Similar to Scotch broom, active management to control or eradicate an infestation occurs when there are overriding resource concerns. Bio-control insects are well established on the Forest.

Threats: While infestations don't result in a great deal of economic harm in forest settings, St. John's-wort displaces native vegetation and can alter ecological functioning.

Mode of Establishment: St. John's-wort establishes from seed that may be transported by vehicles carrying soil or plant parts.

4.9.2.6 Tansy ragwort distribution on the Forest is similar to that of Scotch broom. Bio-control insects are present west of the Cascade Range crest. East of the crest, bio-control insects have not established, due to the colder winters. Management priority in this area is to control and eradicate infestations by manual, mechanical or chemical treatment methods.

Threats: Tansy ragwort is poisonous to livestock, particularly horses. At sites where it becomes dominant, it can displace native vegetation and alter ecologic functioning.

Mode of Establishment: The light seed is dispersed by wind and can be transported in soil on vehicles.

4.9.3 Direct and Indirect Effects

The invasive plants listed above (with the exception of the knapweeds) are common along roadsides, in old landings, in clearcuts, and in other areas with a history of ground disturbance throughout much of the Clackamas River and Zigzag Ranger Districts. Vehicles and heavy equipment can be a major vector for the spread of invasive plants along roads and from roads into forest and forest openings.

The design criteria in s. 2.3.5 would minimize the likelihood that invasive plants would spread: #5 would minimize soil disturbance, #7 would prevent erosion and specifies the use of weed free erosion control methods, and #8 would require the cleaning of equipment and other practices to minimize the spread of weeds.

Other Competing and Unwanted Vegetation

Fuels treatments in thinning projects are exempt from the requirements of the Record of Decision and Mediated Agreement for the "Managing Competing and Unwanted Vegetation" Final Environmental Impact Statement. Slash treatments associated with road construction is included. However the slash, woody debris and root wads that result from the temporary road construction associated with this project would be

temporarily set aside and used to block the road when logging is completed. There would be no burning of this material.

There are some plants such as rhododendron, chinquapin and tree saplings that can compete with huckleberries. There may be some follow-up treatments to hand cut these competing plants to release huckleberries.

This project is consistent with standards and guidelines for competing and unwanted vegetation.

4.9.4 Cumulative Effects

The analysis areas for competing and unwanted vegetation for cumulative effects are the huckleberry enhancement units and the plantations and disturbed areas directly adjacent.

Unwanted species could be spread or introduced by equipment that move from infected areas to uninfected areas. Other actions can exacerbate the situation by introducing seed or making the area more conducive to invasive species and less desirable for native species. These actions include canopy removal, soil disturbance, OHV use, and grazing. Because the project is designed to attract people into the area to pick huckleberries, there is the potential for them to distribute invasive plant seeds on their clothing. The design criteria including the washing of equipment and the use of certified seed and straw for erosion control would minimize the movement of unwanted species.

The 2005 Record of Decision for Preventing and Managing Invasive Plants and the 2008 Record of Decision for Site-Specific Invasive Plant Treatments for the Mt. Hood National Forest and Columbia River Gorge National Scenic Area provide additional cumulative effects discussion across a broader landscape.

4.10 ECONOMICS

One of the dual goals of the Northwest Forest Plan is to provide a sustainable level of forest products for local and regional economies and to provide jobs. The Northwest Forest Plan Final Environmental Impact Statement has an in-depth analysis of the economic basis behind the goal of providing forest products for local and regional economies. It also contains an analysis of the social and economic benefits and impacts of preservation, recreation and other values. The primary purpose of this project is to enhance huckleberries. To accomplish that, trees would be removed to allow more sunlight to the ground. To the extent that timber volume is removed, there would be associated benefits to local and regional economies from the harvest, processing and utilization of wood but there would also be benefits as huckleberries are enhanced and opportunities improve for both subsistence and recreational picking.

Since timber is auctioned to bidders the project must have products that prospective purchasers are interested in and they must have log values greater than the cost of harvesting and any additional requirements.

Alternative A would not provide forest products consistent with the Northwest Forest Plan goal of maintaining the stability of local and regional economies. The proposed action would provide for jobs associated with logging and sawmill operations and would contribute to meeting society's forest product needs. The NFP (p. 3&4-297) contains an analysis of employment in the timber industry.

Based on past experience with projects with similar prescriptions and similar logging systems, it is likely that there would be sufficient value of timber removed to fund this huckleberry enhancement project.

4.10.2 Forest Plan standards and guidelines

Mt. Hood Forest Plan References
Forest Management Goals - 19, page Four-3, page Four-26, See FEIS page IV-112
Northwest Forest Plan Standards and Guidelines page A-1, and FSEIS pages 3&4-288 to 318

The proposed action is consistent with Forest Plan goal to efficiently provide forest products.

4.11 TRANSPORTATION

Roads Analysis is a process of considering landscape-level information before making site-specific decisions about road management. A Roads Analysis has been developed at the Forest scale (USDA 2003). Road management decisions are informed by this Forest-level analysis, and are focused by project-level specific information.

The objective of this project-level roads analysis is to provide information to decision makers so that the future road system can be one that is safe, environmentally sound, affordable and efficient. A project level roads analysis may include topics such as: 1) construction of new permanent system roads, 2) reconstruction or stabilization of existing roads needed for the project, 3) making changes to road maintenance levels, 4) decommissioning system roads, 5) storm proofing, 6) road closures and 7) the construction or reconstruction of temporary roads.

Temporary roads are roads that are built by contractors to access landings and are closed upon completion of logging until they are needed again. They are not considered part of the Forest's system of permanent roads.

Section 4.2 has an in-depth discussion of inventoried roadless areas and undeveloped areas.

4.11.1 Existing Situation

The existing road network is not sufficient to access all of the proposed treatment areas.

In terms of aquatic risk ranking from the Forest-wide Roads Analysis, all of the roads in the project area score as low risk.

Direct and Indirect Effects

4.11.2 Alternative A

With no action there would be no impact to the transportation network.

4.11.3 Proposed Action

Approximately **1.4 miles of existing temporary** roads would be reused. Approximately **4.7 miles of new temporary roads** would be constructed. Roads are shown in the unit maps in Appendix A. These roads would be restored upon project completion. Some of the temporary roads would be restored in a way that leaves a walking trail for huckleberry picking access.

The proposed temporary roads are not in riparian reserves, have no stream crossings and have no hydrologic link to streams (s. 4.6.1.2). These roads would be constructed on gentle slopes.

4.11.4 Cumulative Effects

Roads are being decommissioned across the Forest. Approximately 7 miles have recently been decommissioned in the vicinity of the project. The proposed action would result in little or no direct or indirect negative effect to the Forest's permanent transportation system. Since every project contributes toward maintaining the Forest's road network there would be no substantial cumulative change to roads. Refer to the Forest-wide Roads Analysis (USDA 2003) for a discussion of the transportation system as a whole. An open-road density analysis can be found in the Wildlife section.

4.11.5 Forest Plan standards and guidelines

Forest Plan References

Forestwide Timber Management Standards and Guidelines - FW-407 to FW-437, page Four-95
See FEIS page IV-123

The proposed action is consistent with Forest Plan goal to efficiently provide transportation.

4.12 AIR QUALITY

The following actions have the potential to affect air quality: burning slash, exhaust generated by vehicles, equipment and chainsaws and dust created by vehicles that drive on aggregate surface and native surface roads.

4.12.1 Existing Situation – Air pollution sources in the project area include campfire smoke and wildfire smoke. Air dispersing from the project area toward the areas of concern is generally good to excellent except when prolonged wildfires are burning. Section 2.2.4 has a discussion of past fire history.

4.12.2 Direct and Indirect Effects

Alternative A (No Action) would not change air quality. Fire hazard is a concern in the project area particularly as lodgepole pine trees succumb to mountain pine beetle. Alternative A would result in a trend toward increased risk of wildfire or degradation of air quality.

Proposed Action

For this project, the following actions have the potential to affect air quality:

Exhaust and its pollutants would be created by vehicles and equipment. Dust from hauling on aggregate surfaced roads. Smoke would come from the burning at landings. The removal of tops and other woody material at the landings would be encouraged where feasible. Material that is not removed would be piled and burned at the landings.

Exhaust created by vehicles and equipment would disperse and would not likely cause health concerns for forest users. Dust from log haul would not likely be an issue for this project because the primary haul roads are paved. Local dust may occur in the vicinity of the units for the portions of the project that occur in the summer and may be inconvenient for campers at Summit Lake.

Since implementation would likely be spread out over several years, the burning would also be spread out over several years. Burning has the potential to degrade local air quality for short periods of time. The principle impact to air quality from burning is the temporary visibility impairment caused by smoke to the recreational users. Past experience has shown that air quality declines are limited in scope to the general burn area and are of short duration. The effects to forest visitors would be minimal because burning would happen after the peak recreation season, in the fall (October – December).

Health risk 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 create the greatest health risk. At this size the material can pass normal pulmonary filtering processes and be deposited into lung tissue. Particulates larger than 10 microns generally fallout 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.

4.12.3 Indirect Effects – All 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. Due to the season of the burn, strong inversions are unlikely to develop and hold a dense smoke plume to adversely affect distant residential areas. Since the quantity of burning is minimal and would be conducted when smoke dispersion conditions are favorable to minimize the potential for adverse affects there would be no effect to Class I airsheds.

4.12.4 Cumulative Effects

The following are areas of concern for smoke and pollution intrusion: Portland/ Vancouver metropolitan area, the Salem area, Mt. Hood Wilderness, Bull of the Woods Wilderness, Salmon –Huckleberry Wilderness, Mt. Jefferson Wilderness and the many new smaller Wilderness additions. The analysis area includes a large airshed that incorporates both the west side and east side of the Forest and the area adjacent to the Forest including the Warm Springs Reservation.

In addition to the potential impacts described above, air quality can be affected by actions such as forest fires and controlled burning elsewhere on the Forest, on the Warm Springs Reservation, on private lands and lands managed by other agencies. Field burning, smoke from household wood stoves, smoke from camp fires, motor vehicle exhaust and smoke stack sources from industry also affect air quality.

The proposed action and other projects that involve burning in the airshed would affect air quality but would not likely be experienced in substantial quantities in the Wildernesses or adjacent communities due to the timing of burning as described above. There is a low likelihood of this project contributing to a substantial cumulative effect to air quality.

4.12.5 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.

The analysis above shows that the project would be consistent with air quality standards and guidelines.

4.13 CLIMATE CHANGE

4.13.1 Introduction – A growing body of scientific evidence and climate modeling indicate that climate change is occurring. While there are no specific projections for the project area, the situation would likely be one where the summers are drier and the snow melts earlier in the spring (Bare 2005) (Mote 2003), (Mote 2005), **(**Dale 2001). There are some who believe that climate change is not occurring or that it is not human caused. This document is not intended to present arguments on any of these theories because they are well documented elsewhere.

This project was not specifically designed to mitigate or respond to potential climate change. This section addresses aspects of the project that may affect carbon emission or sequestration and how the project may help or hinder the forest's ability to deal with climate change. This analysis does not attempt to quantify carbon emission or sequestration.

4.13.2 Existing Situation

This project involves the thinning of mid-seral stands to enhance huckleberries. Forest health and growth issues are discussed in section 2.2.4.

4.13.3 Direct, Indirect and Cumulative Effects

This project is not likely to have direct localized effects on climate. By its very nature, the discussion of a project's effect on climate change is indirect and cumulative because the effects occur at a different time and place, and because the scale of the discussion is global. Since it is not reasonable to measure a project's global impact, the discussion here focuses on key elements of forest management discussed in the scientific literature.

For this proposal, the following actions have the potential to affect carbon emissions or sequestration:

- Thinning to enhance huckleberries would have a side benefit of improving the health and growth of the residual stand resulting in trees that are better able to withstand stresses such as dry summer conditions (Millar 2007) (Spittlehouse 2003). The no-action alternative would result in trees that are stressed by moisture competition.

- Variable density thinning with skips and the retention of minor species would result in stands that are resilient and better able to respond to whatever changes come in the future (Millar 2007). The no-action alternative would result in the continuation of crowded stands.

- Fossil fuel is used by equipment such as saws, tractors and log trucks. It is possible for some of this equipment to use biofuels, and it is likely to be used where it is available and price competitive. The no-action alternative would not use fuel.

- Tree tops would be yarded to landings. Operators would be encouraged to remove this material. If it is not removed it would be burned at landings releasing carbon into the atmosphere. If tree tops were left in the stand they would impede access for huckleberry gathering and would result in a high fire hazard situation. The no-action alternative would not have any burning. If woody material is removed and used to generate electricity or to create biofuels, it may result in reduced reliance on fossil fuels to power vehicles or generate electricity (Bare 2005) (IPCC 2007).

- Woody debris retained on the ground increases soil carbon sequestration (Millar 2007). The proposed action would retain existing debris and logs on the ground and would add more as trees are felled to create large woody debris. The no-action alternative would result in stagnation of trees and some would eventually die and fall to the ground.

- Utilizing trees to create long-lived wood products sequesters carbon. The no-action alternative would not create any long-lived wood products (IPCC 2007) (FAO 2007) (Stavins 2005) (Upton 2007). While thinning to enhance huckleberries is the primary objective of this project, it would also result in the removal of logs to make lumber and other forest products. Some feel that on balance the process of harvesting wood and turning it into products may release more greenhouse gases than sequestering carbon in forests by leaving the trees there (Ingerson, 2009). Other literature (Upton 2007) compared the greenhouse gasses emitted and sequestered by wood based housing to alternative building materials and found that wood housing had a lighter impact than the alternatives.

To summarize, the alternatives would result in some carbon emissions and some carbon sequestration. The benefits to forest health and resiliency with the proposed action would allow stands to better respond and adapt to the future climate. The purpose of this analysis is not to resolve debates about climate change. This project was not specifically designed to mitigate or respond to potential climate change and no attempt has been made here to quantify carbon emission or sequestration or to assert that one alternative would emit or sequester more than another.

4.14 HERITAGE RESOURCES

The National Historic Preservation Act (NHPA) and the National Environmental Protection Act (NEPA) both require consideration be given to the potential effect of federal undertakings on historic resources, (including historic and prehistoric cultural

sites). The guidelines for assessing effects and for consultation are provided in 36 CFR 800. To implement these guidelines, in 2004, Region 6 of the Forest Service entered a Programmatic Agreement (PA) with the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP).

Alternative A - No Action

Under this alternative no timber harvesting or other associated actions would be implemented to accomplish project goals. Heritage resources would only be affected by decay and other natural forces that are already occurring. This alternative would have no effect on heritage resources.

Alternative B –Proposed Action

There are several archaeological properties located adjacent to or within units. The sites are old trails and associated features that are no longer maintained but have blazes and sometimes a visible trail tread. The design criteria in s. 2.3.5.9 would result in adequate protection for these sites.

Cumulative Effects

The analysis areas for heritage resources for cumulative effects are the huckleberry enhancement units and the areas directly adjacent including the trails and features that cross in and out of the units.

Heritage resources can be affected by actions such as ground based logging systems, road and landing construction, fuels treatment, OHV use, and grazing. The project design criteria would protect historic trails and blaze trees that mark trails. Because the project is designed to attract people into the area to pick huckleberries, there is the potential for them to damage heritage resources. The proposed action combined with other actions would not likely result in harm to heritage resources.

4.15 ENVIRONMENTAL JUSTICE – CIVIL RIGHTS

Executive Order 12898 directs agencies to identify and address disproportionately high and adverse human health or environmental effects of projects on certain populations. This includes Asian Americans, African Americans, Hispanics, American Indians, low-income populations and subsistence uses. The Civil Rights Act of 1964 prohibits discrimination in program delivery and employment. There are communities with minorities and low-income populations that may be affected by the project. The town of Estacada is 40 miles away. There are no known special places for minority or low-income communities in the area. Individuals may work, recreate, gather forest products or have other interests in the area. Neither the impacts nor benefits of this project would fall disproportionately on minorities or low-income

populations. Directly adjacent to the project is the Confederated Tribes of the Warm Springs Reservation. There are no known areas of religious importance in the area.

Section 2.2.4 describes the use of huckleberries by American Indians. The project has been developed in coordination with tribes. The no-action alternative however would result in continued decline in huckleberry production and would not be consistent with treaty obligations.

No adverse civil rights impacts were identified. There would be no direct, indirect or cumulative effects to environmental justice or civil rights.

4.16 RANGE RESOURCES

4.16.1 **Existing Condition**

The project area has a long history with grazing beginning in the early 1900s. After large fires burned the area, sheep were grazed extensively taking advantage of the abundant forage. More recently, trees grew in and their crowns created too much shade for forage.

Clearcut harvesting created transitory range providing forage on a relatively short-term basis. The forage production can sometimes be substantial for the first 8-10 years following harvest but drops off as the tree canopy shades out the herbaceous vegetation. The most recent clearcuts are beginning to lose forage quality and quantity. The best quality forage is in riparian areas and meadows.

The planning area lies within portions of the Wapinitia and Clackamas Lake Cattle Allotments. Most of the Abbott section is in the Wapinitia Allotment which is active and recently has allowed 100 cow/calf pair each year. The portion of the Power Line section north of the power line is in the Clackamas Lake Allotment but this allotment is currently vacant and has not had any grazing since 1995.

Specific details of allotment management such as pasture movement schedules, range readiness recommendations, utilization limits, range improvement maintenance responsibilities etc., are discussed in the Allotment Management Plans for these allotments. Range improvements within these allotments are a combination of drift and boundary fences, stock watering ponds, spring developments, corrals and cattleguards.

For this project, the following actions have the potential to affect range resources: reducing tree density, increasing ground disturbance by skidding, temporary road and landing construction and the burning of logging debris on landings. Noise disturbance from heavy equipment, chain saws and log haul would be temporary and would cause cattle to move if it occurs during the time of year the animals are present. The presence of huckleberry pickers may also cause a disturbance factor that may displace cattle during the time when berries are ripe.

4.16.2 Direct and Indirect Effects

No Action

No trees would be cut. Forage would continue to decline as plantations age.

Proposed Action

Seed spread for erosion control on skid trails and landings and the reduction of canopy cover would stimulate an increase in herbaceous forage which would potentially improve distribution patterns within the allotments. There would likely by some short term displacement of animals during implementation but the overall affect would be beneficial for range resources.

4.16.3 Cumulative Effects

The analysis areas for range resources for cumulative effects are the boundaries of the grazing allotments. Past and current actions that have affected range resources include timber harvesting, road construction, trail construction, dispersed recreation, hunting, hiking, OHV use, mushroom harvesting, firewood gathering and fire suppression. Deer, elk and cattle eat similar forage species and therefore compete with each other. See s. 4.0.5 for a discussion of energy corridors. There are no other foreseeable actions that would affect range resources.

Neither the proposed action nor other ongoing actions would prevent livestock from grazing. Grazing may improve as forage becomes more readily available and livestock distribution would improve taking grazing pressure off riparian areas. Grazing and huckleberry management are compatible uses of the landscape.

4.17 OTHER

Farm And Prime Range Land
There would be no effect upon prime farmland or prime rangeland. Farm land is not present. Grazing occurs in the project area but would not be detrimentally impacted by the proposed action.

Flood Plains Or Wetlands
No flood plains or wetlands are affected by the proposed action.

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

Productivity
The relationship between short-term uses and the maintenance of long-term productivity: no reductions in long-term productivity are expected. See soils section.

Irreversible and Irretrievable Commitments
The use of rock for road surfacing is an irreversible resource commitment.

5.0 CONSULTATION AND COORDINATION

The Forest Service consulted the following Federal, State, and local agencies and tribes during the development of this environmental assessment:

5.1 FEDERAL, STATE, AND LOCAL AGENCIES

U.S. Fish and Wildlife Service	National Marine Fisheries Service
Oregon Historic Preservation Office	Bonneville Power Administration
Northwest Power Planning Council	Clackamas River Water
South Fork Water Board	Oak Lodge Water Board
Mt. Scott Water District	Bureau of Land Management
Metro	Clackamas River Basin Council
City of Estacada	City of Gresham
City of Lake Oswego	City of Gladstone
City of Oregon City	City of West Linn
Clackamas County	Oregon Department of Transportation
Oregon State Parks	Oregon Department of Forestry
Oregon Department of Fish and Wildlife	Oregon Division of Lands
Oregon Marine Board	Eagle Creek National Fish Hatchery
Environmental Protection Agency	

5.2 TRIBES

Confederated Tribes of Warm Springs
The Confederated Tribes of the Grand Ronde Community of Oregon

5.3 Scoping and Public Involvement

A scoping process to request public input for this project was conducted. A letter describing the proposed project and requesting comments was sent out on September 15, 2009. The Forest publishes a schedule of proposed actions (SOPA) quarterly. The project first appeared in June 2009, and in subsequent issues. Several public field trips were conducted to show folks past enhancement efforts and the proposed treatment units. The legal notice for the 30-day comment period for this project was published in the Oregonian on June 6th 2010. Responses to substantive comments are included in Appendix B. A list of persons and organizations that were sent notice is

in the analysis file along with a list of commenters and the complete text of comments.

5.4 List of Preparers

Jeanne Rice – Ecologist. Graduate of Humboldt State University (1980) in Forest Management, completed the Forest Service silviculturist certification program (1988-1990), and is currently a member of the NW Oregon ecology group (Siuslaw, Willamette, and Mt Hood NFs) assisting forests and leading teams on huckleberry restoration, application of sustainability principles, deadwood condition assessment, fire regime condition class assessment, climate change, forest plan monitoring projects. Jeanne has spent years coordinating the huckleberry dialog with researchers and tribes. She helped develop the June 2008, Northwest Huckleberry Workshop which was sponsored by Confederated Tribes of Warm Springs Reservation, Confederated Tribes of Siletz Indians, Forest Service and Oregon State University Extension Service.

Glenda Goodwyne, - Forester, Certified Silviculturist. Glenda has B.S. Forest Management from Oregon State University, 1985 and an A.A.S. Forest Management from Tuskegee University, 1980. She completed Silviculture Institute at Oregon State University/University of Washington in 1998, and is certified as silviculturist and most recently re-certified in 2003. Glenda has worked as a forester with the Forest Service for 25 years in Oregon, Washington, and California.

Sharon Hernandez - Wildlife Biologist. Sharon graduated from Michigan State University in 1992 with a B.S. in Wildlife Management. She has worked as a biologist for the Forest Service for 15 years in Washington and Oregon.

David Lebo - Westside Zone Botanist, Mt. Hood National Forest. B.A. Frostburg State College; M.A. University of Montana; M.S. University of Washington (forest ecology). David specializes in forest ecology and botany with a particular interest in cryptogamic botany (fungi, lichens, and bryophytes). He has worked for the Forest Service for two decades in Washington and Oregon including a six-year stint as interagency ecologist for the BLM and Forest Service in the Klamath Basin in southern Oregon.

Regina K. O'Brien - Fisheries Biologist. Gina has a B.S. in Fisheries and a B.S. in Zoology from Oregon State University. She's worked for the Forest Service for ten years in Oregon and Idaho.

Jim Roden - Writer/Editor. Jim has a B.S. in Forest Management from Northern Arizona University. He has worked as a forester for the Forest Service for 30 years in Wyoming, California, Idaho and Oregon. He is a specialist in timber sale planning, geographic information systems and economic analysis.

James Rice – Supervisory Forester. Jim has a B.S. in Forest Science from Humboldt State University. He has worked for the Forest Service for 30 years in Southern California, Northern California and Oregon. He was a certified silviculturist in Region 5 and is currently a certified silviculturist in Region 6.

Gwen Collier - Soil Scientist. Gwen has a B.S. in Biology and Environmental Science from Willamette University and a B.S. in Soil Science from Oregon State University. She has worked for the Forest Service for 29 years in Oregon, Washington and Idaho. She is a specialist in soil science and hydrology.

Ivars Steinblums - Forest Hydrologist. Ivars has a B.S. in Forestry from Humboldt State University (1973), and a M.S. in Forest Engineering (Watershed Management) from Oregon State University (1977). He has worked 2 years as a timber appraiser for county government in Northern California, and 30 years as a hydrologist for the Forest Service in California and Oregon.

Susan Rudisill - Archaeological Technician. Susan has worked for the Forest Service for 25 years. She has served as an Archaeological Technician for the Forest Service for 19 years in Oregon. Training: Archaeology at Mt. Hood Community College, Anthropology at Clackamas Community College, Lithic Analysis at The University of Nevada, Reno. She has also received the following training sessions through the Forest Service: Rec. 7, Federal Projects and Historic Preservation Laws.

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