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Forest Service

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Environmental Assessment

Wiley Thin Timber Sale

Sweet Home Ranger District, Willamette National Forest

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ERRATA SHEET

The following changes were made to this Environmental Assessment after the 30-day public comment period.

- Page 16: Additional information about construction of temporary haul roads and skid roads needed by harvest unit within Alternative 2 description.
- Page 18: Revised map of proposed harvest units for Alternative 2 to make the information more readable.
- Page 32-8: Summary of comments from the only letter received during the 30-day public comment period and Forest Service responses to these comments.
- A revised Fish BA replaced the original BA so that more information on the process could be included in the document. The findings did not change.
- Page numbers in the table of contents were changed in response to above edits

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SUMMARY

The Willamette National Forest proposes to commercially thin up to 80 acres of young managed stands in the Wiley Creek watershed. Residual canopy closures would range from 40 to 60%, except a 1.4 acre unit dominated by mistletoe-infected western hemlock. Residual canopy closure in the 1.4 acre unit would be 30%. The project area is composed of isolated parcels of public land south of US Highway 20 and west of the main Willamette National Forest boundary on the Sweet Home Ranger District, Oregon.

This action is needed to restore healthy stand development in managed stands and to help meet annual timber targets assigned to National Forests through the budgeting process. Selected managed stands were chosen because their stocking levels are too high for optimal tree growth and healthy stand development, and selected trees for thinning were of merchantable size for sale.

Through heavy competition for light, water, and nutrients, current stocking levels are slowing tree growth rates, shrinking crown ratios, suppressing understory plant communities. Left untreated, current stocking levels will likely increase mortality in the overstory over the next 20 years. Increased mortality would elevate fuel loading and the risk of substantial stand damage from future fire starts (natural or man-caused).

Proposed thinning will reduce competition effects on stand development and anticipated increases in fuel loading, and ultimately improve terrestrial and aquatic wildlife habitat qualities. This proposed action will also provide wood products for local and regional markets. This action will mitigate but not eliminate the potential spread of unwanted vegetation (noxious weeds) on treated public lands. A risk is associated to the effectiveness of these actions.

In addition to the proposed action, this analysis evaluated the following alternatives:

- The “No Action” Alternative which forgoes stocking level changes through thinning.

No other action alternatives were evaluated due to the project’s small scale, a lack of resource issues to create substantive contrasts in project objectives, the project team’s ability to reach consensus on the proposed action and mitigate project effects, and no expressed alternatives identified during scoping. Only one letter from ONRC was received during scooping and it supported thinning of managed stands.

Based on the analysis in this document, the responsible official will decide whether to complete the proposed action or chose the “No Action” alternative. The decisions in the proposed action include:

- What residual stocking levels to retain,
- What parts of units will be thinned,
- What harvest systems to use,
- Whether fuel reduction measures will be completed,
- What mitigation measures are needed to protect resources, and
- What sale area improvement projects may be implemented and the priority for funding these projects.

CHAPTER 1: INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the *direct*, *indirect*, and *cumulative* environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- *Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Comparison of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences and outputs 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 issues described in Chapter 2. Each section contains the affected environment, followed by issue effects for the No Action Alternative and other alternatives.
- *Agencies and Persons Consulted:* This section provides a list of specialists and agencies consulted during the development of the environmental assessment.
- *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 Sweet Home Ranger District Office in Sweet Home, Oregon.

Background

Managed stands proposed for thinning were previously regeneration harvested between 1955 and 1965, and planted with a mix of conifer seedlings. Three of the four stands were pre-commercially thinned when planted trees were 10-15 years old. Current stocking levels in the four stands range from 150 to 350 trees per acre with patchy distribution due to site conditions and natural hardwood competition. Stocking levels for these stands should be lowered (70 to 100 trees per acre) to reduce competition for light, water and nutrients, accelerate tree growth and improve stand vitality over the next 20 years.

The Willamette National Forest Land and Resource Management Plan as amended (hereafter referred to as the **Forest Plan**) assigned a Matrix - General Forest Management Area (MA-14a) allocation to three (units #2, 3, and 4) of the four stands. This allocation has a primary management objective of producing wood fiber. The fourth stand (unit #1) lies within the Wiley Late-Successional Reserve (LSR) with primary objectives of protecting existing late-successional habitat and accelerating the development of late-successional habitat from early-mid and mid-seral conditions (Mid-Willamette LSRA, page 171). Reducing current stocking levels in all four stands is compatible with

management objectives for Matrix and LSR management areas when designed to increase tree growth and stand vitality (Forest Plan IV-227-30; Northwest Forest Plan Record of Decision Standards and Guidelines B-6, C-22, C-39, and D-8). The Mid-Willamette LSRA affirms Northwest Forest Plan Standards and Guidelines by encouraging young stand thinning when designed to enhance future late-successional habitat conditions (LSRA, VI-71).

A March 2004 Record of Decision amended the Northwest Forest Plan by removing its Standards and Guidelines that define Survey and Manage Mitigation Measures. This decision was supported by analysis in the 2004 Final Supplemental Environmental Impact Statement (FSEIS) to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDI, USDA 2004a).

In response to this decision, the Agencies reviewed the 296 Survey and Manage species to determine their eligibility for inclusion in existing Special Status Programs. Based on that review, 152 of the 296 Survey and Manage species are eligible for inclusion in one or more of the Agencies' existing Special Status Species Programs. The only former Survey and Manage Species found in the project area and reclassified as a Special Status species will be protected with buffers.

Riparian Reserve Management Areas are also located within all four stands. Thinning of Riparian Reserves is appropriate when located and designed to advance the needs of riparian-dependent species and attainment of Aquatic Conservation Strategy Objectives for the Wiley Creek watershed. Riparian Reserves for this project are defined as 172 feet on either side of stream channels (344 feet total width) showing annual scour and deposition. Thinning in this project may occur in selected riparian reserves up to 25 feet on each side of established channels.

The 40,577 acre Wiley Creek subwatershed is approximately 90% private forest lands, 7% urban or rural residential, and 2% public forest land(South Santiam Watershed Assessement, 2000). Some stage of forest habitat covers 97.9 % of the forest lands. Private forest lands are heavily managed for timber products and well roaded. Average road density is approximately 2.05 miles per square mile for the entire subwatershed.

More than 99% of private forest lands in this subwatershed have been harvested previously and current private management practices can be expected to thin or regeneration harvest 15-20% of these lands every decade. These companies are commercial thinning 30-50-year old plantations on gentler ground to capture mortality and further maximize harvest returns. Under this management strategy, few acres of private forest land in the Wiley subwatershed will ever reach 80 years of age.

By contrast, public lands in this subwatershed comprise only 1400 acres in four scattered National Forest parcels and 130 acres in four scattered Bureau of Land Management parcels. About 65% (914 acres) of this National Forest land and all of the Bureau of Land Management lands have been harvested and replanted. The remaining 486 National Forest acres not harvested can be classified as mid- and late seral forest habitat. Much of this older natural habitat is currently reserved from timber harvest within the Wiley LSR.

Purpose and Need for Action

The Sweet Home Ranger District presently has over 17,000 acres of managed stands over 30 years old. An estimated 1,000 acres will be growing into this category each year for the next 20 years. These acres were originally planted at high densities because managers assumed they would be thinned in the future. Reducing stocking levels is needed on many of these acres to maintain stand vitality and improve tree growth as these stands mature.

The purpose of this project is to reduce stocking levels in overcrowded managed stands and offer timber products to regional markets through timber sales. Commercial thinning is the proposed method for achieving these purposes. Thinnings in managed stands would be designed to meet management objectives for LSR, Riparian Reserve and Matrix management allocations.

Stand acres selected for the Wiley Thin project are overstocked and losing growth potential and overall stand vitality. Overstocked conditions are also suppressing understory habitat development in many areas. Natural mortality rates will likely increase over the next 20 years given current stand conditions. Increased mortality would raise forest fuel levels, particularly in fuel classes less than 9 inches, which increases the risk of high-intensity wildfire traveling quickly across the landscape.

This project responds to LSR management objectives (ROD, Attachment A, page B-1) by moving young stand development (unit 1) more quickly toward late seral conditions and reducing risks of large scale disturbances by removing anticipated fuel accumulations. Thinning can also help achieve future late seral habitat conditions by retaining species diversity in the residual overstory. Many older plantations have little species diversity in their overstories. Reducing stocking levels with thinning also responds to goals and objectives in the Forest Plan and moves the other three of the units (#2, 3, 4) towards desired future conditions (Forest Plan, page IV-227) for Matrix lands.

Riparian Reserves account for 45-65% of managed stands on the Sweet Home Ranger District. In order to restore historic conditions in these reserves several factors are needed: large wood, conifer canopy for shade, and aquifer storage areas. This project helps develop large wood and conifer canopy for shade. Thinning increases growth rates toward larger diameter trees and improves the canopy depth of residual trees for riparian shade. Recruitment of large wood in stream channels helps aquifer storage areas to develop by storing sediment in channels.

This thinning project also helps the Sweet Home Ranger District meet annual wood fiber targets assigned through the budgeting process. Sweet Home Ranger District is responsible for harvesting approximately 10-12,000 CCF (hundred cubic feet) per year depending on budget. Thinning older managed stands is a viable practice for meeting such timber targets.

Proposed Action

The Forest Service proposes to commercially thin approximately 80 acres of Matrix, Riparian Reserve, or LSR lands with harvest methods that are cost effective and

responsive to ground conditions and resource needs. Thinning is anticipated to yield up to 2250 CCF in timber volume. Harvest would require no construction of new, permanent roads however, some road maintenance work would occur to permit safe harvest operations. Thinning prescriptions would be designed to address different management objectives for Matrix, Riparian Reserve, and LSR management areas.

Decision Framework

Given the purpose and need, the District Ranger (deciding official) will review the proposed action and other alternatives to compare their attainment of purpose and need within the framework of the Forest Plan. The Deciding Officer will use this comparison to select the action alternative or the "No Action" alternative. Decisions on the following items will be made, if an action alternative is selected:

- Unit acres to thin, and residual stocking levels (% canopy closure) to leave,
- Harvest methods and transportation system needs,
- Mitigation measures to meet Forest Plan Standards and Guidelines, and
- Opportunity projects to accomplish with Knutsen-Vanderberg Act funding.

Public Involvement

This proposal was first listed in the Schedule of Proposed Actions in August 2002. A Project Initiation Letter was sent in January 2003 to interested publics and agencies on the District's NEPA mailing list.

Only one letter from Oregon Natural Resources Council (ONRC) was received during project scoping. ONRC's letter generally expressed support for thinning managed stands when thinning is designed to meet Forest Plan goals and objectives, and did not involve road construction. The letter supported variable density thinning in LSR's and use of thinning in Riparian Reserves to create larger trees for shade and down wood. This letter was shared with the project IDT during initial scoping.

Issues

Scoping with the public and the other agency contacts, as well as internal scoping, helped the Forest Service identify issues associated with the proposed action.

Significant issues are further defined for each project and often used to develop alternatives to the proposed action. Non-significant issues, some of specific concern to the public or associated with Forest Plan standards and guidelines, are mainly addressed by mitigation measures. These mitigation measures are typically common to all action alternatives. Non-significant issues, which are important to list but will not have a significant effect on the human environment but are required to be addressed will either not be analyzed beyond this chapter or addressed in the Environment Consequences chapter.

The Council on Environmental Quality (CEQ) NEPA regulations require this issue delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…"

Significant Issues

Through scoping (internal IDT discussions and external responses) the Forest Service identified a number of issues potentially created by implementing the proposed action. None of these issues proved substantial to where project effects could not be eliminated or minimized through project design or mitigation measures. Therefore no identified scoping issues for this project were considered significant.

Non-Significant Issues

A number of identified issues were dealt with through project design and mitigation measures. All of these issues would be treated the same across any developed action alternatives. Some of these issue statements are standard discussion items for Forest Service projects, but are not relevant to this particular project.

Hydrologic Resources: Wiley and Little Wiley Creeks influence downstream beneficial users (domestic water supply) and anadromous fish (spring Chinook and winter steelhead). Therefore, projects in this watershed must assess cumulative effects on hydrologic resources, specifically with regard to influences on stream channel stability, sediment levels and water temperature in downstream waterways. Project actions that could influence these conditions include: localized ground disturbance in or near riparian reserves, loss of vegetation in riparian reserves or unstable areas, road construction or reconstruction, and heavy truck traffic during the rainy season on gravel roads paralleling the two main river channels.

This particular project would reduce vegetative cover, create minor ground disturbance within riparian reserves, and generate truck traffic next to the main Wiley Creek channel. Criteria to describe project effects on hydrologic resources will include change in Aggregate Recovery Percent (ARP), miles of perennial stream channels next to haul routes, and twice the number of truck loads hauled along on these adjacent routes. Acres of intermittent stream reserves proposed for thinning can also be used to assess the scale of project effects on hydrologic resources.

Anadromous Fish Habitat: Both winter steelhead and spring Chinook spawn in Wiley and Little Wiley Creeks, though steelhead will travel further upstream to spawn. Logging vehicle traffic on existing road systems could affect downstream fish habitat by increasing sediment loading into Wiley and Little Wiley Creeks. Road ditches and outlet culverts provide pathways for generated sediment loads to enter the stream system. Increased sediment from road traffic is most likely where haul routes parallel main creek channels. Two main access roads for this project travel close to segments of the Wiley Creek channel possessing potential spawning habitat or cross over perennial stream channels that flow directly into Wiley Creek. Pulses of sediment from road use are most likely during wet weather months (November to May). Increased sediment flows are most harmful to anadromous fish spawning habitat during peak spawning periods (January to April). Risk of this project affecting spawning habitat through increased sediment will be expressed as twice the number of log truck loads on gravel roads close to potential anadromous habitat.

Unwanted Vegetation: Executive Order 13112 requires that noxious weeds and their spread be addressed in Environmental Assessments. Non-native, competing plant species

(hereafter referred to as *noxious weeds*) have benefited from ground disturbance and vegetation loss from past timber harvest and become well established on private and public lands in the Wiley watershed

Thinning in this project has the potential to further enhance conditions for noxious weed spread by creating exposed soil, increasing light to the forest floor, and moving seeds (or vegetation) into thinning units with harvest equipment, haul vehicles or gravel. False broom (*Brachypodium sylvaticum*) in units 1 and 4 creates the greatest concern for weed spread from this project. Risk of weed spread will be expressed for this project as number of acres of exposed soil from ground disturbance, and number of acres thinned below 60% canopy closure.

Edge Effects on Late-Successional Habitat: Previous studies have described the effects of regeneration harvest or new road construction on adjacent interior late-successional habitat (Chen, 1999). These microsite effects (eg. changes in light penetration, air temperature, wind velocity and/or relative humidity) can influence habitat conditions favored by old-growth dependent species. Additionally, edge effects can take the form of increased windthrow or sunscald mortality of edge trees, and increased understory competition from noxious weeds or early seral species.

While edge effects have been well connected to regeneration harvest edges, only recently have studies begun to examine site effects from different thinning densities on adjacent late seral stands. One study looked at thinning effects on microsite conditions within riparian reserves and found little effect (Chan, 2000). Logic suggests however, that reducing the overstory densities of young stands influences solar light penetration and wind currents to the forest floor. These edaphic changes may extend into adjacent late-successional forests, though how far or to what extent has not been well-enough studied in northwest forests.

This project has the potential to create edaphic changes in late seral habitat adjacent to units 1 and 4. No-harvest buffers were subsequently established along these two habitat boundaries to mitigate potential thinning effects. Therefore edaphic changes on late seral habitat from thinning were determined to be a non-significant issue and will not be discussed further.

Windthrow Damage: Loss of overstory trees in units next to clearcut harvest boundaries can occur during storms with heavy winds. The extent of loss is related to local soil moisture, wind direction and velocity, size of harvest openings, slope position, and stem density of the exposed forest edge.

This project could influence windthrow potential along property boundaries by reducing stem densities in proposed thinning units. The northern boundary of unit 2 and western ridgeline of unit 3 were determined to possess greater potential for windthrow due to anticipated harvest on neighboring private lands in the near future. A higher residual canopy closure (60%) has been prescribed within 100 feet of these two unit boundaries to mitigate future windthrow potential. Because of this prescribed mitigation measure and the scale of effect, windthrow damage was determined to be a non-significant issue.

Northern Spotted Owl: Thinning in this project has the potential to modify useable habitat for the northern spotted owl. Late seral forest is superior habitat and preferred by

spotted owls over other habitat (Thomas et al. 1990). Suitable owl habitat potentially serves the nesting, roosting or foraging needs of spotted owls. Dispersal-only habitat is generally younger than suitable habitat, but has at least a mean 11-inch diameter in the overstory layer and 40% canopy closure. Proposed units 1 and 4 are adjacent to blocks of late seral forest conditions that can be classified as suitable habitat for northern spotted owls.

All four thinning units possess high canopy closures and are considered owl dispersal-only habitat. Proposed thinning could degrade owl dispersal-only habitat by altering its quality without changing its functionality. Habitat quality would be altered when canopy closure is reduced below 60%. Habitat functionality would be changed if canopy closures dropped below 40 percent.

Proposed thinning operations can affect owls in adjacent habitat during the nesting season (March 1 to September 30) through noise disturbance above ambient levels within 0.25 miles (0.5 miles for aircraft and 1.0 miles for blasting) of a nest site. One pair of owls (#4463) near unit 4 and a lone male owl in LSR near unit 1 have responded to calling, though the single male has not been located. Surveys in 1999 confirmed that the owl pair #4463 had successfully reproduced in the area.

Formal consultation with the U.S. Fish and Wildlife Service for this project was completed and recommendations in the 2003 Biological Opinion will be followed during timber harvest operations. Spotted owl surveys will continue in 2004 and any located active nest tree(s) will help direct the timing of logging operations outside of the prime nesting season. Because standard mitigation measures will be followed during project operations, and this project received a "not likely to adversely affect" determination in the 2003 Biological Opinion, this issue was viewed as non-significant. Modification of habitat conditions will be used to describe project effects on northern spotted owls.

Big Game Habitat: Habitat within proposed thinning units is currently thermal cover for big game based on average canopy closures and stand heights. Thinning prescriptions will likely enhance tree growth and stand development to improve thermal cover quality over the long term, and have little habitat impact over the short term. Due to limited public land within the Little Wiley and Lower Wiley subwatersheds, Forest Plan objectives for big game are not applicable in these subwatersheds. This issue was viewed as non-significant and will not be addressed further.

Threatened, Endangered and Sensitive Plant Species: No threatened, endangered, or sensitive plants were located in or adjacent to proposed units. However, a population of sensitive plant species (tall bugbane, *Cimicifuga elata*) is located down-slope from unit #4 which has a large population of false brome *(B. sylvaticum).* Thinning boundaries in unit 4 have been modified to inhibit the spread of this noxious weed toward the known tall bugbane population. This harvest buffer has mitigated this potential project effect and made it a non-significant issue. This issue will not be discussed further.

Sensitive Wildlife Species: Seventeen Region 6 sensitive wildlife species were evaluated to determine if they or their habitat could be impacted by this project. Habitat conditions were found in the planning area for five species (Baird's shrew, Pacific shrew, Pacific fisher, Oregon slender salamander, and Cascade torrent salamander). These species are described in the Biological Evaluation (Appendix C). Habitat for the other

eleven species was not found in the planning area. Habitat and disturbance effects by this thinning project were determined to be minor and short-term, and therefore non-significant.

Bats: Sites commonly used by bats for roosting and hibernacula include caves, mines, snags and decadent trees, wooden bridges and old buildings. Provisions for retaining large snags and decadent trees are defined by Forest Plan Standards and Guidelines. Such large snags and decadent trees will be retained in proposed thinning units. No other bat habitat was found in the planning area. This non-significant issue will not be discussed further.

Migratory Birds: On January 10, 2001, an executive order was signed to protect migratory birds. One of the purposes of the order is to ensure that project planning evaluates project effects on migratory birds. A total of 85 neotropical bird species are recognized as using a variety of habitat types on the Willamette National Forest. Species most likely to occur in the Wiley thinning units are associated with mid-seral, closed canopy forest habitat. Habitat changes from this project are expected to favor as many neotropical species as it negatively effects. Seasonal restrictions designed for northern spotted owl nesting should also minimize project disturbances to nesting neotropical birds. This issue was determined to be non-significant.

Management Indicator Species: Forest planning regulations require the management of wildlife habitats to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (Willamette National Forest Land and Resource Management Plan 1990, FEIS III-69). Management Indicator Species (MIS) selected in the Forest Plan to facilitate management of all species are summarized in the Table 1.

Table 1: Management Indicator Species

Indicator Species	Habitat Feature	Selection Criteria
N. Spotted Owl	Old-growth and mature conifers	Ecological Indicator; Federal Register List of TE&S species
Pileated Woodpecker	Old-growth and mature conifers	Ecological Indicator
Marten	Old-growth and mature conifers	Ecological Indicator
Elk	Winter range	Commonly hunted
Deer	Winter range	Commonly hunted
Cavity Excavators (Woodpeckers)	Dead and Decaying trees	Ecological Indicator
Bald Eagle	Old-growth conifers near large bodies of water	Federal Register List of T&E species
Peregrine Falcon *	Cliff nesting habitat near abundant prey	Federal Register List of T&E species
Anadromous Fish	Water quality	Commonly fished
Resident Fish	Water quality	Commonly fished

* *Recently downlisted to "Sensitive" status*

Effects to these species will be covered by other issues in this document. Effects to Marten are discussed under the issue of edge effects on late successional habitat. Effects on cavity excavators are discussed under the snag and downed wood habitat. Field surveys did not find habitat for Peregrine falcons or bald eagles in the project area.

Snag and Down Wood Habitat: Dead and dying trees (snags) and down wood are important structural components of forest communities and are used by wildlife species in a variety of ways (eg. pileated woodpecker). In forests of western Oregon, snags are used by nearly 100 species of wildlife, of which 53 species (39 birds and 14 mammals) are cavity dependent (Brown 1985). Down wood also contributes structure and habitat diversity for a variety of terrestrial and aquatic species, as well as cycling minerals and nutrients into the soil.

Forest Plan Standards and Guidelines require retention of snags and down wood within harvest units. Snags shall be retained at the minimum 40% level (1.5 snags per acre for low elevation forest) of the potential population of primary cavity excavators (FW-122) and down wood should be retained at a minimum 240 linear feet/acre (FW-212 & 213). The amount of down wood required can be adjusted down for partial harvest areas to reflect the timing of stand development cycles. Down wood already existing in the units should be retained and protected from disturbance during harvest activities to the greatest extent possible.

Distribution, size, and quality standards for snags and down wood are identified in the Forest Plan. Additional direction for the retention of snags and down wood in Late-Successional Reserves is outlined in the Mid-Willamette LSR Assessment (USDA, USDI. 1998). Recently, the DecAID model has become a popular tool for providing watershed-scale scenarios for snag and down wood habitat components (Marcot, et al. 2002). DecAID was briefly used for this project to describe down wood levels may have existed in the Wiley Watershed prior to forest management activities.

Most of the watershed is private timberland that has been harvested at least once in the last 80 years. Only 2.0% of the Wiley Creek watershed is managed by public agencies. Most private lands have few large snags and down wood. Managing snag and down wood components on public land in this watershed will have little ability to mitigate habitat effects from private land management, and should focus on stand-level needs. Silviculture treatments in the Wiley LSR should be designed to move early-mid seral stands toward late seral habitat conditions (USDA, USDI. 1998, pp 117-120) and may create higher levels of snags and down wood than treatments on Matrix lands. ;

Forest Plan standards will be followed to enhance snag and down wood habitat to mitigate past harvest activities on public lands and to accelerate stand development trajectories. Mitigation measures to protect existing snag and down wood habitat and to create additional habitat make these habitat components a non-significant issue for this project.

Former Survey and Manage Species: Surveys were conducted for these species in accordance to established regional protocols, and protection measures are developed for each located site using published management recommendations and professional judgment. The following categories and information discuss survey results relevant to this project.

Species are categorized by their rarity and type of survey required, as follows:

- **A** – Rare species. Pre-disturbance surveys are practical - Manage all known sites, conduct pre-disturbance and strategic surveys.
- **B** – Rare species. Pre-disturbance surveys are not practical - Manage all known sites, conduct strategic surveys.
- **C** - Uncommon species. Pre-disturbance surveys are practical - Manage high-priority sites, conduct pre-disturbance and strategic surveys.
- **D** - Uncommon species. Pre-disturbance surveys are not practical - Manage high-priority sites, conduct strategic surveys.
- **E** – Rare species for which the status is undetermined - Manage all known sites, conduct strategic surveys.
- **F** – Uncommon species for which the status is undetermined - Conduct strategic surveys only.

Surveys to determine presence for mollusk species *Pristiloma articum crateris* and *Megomphix hemphilli* were completed in 2001 - 2002. *M. hemphilli* was found in several locations within units 3 and 4, but this species was subsequently dropped from the list. Surveys for red tree voles (*Arborimus longicaudus*) or great gray owl (S*trix nebulosa*) are not required. Specific mitigation measures for great gray owls require a 300 foot no-harvest buffer around meadows and natural openings.

Surveys also discovered two Survey and Manage lichen species in proposed units. *Leptogium cyanescens* is a minute blue-grey to black lichen that grows on the bark of trees and shrubs, especially big leaf maple (*Acer macrophyllum).* The other species, *Ramalina thrausta,* was also dropped from the Survey and Manage species list. Table 2 describes survey results by thinning unit to species still on the list.

Table 2: Survey and Manage Species by Unit

Unit	Species	Category	# Sites
1	Leptogium cyanescens	A	2
2	None	--	--
3	None	--	--
4	None	--	--

Persistence and spread of *L. cyanescens* may be threatened by timber harvest, post-harvest windthrow of growing substrate, changes in microsite conditions or epiphyte ecology, or increased competition from other epiphytes that favor more open stand conditions. Because *L. cyanescens* favors sheltered hardwoods, removing hardwoods (particularly *A. macrophylum*) in unit 1 could impact known communities of this species. Protective buffers have been placed around known populations to help maintain their presence. Thinning overstory conifers could facilitate the future spread of *L. cyanescens* by increasing hardwood understory communities, though too much light to the forest floor could increase competition from other epiphyte species. This issue was determined to be non-significant due to prescribed mitigation measures for the two known sites, and will not be discussed further.

Recently, a Record of Decision (USDA. 2004) was signed that modified management direction for protected Survey and Manage Species. Under this new direction, many species no longer require protection within this project area, and others will continue to

be protected under the Region's Sensitive Species program. The two sites of *L.cyanescens* will continue to be buffered for this project. Mitigation measures to protect this species make this a non-significant issue.

Heritage Resources: Surveys were completed within all four thinning units in accordance with the Forest Inventory Plan and State Historic Preservation Office (SHPO) standards. No heritage sites were encountered. Unit 1 is adjacent to the Doe Mountain Special Interest Area, which was established in the Forest Plan to protect known heritage resources. No project activities will occur within this special interest area. Standard mitigation measures to protect heritage resources will be followed if heritage resources are discovered during project implementation, in compliance with the National Historic Preservation Act (NHPA). This issue will not be discussed further.

Fuel Loading: Competition for light, space and nutrients creates natural mortality in overstocked mid-seral stands over an extended period. Natural mortality in such stands creates pulses of increased fuel loading on the forest floor of material less than 20 inches diameter. Such fuel loading increases the risk of stand-level damage from natural or man-caused fire starts. Proposed thinning of mid-seral plantations accelerates stocking level reductions that would naturally occur and removes much of the larger fuels that would elevate the risk of stand-level damage from fire starts. Thinning however, creates short-term increases in fuels less than 9-inch diameter. High levels of small fuels allow fire starts (natural or man-caused) to travel quickly across landscapes and build enough intensity to kill overstories.

Fortunately, the project area is generally closed to public access for much of the year which removes the risk of human-caused fire starts. By moderating thinning prescriptions, using logging slash on skid roads to protect soils, and treating high concentrations of fuel in units, this project makes fuel loading a non-significant issue. Estimated tons of created fuel by diameter classes will be used to describe project effects on fuels.

Soil Resources: Harvest activities have potential for creating short-term and localized soil impacts, including displacement, compaction, nutrient loss, and instability. Proposed thinning units generally occur on gentle and stable terrain with productive soils, and most acres will be thinned by ground-based systems. A section of steeper ground in unit 2 will require cable yarding to avoid soil impacts from ground-based operations. Soil compaction in skid trails from previous regeneration harvest operations with tractors was estimated after field transects to range from a low of 5-8% for unit 3 to a high of 11-13% of acres for unit 1.These estimates assumed all skid trail acres were compacted.

Low risk soil conditions, avoidance unstable areas, use of existing skid trails and yarding corridors, and subsoiling compacted sites after operations combine to make potential project impacts to soil resources a non-significant issue. Estimated acres of landings and skid trails used during this thinning will be used to describe project effects on soil resources.

Recreational Fisheries: Riparian reserves are established to meet watershed objectives specified in the Aquatic Conservation Strategy Objectives, which include maintaining or enhancing in-stream habitat conditions. Field surveys found no fish species in stream reaches flowing through proposed harvest units. Project effects on fish species are

discussed above under Anadromous Fisheries. This project will meet the intent of Executive Order 12962 regarding Recreational Fisheries. This issue will not be discussed further.

Environmental Justice in Minority Populations and Low Income Populations: Federal agencies are directed to address effects accruing in a disproportionate way to minority and low-income populations (Executive Order #12898). The closest population centers to the project area are the Cities of Sweet Home (population 7000) and Detroit Lake (population 400). These towns are approximately forty miles west and twenty miles north, respectively, of the South Pyramid planning area. Both communities contain some low-income people and minority persons. No disproportionate impacts to the citizens of these cities are anticipated. All contracts offered by the Forest Service are available to all interested parties and contain Equal Employment Opportunity requirements**.** This issue will not be discussed further.

CHAPTER 2: ALTERNATIVES (INCLUDING THE PROPOSED ACTION)

This chapter describes alternatives considered for the Wiley Thin Timber Sale, including maps. This section describes differences between alternatives that provide a basis for review by the decision maker and the public. Most comparative information in this section is based on project design (e.g. silvicultural prescriptions, number of units). The decision maker uses this information with information in the environmental consequences section (e.g. water quality effects, habitat changes, economics) to make an informed decision.

Alternatives to the proposed action are largely driven by significant issues which create a need to look at different options for meeting the project's purpose and need for action. Because of the scale and simplicity of this thinning project, the IDT did not identify significant issues and defined mitigation measures to non-significant issues that would be similarly applied to action alternatives. As such, this project IDT did not see a need to define alternatives to the proposed action.

Alternative 1: *No Action*

Under the No Action alternative, no commercial thinning will occur at this time in any of the four proposed units. Resource enhancement opportunities through the KV Authorization would not be funded by this project.

Alternative 2: *Proposed Action*

Commercial thinning will occur in 4 units (approx. 80 acres) within LSR, Matrix, and Riparian Reserve lands in the Wiley Creek watershed. Harvesting will be performed with ground-based and cable logging systems using existing road systems and short skid roads. Skid roads will be ripped, seeded and blocked where necessary after logging operations. Thinning these 4 units is expected to produce approximately 2250 CCF in timber volume.

Stand densities will be thinned to 40-60% average residual canopy closures and implemented to meeting Forest Plan Standards and Guidelines for protecting resources (see mitigation measures below). Residual canopy closures on treated acres may vary to meet site-specific objectives.

- Unit 1 will retain 50% canopy closure to meet LSR objectives.
- Unit 2 will retain 50% canopy closure to minimize windthrow along its private boundary lines.
- Unit 3c will be thinned to 60% residual canopy closure to minimize future windthrow on its westerly edge.
- Units 3a, b,& d will be thinned to 40% residual canopy closure to maximize future growth potential of residual trees on Matrix lands.
- Unit 4a will be thinned to 60% residual canopy closure to deter the spread of existing false brome in the understory.
- Unit 4b will be thinned to 40% residual canopy closure to maximize future growth potential of residual trees on Matrix lands.
- Unit 4c will be thinned to 30% residual canopy closure to remove mistletoe-infected western hemlock, and under-planted with western redcedar, Douglas-fir, and western white pine seedlings.

Tree marking guidelines will retain minor overstory species (western hemlock and western redcedar) in all but Unit 4c to retain existing species diversity. Hardwood concentrations will not be thinned to retain current habitat conditions in big-leaf maple communities.

Stand densities will be 60% canopy closure for thinned areas of intermittent stream riparian reserves beyond the 25-50 foot no-harvest buffers along defined channels. Full retention buffers will be created along any perennial stream channels to ensure stream temperatures are maintained at current or lower levels. Buffers will extend up to 172 feet from either side of perennial stream channels.

Approximately 1200 feet of temporary haul road will be created in Unit 2 and 700 feet of temporary haul road reopened in unit 1 to facilitate logging operations. Haul roads will be native surface and used by log trucks to access small landings.

In addition, ground-based logging operations will need to reopen 3600 feet of skid trails within the four units. Skid trails will be native surface and used by processor-forwarders

Unit 1 - 1200 feet of skid trails
Unit 2 - 1200
Unit 3 - 2000
Unit 3 - 1000

Road maintenance (brushing, ditch clearing) of existing system roads will occur to meet OSHA requirements for safe working conditions for log truck drivers, and to protect existing transportation resources.

No-harvest buffers (100 feet) will be established along adjacent late-successional habitat blocks possessing interior habitat to mitigate potential microsite changes resulting from thinning in units.

No-harvest buffers (172 feet) will be established around known *Leptogium cyanescens* sites in Unit 1.

Mitigation measures listed below will also be implemented during or after harvest operations to minimize or prevent resource effects from harvest operations.

The unit boundary in the northwest quarter of unit 4a will occur at the slope break and logging equipment will not operate within 50 feet from this slope break, in order to discourage the spread of false brome downslope toward *C. elata*.

Tops from harvested trees will be placed in skid roads to buffer soils from compaction by processor and forwarder equipment. Handpiling may be used in areas of high fuel concentrations for burning. Underburning may also be exercised if post-harvest surveys demonstrate a need and the risk of damaging residual trees is determined to be low.

Snag and down wood components will be created from large standing live trees after harvest operations using K-V funding. These habitat components are further defined under Mitigation Measures and in Appendix E.

Resource enhancement opportunities through the K-V funding program and their funding priority are described in detail in Appendix E.

Table 3: Proposed Harvest Units for Alternative 2

Unit (1)	Harvest Prescription -Average % canopy closure after harvest	Logging System	Harvest Acres	Volume (CCF)
1	Thin – 50%	Proc./ For.	18.4	474
2	Thin - 50%	Skyline & Proc./ For.	28.0	1000
3 part c	Thin - 60%	Proc./ For.	11.0	275
3 parts a,c,d	Thin - 40%	Proc./ For.	13.6	340
4 part a	Thin – 60%	Proc./ For.	3.9	89
4 part b	Thin – 40%	Proc./ For.	2.3	39
4 part c	Thin – 30%	Proc./ For.	1.4	26
Total			**78.6**	**2243**

(1) Unit maps defining unit subdivisions can be found in Appendix D.
CCF represents timber volume in hundred cubic feet.
Proc./For. refers to processor/forwarder, a ground-based logging system

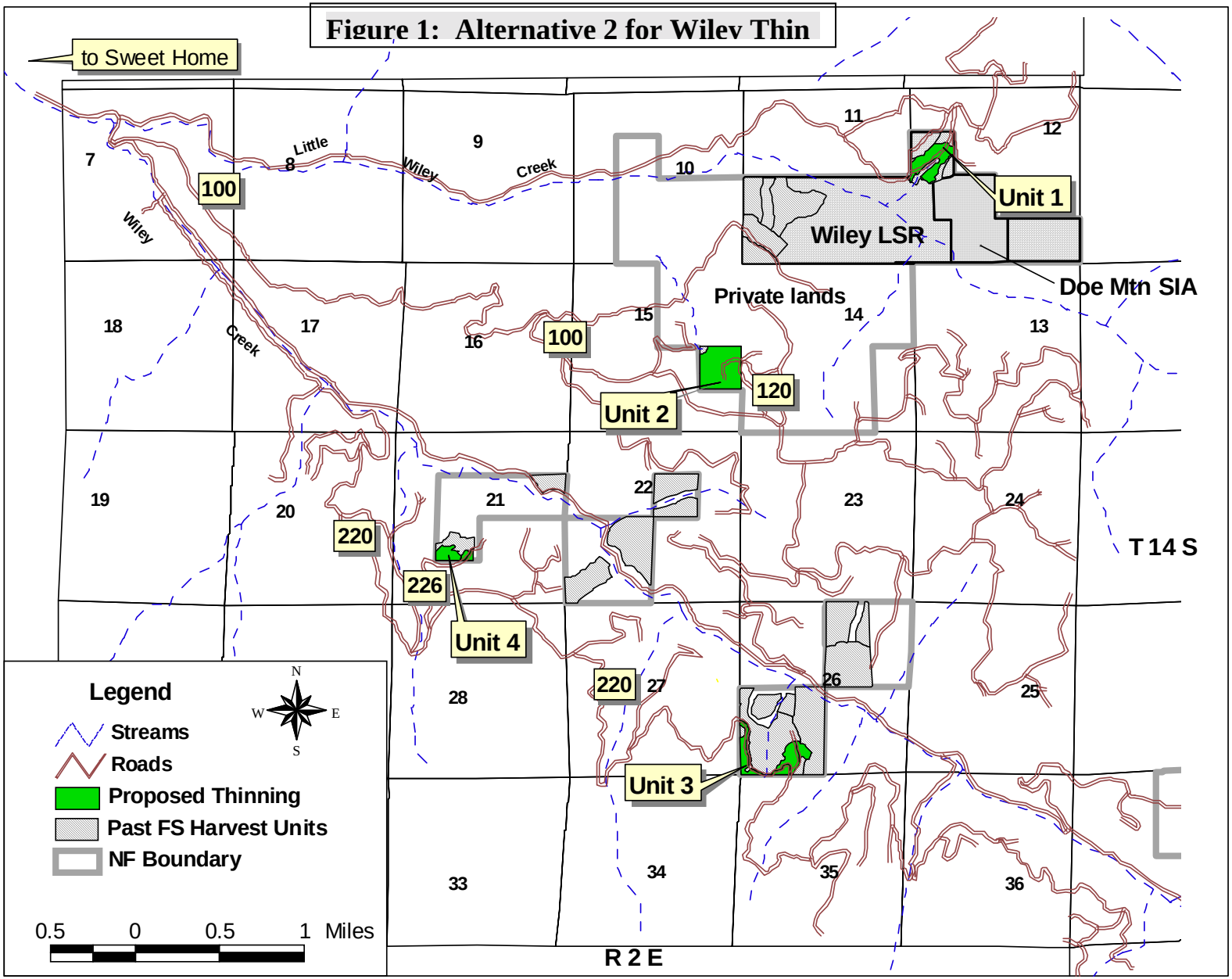
Figure 1: Alternative 2 for Wiley Thin
to Sweet Home
Little Wiley Creek
Wiley Creek
100
100
220
220
226
Unit 1
Unit 2
Unit 3
Unit 4
120
Wiley LSR
Doe Mtn SIA
Private lands
T 14 S
R 2 E
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
33
34
35
36
Legend
Streams
Roads
Proposed Thinning
Past FS Harvest Units
NF Boundary
N
W
E
S
0.5 0 0.5 1 Miles

Mitigation Measures

In response to public comments on the proposed action and IDT recommendations, mitigation measures were developed to ease potential resource effects that action alternatives may cause. Mitigation measures would apply equally to all action alternatives unless specified differently.

Hydrology and Fisheries Resources

- Seasonal restrictions (November 1 to May 31) on logging operations to minimize sediment loading in streams during the rainy season and spawning season.
- Apply dust abatement techniques (spraying water) on main road sections adjacent to Wiley and Little Wiley Creeks during log hauling (July 1 to September 30).
- Full width (172 feet) no-harvest buffers on perennial non-fish bearing stream channels; reduced width (25-50 feet) buffers on intermittent stream channels.
- Apply Forest Service, Region Six Best Management Practices for water quality during operations, including rocking road segments, installing sediment catchments in ditches, and mulching disturbed areas after harvest operations.

Northern Spotted Owl

- Standards outlined for spotted owls in the Biological Opinion (USDI 2/27/03) will be adhered to.
- Operating season will be limited from March 1 to September 30 for unit 1 to protect nesting northern spotted owls and from March 1 to July 15th for unit 4 to minimize disturbance during nesting season. Operating restrictions shall apply until non-nesting is verified through field surveys (FW-173, Forest Plan, pg IV-73).

Noxious Weeds

- Equipment cleaning requirements are included in timber contracts to control the spread of seeds and vegetation. Approved equipment-cleaning areas will be identified in timber sale contracts.
- A harvest sequence of units will be defined for the operator in the contract to reduce the risk of transporting weed material from one unit to another by logging equipment. To the degree possible, uninfested areas of units will be thinned before infested areas.
- A 50-foot no-equipment buffer will be placed along the slope break of Unit 4 to protect downslope population of tall bugbane from noxious weed competition.
- Disturbed sites with exposed soil will be sowed with a native species seed mix soon after operations are complete. Temporary roads and skid trails in harvest units will be planted and closed after logging operations are complete to discourage weed species establishment.
- Several small weed populations on access roads will be treated prior to harvest operations.
- Weed populations will be mapped and monitored for change.

Down Woody and Snags

- Snags to be felled for OSHA safety requirements will remain as downed wood.
- Retain or create snag habitat from existing stands at 10 trees per acre in Unit 1, and 5 trees per acre in units 2-4. Douglas-fir and western redcedar should be preferred species, and the largest diameter trees should be selected whenever possible.

Big Game

- Temporary roads opened during harvest operations will be bermed after harvest operations are completed.

Heritage Resources

- Implement contract provisions in the event that heritage resources are encountered during project implementation.

Fuel Loading

- Place tree tops and branches in skid trails to protect soil resources from ground-based logging equipment and to compact small (>9 inches diameter) fuels. Compaction reduces fuel ladders and increases decomposition of fine fuels.
- Other tree tops will be piled at landings whenever possible for pile burning or chipping.

Comparison of Alternatives

This section provides a tabular summary of effects by alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively between alternatives.

Table 4: Alternative Summary

	Alternative 1	Alternative 2
Acres Harvested	0	80
Total Volume (CCF)	0	2243
Average Canopy Closure for all treated stand acres	85%	50%
Temporary Haul Roads Created or Opened in Units (feet)		1900
Temporary Skid Roads Opened in Units (feet)		5400
Total Harvest Revenue ($255/CCF)	$0	$571,965
Harvest Costs ($190/CCF)	$0	$426,170
KV Project Costs	$0	$84,146

CHAPTER 3: ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected project 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 Table 4 above.

Hydrology: Stream channel stability, sediment levels and water temperature will be addressed in this section. Water quality conditions in the Wiley watershed will continue to be more influenced by practices connected to private land management. Only 2% of the 40,577 acre Wiley Creek subwatershed is managed by public resource agencies, and 90% is managed by private industrial timber corporations (E&S Environmental Chemistry, Inc. 2000).

Under Alternative 1 (No Action) channel stability would remain at present conditions. Rosgen type A & G channels would experience direct but short-term instability of their lower banks and substrate, as small wood accumulates in channels from a declining stand. Overstocked stand conditions will force the natural selection of dominant trees. Suppressed trees will die and fall providing small diameter wood into the channel. This wood will trap small amounts of sediment and deflect flows into the channels' lower banks, but is not large enough to moderate flow energies and could be mobilized under moderate flows.

Indirectly, increases in sediment loads would pulse through the channel as this wood breaks down. The small size of this channel wood and its decomposition rate, 10 to 20 years depending on water contact, sets the channel up for higher sediment loads through time.

Cumulatively, these sediment pulses should have a temporal and spatial distribution within the historic range of natural variability. Rationale to support these conclusions is based on observing the effect of understory fires and the conditions of suppressed unmanaged stands within the western Cascade mountain range. Channel stability would experience a short decline and sediment inputs would rise slightly, but water temperatures would remain similar to current conditions. No improvements to these characteristics are anticipated under Alternative 1.

Under Alternative 2, approximately 80 acres in four units would be thinned. These units are located within four different land sections that are more than a mile apart. They exist within "satellite" parcels surrounded by private timber land. Units 1 and 2 are found within the Little Wiley 6th field watershed, while Units 3 and 4 are found within the Lower Wiley 6th field watershed. All four units are within the Wiley Creek 5th field watershed. Wiley Creek is identified by Oregon Department of Environmental Quality as a potential 303d-listed stream for exceeding water temperature standards in the lower reaches.

Alternative 2 would generate approximately 221 log truck loads on road segments that are adjacent to Wiley Creek. These are private roads that experience heavy year-around log haul from private timber lands. Public use (eg. hunting, gathering, and sightseeing) generates year-around traffic on lower portions of these road systems below gates, and seasonal use on upper portions during the fall and winter seasons when the gates are opened during big game hunting seasons. A processor-forwarder logging system is proposed to remove thinned trees and place them on landings where they would be loaded to trucks. Soils disturbance is generally minimal when using a forwarder due to its low ground pressure of their tracks or tires. Slash would also be placed in skid trails as an additional buffer to the soil impacts (see Soils discussion). It is therefore anticipated that minimal surface runoff or channeling would occur from thinning activities in these four units.

Stream channel stability would be maintained by buffering channels within the riparian reserves. Affected channels are Rosgen type A and G channels and some (eg. unit 1) have a discontinuous nature to their

surface flow. Current rooting zones (25 feet each side) would define proposed no harvest buffer widths along upland area channel reaches.

Direct short-term input of sediment at temporary stream crossings by skid trails would be limited by designating stable crossing locations. These inputs are well within the State's restrictions due to use of Best Management Practices and the stable character of affected channels. Harvest equipment effects to channel stability at these crossings would be minimized by selecting stable crossing locations, restricting season of use, monitoring operations, and using erosion control measures whenever necessary. Indirect effects of logging slash falling into channel areas would be minimal due to established channel buffers and restricted to the few crossing locations. Due to the relative distance between these four stands and the stable nature of stream channels downstream from thinning units, no adverse cumulative effects on channel stability are anticipated from proposed thinning under Alternative 2.

Alternative 2 would maintain full riparian reserves on all perennial stream channels. These reserves would maintain conifers or hardwoods that currently shade the channels. No direct, indirect or cumulative adverse impacts to stream temperatures are anticipated from thinning operations if full reserves on perennial streams and partial buffers on intermittent streams are prescribed.

Condition and use of the road system for timber haul and other vehicles is likely to have a greater direct impact on water quality than proposed upland harvest activities in these four harvest units. Fine sediments are shed from road surfaces during truck hauling as dust during dry periods or suspended fines in surface runoff during wet periods. Best Management Practices are specified to control the greater of these inputs of fines into anadromous fish habitat. These practices include ditch cleaning, sediment catchments where deemed necessary, filter material placed adjacent to critical areas to catch fine sediments, and control of sediments generated by timber hauling activities. Short pulses of sediment will likely be created during ditch and catch basin cleaning activities. These pulses can be reduced with properly placed mulching material. Implementing these practices at the appropriate time of year can also substantially reduce sediment movement when road segments adjacent to main creek channels are used for log haul.

Indirect and cumulative effects of project generated fines are not significant when compared to natural sediment loads, both in terms of the timing and type of material generated. The shear volume of water pumped out of the Wiley and Little Wiley subwatersheds (maximum 9,640cfs, with average winter flows swinging from 300cfs to 1500cfs. USGS Real Time web site) flushes fine sediment components out of the system. This material retains mobility downstream due to the increase in steam flow from the South Santiam River. During gentler flows, fine sediments entering the channel will find their way into the interstices between gravels and remain until flushed out. Such sediment collection reduces the viability of species dependent on these gravels. The key component to these effects is the source of fine sediments during gentler flow periods. The main source of these fine sediments is the road system and natural earth flows in the watershed. The amount of fine sediments created by this proposed project is not significant, for such sediments will likely remain mobile and move downstream to the South Santiam River.

No cumulative effects are anticipated due to the size of the units, their juxtaposition to each other, and the proposed thinning prescriptions. When utilizing the Aggregate Recovery model, proposed thinning under Alternative 2 would create a 0.06% change in cumulative vegetative recovery for the watershed.

No floodplains or jurisdictional wetlands are affected by Alternative 2.

Anadromous Fish Habitat: Under Alternatives 1 and 2, anadromous fish habitat will be most influenced by management activities on private lands in the watershed. Vegetative conditions near perennial stream channels should improve over the next 10-20 years on both private and public lands as young plantations

develop. Riparian habitat development should have a positive effect on fish habitat by improving water quality (water temperature) and contributing more wood structure in stream channels. In 20-40 years, timber harvest on private lands may affect fish habitat quality through increased sediment loading caused by log truck traffic on roads near spawning habitat and removal of trees within riparian zones.

Alternative 2 has potential to affect anadromous fish habitat through short-term sediment creation off roads during log hauling operations. As discussed under the Hydrology section of this chapter, sediment influences fish habitat by accumulating and clogging spawning gravels. These influences will be minimized under Alternative 2 by restricting harvest operations to dry seasons, using dust abatement techniques on main roads near spawning habitat during log haul, and maintaining no-harvest riparian reserves.

Alternative 2 will generate approximately 221 log loads on haul routes in the Wiley Creek subwatershed. Approximately 46 loads from unit 1 will flow north into the South Santiam watershed. About 2.78 miles of gravel haul route paralleling Wiley Creek will be used for this project, though only 0.13 miles of this haul route will experience most of the log loads (175 loads). The other 2.65 miles of haul route near Wiley Creek will experience only 77 log loads. Log trucks will also cross over class III stream channels that flow into Wiley Creek. Season of haul and short lengths of roads interacting with these class III riparian areas should keep sediment creation quite low.

Potential for increased sediment into Wiley and Little Wiley Creeks from logging operations should be low for short periods during project operations under Alternative 2, but slightly higher than under Alternative 1. Given discussions under the hydrology section of this chapter, habitat effects from increased sediment from this project should be insignificant.

Consultation with National Oceanographic and Atmospheric Administration (NOAA) Fisheries will be completed for this project prior to making a decision. This project will adhere to subsequent recommendations contained in NOAA's biological opinion.

Unwanted Vegetation: The following documents guide the treatment of competing and unwanted vegetation in the Pacific Northwest:

- Final EIS for Managing Competing and Unwanted Vegetation (USDA Forest Service PNW Region, November 1988) specified a broad spectrum of appropriate vegetation management techniques for use in the region.
- The Mediated Agreement is a settlement approved in the US District Court in May 1989, between plaintiffs and USDA Forest Service regarding how the Forest Service implements the Final EIS. Specifically, it addresses adequate analysis and evaluation of preventative techniques, how well treatments meet goals and objectives, impacts and long term site productivity, and environmental and human risk.
- Willamette National Forest Integrated Weed Management Environmental Assessment (1999)
- Executive Order 13112 (February 3, 1999)
- Forest Service Land Management Actions as Contributors to Non-native Plant Invasions in Pacific Northwest Forests and Rangelands: a Review. D.N. Kimberling, et al. Unpublished Draft 4/11/03.

Timber sale contracts are now required to include provisions to minimize introduction and spread of invasive plants. Weed populations in the units and along transportation routes must be mapped on the timber sale contract map and equipment-cleaning areas need to be designated by agency staff.

Increased light along roadways and ground disturbance from vehicles make roadways good habitat corridors for weed invasion (Parendes 1994). Weed seeds also can be carried onto forested areas with off-site gravel

sources, on logging and road building equipment, or by any vehicle using a road. Even changes in rainwater runoff and erosion patterns caused by timber harvest can influence the spread of noxious weeds in a watershed.

Thinning may also enhance habitat for these weed species by opening overstory canopies and disturbing soil to favor seed germination. In addition, other weed species may be brought into the area on logging and slash-treating equipment.

The Wiley Thin units are highly infested with noxious weeds due to the island nature of National Forest lands in a watershed dominated by actively managed private timber lands. Surrounding private lands do not receive much scrutiny for weeds, and weed infestations on private lands are gradually spreading onto the public lands, especially along roadways. The weed species of greatest concern in Wiley watershed are false brome (*B. sylvaticum*), Himalaya blackberry (*R. discolor*), St. John's wort (H. *perforatum*) and tansy ragwort (*S. jacobea*).

The primary weed species of concern for this project is false brome due to its ability to quickly occupy disturbed sites and thrive in understory communities long after overstory forest canopies have closed. Most weed species do not do well under closed canopies. In recent years, false brome has quickly spread outwards from Benton and Lane counties in the Willamette Valley and ranges from the Pacific coast to the Metolius watershed east of Cascades Mountains; and in the Coast Range from near the Columbia River to Josephine County in southwestern Oregon.

It is a highly invasive grass that has the capability to dominate the forest floor to the exclusion of native species. It has broad ecological amplitude that allows it to succeed in heavy shade or in openings such as meadows and roadsides. It does not appear to have forage value for big game and thus receives little grazing pressure. False brome infestations effect understory plant diversity, which in turn influences animal and fungal habitats and communities. Increased false brome densities cause decreases in big game forage, shifting mammal communities from larger mammals to smaller mammals, especially rodents. False brome proliferation may lead to increases in meadow-inhabiting rodents. Such rodents are known to cause damage to small conifer seedlings and saplings, which would inhibit the establishment of a vigorous understory or multi-layered stand. Decline in interior-forest associated rodent species may influence the dispersal of fungal spores, especially of the hypogeous (truffle) fungi, which are important mycorrhizal associates of trees.

Possible mitigation measures against the spread of false brome include dropping infested areas from units, timing of harvest, equipment cleaning in infested areas to prevent seeds from being carried out of infested areas, leaving a no-harvest strip along infested roadsides, pre-treating smaller false brome populations prior to harvest or road operations, and mechanically removing seed-infested soils open to vehicle traffic.

False brome is well distributed on private lands in the Wiley Creek watershed, especially along main roadways. By contrast, it is only scattered on National Forest lands in this watershed and these occupied areas tend to be small. False brome is found in all proposed units of the Wiley Thin project. Specifically, it is found scattered along the native surface road through unit 1; the southeast corner of unit 2; along the road system in unit 3; and throughout the west half and along roads in the east half of unit 4.

Himalaya blackberry prefers open areas and roadsides but can also persist and spread under the forest canopies. This species is predominantly spread by birds and animals that eat the berries, but can also spread vegetatively by root tipping. Infestations of Himalaya blackberry typically form impenetrable thickets that exclude other plant species, inhibit large animal movement, and otherwise damage native plant ecology. This species is found on a spur road in unit 3.

St. John's wort is a very common and widely spread weed found typically along roadsides in the Cascade Range. Tansy ragwort has the same general distribution in this area, but in lower densities than St. John's wort. The main concern over the spread of these species in the planning area is their effects on special habitat areas (i.e. rock outcroppings and meadows). They have potential to dominate and suppress the native plant communities, and adversely affect their ecology. Rocky meadows located south of unit 2 are probably the most significant habitats at risk. This meadow complex is on private land and has a road running through the largest meadow.

Noxious weeds become a critical concern when they threaten populations of sensitive or TE&S plant species. In the Wiley Thin project area, false brome could spread to and dominate an area upslope of a known population of tall bugbane (*Cimicifuga elata*), a species on the Region 6 Sensitive Species list. This population is located in mature forest approximately 400 feet downhill from the boundary of unit 4. Erosion and rainwater runoff are the most likely modes for false brome to spread toward this tall bugbane population. Project design should minimize the risk of false brome spreading toward this population.

Alternative 1 does not increase the risk of spreading weeds on public lands in the project area. Vehicle traffic, as weed vectors, would be limited to private timber operations near proposed units and public traffic during hunting seasons. Few weed species can survive the heavy shade that results from foregoing thinning in these stands. Risk of spreading weeds is lower with such light limitations in the understory and because no mechanized equipment is entering these stands as a potential carrier of weed seeds.

Alternative 2 reduces canopy closures near weed-infested areas, thereby increasing light penetration to existing invasive species. Invasive species of highest concern in this planning area, false brome and Himalaya blackberry, can actually tolerate moderate to heavy canopy shading. Both species can spread under shade, and increased light to the ground will likely stimulate growth of existing populations. Mechanical disturbance to soil during harvest operations is the primary influence to weed spread under Alternative 2.

Under Alternative 2, a combination of mitigation measures will be used to limit or prevent the mechanical spread of noxious weeds (see page 15). In all units, small existing infestations will be pre-treated and removed wherever possible so that harvest–related operations will not spread on-site seeds or other live plant material to other sites. Soil disturbance will be seeded with an appropriate species mix, monitoring disturbed sites after harvest operations, and controlling any resulting infestations.

In unit 4, non-infested areas will be thinned before infested areas. Once infested areas are thinned, harvest equipment will be cleaned of dirt and debris before moving to another unit. A 50-foot buffer will also be marked along the slope break to the north of infested areas in unit 4a. Thinning may still occur in this buffer by reaching in with mechanical arms or cable winching logs out, however wheeled or tracked vehicles will not be allowed to enter the buffer. A higher canopy closure (60%) will be left over infested areas in unit 4a to discourage false brome growth.

In the other units, infested roadsides will be pre-treated before equipment enters the stands in order to reduce risk of weed spread. Even pre-treating roadsides will not completely eliminate the risk of seed spread from operations on the roads. Viable seed may reside in the soil and potentially spread by machinery.

Alternative 2 will generate KV funds to control noxious weed spread and monitor the effectiveness of control methods used on existing weed populations.

Windthrow Damage: Currently, only unit 1 shares a boundary (527 feet) with a recent (<10 years old) regeneration harvest edge, though other units border private land that could be harvested in the next 10 years.

Unit 2 is most at risk of being exposed in the near future by harvest of older trees (> 40 years) on adjacent private land (847 feet).

Most private forest next to proposed thinning units is young and only likely to be lightly thinned in the next 10 years. Units 1 is predominantly surrounded by public lands or young trees on private lands. Unit 4 shares substantial boundary with private land, though trees on this private land are young and may not be harvested for 10 years. The western boundary of unit 3 possesses a natural risk of windthrow because it runs along a prominent ridgeline (1310 feet). Private forest stands to the west of this boundary were recently thinned, and likely will not be regeneration harvested in the next 10 years. Risk of windthrow along exposed unit edges can be reduced by retaining higher stocking densities within a specified distance from such unit boundaries.

Under Alternative 1, potential windthrow damage within proposed thinning units will be largely influenced by harvesting on adjacent private land and severe storm events. Dense stocking levels on public lands will armor stands from high wind velocities during winter storms. Some windthrow is still likely to occur along exposed edges next to harvested private lands.

Under Alternative 2, an average 60% canopy closure will be left within 100 feet of the northern boundary of unit 2 and the western ridgeline of unit 3. Thinning along these edges could increase windthrow risk, but retaining 60% canopy closure along these unit edges should place windthrow risk levels only slightly higher than current conditions. Over the long term, proposed thinning should increase tree vigor and canopy diversity on treated acres. Greater tree vigor and stand structure should benefit wind firmness along these unit boundaries.

Edge Effects on Late-Successional Habitat: Thinning designs should at least consider the topographic position of thinned stands relative to adjacent late-successional forest. Habitat edges on south or west-facing aspects may be more sensitive to thinning effects than north or east aspects. Thinning units that are below late-successional habitat on steep slopes may also create more edge effects than units above. Retaining higher stocking levels in buffers along unit boundaries with late-successional habitat has become the common mitigation measure for edge effects. Both units 1 and 4 share boundaries with late-successional habitat that contains interior habitat conditions.

Alternative 1 creates no risk of changing microsite conditions within adjacent late-successional habitat next to proposed units. Stocking levels along these unit boundaries will remain high and slowly develop into functional buffers on late-successional habitat. Within 30-40 years, plantation acres will develop into mid-seral habitat and dissolve these abrupt habitat boundaries.

Alternative 2 creates low risk of changing microsite conditions within adjacent habitat by retaining a 100 foot no-thin buffer along unit edges next to late seral habitat. Edaphic effects (solar radiation, wind speed, relative humidity, air and soil temperatures) on adjacent late seral habitat caused by thinning parts of unit 1 will be insignificant. Over the next 30-40 years, thinned acres will grow into high quality mid-seral habitat and blur abrupt habitat boundaries.

Northern Spotted Owls: Under Alternative 1, no direct effects to owls or owl habitat will occur. Habitat in proposed units will continue to function as dispersal habitat. Stand densities will remain high in parts of these units and tree growth will start slowing down over the next 10 years as trees compete for limited space and resources.

Development of late-successional habitat conditions in unit 1 will follow a natural process, and likely will be reached between stand ages 160-200 years depending on natural disturbance events that influence stand density (Garman, 2000). Understory plant communities will be retarded wherever stand densities remain high. Tree crown biomasses and vertical depth will begin shrinking over the next 20 years as lower level

live branches are shaded out by high stem densities. These stand changes are likely to retard the transition of current dispersal habitat to higher quality owl habitat.

Over the next 20-40 years, mortality rates will likely increase and begin creating small openings in the overstory. Natural mortality will reduce stocking levels asymmetrically across the stands, but trees may be slow to respond to increased light due to reduced crown biomass. Small diameter fuels (<9 inches diameter) will increase in areas of higher natural mortality.

Under Alternative 2, a total of 80 acres of dispersal habitat will be commercially thinned in four separate units. The quality of this habitat will be affected but the functionality will not change since all treated stands will retain an average 40 to 50% canopy closure. One exception will be the 1.4 acres of mistletoe-infested hemlock in Unit 4c where canopy closure will be reduced to 30 percent. For this unit, habitat functionality will be reduced.

Thinning will remove most existing snag habitat in proposed units. Snag habitat benefits some spotted owl prey species. Existing snags are generally small diameter trees (less than 10 inches). Loss of snag habitat will be mitigated by the creation of up to 5 snags per acre in unit 1 and 1.5 snags per acre in units 2-4.

Alternative 2 *may affect* dispersal habitat by removing as much as 60 percent of existing overstory canopy closures in portions of units 3 and 4. While thinned units remain dispersal habitat, the quality of this habitat is lowered over the short-term. Proposed thinning will also have long-term habitat benefits by encouraging late-successional characteristics to develop more quickly.

Surveys for spotted owls in 2003 located a single spotted owl near unit 1. A pair of owls was previously located in late seral habitat close to unit 4. Additional surveys will be conducted in 2004 and prior to operations to determine if the owl near unit 1 has a mate.

Seasonal restrictions on logging operations will be imposed on all activities within ¼ miles of identified nest trees. The length of operating restrictions will depend on confirmed nesting activity. Thinning of proposed units will minimize habitat effects by retaining canopy closures at or above 40 percent.

Alternative 2 will have *no effect* from disturbance to known spotted owls within the LSR during the nesting season. A seasonal restriction of March 1 to September 30 will apply to all timber harvest operations in unit 1. Alternative 2 does create a *may affect, not likely to adversely affect* from operation noises for spotted owls outside the LSR. Timber operations in unit 4 will be seasonally restricted from March 1 to July 15 to avoid disturbing spotted owls, but permitted to occur during the latter half of the nesting season. The Wildlife Biological Evaluation (Appendix C) contains additional information on project effects to spotted owls.

Fire Effects: Under Alternative 1, no new fuels treatment will occur in this planning area. While the fire occurrence rate for this area is low, the risk of ignition sources (lightning or humans) is always present. Present natural fuel build up and topography could encourage a fire start to build into a stand-replacing event if undetected for awhile during hot weather. Alternative 1 offers no funding opportunity to reduce current fuel levels in the planning area and subsequently allows fuel conditions for a stand-replacing wildfire to increase.

Thinning under Alternative 2 will change fuel level conditions in the planning area from Fire Behavior fuel model 8 to model 10, by increasing small fuels (<3-inch diameter) from approximately 5 to 11.5 tons/acre in thinned areas. This increase comes from tops and branches of harvested trees, and will likely aggravate fire behavior if a fire start occurs. Fire behavior under model 10 is fairly active. Thinning will in turn reduce long-term fire behavior by removing large fuels (> 9 inches diameter) that naturally accumulate over time. Large fuel causes fires to burn hotter once they've reached an active level, which creates greater stand mortality and soil damage particularly near heavy accumulations.

Post-harvest fuel treatments under Alternative 2 will decrease fuel loading in thinning units and long term fire risks in the project area. The burning of removed tops will present a small impact to local airsheds from smoke. All burning will take place in accordance with the Oregon Smoke Management Plan which issues daily burning instructions specific to burning location and allowable quantity of smoke. All burning activities will be monitored on a daily basis.

Sensitive Plant Species: Thirty-two Region 6 sensitive plant species were evaluated to determine if they or their habitat would be impacted by this project. Habitat exists for the following twelve species: *Agoseris elata, Asplenium septentrionale, Carex scirpoidea* var. *stenochlaena, Cimicifuga elata, Corydalis aqua-gelidae, Eucephalus vialis, Iliamna latibracteata, Lewisia columbiana* var. *columbiana, Pellaea andromedaefolia, Polystichum californicum, Romanzoffia thompsonii,* and *Sisyrinchium sarmentosum.* No sensitive plant species were found in or adjacent to the proposed units. There is a previously reported site of *C. elata* in the late-successional stand ¼ to ½ mile to the north of unit 4. Further information about these species is found in the Botany Biological Evaluation (Appendix A).

Under Alternative 1, habitat for some of these species will deteriorate as the dense canopies of Douglas-fir close in and darken the forest floor. Species whose habitat will deteriorate under a closed canopy include *C. elata, C. aqua-gelidae, E. vialis, I. latibracteata, and S. sarmentosum*. Habitat for the other species will not be affected because they are rock dwellers and rock openings generally are naturally maintained.

Under Alternative 2, habitat for six of the eight sensitive plant species may be improved by thinning. A population of *C. elata* is located approximately ¼ to ½ mile north of unit 4, and thinning this stand may allow the species to spread. *C. elata* requires a hardwood component, usually fulfilled by bigleaf maple. The thinning prescription retains all bigleaf maple. Thinning will also enhance habitat by opening the stand so that more light gets to the forest floor. *A. elata, C. aqua-gelidae, E. vialis, I. latibracteata,* and *S. sarmentosum* prefer open forest stands and habitat for them will be enhanced by thinning.

Migratory Birds: On January 10, 2001 an executive order was signed to protect migratory birds. One purpose of the order is to ensure that environmental analyses evaluate the effects of proposed actions on migratory bird habitat. Habitats vary broadly for this group of species.

There are 85 bird species recognized as neotropical migrants on the Forest. Thirty-five of these species are identified as "species of concern" in "Neotropical Migrants on National Forests in the Pacific Northwest" by Brian Sharp (1992). These species are associated primarily with old-growth, riparian, rocky cliffs, or grass habitats.

Alternative 1 will create no disturbance or impacts to migratory birds. Large scale changes in bird species diversity or numbers and habitat on National Forests will be dependent on natural and human-caused disturbances, primarily wild fire. Subtle habitat changes will occur over time as tree densities decrease and snags and down wood increase through natural mortality as competition increases for growing space and nutrients. Natural reductions in tree densities will encourage understory communities to develop as increased sunlight reaches the forest floor.

The light to moderate thinning planned under Alternative 2 will result in an average overstory canopy closure of 40 – 60%. Thinning should increase structural diversity within the stands by reducing competition of the overstory trees and accelerate understory development from increased sunlight to the forest floor. This process will create a more open forest habitat than what currently exists. Such changes in forest habitat will benefit some bird species and negatively impact others. One study completed on bird response to thinning young Douglas-fir forests in the Oregon Coast Range (Hayes et al. 2002) showed that of the 22 bird species statistically sampled, detections after thinning decreased for nine species and increased for eight species

relative to control areas. Five species showed no change. The magnitude of response (either positive or negative) for eight of the 17 species varied with thinning intensity. This same general trend of bird response to thinning occurred in the Willamette National Forest Young Stand Thinning and Diversity Study. Four species had a positive response to thinning and six had a negative response (Hager and Howlin 2001). The authors identified five additional uncommon bird species that had much higher detection rates after the stands were thinned, indicating a positive response to thinning. A fairly large number of species in this study had no response.

Thinning will influence abundance of migratory bird species in these stands. Each stand has portions left untreated that will serve as refugia for those migratory bird species negatively impacted by thinning. Over the long-term, all migratory bird species should benefit from thinning these dense stands.

Timber harvest activities during the spring and summer may impact nesting birds through disturbance. Seasonal operating restrictions planned for spotted owls (see Mitigation Measures Common to Action Alternative) will provide some level of protection from operating disturbances during the nesting season.

Management Indicator Species: Project effects to spotted owls and cavity excavators (snag dependent species) are addressed elsewhere in this chapter. No habitat for Peregrine falcon was found in the planning area during field surveys.

Pileated woodpeckers are associated with forest habitats having large trees, especially large snags for nesting and foraging (Csuti, et.al. 1997). Existing snags within proposed thinning units are likely used by pileated woodpeckers for foraging only. Alternative 1 will have no direct or indirect effects on pileated woodpeckers or existing habitat.

Alternative 2 will have no effect on old-growth and mature conifer habitat, but will likely reduce existing small snag habitat that could be used by pileated woodpeckers for foraging. Most existing snags that will be felled for worker safety under Alternative 2 are small, less than 10 inches diameter. Snag habitat loss will be mitigated by creating up to 5 snags per acre in unit 1 and 1.5 snags per acre in the remaining three units following timber harvest. Proposed thinning will likely encourage development of late-successional habitat thereby creating long-term benefits to this species.

Marten prefer mature forests with closed canopies but will utilize other habitats provided that down wood is available for cover (Csuti, et.al. 1997). Marten are unlikely to inhabit the project area. Alternative 1 will have no direct or indirect effects to marten.

Alternative 2 will have no effect on old-growth and mature conifer habitat. Proposed thinning prescriptions will encourage the development of late-successional habitat thereby creating long-term benefit for marten. Creation of down wood after thinning will provide additional cover for marten.

The units currently provide winter range thermal cover for both deer and elk. Alternative 1 will have no direct or indirect effects to deer and elk winter range.

Under Alternative 2, proposed commercial thinning units will improve thermal cover within winter range by reducing tree density and encouraging more structural diversity to develop in the thinned stands. Reducing the canopy cover will also allow additional sunlight to reach the forest floor, resulting in increased shrub and herbaceous vegetation growth for forage. Such an understory response is not as likely in unit 4a where false brome (B. sylvaticum) dominates parts of the understory. All existing roads opened to provide access for timber harvest will be closed when the project is complete. Increased disturbance to big game from open road used by this project will be short-lived.

Bald eagles are not known to occur within the project area. They prefer large bodies of water with sufficient fish or waterfowl populations for prey and large trees for roosting and nesting. Neither Alternative 1 nor 2 would create direct or indirect effects to bald eagles.

Snags and Down Woody Habitat: There are approximately 1244 acres of forest habitat on National Forest lands in Wiley and Little Wiley subwatersheds. Forty-one percent (511 acres) of public lands have been harvested over the past 40 years and have few large snags or down wood. Remaining large snags and down wood are well decayed. Natural mortality of trees in these stands has created minor amounts of small diameter snags and down wood. Current snag density on these public lands is estimated to average 45 percent (or 1.7 snags per acre). Most snags occur in unharvested habitat (seral stages 3 and 4).

The percent cover of down wood in natural stands can average up to 17 percent across this landscape (Marcot, et.al. 2002). This includes all decay classes of down wood greater than 4 inches diameter. Approximately half this material is in decay classes 1-4 and half in decay class 5.

Recent surveys estimated the amount of down wood available in Unit 1 (see Table 5) as a percent cover of the forest floor. Down wood currently covers slightly more than 5 percent of the forest floor in this unit. Most of this material is from the original stand, is large and well decayed (decay classes 4 and 5). Proposed thinning units 2, 3 and 4 likely have similar amounts and decay classes of down wood as found in unit 1.

Table 5: Percent Ground Cover of Down Wood in Unit 1

----by Decay Class----					Total
1	2	3	4	5	
.59	.23	.73	1.89	1.63	5.07

Under Alternative 1, no immediate changes in snag density or down wood within the proposed units are expected. Natural processes over time will increase the density of both snags and down wood.

Under Alternative 2, thinning 80 acres will fell some existing snags for operation safety concerns. Felled snags will remain on site as down wood habitat. To increase snag and down wood habitat in thinning units, 10 trees per acre in unit 1 and 5 trees per acre in units 2 - 4 will be topped or felled after thinning is complete. Selected trees will be from larger size classes in the stands. More trees will be selected in unit 1 because of a greater interest in improving late seral habitat conditions within LSR's. Thinning will promote growth in residual trees, thereby creating larger diameter trees sooner. Larger trees will offer higher quality down wood and snag habitat in the future.

Sensitive Wildlife species: Habitat for R-6 sensitive wildlife species, Baird's shrew, Pacific shrew, Pacific fisher, Oregon slender salamander, Cascade torrent salamander, and Mardon skipper does exist within or adjacent to the proposed thinning units. Alternative 1 will have no impacts on these sensitive wildlife species.

Planned harvest activities under Alternative 2 may impact Baird's shrew, Pacific shrew, Pacific fisher, Oregon slender salamander, and Cascade torrent salamander either through disturbance or habitat modification. These impacts should be minor and short-term because residual canopy closures on most treated acres will remain at least 40%, most ground disturbance will be limited to designated skid roads and landings, existing down wood concentrations will be avoided, and additional snags and down wood will be created after harvest. See Wildlife Biological Evaluation (Appendix C) for further details on all affected sensitive species.

Special Habitats: Special habitats are non-forested areas including seeps, rock outcrops and gardens, caves, and meadows. These sites are important reservoirs of biodiversity, providing habitat for a variety of plants,

fungi, and animals not often found in forested areas. In addition, many sensitive species are found in special habitats.

Several special habitats were found in or adjacent to the proposed harvest units. Most of these sites were likely impacted by the initial harvest of these units. No buffers were left around these sites so they presumably experienced changes in solar radiation, relative humidity, and other microsite factors. The consequence of that initial harvest disturbance is difficult to assess. Special habitats likely to be affected by proposed harvest activities in Alternative 2 have been evaluated and habitats will be protected where necessary.

Former Survey and Manage Species: Great gray owls (S*trix nebulosa)* typically nest above 3000 feet elevation in conifer habitat that is greater than 80 years old with a canopy closure over 60 percent located within 1000 feet of a natural meadow larger than 10 acres (Region 6 Survey Protocol for the Great Gray Owl, April 1995). Surveys are required for ground disturbing activities that impact nesting habitat. Specific mitigation measures in the amended Forest Plan for this species include the following:

- No-harvest buffer of 300 feet around meadows and natural openings.
- One-quarter mile protection zone around known nest sites (ROD C-21).

Alternatives 1 and 2 are not expected to create direct or indirect effects to great gray owls. Proposed thinning units are not located within 1000 feet of a natural meadow over 10 acres in size, and only unit 2 has acres above 3000 feet elevation. This project will not affect forest habitat that could function as nesting habitat for this species.

Only one plant species that required protective measures (manage all known sites) as a former Survey and Manage species was found in or near proposed harvest units. This species was moved onto the Region's Sensitive Species list and will be protected with a no-harvest buffer. This tiny lichen species (*Leptogium cyanescens)* grows among the epiphyte communities on the trunks and branches of hardwoods, particularly bigleaf maple

Under Alternative 1, the effect of not thinning the stands will likely not affect *L. cyanescens* because of where it typically is found. *L. cyanescens* in unit 1 occurs in larger bigleaf maple clusters that have been excluded from the thinning unit and should not be affected by the development of dense Douglas-fir stands over time. These sites are likely to persist without any overstory treatment.

Under Alternative 2, *L. cyanescens* sites were excluded from thinning units. The variable thinning prescriptions will, in the long-term, enhance habitat for this species. Larger diameter trees, retention areas, dominant tree release, and retention of minor tree species will add complexity to these stands. Thinning is expected to enhance *L. cyanescens* habitat by encouraging its favored hardwood and shrub substrates in the understory.

Some species of mycorrhizal fungi may suffer short-term declines after thinning due to the reduction of host trees. Also, any undetected sites of survey and manage lichens may be impacted. However, any negative effects to survey and manage species habitat are expected to be short-term.

Soil Resources: Field surveys found some soil compaction in skid trails in proposed units from the initial harvest entry some 30-40 years ago. Most sections of old skid trails have grown over with hardwood and conifer regeneration. Proposed yarding will for the most part use pre-existing skid trails and cable yarding corridors, and should not create much additional compaction. Concentrations of down logs from previous harvest can be found in portions of thinning units. This debris contributes to nutrient cycling and will be avoided during proposed operations as much as possible. Additional down wood will be added to thinned

acres by falling trees after harvest operations. Duff retention standards will also be established for each unit to protect nutrient cycling.

New compaction can be mitigated by designating skid trail locations and placing yarding debris in skid trails for equipment to travel over and buffer soils. Logging operations can also be restricted to dry season months. Any resulting compaction can be further mitigated by ripping and then planting affected areas with a native seed mix. No other soil impacts are anticipated from this project, and long-term effects on soil productivity should be negligible. Mitigation measures would be similarly defined for all action alternatives, therefore this issue was considered non-significant.

Heritage Resources: The effects on heritage resources from this project will remain constant for all alternatives being considered. Any unforeseen mitigation efforts will be considered in consultation with the State Historic Preservation Office (SHPO).

Aquatic Conservation Strategy Objectives (ACSO): This project will not prevent attainment of ACSO's as defined by the Northwest Forest Plan (USDA, USDI, 1994) within the Wiley Creek watershed, as amended. Mitigation measures for this project, the low number of acres treated, and the nature of proposed thinning will maintain project consistency with watershed resource goals defined by the ACSO's.

Hydrology Cumulative Effects and Management Activities: When added together, cumulative effects are those that independently do not pose a risk to water quality, but collectively may have some measurable effect on water quality. DEQ has accepted the Forest Plan method for accessing these effects by accepting BMP W-5 for addressing cumulative effects. A brief discussion on the process for assessing cumulative effects on the watershed is listed below. For a complete discussion of this methodology please reference the Forest Plan FEIS (pp E-4 thru 25). A summary follows:

A. Preliminary Assessment

Step 1: Identify Location and Types of Potential Effect. These include:

- *Decreased diversity and stability of aquatic spawning and rearing habitat (gravels & pools), due to decreases in large woody material;*
- *Increased pool filling by deposited sediment and bed load;*
- *Decreased quality of spawning gravels due to increased water velocity during peak flows and increased embeddedness by fine sediments;*
- *Increased stream channel erosion from cumulative increases in rain-on-snow peak flow runoff;*
- *Increased stream bank erosion and stream widening due to cumulative effects of increases in peak flows, sediment, and decreases in large woody material;*
- *Increased turbidity from a cumulative increase in sediment and;*
- *Increased water temperatures from direct removal of shade, and/or from stream widening.*

Step 2*:* Identification of Assessment Area

Step 3: Assessment of Conditions - Where one or more of the following three conditions exists within the project area, the potential for cumulative effects should be considered an issue in development of project alternatives, and an intensive assessment should be considered.

- *A high potential for increases in sediment from mass movement or surface erosion exists.*
- *The potential for changes in the timing and size of peak flows exists due to changes in hydrological recovery of the vegetation in the transient snow zone.*

- *The role and functioning of large woody material in the water, and the amounts of large woody material available for future recruitment to the channel has been substantially reduced below natural levels.*

B. Intensive Assessment

Step 1: Collect Information on Potential Upland Sediment Sources

Step 2: Collect Information on Stream Conditions

C. Selection of Project Practices

Practices should be selected which are highly effective in protecting beneficial uses, and which provide a low risk of adverse effects to streambank and streambed stability.

> *As part of this analysis, land types and beneficial uses (eg. municipal water usage) were used to establish a mid-point level to trigger when intensive field analysis would be done. The model utilized is Aggregate Recovery Percentage (ARP), as found on page E-6 of the Forest Plan. This model states if stands are maintained above a 70 percent canopy they are considered 100 percent recovered. It is then determined after looking at the watershed condition types for streams found within the project area what management prescriptions should be followed (Forest Plan, pgs. E-10 to E-17). "This criteria is intended to address the potential for changes in peak flows during rain-on-snow events, and the associated potential change in the stability of the streambanks and streambed" (Forest Plan, pg. E-6).*

It was determined that implementing this project would better preserve the stand into the future, and benefits would offset short-term impacts caused by removing wood biomass through thinning. Silviculture and hydrology prescriptions for the units are site-specific and protect unstable areas from harvest effects. Hence, cumulative effects tradeoffs were considered for the short–term and the long-term. Short-term effects anticipated from this project include additional accumulation of snow due to reduced canopy levels and ground disturbance during the removal of the wood biomass.

Implementation of specific BMP's also reduces the potential cumulative effects from additional temporary road building in the area. The Watershed condition types were type 2, and 4 channels (LRMP; pg. E-10-12). Upon reviewing these criteria, the change in ARP 0.06%, the streams involved in this project and the small size of the project, it is not anticipated that adverse cumulative effects would occur.

Cumulative Effects for Other Resources: Discussions of cumulative effects on protected fish, wildlife and botany species and their habitats are included in Biological Evaluations in the Appendices and other sections of this chapter. No other cumulative effects are anticipated from this project.

The 40,577 acre Wiley Creek subwatershed is approximately 90% private forest lands, 7% urban or rural residential, and 2% public forest land. Some stage of forest habitat covers 97.9% of the forest lands. Private forest lands are heavily managed for timber production and well roaded. Average road density in this subwatershed is approximately 2.05 miles per square mile.

More than 99% of private forest land has been previously harvested and current private management practices can be expected to thin or regeneration harvest 15-20% of these lands every decade. Given this management strategy, few acres of private forest land in the Wiley subwatershed will ever reach 80 years of age.

By contrast, public lands in this subwatershed comprise only 1400 acres in four scattered National Forest parcels and 130 acres in four scattered blocks managed by the Bureau of Land Management. About 65%

(914 acres) of this National Forest land and all of the Bureau of Land Management lands have been harvested and replanted. The remaining 486 National Forest acres that has not been harvested is a mix of mid- and late seral forest habitat. Much of this habitat is within the Wiley Creek LSR and reserved from timber harvest.

The thinning of 80 acres represents slightly more than 8% of current public land plantations still available for management over the next 50 years. When compared to forest management activities on surrounding private lands, the Wiley Thin project possesses little potential for creating cumulative effects on forest resources and processes, or for significantly increasing cumulative effects created by private land management.

Table 6: Summary Table of Alternatives by Descriptive Criteria

	Alternative 1	Alternative 2
Acres Harvested	0	80
Total Volume (CCF)	0	2243
Average Canopy Closure for all treated stand acres	85%	50%
Total Harvest Revenue ($255/CCF)	$0	$571,965
Harvest Costs ($190/CCF)	$0	$ 426,170
KV Project Costs	$0	$84,146
Change in Aggregate Recovery Percent from Project	0	-0.06 %
Log Truck Trips on Gravel Roads in Wiley Creek Watershed	0	221[1]
Miles of Gravel Haul Routes close to Anadromous Fish Habitat	0	2.78
Noxious Weed Risk (*acres of skid trails and landings*)	0	8
Windthrow Risk (*total length of high risk edge*)	0	2684 feet

1 Total truck trips do not occur on all 2.78 miles of Gravel Haul Routes. Approximately 175 loads travel down 0.13 miles of road near Wiley Creek, while only 77 loads travel the remaining 2.65 miles.

CHAPTER 4: CONSULTATION AND COORDINATION

The Forest Service received input from or consulted with the following individuals, Federal, State, and local agencies, tribes and non-Forest Service personnel during the development of this environmental assessment:

CORE INTERDISCIPLINARY TEAM MEMBERS:

Brian McGinley (planner), Wayne Somes (fisheries), Noel Bacheller (botany), Kelly Esterbrook (fire and fuels), Virgil Morris (wildlife)

FEDERAL, STATE, AND LOCAL AGENCIES:

Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Oregon State Historic Preservation Office, National Oceanographic and Atmospheric Agency - Fisheries, USDI Fish and Wildlife Service

TRIBES:

Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz, Confederated Tribes of Warm Springs

OTHERS:

Oregon Natural Resources Council, Cascade Timber Services, Weyerhauser Co.

Response to ONRC Comments Received during 30-day Public Comment Period

Only one letter from Oregon Natural Resources Council (ONRC) was received during the 30-day public comment period that ended on September 10, 2004. The following summarizes responses to comments in this letter. A complete copy of ONRC comments is located in the project file at the Sweet Home Ranger District office.

Road Building Issues: "Though only minimal temporary road building will be performed in the project area, ONRC has to make a major objection to the way the EA failed to disclose the details of this road-building."

- **FS Response:** Information on temporary roads and skid trails by harvest unit has been added to the EA (page 16). The essence of these roads remains the same as originally discussed in the EA. These roads will provide temporary access for harvest equipment and log trucks, then closed and revegetated when operations are complete

Thinning Suggestions: "Thinning must be done very carefully in order to avoid, minimize, and mitigate logging's numerous adverse ecological effects…. Make sure long-term benefits out-weigh short-term degradation…One of your evaluation criteria should be whether any short-term degradation of ACS objectives is offset by long-term benefits brought about by the proposed action….Though ONRC expressed its support of variable density thinning in the scoping process for the Wiley Thin, the EA does not propose to do this type of thinning."

- **FS Response: T**his project document recognizes the disturbing effects of harvest operations, particularly in discussions about hydrology, soils, and noxious weeds, and specifies mitigation measures to minimize these effects. Additionally, harvest methods were selected and skid trails designated to minimize ground disturbance during harvest operations.

- Project compliance with ASCO management direction is a standard review element of all timber sale projects (EA, page 33), though the context of this review has recently been reinterpreted through a Record of Decision (USDA 2004b) amending management plans within the range of the northern spotted owl. This ROD directs managing agencies to assess ASCO's at the watershed level rather than the project level.
- Variable density thinning designs have received a great deal of attention lately and can produce good results in harvest units, however, the district does not feel obligated to apply this design on all projects or thinning acres. Thinning prescriptions for this project, though simple in design, do provide variability across subunits and from the retention of riparian reserves and habitat buffers. The result of these prescriptions is likely to be variable density across harvest units.

Protect Soil and Water Quality: "Soil disturbance caused by logging, road building, skid trails, and pile burning causes erosion that adversely impacts both soil and water resources….This project should use the lease ground-disturbing methods of treatment in Unit 1 in LSR, especially in the 5 acres of riparian reserves being treated."

- **FS Response:** Discussions of project effects on soil and water resources are discussed in this analysis (EA, pages 21-2 and 32-33). Skid trails and haul routes are will be designated to minimize harvest effects, and seasonal restrictions specified to direct harvest activities during the dry season. Selection of harvest systems for each of the units is made considering terrain conditions, anticipated resource effects, and economics. Moderate and stable terrain conditions in Unit 1 allow for use of a processor/forwarder logging system without undue resource effects.

Ensure Adequate Protections for Spotted Owls: "This project will disturb owls during the nesting season and temporarily disrupt suitable dispersal habitat in the project area. The noise disturbance, especially, should be mitigated as much as possible so that spotted owls can remain as successful in this area as possible, especially due to new information regarding their threats."

- **FS Response:** This project has followed regional survey protocol for the northern spotted owl, and given due consideration of disturbance and habitat effects from harvest operations. Anticipated project effects have been presented to the USFWS for consultation. A biological opinion (USDI 2003) from USFWS has been received concurring with our project assessment. Logging operations within units 1 and 4 will follow seasonal restrictions to avoid disturbance during the critical nesting period.

Create more CWD and Snags: "This project does a decent job of providing adequate snags, especially in the LSR unit. Because of the lack of snags and woody debris on adjacent private lands, however, it would be ideal if you would leave even more dead wood in the matrix units."

- **FS Response:** Specifications for CWD and snags are located on page 19 of the EA and were designed to meet Forest Plan Standards and Guidelines. Project effects on these habitat features are described on page 30 of the EA. This project has no obligation to mitigate resource impacts on adjacent private lands, and leaving more habitat on 80 acres of public land is not likely to provide much mitigation for the 1000's of private forest land.

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APPENDIX A: BOTANY BIOLOGICAL EVALUATION

File Code: 2670 **Date:** November 18, 2003
Route To:

Subject: Botanical Biological Evaluation for Wiley Thin Timber Sale

To: Brian McGinley/Project Files

Noel Bacheller, Botanist _____ Date _____

Introduction

Forest management activities that may alter habitat for PETS (proposed, endangered, threatened, or sensitive) species require a Biological Evaluation (FSM 2671.44) to be completed. The Biological Evaluation process (FSM 2672.43) is used to assist in determining the possible effects the proposed management activities have on:

A. Species listed or proposed to be listed as endangered (E) or threatened (T) by the U.S. Fish and Wildlife Service (FWS).

B. Species listed as sensitive (S) by the USDA Forest Service, Region 6. There are 32 plants listed on the Regional Forester's Sensitive Plant List that are documented or suspected to occur on the Willamette National Forest (Attachment 1).

Project Location and Description

This project originally considered commercial thinning of approximately 146 acres of young managed stands in the Wiley Creek subwatershed. The planning area consists of small isolated Forest Service parcels of land surrounded by large private timber holdings. The adjacent private land holdings are generally less than 60 years old and are heavily managed. Noxious weeds are abundant on much of the private land, and sporadic on federal land. The proposed units of the planning area are between 37 and 46 year-old coniferous forest with considerable hardwood presence and hardwood-dominated areas. The vegetation community is western hemlock series, with a variety of plant associations and site indices. Forest Service land adjacent to the proposed units (when present) is late-seral or hardwood-dominated riparian. Land allocations are Matrix (General Forest), and LSR (Late Successional Reserve). Units proposed for treatment are located in T. 14S., R. 2 E., Sec. 12, 15, 21, and 26.

The no-action (Alternative 1) and one action alternative have been identified. Alternative 2 will result in the thinning of approximately 80 acres in 4 units.

Biological Evaluation Process

Under the suggested procedure for conducting and documenting findings of a biological evaluation in the Forest Service Manual, section 2672.43, the Biological Evaluation is a 5 step process to evaluate possible effects to Proposed, Endangered, Threatened, and Sensitive (PETS) species. The four steps are as follows:

1. Review of existing documented information.
2. Field reconnaissance of the project area.
3. Evaluation of impacts of the project to local populations of PETS species.
4. Consultation with US Fish and Wildlife Service is necessary when the proposed project is likely to affect Proposed, Endangered, or Threatened species. Performance of analysis of the significance of the project's effects on local and entire populations is needed if the proposed project is likely to affect sensitive species.
5. If step 4 cannot be completed due to lack of information, a biological investigation is required.

Evaluation of effects for each species may be complete at the end of step #1 or may extend through step #5, depending on project details.

Evaluation and Survey of the Planning Area

Pre-field review was performed for the Wiley Thin planning area in the summer of 2001 in order to determine the presence of known sites or habitat for PETS species. Using the Willamette National Forest list of potential PETS species (compiled from current USFWS listings, Oregon Natural Heritage Program listings, Oregon Department of Agriculture listings, and the Regional Forester's sensitive species list), maps of known sensitive plant populations were checked for previously reported sites and aerial photos and topographical maps were scrutinized for potential habitat.

In areas where pre-field review identified potential habitat, field reconnaissance was done in accordance with established protocols and appropriate level of detail (see attachment 2). Surveys were done in the summer and fall of 2001, and one unit was surveyed again in the spring of 2002. All units in the planning area were field surveyed at level B, high intensity.

Table 1 displays the results of pre-field review, the level of field surveys performed (if applicable), and the results of the surveys:

Table 1: Summary of Evaluation Process for PETS Species in Wiley Thin Timber Sale

Species	Prefield Review	Field Recon.	Species Presence
Agoseris elata	habitat present	level B, high	
Arabis hastatula	habitat not present		
Arnica viscosa	habitat not present		
Asplenium septentrionale	habitat present	level B, high	
Aster gormanii	habitat not present		
Botrychium minganense	habitat not present		
Botrychium montanum	habitat not present		
Botrychium pumicola	habitat not present		
Calamagrostis breweri	habitat not present		
Carex livida	habitat not present		
Carex scirpoidea var. *stenochlaena*	habitat present	level B, high	
Castilleja rupicola	habitat not present		
Cimicifuga elata	habitat present	level C, high	
Coptis trifolia	habitat not present		
Corydalis aqua-gelidae	habitat present	level B, high	
Eucephalis(Aster) vialis	habitat present	level B, high	
Frasera umpquaensis	habitat not present		
Gentiana newberryi	habitat not present		
Iliamna latibracteata	habitat present	level B, high	
Lewisia columbiana var. *columbiana*	habitat present	level B, high	
Lycopodiella inundata	habitat not present		
Montia howellii	habitat not present		
Ophioglossum pusillum	habitat not present		
Pellaea andromedaefolia	habitat present	level B, high	
Polystichum californicum	habitat present	level B, high	
Potentilla villosa	habitat not present		
Romanzoffia thompsonii	habitat present	level B, high	
Scheuchzeria palustris var. *americana*	habitat not present		
Sisyrinchium sarmentosum	habitat present	level B, high	
Utricularia minor	habitat not present		
Wolffia borealis	habitat not present		
Wolffia columbiana	habitat not present		

Potential Effects on PETS Species

Potential effects are documented in this Biological Evaluation in accordance with the formats put forth for listed species in the 1986 Endangered Species Act regulations (50 CFR Part 402) and the March 1998 USFWS/NMFS Endangered Species Consultation Handbook; and for sensitive species, in the Forest Service Manual section 2670 and in a memo issued August 17, 1995 by the Regional Foresters of Regions 1, 4, and 6. Attachment 3 gives details on the effects categories described in this memo. Table 2 shows conclusions for effects of proposed actions on sensitive species with respect to each alternative in the Environmental Assessment. More detailed information on potential project effects on PETS species is found in the Environment Assessment for the project. Some effects information is also listed in the "Discussion of PETS Species" section below.

- **Key to Abbreviations in Table 2 (See attachment 4).**
- NI = No Impact
- MIIH = May Impact Individuals or Habitat, But Will Not Likely to Contribute
  - to a Trend Towards Federal Listing or Loss of Viability for the Population or Species
- WOFV* = Will Impact Individuals or Habitat with a Consequence That the
  - Action May Contribute to a Trend toward Federal Listing or Cause a Loss of Viability for the Population or Species
- BI = Beneficial Impact
- * Considered a trigger for a significant action in NEPA
- ** Note: The rationale for the conclusion of effects is contained in the NEPA document.

Table 2: Sensitive Species BE: Summary of Conclusion of Effects**

• **Species**	• **Alt. 1**	• **Alt. 2**
Agoseris elata	• NI	• NI
Asplenium septentrionale	• NI	• NI
Carex scirpoidea var. *stenochlaena*	• NI	• NI
Cimicifuga elata	• NI	• MIIH
Corydalis aqua-gelidae	• NI	• NI
Eucephalis(Aster) vialis	• NI	• NI
Iliamna latibracteata	• NI	• NI
Lewisia columbiana var. *columbiana*	• NI	• NI
Pellaea andromedaefolia	• NI	• NI
Polystichum californicum	• NI	• NI
Romanzoffia thompsonii	• NI	• NI
Sisyrinchium sarmentosum	• NI	• NI

Discussion of PETS Species

This section of the Biological Evaluation addresses only those plant species for which suitable habitat is present or for which sites were found, as presented in Table 1. Surveys were conducted using the intuitive-controlled method. Suitable habitat for 12 sensitive plant species occurs in the Wiley Thin Timber Sale area. No sensitive plant populations were located during field reconnaissance.

Descriptions and other relevant information for species for which habitat was present are detailed below:

Tall Agoseris (*Agoseris elata*)
Status: Oregon Heritage-List 2; R-6 Sensitive

A. Range and Habitat

Tall agoseris ranges from Washington to California. It inhabits dry to mesic meadows and open woods, from valleys to moderate montane elevations. Tall agoseris blooms from June-August, depending on the elevation.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Grass Fern (*Asplenium septentrionale*)
Status: Oregon Heritage- List 2; R-6 Sensitive

A. Range and Habitat

The grass fern has a circumboreal distribution; in Oregon it is found on Umpqua NF. This plant inhabits moist cliff crevices and talus slopes, and is recognizable throughout the growing season.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Carex scirpoidea* var. *stenoclaena
Status: Oregon Heritage- List 2; R-6 Sensitive

A. Range and Habitat

This species grows on wet rock faces in Washington, NE Oregon (Wallowa Mtns.), inland to northern idaho and western Montana, and north to Alaska. One disjunct site has been located on the McKenzie River Ranger District of the Willamette National Forest. Flowering occurs mid-July.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Tall Bugbane (*Cimicifuga elata*)
Status: Federal Species of Concern; State Candidate;
Oregon Heritage- List 1; R-6 Sensitive

A. Range and Habitat

Tall bugbane is a Pacific Northwest endemic found west of the Cascade crest. On the Willamette National Forest it has been found on the Sweet Home, McKenzie River, and Middle Fork Ranger Districts. This species grows on moist and generally steep north slopes, usually below 2500 feet in elevation. Tall bugbane generally grows beneath a mixed conifer and hardwood overstory. Tall bugbane sends up a spike of small white flowers in June, July or August.

B. Pre-field Review

One population of tall bugbane is documented near the planning area. A known population is located less than ½ mi north of unit 4 in late successional forest. Suitable habitat does occur in unit 4, however no evidence of the species was found during field reconnaissance.

C. Field Reconnaissance

A level C survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

- Evidence of this species was not found in any of the proposed management units in the planning area, therefore no direct effects are anticipated. For the known population north of unit 4, the conclusion of effects category (see attachment 3) appropriate for the proposed management would be:

- *May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Loss of Viability to the Population or Species.*

E. Cumulative Effects

Thinning the conifer overstory and creating canopy gaps will enhance habitat for tall bugbane in the long-term. A noxious weed infestation in unit 4 could spread to the tall bugbane population without appropriate weed control mitigation in the action alternatives. Tall bugbane populations in the Wiley Creek subwatershed have likely been devastated over the adjacent private lands

F. Conflict Determination

The consequence of adversly affecting the species in the Wiley Thin planning area is low: 10 populations of tall bugbane are known to occur on the Sweet Home Ranger District. These populations are scattered over hundreds of acres of suitable habitat and total nearly 1000 individuals. The likelihood of adversely affecting the population to the north of unit 4 is low to moderate because of possible noxious weed spread. The spread of the noxious weed in question, false brome (*Brachypodium sylvaticum*), would likely take considerable time to reach the tall bugbane population, and may not be able to compete effectively with native vegetation in the late seral habitat to the north of unit 4. Although unlikely, the population of tall bugbane could possibly be impacted without adequate noxious weeds mitigation. Provided adequate noxious weed mitigation and hardwood retention, management could improve overall habitat quality for the species in unit 4 by increasing canopy gaps and light to the understory, environmental characteristics that are favorable to tall bugbane.

G. Recommendations

Proceed with project, but mitigate for noxious weeds.

H. Communication with U.S. Fish and Wildlife Service

Not required for sensitive species.

Cold-water Corydalis (*Corydalis aqua-gelidae*)
Status: Federal Species of Concern; State Candidate;
Oregon Heritage - List 1; R-6 Sensitive

A. Range and Habitat

Cold-water corydalis is a local endemic found on the west slope of the Cascades in southern Washington and northern Oregon. On the Willamette National Forest it has been found on the Sweet Home and Middle Fork Ranger Districts. Its habitat is seeps, headwalls, and streamside under a coniferous canopy. This species can be recognized during the summer months.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Wayside Aster (*Eucephalis (Aster) vialis*)

- Status: Oregon Heritage- List 1; R-6 Sensitive

A. Range and Habitat

Road corridor and forest edge environments, or dry open woods with canopy gaps. Stands with frequent fire intervals of 5-25 years at elevations of 500 to 3150 feet. Flowering occurs from July through September.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

California globe mallow (*Iliamna latibracteata)*
Status: Oregon Heritage- List 2; R-6 Sensitive

A. Range and Habitat

California globe mallow is endemic to the Pacific Northwest, from Humboldt County, California north and through southern Oregon. A small population is located on private land near the Sweet Home RD. It prefers moist, open forest and streams at low to middle elevations. Globe mallow flowers from June to August.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found therefore no effects are anticipated.

Columbia Lewisia (*Lewisia columbiana* var. *columbiana*)
Status: Oregon Heritage- List 2; R-6 Sensitive

A. Range and Habitat

Columbia lewisia is found mostly in the Cascade Range of Oregon and Washington, and in the mountains of Idaho. It grows on exposed gravelly and rocky slopes or rock crevices, and blooms from May to August. One population is known from the Middle Fork District of the Willamette National Forest.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Coffee Fern (*Pellaea andromedaefolia*)
Status: Oregon Heritage- List 2; R-6 Sensitive

A. Range and Habitat

The coffee fern ranges from the middle of Oregon through southern California. It is a rock dweller, preferring non-calcareous substrate at low to middle elevations. This species is recognizable throughout the growing season.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

California Swordfern (*Polystichum californicum*)

Status: Oregon Heritage-List 2; R-6 Sensitive

A. Range and Habitat

The California swordfern is a Pacific Northwest plant, ranging from Washington to mid-California. One population is found on Sweet Home RD. This swordfern prefers sheltered, warm sites in cliffs and rock crevices at low elevations. It is recognizable throughout the growing season.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Thompson's Mistmaiden (*Romanzoffia thompsonii*)

Status: Oregon Heritage- List 1; R-6 Sensitive

A. Range and Habitat

Thompson's mistmaiden is an Oregon endemic which is found on all Ranger Districts on the Willamette NF. It prefers steep, vernally wet, open rocky slopes at low to middle elevations. This plant flowers from April through July, depending on elevation.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

Suksdorf's Blue-Eyed Grass (*Sisyrinchium sarmentosum*)

Status: Federal Species of Concern; State Candidate;

Oregon Heritage- List 1; R-6 Sensitive

A. Range and Habitat

This blue-eyed grass is found from Canada to Oregon and east to North Dakota. It prefers mesic meadows and streamsides. It blooms from June through July.

B. Pre-field Review

Suitable habitat does exist within the Wiley Thin planning area.

C. Field Reconnaissance

A level B survey was completed. Surveys were conducted in the summer and fall of 2001.

D. Analysis of Effects

Evidence of this species was not found, therefore no effects are anticipated.

ATTACHMENT 1: Regional Forester's Sensitive Plant List for the Willamette National Forest (Revised 2001). Species of federal, state and local importance are included on the R-6 list.

Species	Occurrence on WNF	ONHP Status	State Status	Federal Status	Habitat Types
Agoseris elata	S	2			MM,DM
Arabis hastatula	D	1		SofC	RO
Arnica viscosa	S	2			RS
Asplenium septentrionale	S	2			RO
Aster gormanii	D	1			RS
Botrychium minganense	D	2			RZ,CF
Botrychium montanum	D	2			RZ,CF
Botrychium pumicola	S	1	LT		HV
Calamagrostis breweri	D	2			MM,RZ
Carex livida	S	2			WM
Carex scirpoidea var. stenochlaena	D	2			RO
Castilleja rupicola	D	2			RO
Cimicifuga elata	D	1	C		CF
Coptis trifolia	S	2			WM,CF
Corydalis aqua-gelidae	D	1	C		RZ,CF
Eucephalis (Aster) vialis	S	1	LT	SofC	CF
Frasera umpquaensis	D	1	C		MM
Gentiana newberryi	D	2			MM
Iliamna latibracteata	S	2			CF,RZ
Lewisia columbiana var. *columbiana*	D	2			RS
Lycopodiella inundata	D	2			WM
Montia howellii	D	4	C		RZ
Ophioglossum pusillum	D	2			WM
Pellaea andromedaefolia	S	2			RO
Polystichum californicum	D	2			RO
Potentilla villosa	D	2			RS, RO
Romanzoffia thompsonii	D	1			RS
Scheuchzeria palustris var. americana	D	2			WM
Sisyrinchium sarmentosum	S	1	C	SofC	MM,DM
Utricularia minor	D	2			SW
Wolffia borealis	S	2			SW
Wolffia columbiana	S	2			SW

Occurrence on Willamette National Forest:

S = Suspected
D = Documented

Oregon Natural Heritage Program (ORNHP):

1 = Taxa threatened or endangered throughout range.
2 = Taxa threatened or endangered in Oregon but more common or stable elsewhere.
3 = Species for which more information is needed before status can be determined, but which may be threatened or endangered (Review).
4 = Species of concern not currently threatened or endangered (Watch).

Oregon State Status:

LT = Threatened
LE = Endangered
C = Candidate

Federal Status: These plant species were originally published as CANDIDATE THREATENED (CT) in the Smithsonian Report, **Federal Register**, July 1, 1975, or as PROPOSED ENDANGERED (PE) in a later report, **Federal Register**, June 16, 1976. The latest **Federal Register** consulted was dated September 30, 1993. Updated listings appear periodically in the Notice of Review (USFWS); the status of several species is categorized as follows:

LE = Listed as an Endangered Species
LT = Listed as a Threatened Species
PE = Proposed as an Endangered Species
PT = Proposed as a Threatened Species
C = Candidate for Listing as Threatened or Endangered
SofC = Species of Concern; taxa for which additional information is needed to support proposal to list under the ESA.

Habitat Types:

MM = Mesic meadows
WM = Wet meadows
DM = Dry meadows
RZ = Riparian zones, floodplains
CF = Coniferous forest
RS = Rocky slopes, scree
RO = Rock outcrops, cliffs
DW = Dry open woods
HV = High volcanic areas
SW = Standing water

ATTACHMENT 2: Field reconnaissance survey levels for determining presence potential for TES species.

Level A: Aerial photo interpretation and review of existing site records. Determination of the potential for a listed species to occur within the proposed project area. No field surveys completed.

Low potential:	Less than 40% potential for listed species inhabiting the project area.
Moderate potential:	40-60% potential for a listed species inhabiting the proposed project area.
High potential:	Greater than 60% potential for listed species inhabiting the proposed project area.

Level B: Single entry survey of probable habitats. Areas are identified by photos and existing field knowledge. Field surveys are conducted during the season most favorable for species identification.

Low intensity:	Selected habitat surveys (approximately 5-10% of area) are conducted with a single entry for listed species inhabiting the proposed project area.
Moderate intensity:	Selected habitat surveys (approximately 10-40% of area) are conducted with a single entry for listed species inhabiting the proposed project area.
High intensity:	Selected habitat surveys (approximately 40-60% of area) are conducted with a single entry for listed species inhabiting the proposed project area.

Level C: Multiple entry surveys are conducted for listed species likely to inhabit the proposed project area.

Low intensity:	Selected habitat surveys (approximately 5-10% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.
Moderate intensity:	Selected habitat surveys (approximately 10-60% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

High intensity:	Selected habitat surveys (approximately 60-80% of area) are conducted with repeated entries for listed species inhabiting the proposed project area.

ATTACHMENT 3: Conclusions Of Effects For Use In Biological Evaluations and Assessments,USDA Forest Service - Regions 1, 4, and 6, August, 1995

- **Listed Species:**
  - 1. No Effect
    Occurs when a project or activity will not have any "effect", on a listed species, or critical habitat.
  - 2. May Affect - Likely to Adversely Affect (LAA)
    - If the determination in the biological assessment is that the project May Affect - Likely to Adversely Affect a listed species or critical habitat, formal consultation must be initiated (50 CFR 402.12). Formal consultation must be requested in writing through the Forest Supervisor (FSM 2670.44) to the appropriate FWS Field Supervisor, or NOAA Fisheries office.
  - 3. May Affect - Not Likely To Adversely Affect (NLAA)
    - If it is determined in the biological assessment that there are "effects" to a listed species or critical habitat, but that those effects are not likely to adversely affect listed species or critical habitat, then written concurrence by the FWS or NOAA Fisheries is required to conclude informal consultation (50 CFR 402.13).
  - 4. Beneficial Effect
    - Written concurrence is also required from the FWS or NOAA Fisheries if a beneficial effect determination is made.

    Requests for written concurrence must be initiated in writing from the Forest Supervisor to the State Field Supervisor (FWS or NOAA).

- **Proposed Species:**

Whenever serious adverse effects are predicted for a proposed species or proposed critical habitat, conferencing is required with the FWS or NOAA.

  - 1. No Effect
    When there are "no effects" to proposed species, conferencing is not required with FWS or NOAA.
  - 2. Not Likely to Jeopardize the Continued Existence of the Species or Result in Destruction or Adverse Modification of Proposed Critical Habitat
    This conclusion is used where there are effects or cumulative effects, but where such effects would not have the consequence of losing key populations or adversely affecting "proposed critical habitat". No conferencing is required with FWS or NOAA if this conclusion is made. However, for any proposed activity that would receive a "Likely To Adversely Affect" conclusion if the species were to be listed, conferencing may be initiated.
  - 3. Likely to Jeopardize the Continued Existence of the Species or Result in

- Destruction or Adverse Modification of Proposed Critical Habitat
  This conclusion must be determined if there are significant effects that could jeopardize the continued existence of the species, result in adverse modification or destruction of proposed critical habitat, and/or result in irreversible or irretrievable commitments of resources that could foreclose options to avoid jeopardy, should the species be listed. If this is the conclusion, conferencing with FWS or NOAA is required.

- **Sensitive Species:**
  - 1. No Impact (NI)
    A determination of "No Impact" for sensitive species occurs when a project or activity will have no environmental effects on habitat, individuals, a population or a species.

  - 2. May Impact Individuals or Habitat, But Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)
    Activities or actions that have effects that are immeasurable, minor or are consistent with Conservation Strategies would receive this conclusion. For populations that are small - or vulnerable - each individual may be important for short and long-term viability.

  - 3. Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (WIFV)
    Loss of individuals or habitat can be considered significant when the potential effect may be:
    1. Contributing to a trend toward Federal listing (C-1 or C-2 species)
    2. Results in a significantly increased risk of loss of viability for a species
    3. Results in a significantly increased risk of loss of viability for a significant population (stock)

  - 4. Beneficial Impact (BI)
    Projects or activities that are designed to benefit, or that measurably benefit a sensitive species should receive this conclusion.

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APPENDIX B: WILDLIFE BIOLOGICAL EVALUATION

Wiley Thin Timber Sale

Wildlife Biological Evaluation

Sweet Home Ranger District, Willamette National Forest

Prepared By:/s/ Virgil Morris 11-18-03
District Wildlife Biologist **Date**

BIOLOGICAL EVALUATION

INTRODUCTION

Proposed management activities addressed in Wiley Thin Timber Sale Biological Evaluation may disturb individuals or alter habitat for Proposed (P), Endangered (E), Threatened (T) and Sensitive (S) species (PETS). A Biological Evaluation (BE) is required to determine possible impacts each alternative may have on:

1) Species listed as proposed for listing or currently listed as endangered or threatened. This includes Canada lynx, Northern spotted owl, and Northern bald eagle. All three species are threatened (USDA Forest Service, Pacific Northwest Region, 8/17/2000).

2) Species listed as sensitive that are documented or suspected to occur on the Willamette National Forest (Regional Forester's Sensitive Animal List, 11/15/00). This includes California wolverine, Pacific fisher, Baird's shrew, Pacific shrew, Pacific fringe-tailed bat, least bittern, bufflehead, Harlequin duck, yellow rail, tricolored blackbird, Peregrine falcon, black swift, foothill yellow-legged frog, Oregon spotted frog, Northwestern pond turtle, Oregon slender salamander, Cascade torrent salamander, and Mardon skipper.

ALTERNATIVES

One no-action (Alt. 1) and one action (Alt. 2) alternative have been identified. Activities under Alternative 2 that may affect PETS species through disturbance or habitat modification are listed below. All acreage and mileage figures are estimates.

1) Commercial thinning on approximately 80 acres.
2) Precommercial thinning on approximately 66 acres.
3) Aerial fertilization on approximately 70 acres.
4) Snag and down wood creation on approximately 466 trees.
5) Pruning on approximately 59 acres of young plantations.

Table B-1 identifies each of the PETS species and the effects this project will have on them. Only those species that may be disturbed or have affected habitat are discussed in greater detail.

There is no habitat within the project area for Canada lynx, Northern bald eagle, California wolverine, least bittern, bufflehead, harlequin duck, yellow rail, tricolored blackbird, black swift, foothill yellow-legged frog, Oregon spotted frog, and Northwestern pond turtle.

Table B-1: PETS Species List

Species	Step 1 Prefield Review	Step 2 Field Recon.	Step 3 Risk Assessment	Step 4 Analysis of Effect
Birds				
Spotted Owl	HP	Surveyed	Potential	MA-NLAA
Bald Eagle	HNP			
Peregrine Falcon	HNP			
Least Bittern	HNP			
Bufflehead	HNP			
Yellow Rail	HNP			
Tricolored blackbird	HNP			
Black Swift	HNP			
Harlequin Duck	HNP			
Mammals				
Canada Lynx	HNP			
Baird's Shrew	HP		Potential	May Impact
Pacific Shrew	HP		Potential	May Impact
Pacific Fringe-tailed Bat	HP		Potential	May Impact
Pacific Fisher	HP		Potential	May Impact
California Wolverine	HNP			
Herpetiles				
Foothill Yellow-legged Frog	HNP			
Oregon Slender Salamander	HP		Potential	May Impact
Cascade Torrent Salamander	HP		Potential	May Impact
Oregon Spotted Frog	HNP			
Northwestern Pond Turtle	HNP			
Insects				
Mardon skipper	HP		Potential	No Impact

HP = Habitat present
HNP = Habitat not present
*MA-LAA = **M**ay Affect, **L**ikely to **A**dversely **A**ffect*
*MA-NLAA = **M**ay Affect, **N**ot **L**ikely to **A**dversely **A**ffect*

DESCRIPTION OF AFFECTED SPECIES

NORTHERN SPOTTED OWL

The northern spotted owl (*Strix occidentalis caurina)* is listed as a threatened species known to occur in the Wiley Thin planning area.

Existing Condition

The Northern spotted owl occurs primarily within older timber stands with sufficient forest structure to provide food, cover, suitable nest sites, and protection from predators and weather. Suitable spotted owl habitat refers to nesting, roosting, and foraging (NRF) habitat and generally consists of forested stands over 80 years old, multi-storied with snags and down wood, and canopy closure generally exceeding 60%. Late

seral forest is superior habitat and preferred by spotted owls over other habitat conditions (Thomas et al. 1990).

Habitat that only provides for dispersal generally consist of forested stands 40 to 80 years old, canopy closure of 40 to 60%, and average tree diameter of 11 inches or greater. This habitat may also provide for some minimal foraging. Dispersal habitat is used by spotted owls to navigate between stands of suitable habitat and by juveniles to disperse from natal cores.

Timber harvest and road construction can affect spotted owls by modifying habitat within their home range. Habitat modification may occur in three different ways: (1) Degrade habitat – affect the quality of suitable owl habitat or dispersal habitat without altering the functionality of such habitat, (2) Downgrade habitat – alter the functionality of suitable habitat so that it no longer supports nesting, roosting, and foraging, and (3) Remove habitat – alter suitable or dispersal habitat to such an extent that the habitat no longer supports nesting, roosting, foraging, or dispersal.

Timber harvest and road construction may affect spotted owls by creating noise disturbance above ambient levels during the nesting season March 1 – September 30. Disturbance can occur from any activity producing above-ambient noise within 0.25 miles (0.5 miles for aircraft and 1.0 mile for blasting) of owls during the nesting season.

Timber harvest and road construction may also affect spotted owls by fragmenting the remaining habitat thereby creating more favorable conditions for great horned owls, which prey on spotted owls, and barred owls, which compete with spotted owls for territories.

The proposed units are located within a small block of public land surrounded by private timber land. Most of the surrounding private land has been harvested in the past. One owl pair is known in the vicinity of unit 4 on public land. This pair produced young in 1999. Habitat in unit 4 is not suitable owl habitat but is dispersal habitat.

The units and surrounding areas (out to 0.5 miles) were surveyed for spotted owls (R6 Survey Protocol) in 2001-2003. One additional spotted owl was detected at night in the vicinity of unit 1 but could not be located during the follow-up day visit.

Table B-2. Habitat within each unit.

Unit	Total Unit Acres	Acres of Suitable Habitat	Acres of Dispersal Habitat
1	18.4	0	18.4
2	28.0	0	28.0
3	24.6	0	24.0
4	7.4	0	7.4
Total	**78.4**	**0**	**77.8**

Canopy closure within the units (Table 2) is high (>80%) with tree diameters of the dominant and co-dominant trees exceeding 11 inches over portions of each unit. Down wood in the units is large and well decayed but of low amounts. Snags are more numerous but small, less than 10 inches diameter. The units currently provide for spotted owl dispersal habitat but are not suitable spotted owl habitat.

Late-Successional Habitat

Unit 1 is located in the Wiley Late-Successional Reserve (RO-216). The remaining units are in matrix lands.

Direct/Indirect Effects

Alternative 1- No Action
There will be no direct or indirect effects to spotted owls or spotted owl habitat. Habitat within the proposed units will continue to function as dispersal habitat.

Alternative 2
Treatment of 80 acres in Alternative 2 will degrade the existing dispersal habitat by removing part of the overstory. Quality of this dispersal habitat will be affected but the functionality will not since most treated areas will retain a minimum 40 percent canopy closure to maintain dispersal capability of the habitat. The exception will be 1.4 acres of unit 4c that will retain only 20% canopy closure due the desire to replace mistletoe infected hemlock with healthier growing stock.

Many of the existing snags within the treated areas will be felled for safety concerns during thinning operations, which may impact spotted owl prey species utilizing this habitat. These small snags will be retained as down wood. Thinning will also result in the loss of future snag and down wood habitat. Most of the trees removed would have eventually died from suppression thereby creating snags or down wood. This loss of habitat will be mitigated for by the creation of snags and down wood after thinning operations are completed. The created snags and down wood will be selected from the larger size diameter trees within the stands.

This project *may affect* dispersal habitat by removing up to 60 percent of the existing canopy but will have long-term benefits in the development of larger, more structurally diverse trees and through the creation of snags and down wood. These treatments will encourage the development of late-successional conditions to provide for a wide range of wildlife, including spotted owls.

There will be a seasonal restriction of March 1 – September 30 on all timber harvest operations that may disturb spotted owls within the LSR. There will be *no effect* to spotted owls within the vicinity of unit 1. Alternative 2 will create a *may affect* to spotted owls outside the LSR. Unit 4 will have a seasonal restriction of March 1 – July 15, allowing timber harvest to occur within the latter part of the nesting season.

Cumulative Effects
Cumulative effects result from the incremental impacts of past, present, and foreseeable future actions that remove spotted owl habitat. The Wiley Thin planning area has a long history of timber harvest and road building on both private and public lands. These actions have removed suitable spotted owl habitat in the past, which also reduced the amount of interior forest habitat available to spotted owls due to edge effect of the openings. This has allowed both great horned and barred owls to increase within the planning area. Both species can impact spotted owl numbers, either through predation by great horned owls or competition by barred owls for breeding territories.

There are no additional habitat altering projects on public lands being planned in the vicinity of this project at this time. There are ongoing timber harvest operations on private land in the vicinity of unit 1.

BAIRD'S SHREW
The Baird's shrew (*Sorex bairdi permiliensis***)** is a Region 6 Sensitive Species.

Existing Condition
The Baird's shrew is found in cool, moist areas, usually within coniferous or deciduous forests (Csuti et al.1 997). They often utilize down wood or ground litter in riparian and uplands. They feed on a variety of invertebrate species. It is thought they occur on the Sweet Home Ranger District and possibly in the Wiley Thin planning area.

Direct Effects
Some individuals may be lost or disturbed during the implementation of this project.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects
It is undetermined what specific impact this project will have on individuals or the species population, but retention of no harvest stream buffers, reduction in intense slash burns, and retention and creation of down wood and debris in this and future projects on public land will improve habitat conditions for this species.

For the Baird's shrew and its habitat, *a may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration.

PACIFIC SHREW
The Pacific shrew (*Sorex pacificus cascadensis*) is a Region 6 Sensitive Species.

Existing Condition
The Pacific shrew prefers humid forests, marshes, and thickets, often near riparian vegetation. They require down logs, brushy thickets, or ground debris for cover and hiding (Csuti et. al. 1997). They have been found in early successional forests.

It is thought they occur on the Sweet Home Ranger District and possibly in the planning area, but they have not been documented.

Direct Effects
Some individuals may be lost or disturbed during the implementation of this project.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects
It is undetermined what specific impact this project will have on individuals or the species population, but retention of no harvest stream buffers, reduction in intense slash burns, and retention and creation of down wood and debris in this and future projects on public land will improve habitat conditions for this species.

For the Pacific shrew and its habitat, a *may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration.

PACIFIC FRINGE-TAILED BAT
The Pacific fringe-tailed Bat (*Myotis thysanodes respertinu*) is a Region 6 Sensitive Species.

Existing Condition
The Pacific fringe-tailed bat occurs in the Cascade Range and Tillamook County in coniferous stands with numerous snags and large trees. Their distribution is patchy across their range. It is unknown if they occur on the Sweet Home Ranger District.

Direct Effects
Some individuals may be disturbed during the implementation of this project. Most of the existing snags that need to be felled are small but could receive some use.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects
It is undetermined what specific impact this project will have on individuals or the species population, but retention and creation of snag habitat in this and future projects on public land will improve habitat conditions for this species.

For the Pacific fringe-tailed bat and its habitat, a *may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration.

PACIFIC FISHER
The Pacific fisher (*Martes pennanti*) is a Region 6 Sensitive Species.

Existing Condition
The Pacific fisher primarily uses mature, closed canopy coniferous forest containing some deciduous component. They frequently use riparian corridors. They will use cutover areas as secondary habitat. Abundant snag and down wood habitat is important.

One sighting of Pacific fisher was recorded on the Sweet Home Ranger District with additional sightings on adjacent Districts.

Direct Effects
Some individuals may be disturbed during the implementation of this project.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects
It is undetermined what specific impact this project will have on individuals or the species population, but retention of no harvest stream buffers, reduction in intense slash burns, and retention and creation of down wood and debris in this and future projects on public land will improve habitat conditions for this species.

For the Pacific fisher and its habitat, a *may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration.

OREGON SLENDER SALAMANDER
The Oregon slender salamander (*Batrachoseps wrighti*) is a Region 6 Sensitive Species.

Existing Condition
The Oregon slender salamander typically occurs under tree bark and moss on the ground in mature and second-growth Douglas-fir forests (Csuti et al.1997). Bark heaps at the base of snags and down wood appears to be very important.

Direct Effects
Some individuals may be disturbed during the implementation of this project.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects
It is undetermined what specific impact this project will have on individuals or the species population, but retention of no harvest stream buffers, reduction in intense slash burns, and retention and creation of down wood and debris in this and future projects on public land will improve habitat conditions for this species.

For the Oregon slender salamander and its habitat, a *may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration

CASCADE TORRENT SALAMANDER
The Cascade torrent salamander (*Rhyacotriton cascadae*) is a Region 6 Sensitive Species.

Existing Condition
The Cascade torrent salamander occurs in the Cascade Range in rocks bathed in a constant flow of cold water, in cool rocky streams, lakes and seeps, usually within conifer or alder forests (Csuti et al. 1997). They are dependent on nearly continuous access to cold water and can be found moving about in forests during wet weather.

Direct Effects
Some individuals may be disturbed during the implementation of this project.

Indirect Effects
Some habitat may be impacted by ground disturbance.

Cumulative Effects

It is undetermined what specific impact this project will have on individuals or the species population, but retention of no harvest stream buffers, reduction in intense slash burns, and retention and creation of down wood and debris in this and future projects on public land will improve habitat conditions for this species.

For the Cascade torrent salamander and its habitat, a *may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species* determination was made for Alternative 2. This impact should be of short duration.

Mardon Skipper
The Mardon Skipper (*Polites mardon*) is a Region 6 Sensitive Species.

Existing Condition
The Mardon Skipper is a small butterfly less than one inch in length that occurs in open grasslands in the Cascade Range. Shade can be a barrier to this species. Adults depend on flowering plants for food and native bunchgrass for egg laying. Caterpillars feed on the grass after hatching and chrysalids (pupa) hibernate in the grass crowns during the winter.

The natural opening on private land adjacent to unit 2 may provide suitable habitat. It is unknown if this species occurs here or on the Sweet Home Ranger District.

Direct Effects
Thinning being planned for unit 2 is not close enough or heavy enough to expand the natural opening on private land. There will be no direct effects to this species.

Indirect/Cumulative Effects
There should be not indirect or cumulative effects from this project.

This project will have *no impact* on the Mardon Skipper or its habitat.

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APPENDIX C: FISH BIOLOGICAL ASSESSMENT

Project Name: Wiley Thin Timber Sale

NEPA Document Name: Wiley Thin Timber Sale

Watershed Analysis: South Santiam Watershed Assessment, E&S Environmental Chemistry, Inc. and South Santiam Watershed Council, January 2000.

Other ESA Consultation: USFWS Wildlife Biological Opinion 2/27/03, Ref. # 02-7967

Administrative Unit: Willamette National Forest, Sweet Home Ranger District

Prepared By: Wade Sims, ESA Consultation Biologist (Fisheries), Willamette & Siuslaw NFs

Date: September 23, 2004

ESA Unit, Critical Habitat, and EFH Addressed in this BA:

LISTED SPECIES or HABITAT	ESA STATUS	ESA / EFH DETERMINATION
Upper Willamette River Spring Chinook Salmon ESU	Threatened	May Affect, Not Likely to Adversely Affect
Upper Willamette River Winter Steelhead ESU	Threatened	May Affect, Not Likely to Adversely Affect
Spring Chinook Salmon Essential Fish Habitat	N/A	Will Not Adversely Affect

Project Location:

HUC	NAME	USGS HUC CODE
4th Field	South Santiam River	17090006
5th Field	Wiley Creek	1709000605
6th Fields	Lower Wiley Creek	170900060501
	Little Wiley Creek	170900060502

I. INTRODUCTION

This Biological Assessment (BA) was prepared in accordance with the following guidance and direction:

Endangered Species Act of 1973 (as amended),

50 CFR § 402.12 (Interagency Cooperation, Biological Assessments),

Endangered Species Consultation Handbook (USFWS and NMFS, March 1998),

Streamlined Consultation Procedures for Section 7 of the Endangered Species Act (FS, NMFS, BLM and USFWS, July 1999),

Analytical Process for Development of Biological Assessments for Consultation on Federal Actions Affecting Fish Proposed or Listed Under the Endangered Species Act Within the Northwest Forest Plan Area (Draft Interagency Guidelines, August 2004) and,

Magnuson-Stevens Fishery Conservation and Management Act (§ 305(b)) and its implementing regulations (50CFR § 600).

This project has the potential to affect Upper Willamette River (UWR) spring chinook salmon and Upper Willamette River (UWR) winter steelhead, species listed as threatened under the ESA. This document assesses the potential effects that the implementation of the project may have on these species and their habitat and also evaluates the effect of the project on Essential Fish Habitat (EFH) as designated by the Magnuson-Stevens Fishery Conservation and Management Act.

This Biological Assessment was reviewed by the Willamette Basin Streamlined Consultation Level I team (Fisheries) on August 10, 2004. The team agreed that the Biological Assessment was complete, and agreed that the determinations reached with the Biological Assessment were accurate.

In conjunction with the recent efforts to clarify language in the 1994 Northwest Forest Plan Record of Decision regarding the Aquatic Conservation Strategy, and in response to concerns raised in previous litigation, NOAA Fisheries has been working with the U.S. Fish and Wildlife Service (USFWS), BLM, and the Forest Service (FS) to revise the methods for making determinations of effect for land management activities impacting ESA-listed salmonid species in the Northwest Forest Plan geographical area. This new approach, currently in draft form entitled "*Analytical Process for Development of Biological Assessments for Consultation on Federal Actions Affecting Fish Proposed or Listed Under the Endangered Species Act Within the Northwest Forest Plan Area*" (herein referred to as the AP) was used to assess the effects of this proposed action.

The constituent activities or elements of the proposed action (e.g., timber harvest, road construction, log hauling) were analyzed for potential effects on the habitat pathways of water quality, habitat access, habitat elements, channel conditions and dynamics, flow/hydrology, and watershed conditions. Each pathway has several relevant habitat indicators, such as temperature, physical barriers, and large woody debris.

In applying the AP approach, the action agency is to consider eight factors, derived largely from the joint NOAA Fisheries Service and Fish and Wildlife Service ESA Section 7 Consultation Handbook, when evaluating the effects of an action on habitat indicators and subsequently the effects on ESA-listed fish. These factors are proximity, probability, magnitude (severity and intensity), nature, distribution, frequency, duration, and timing. It is possible for agencies to complete their action analysis and reach an effect determination using only the first three factors. For example, if the action agency determines the species or habitat is not in proximity to the effects of a project element, then the element has a neutral effect on this indicator and no further analysis is needed. Likewise, if the outcome of assessment of the probability factor is entirely discountable (extremely unlikely to occur), no further factor analysis is required for that element. If the outcome of the probability analysis is not discountable, the element should be assessed for the magnitude factor. Again, should the outcome of the assessment for magnitude result in insignificant effects, no further factor analysis is required for that project element.

This analysis considered the potential direct and indirect effect of the project's elements on each habitat indicator and then utilized the relevant factors to determine if there was an effect and whether it was insignificant, discountable, or beneficial. A summary for each habitat indicator has been developed to ascertain whether effects from various elements combine to create adverse effects on any of the indicators. There are no other concurrent Federal action consultations that, when combined with this action, would have a significant effect on the watershed's baseline conditions. Also, there are no interrelated or interdependent actions related to the proposed project that require consideration. All of this information was used to make an overall project effect determination.

II. ACTION AREA DESCRIPTION

The ESA defines the Action Area as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." (50 CFR § 402.02 Definitions).

This project has timber harvest units in both of the 6th field watersheds that make up the Wiley Creek 5th field watershed (Upper Wiley Creek and Little Wiley Creek) (Figure 1). All road work and timber transportation which may affect the ESA listed fish species also occurs in these two 6th field watersheds. There is a very low or zero probability that this project will directly or indirectly affect listed fish downstream from the Wiley Creek confluence with the South Santiam River. Therefore, these two 6th field watersheds are designated as the Action Area for the purpose of this consultation.

Wiley Creek flows into the South Santiam River immediately downstream (600 meters) from Foster Dam (Figure 1). None of the Wiley Creek watersheds were designated as Key Watersheds under the Northwest Forest Plan.

A Watershed Analysis was completed for the South Santiam Watershed which includes the potentially affected watersheds. This document was finalized in January, 2000 and prepared by E&S Environmental Chemistry, Inc. and the South Santiam Watershed Council.

The Forest Service administers very little land in the Wiley Creek watershed (Figure 1 and Table 1). Approximately 914 acres of the Forest Service land has been previously harvested

and replanted. Most of the remaining 486 national forest acres are within the Wiley LSR block (424 acres).

Private land in the Wiley Creek watershed is primarily owned by timber companies. Most of these private timberlands have been previously harvested and replanted. These companies are now actively managing these plantations to reduce stocking levels with commercial thins and regeneration harvest

Table 1. Land Ownership in the Wiley Creek Watershed.

Watershed	Acres	Land Ownership					
		Private		Forest Service		BLM	
		Acres	Pct	Acres	Pct	Acres	Pct
Wiley Creek 5th	40,577	39,047	96%	1,400	3.5%	130	0.5%
Upper Wiley Creek 6th	29,700	28,820	97%	790	2.5%	90	0.5%
Little Wiley Creek 6th	10,877	10,227	94%	610	5.5%	40	0.5%

Baseline Watershed Condition, FWS/NOAA Fisheries Table of Population And Habitat Indicators

Due to the limited amount of Federal land in the Wiley Creek 5th field watershed, there has been very little watershed condition data collected. ODFW surveyed Wiley Creek and two small tributaries to Wiley Creek in 1994. No quantitative data is available for conditions in Little Wiley Creek. Field observations indicate that the conditions of the two watersheds are similar, therefore the condition ratings for the two 6th field watersheds are indicative of the 5th field watershed condition. Table 2 shows the baseline condition of the Action Area. Data from ODFW stream surveys, Watershed Analysis, and professional judgment was used to categorize the condition of each indicator. A narrative discussion on the baseline condition for the indicators is provided later in this document under the effect rationale section.

Table 2. Action Area Baseline Condition, Wiley Creek 5th Field Watershed.

Indicator	Baseline Watershed Condition
	Wiley Creek 5th Upper Wiley Creek/Little Wiley Creek 6ths
Temperature	NPF
Sediment / Turbidity	AR
Chemical Contamination / Nutrients	PF
Physical Barriers	AR
Substrate	AR
Large Woody Debris	NPF
Pool Frequency and Quality	NPF

Large Pools	NPF
Off-Channel Habitat	NPF
Refugia	NPF
Width/Depth Ratio	NPF
Streambank Condition	PF
Floodplain Connectivity	NPF
Peak/Base Flows	AR
Drainage Network	NPF
Road Density and Location	NPF
Disturbance History	NPF
Riparian Reserves	NPF
Disturbance Regime	NPF
Summary Rating	NPF

NPF = Not Properly Functioning
AR = At Risk
PF = Properly Functioning

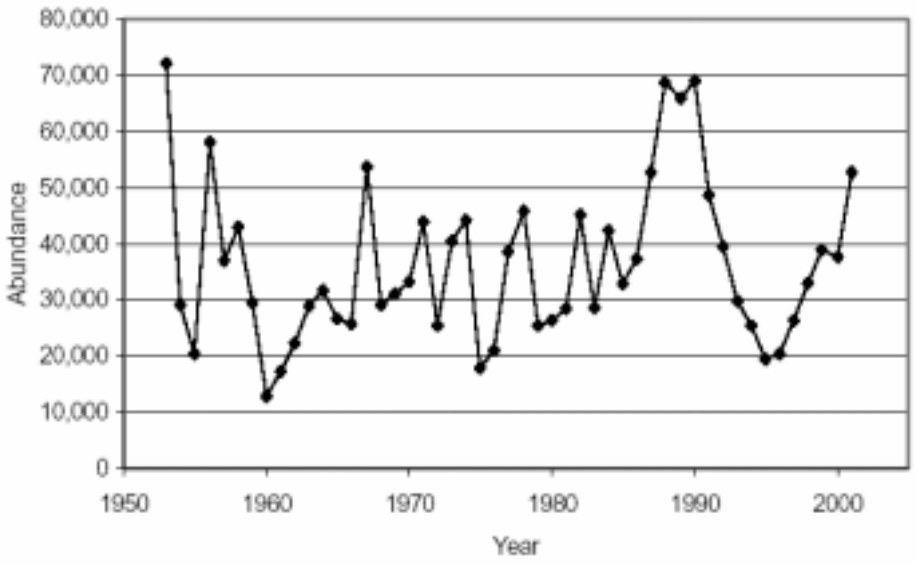
III. ESA FISHERIES INFORMATION

This project is located in watersheds currently providing habitat for the UWR spring chinook salmon and UWR winter steelhead. Both species are listed as threatened under the Endangered Species Act. Streams in the action area that are utilized by UWR spring chinook salmon have been designated as Essential Fish Habitat under the Magneson Stevens Act.

UWR spring chinook salmon and UWR winter steelhead utilize habitat in the Wiley Creek watershed (Figure 1). The winter steelhead typically utilize all stream reaches as shown in the figure, while spring chinook salmon will only utilize all of the available habitat during higher flow years, and more often are found lower in the watershed. **For the purposes of this consultation, we will consider the distribution of the two species to be synonymous**. The majority of winter steelhead spawning activity occurs in the upper reaches of these tributaries. The majority of spring chinook salmon spawning activity occurs in the lower mainstem reaches of Wiley Creek and Little Wiley Creek.

Spring Chinook Salmon

The graph below shows the number of UWR spring-run chinook passing Willamette Falls. The count is of mixed natural and hatchery origin, with the majority of fish likely of hatchery origin. (NOAA Fisheries BRT, 2003).



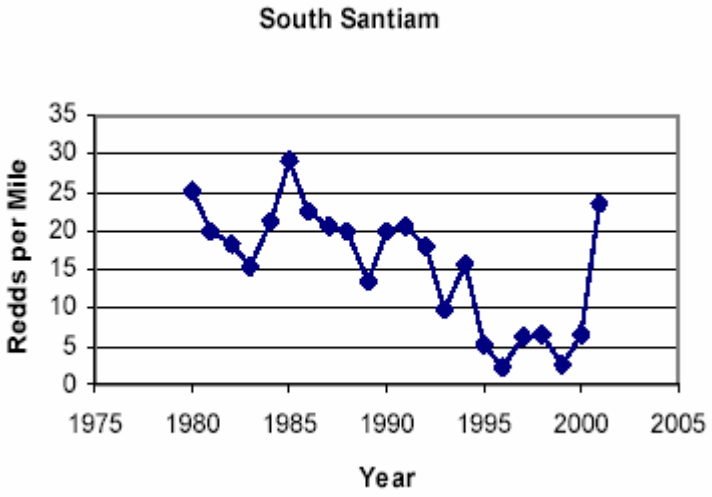
NOAA's Basin Recovery Team (BRT) has compiled some information on the biological condition of the spring chinook salmon in the Upper Willamette River. A 2002 survey of 50.8 miles of stream in the South Santiam River below Foster dam found 982 redds. However, 84% of the carcasses recovered in the South Santiam in 2002 were fin-clipped and of hatchery origin (Schroeder et al 2002). Fin-clip recovery fractions for spring chinook in the Willamette tend to underestimate the proportion of hatchery-origin spawners (Schroeder et al 2002), so the true fraction is likely in excess of 84 %. This population is not considered self-sustaining.

ODFW surveyed for redds in Wiley Creek in 2002, finding only 1 redd in 1.5 miles, with 26 observed dead salmon. They surveyed 22.7 miles of index area stream reaches in the South Santiam River basin in 2002, and found 28 total redds, and 85 dead salmon. ODFW does not consider Wiley Creek to be an important spring chinook salmon stream (Wayne Hunt, ODFW, pers. comm. 2004). Spring chinook salmon spawn in the Wiley Creek watershed during September through mid-October. Fry typically emerge from redds by March.

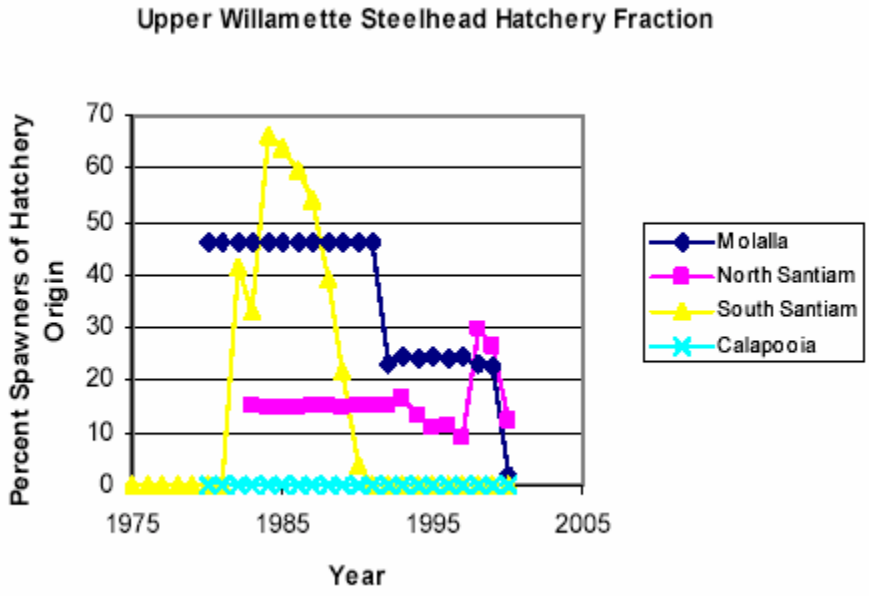
Winter Steelhead

NOAA's 2003 assessment of winter steelhead below Foster Dam reached similar conclusions. They indicated that they could not conclusively identify a single population that is naturally self-sustaining.

The following graph shows the results of their redd surveys of winter steelhead in the South Santiam below Foster Dam.



This graph shows the percent of the population that is of hatchery origin.



ODFW has found an average of 24 redds over the last 5 years in a 1.3 mile reference reach on Wiley Creek. They typically survey 8.8 miles of index area stream reaches in the South Santiam River basin, and find 130 redds per year, on average. ODFW does consider Wiley Creek to be an important winter steelhead stream (Wayne Hunt, ODFW, pers. comm. 2004). Winter steelhead spawn in the Wiley Creek watershed during March through May, with most

spawning occurring in late March through early May. Fry typically emerge from redds by July 15.

IV. PROJECT DESCRIPTION

This project, scheduled to be implemented in 2005, plans to commercially thin approximately 77 acres of previously harvested and densely planted conifer-dominated stands of timber, producing 2,243 CCF of timber, accelerating the development of late successional habitat characteristics, and increasing the growth and vigor of the retained overstory vegetation.

Managed stands proposed for thinning were previously regeneration harvested between 1955 and 1965, and planted with a mix of conifer seedlings. Three of the four stands were pre-commercially thinned when trees were 10-15 years old. Current stocking levels in these stands range from 150 to 350 trees per acre with patchy distribution due to site conditions and natural hardwood competition. Stocking levels should be lowered (70 to 100 trees per acre) for optimal tree growth and stand vitality over the next 20 years. Unit 1 is in LSR, other three are in Matrix. The site potential tree height for this area is 172 feet. All applicable R6 Forest Service Best Management Practices for protecting water quality will be implemented.

This project can be divided into five specific elements:

1. Timber felling,
2. Log yarding and decking at landings,
3. Road construction, reconstruction and decommissioning,
4. Road maintenance, and,
5. Transportation of logs from landings to the mill

Each activity element is described in detail below.

1) Tree felling

This project will harvest timber from approximately 77 acres, as shown in Table 3. This activity is scheduled to occur during approximately 55 days (40 days for the ground based yarded units and 15 days for the skyline units) throughout August and September of 2005.

Trees will be harvested in six acres of riparian reserves within units 1, 2, and 4a (see Figures 2,3 and 5). These riparian reserves are associated with intermittently flowing stream channels, which will be buffered with a 50’ no-harvest, no-entry protection area on either side of the stream. This treated stands within riparian reserves extend on both sides of the intermittent stream within Unit 1, and on the very upper portions of two intermittent streams in Units 2 and 4a. Higher stocking levels will be retained in thinned areas of intermittent stream riparian reserves. Full retention buffers (one site potential tree height, 172 feet) are established along all perennial stream channels, and there will be no harvest within these buffers.

Most stand densities will be reduced to 40-60%, except for a 1.2 acre parcel (Unit 4c) which will be thinned to 20% average canopy closure in order to remove mistletoe-infected western hemlock, which comprises most of the stand.

2) Log yarding and decking

All units harvested using a harvester (processor)/forwarder system except a portion of unit 2 (approximately seven acres) which will be skyline yarded. This activity is scheduled to occur during approximately 55 days (40 days for the ground based yarded units and 15 days for the skyline units) throughout August and September of 2005.

Ground-based yarding equipment will not be used on slopes greater than 30% gradient. Yarding will not occur within or across riparian reserves with the exception of the ground based yarding in the treated areas on the outer portions of three intermittent streams as described above. Yarding within riparian reserves will not occur when the soil is saturated with water, in order to minimize soil compaction, displacement, and rutting. The intermittent stream crossing in Unit 1 will be crossed by the harvester/forwarder ground based equipment at an existing log "culvert" crossing. As a standard practice, soil at this crossing will be partially protected by placing logging slash in front of the equipment, creating a mat of branches for the equipment to drive across. Post-use assessment will prescribe some additional restoration measures such as seeding or water-barring, again as a standard management practice.

3) Road construction, Reconstruction, and Decommissioning

No new permanent roads will be constructed with this project. Several short sections of temporary road will be constructed to allow access to preferred landing sites within harvest units, primarily within Unit 2. This temporary road will be constructed, utilized and decommissioned in August 2005. None of these roads are within riparian reserves, nor do they have any hydrologic connection (i.e. no culverts are necessary).

The existing roads to be used by this project are of suitable quality and are relatively stable systems, which receive frequent use by the public and commercial traffic. Two road segments within Units 1 and 2 will have minor reconstruction, limited to the application of spot rock, and some minor surface clearing and brushing.

Short harvester/forwarder skid trails will be created to facilitate logging and then decommissioned immediately following their use. These paths will not require spec road construction, and are all outside of riparian reserves, with the exception of minimal travel through the outer portion of the few treated intermittent stream reaches. Access will need to be provided across one intermittent stream interior to Unit 1 for the harvester/forwarder equipment. There is an existing low standard road at this crossing (log "culvert"), and the equipment will cross at the previously disturbed site. No new culverts will be installed, no additional road surfacing will be applied, and use of this crossing will only occur during non-saturated soil conditions and when the stream is dry. The crossing will have limited understory vegetation removed to facilitate access.

Table 3. Unit specific information, Wiley Timber Sale.

Unit	Approximate Unit Size (Acres)	Acres RR Treatment[1]	Mean Tree Age	Mean Tree DBH (in)	Mean Tree Height (ft)	% Canopy Retained[2]	Trees Per Acre		Midpoint Elevation (ft)	Typical Unit Slope (%)	Length of Stream (ft) Potentially Affected[3]	Distance (ft) to Perennial Stream	Distance to Listed Fish (miles)
							Pre	Post					
1	18	5	30-45	12	90	50	230	102	2,000	**15-30**	740	172	0.3
2	28	0.5	40-45	9	65	50	115	70	2,860	30	100	500	1.2
3a	4	0	30	10	80	60	130	92	2,600	20	0	650	0.5
3b	7	0	30	10	80	40	130	92	2,500	25	0	500	0.5
3c	11	0	45	11	80	40	250	140	2,670	30	0	660	0.5
3d	2	0	30-45	10	80	40	130	92	2,380	30	0	1,400	0.5
4a	4	0.5	45	11	80	60	240	120	2,100	25	100	475	0.5
4b	2	0	45	10	80	40	250	100	2,120	30	0	575	0.5
4c	1	0	45	8	60	20	300	50	2,140	15	0	725	0.5

1 All riparian reserve treatment is along stream with intermittent flow, all perennial streams are buffered from harvest by full width NW Forest Plan riparian reserve widths.

2 Higher canopy retention (60%) in treated riparian reserves, Mean existing canopy closure is approximately 85%.

3 This is the total length of stream within a harvest unit, all of which are intermittent, and which are partially protected by a no-treatment, no-entry buffer which extends 50 feet on either side of the stream channel.

4) Road maintenance

Minimal road maintenance will be needed prior to being used by this project. Some brushing, limited spot rocking, and minor ditch cleaning will be conducted on the 220 road between Unit 3 and Unit 4 (Figure 6). An estimated two days of maintenance is scheduled to occur in August 2005. Other roads used by the project are in good existing condition and will not require pre-use maintenance. During project implementation, it may be necessary to perform some road maintenance such as grading and applying water for dust abatement purposes. The specific location of this work will not be known until the project is underway, as the work will be conducted on an as-needed basis.

5) Timber transportation

This project will require log trucks to haul approximately 221 loads of logs from the project area. This activity will occur during an estimated 40 day period during August and September 2005. About 77 of these trips will use the aggregate surfaced road 220 adjacent to

Wiley Creek, and 98 loads will be hauled from Unit 2 down the 100 road which is an aggregate surfaced ridgetop road system separating the Wiley Creek and Little Wiley Creek watersheds. The remaining 46 loads of logs (from Unit 1) will be hauled north, down a high quality road out of the action area. (There will be no effect to ESA listed fish due to this segment of haul, and it is not discussed further in this document).

Haul will only be allowed during the drier periods of the year (June through October). Dust abatement (spraying water) will be utilized as necessary to reduce the probability of airborne sediment reaching Wiley Creek.

The haul route crosses twelve perennial streams (aggregate surfaced road crossings Figure 6, # 1-11 and a paved bridged crossing over Wiley Creek Figure 6, #12). Six of these perennial stream crossings are distant from streams utilized by ESA listed fish (# 1-6, Figure 6; Table 4), and six of the crossings (#7-12) are very close to listed fish habitat in Wiley Creek or its tributaries (Figure 6, Table 4).

Three of these twelve crossings are over streams utilized by ESA listed fish (#8, 10, and 12). These crossings are on the 220 road, with two of the crossings (#8 and #10, Figure 6) over minor tributaries to Wiley Creek (culverts), and the other at a bridged crossing near the Wiley Creek/Little Wiley Creek confluence. The approaches to the bridge crossing and the bridge surface are paved. The approaches to crossing #8 and 10 are low gradient, have an aggregate surface, and show no indication of surface rutting or excessive surface erosion.

Approximately 1.75 miles of the 220 road used for timber transport is within the riparian reserve associated with Wiley Creek. About 0.75 miles of this road is within 100 feet of Wiley Creek.

Perennial stream crossings along the haul route will have any ditches draining into them mulched for a 200-foot distance above their confluence. Weed free straw bales may be used as sediment trapping devices if deemed necessary at the time of operation. Water sources for filling trucks will be mulched to reduce the amount of sediment entering the channel as a result of overfilling and hose drainage. Straw bales could also be utilized to reduce sediment input at these locations, if necessary.

Table 4. Timber Haul Route Information

Road Number	Surface Type	Est. Use (Loads)	Dust Abate-ment?	Haul Dates	Number of Stream Crossings:			Miles of Haul Route Adjacent[1] To:	
					Over LFH Streams	Over Other Perennial	Closest Distance to LFH (feet)	LFH Streams	Perennial Streams
220	Aggregate	77	Yes	Jun-Oct	3	9	0	0.75	0.4
100	Aggregate	98	No	Jun-Oct	0	0	100	0	0

LFH = ESA Listed Fish Habitat, in this case UWR spring chinook salmon and/or UWR winter steelhead.

[1] Adjacent = within 100 feet

Table 5. Aggregate Surfaced Road and Perennial Stream Crossing Information

Road Number	Crossing Number	Road Surface	Distance to LFH (ft)	Downstream Condition Between Crossing and LFH	Channel Gradient Downstream
220	1	Aggregate	4,000	Complex	
	2	Aggregate	6,400	Complex	
	3	Aggregate	6,400	Complex	
	4	Aggregate	3,300	Complex	
	5	Aggregate	4,900	Complex	
	6	Aggregate	2,900	Complex	
	7	Aggregate	65	Simplified	Low <5%
	8	Aggregate	0	Simplified	Low <5%
	9	Aggregate	100	Simplified	Low <5%
	10	Aggregate	0	Simplified	Low <5%
	11	Aggregate	145	Simplified	Low <5%

V. DETERMINATION OF EFFECT

This project is located in a watershed which provides habitat for listed UWR spring chinook salmon and UWR winter steelhead, and these species currently occupy and utilize this habitat for adult holding, spawning, and juvenile rearing and over-wintering. The implementation of this project will result in a disturbance; soils will be displaced and compacted, vegetation will be cut and removed, and vehicle traffic on roads will be increased. This disturbance has the potential to expose ESA listed UWR spring chinook salmon and UWR winter steelhead to adverse effects. This project was designed to minimize or eliminate any adverse effects, while also meeting other land management plan objectives.

An analysis is presented below that summarizes the total effect that the project will have on UWR winter steelhead and UWR spring chinook salmon. Projects that are classified as Not Likely to Adversely Affect must have only insignificant and/or discountable effects on ESA listed fish or their habitat. These terms are defined by the AP as:

> *Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.*

The conclusion of this analysis is that the expected effects will be discountable and/or insignificant because of the spatial separation of most of the project from streams occupied by the ESA listed fish, the low likelihood that the implementation of the project will affect either species or their habitat, and the limited magnitude of these effects if any were to occur. Other factors were analyzed and determined to not be of concern.

Therefore, it is determined that this project **May Affect,** but is **Not Likely to Adversely Affect** UWR spring chinook salmon, UWR winter steelhead, and/or their habitat. Using the same logic regarding effects to fish habitat, it is also determined that this project will **Not Adversely Affect** Essential Fish Habitat for spring chinook salmon. Essential Fish Habitat is not designated for winter steelhead.

The effect that this project may have on ESA listed UWR spring chinook salmon and UWR winter steelhead was assessed using these eight factors:

1) Proximity – The geographic relationship between the project element or action and the species/designated critical habitat.

2) Probability – The likelihood that the species or habitat will be exposed to the biotic or abiotic effects of the project element or action to the indicator.

3) Magnitude - The severity (stated in terms of how long the species or habitat will take to recover after the effect) and intensity (stated in term of how much of the habitat or how many of the individuals or populations in the action area will be affected) of the effect.

4) Distribution - The geographic area in which the disturbance would occur (may be several small effects or one large effect).

5) Frequency - How often the effect would occur.

6) Duration - How long the effect would last. Potential categories include a) short-term event whose effects subside immediately (pulse effect); b) sustained, long-term effect, or chronic effect whose effects persist (press effect); and c) permanent event that sets a new threshold for a species' environment (threshold effect).

7) Timing - When the effect would occur in relation to the species' life-history patterns.

8) Nature - Effects of the action on elements of a species' life cycle, population size or variability, or distribution; or on the primary constituent elements of critical habitat, including direct and indirect effects.

Each of the habitat indicators are assessed in the following sections using the relevant factors as described in the AP. A summary of how the effects to the indicators are translated into effects to the ESA listed fish is presented below.

Proximity Although some of the existing roads used for the transportation of logs out of the project area cross stream habitat currently utilized by the two ESA listed fish, most of the project elements occur at least 0.3 miles upslope from listed fish habitat, and there are limited effect pathways connecting the elements to streams occupied by ESA listed fish.

Probability The likelihood that the ESA listed fish will be exposed to negative effects associated with this project is low. BMPs and project design criteria will likely stop or minimize any potential negative changes in any habitat indicators before they result in adverse effects to the ESA listed fish species. However, vegetation management, road construction, and timber transportation all have a small probability of indirectly leading to site-scale degradation of the indicators for watershed health, so there is a potential that these site-scale effects could be transferred to the downstream reaches occupied by the listed fish.

Magnitude The project elements most likely to negatively affect ESA listed fish habitat are road maintenance and timber transport. Since this activity only occurs adjacent to a small

portion of the available habitat, and the effects are not expected to persist, the severity of the negative effect is expected to be very minimal.

Distribution The potential limited negative effects will occur at only a few very small areas, at five stream crossings.

Frequency The project will be implemented in one season of operation, August through September, therefore would have very limited frequency effect.

Duration If negative effects are in fact realized, they will be of short duration, likely to only persist for a few months after the first Fall rain events.

Timing Effects are expected to be discountable or insignificant. However, If any non-predicted negative effects to ESA listed fish habitat were to occur, they would affect these fish during the first fall and winter following the implementation of the project. This is the time period when the adult ESA listed fish are spawning, and fertilized eggs are present in the redds.

Nature Effects are expected to be discountable or insignificant. However, it any non-predicted negative effects were to occur, they would minimally affect adult spawning success and potentially affect egg-fry survival rates.

The above assessment of the limited proximity of the project to ESA listed fish habitat, the very low probability that any negative effects will be transmitted to ESA listed fish habitat, and the low expected magnitude of any negative effects, if they were to occur leads to the determination that this project will have only insignificant and/or discountable negative effects on UWR spring chinook salmon, UWR winter steelhead, or their habitat.

Section VI, below, provides a more detailed assessment of the potential effect that each project element will have on the AP indicators, where appropriate, as well as providing an assessment of the baseline condition for each indicator.

VI. RATIONALE FOR DETERMINATION OF EFFECT AND BASELINE CONDITION INFORMATION

A review of the AP habitat indicator list revealed that some indicators may be directly or indirectly affected by the implementation of this project: The following is a brief assessment of potential effects that *might* occur with timber sale actions in general.

1) Suspended Sediment - Intergravel DO/Turbidity and Substrate. Skidding and yarding of logs, with the associated soil disturbance and compaction, road improvements such as blading, ditch cleaning and culvert replacements, new temporary road construction, and the transport of logs on roads all have the potential to increase sediment delivery rates to streams.

2) Woody Material. Removal of trees has the potential to affect short-term and long-term woody material recruitment rates to the stream network.

3) Peak / Base Flows and Disturbance History. Vegetation removal has the potential to affect water yield and timing. Since this land management project will be manipulating vegetation and disturbing soils, it will increase the land area affected by disturbance in the watershed.

4) Temperature. Vegetation manipulation within riparian reserves has the potential to reduce stream shade and subsequently affect stream temperature

5) Road Density & Location. Construction of new roads will increase road density and based on the established NOAA guidelines, this could potentially lead to a watershed-scale degradation.

6) Riparian Reserves. This project will harvest and yard logs within riparian reserves, so the reserves could potentially be affected.

There is a very low probability that the remaining AP habitat indicators will be directly or indirectly affected.

The baseline condition of these indicators, and a discussion on the expected effects this project may have on the indicators is discussed in the following narrative.

Suspended Sediment - Intergravel DO/Turbidity, Substrate Character, and Embeddedness

The baseline condition of the Wiley Creek watershed is At Risk for turbidity, and At Risk for substrate. The 1994 ODFW survey showed that sand sized particles covered less than 10% of the stream surface area. No recent survey information is available.

This group of indicators is the one most likely to be negatively affected by the implementation of this project. Four project elements have the potential to increase the sediment delivery rates to stream channels: 1) road construction and decommissioning, 2) road maintenance, 3) timber transportation, and 4) timber yarding. The extent of these effects is discussed by activity category below.

Road construction, reconstruction, and decommissioning

This project element will have only insignificant and/or discountable effects to these indicators. The effects are only minimally negative, and only will occur at the site-scale, as described by the following analysis.

Proximity The only new road construction occurs within Unit 2, which is 1.2 miles upstream from habitat occupied by listed fish. Two sites will have minor road reconstruction with some spot rocking and minor surface clearing and brushing. This activity will occur outside of riparian reserves, and within harvest units 1 and 2, located 0.3 and 1.2 miles upstream from ESA listed fish habitat.

Probability Since the roads to be constructed or reconstructed will not have any hydrologic connection, and are located outside of riparian reserves, there is a near zero probability that this activity will result in increased sediment delivery to the stream network.

Magnitude It is expected that the site-scale degradation associated with this activity will extend only a short distance downslope from the disturbed sites, and that this effect will not change sediment delivery rates to the stream network.

Duration These short landing access roads will be decommissioned immediately following use. Effects to the indicator are expected to be expressed only during the first fall/winter runoff period as disturbed sites will be seeded and ground cover vegetation will be reestablished within 12 months.

Road maintenance

This project element will have only insignificant and/or discountable effects to this group of indicators. The effects, although moderately likely to occur, are only minimally negative, as described by the following analysis.

The roads used for transport are non-federal, and used year-round for private timber transport. Most of the road network to be utilized can be categorized as ridgetop road, that is, it primarily follows the relatively flat topography along drainage divides, with minimal stream crossings or other hydrologic road/stream connections (i.e. relief culverts which deposit ditch water directly to stream channels), and few drawbottom road segments.

Proximity The higher levels of road maintenance, on the upper portion of the 220 road, will take place at least 0.5 miles upstream from listed fish habitat (Table 5). The 11 perennial stream road crossings described in Table 5 were analyzed in the field to determine the expected rate of sediment delivery due to road maintenance activities. Six of the crossings are spatially distant from the listed fish habitat and it was determined that the existing channel would likely retain any increased sediment delivered to the stream prior to it being moved downstream to the listed fish habitat. There were five crossings that were identified as potential concerns (crossings 7-11, Figure 6).

Probability The close proximity of the project element to ESA listed fish habitat, coupled with the moderate level of disturbance associated with this type of activity, results in an assessment of moderate likelihood that this indicator will be negatively affected by the implementation of this element.

Magnitude The negative effects to this indicator due to the implementation of this project element will be minimized through the implementation of standard Best Management Practices to reduce the erosion of fine sediment from road surfaces. Additional design criteria incorporated into this activity include the mulching of ditch lines and use of straw bales near culvert inlets, if determined to be necessary. It is expected that only a small quantity of fine sediment will be added to ESA listed fish habitat, and the majority of this sediment is expected to be rapidly transported downstream. One of the goals of road maintenance work is to reduce the sediment input from chronic road related erosion sites, such as plugged culverts, blocked ditchlines, and degraded surfacing. Therefore, implementation of the road maintenance is likely to have an immediate positive effect on sediment loading of Wiley Creek, and this positive effect will likely outweigh any slight increase in sediment delivery due to the road maintenance itself. Less than 10% of the ESA listed fish habitat in the Wiley Creek watershed has the potential to be affected by this activity.

Duration This sediment will be delivered as the work is being completed, or during the first wet season, and is not expected to continue to deliver sediment after the first year.

Timber transportation

The transportation of logs from this project has the potential to increase the road surface erosion rates. The mechanical breakdown of surface aggregate during transportation activities increases the level of fine soil particles available for erosion from the road surface during precipitation events or by wind blown particles. This project element will have only insignificant and/or discountable effects to this group of indicators. The effects , although moderately likely to occur, are only minimally negative, as described by the following analysis.

Proximity Although much of this project element occurs spatially distant from ESA listed fish habitat, some of the transport activity occurs immediately adjacent to and over streams utilized by the listed fish species for spawning, rearing and adult holding.

Probability The likelihood that this project element will negatively affect these indicators is low to moderate. The immediate proximity of the element to the occupied habitat increases the probability that this habitat will be exposed to any negative effects, however, the existing condition of the haul road over these sites (only crossings over utilized habitat is on a paved bridge, or low gradient, well surfaced aggregate road) reduces the likelihood that effects will be transmitted to the ESA listed fish or their habitat. All other road surfaces within riparian reserves are armored with aggregate or pavement, there is dense riparian vegetation between the haul roads and stream channels, and well drained road/stream crossings will direct ditchline sediment onto sideslopes before they are added to stream channels. Much of this sediment will become entrained in the ditchlines or by structure in the tributary streams. Roads used for the project will be maintained prior to use and during haul if necessary. Dust abatement will reduce the likelihood of wind-blown dust particles from entering ESA occupied stream habitat.

The 11 perennial stream road crossings described in Table 5 were analyzed in the field to determine the expected rate of sediment delivery due to timber transportation activities. Six of the crossings are spatially distant from the listed fish habitat and it was determined that the existing channel would likely retain any increased sediment delivered to the stream prior to it being moved downstream to the listed fish habitat. There were five crossings that were identified as potential concerns (crossings 7-11, Figure 6). It is possible that the increased commercial vehicle traffic at these sites, related to this project, could result in a slight increase in sediment delivery rates to habitat utilized by the listed fish.

Magnitude The potential negative effects associated with this element will be reduced by protection measures which will restrict the timing of the activity to dry season haul only. Ditch line mulching and other standard BMPs will also reduce the magnitude of any negative effects. Additionally, the minimal amount of transport (only 77 log truck loads) over or near ESA listed fish habitat will minimize the potential exposure to any negative effects.

Duration Any increase in sediment delivered to streams due to the implementation of this element will likely occur during the first significant precipitation event following the use of the roads, as the crushed aggregate is washed from the road surface and into the drainage network, and is not expected to persist beyond the initial wet season.

Timber yarding

This project element has the potential to increase the soil erosion rates near several intermittent stream channels, and thereby affect this group of indicators at the site-scale. These effects are not expected to be measurable and are insignificant at the ESA fish habitat scale, due to the limited extent and spatial proximity of this activity to their habitat, as described by the following analysis.

Proximity This project element is planned to occur at least 0.3 miles upstream from the nearest ESA listed fish habitat.

Probability The likelihood that this group of indicators will be negatively affected by this project element is moderate at the site scale, and very low at the ESA listed fish habitat scale. Perennial streams will be buffered from any new disturbance by at least 172 feet, and intermittent streams will have at least a 50 foot buffer (one exception, see discussion below). Project design criteria and protection measures implemented with this project (thinning prescription, required use of harvester/forwarder equipment, contract provision restricting

soil compaction or disturbance to less than 20%, minimizing yarding across stream channels) will result in very little new soil disturbance. Slopes within the units are low to moderate, and ground based yarding will not be utilized on slopes greater than 30%, reducing the probability that any disturbed soil will be transported through buffers and into stream channels.

This activity will allow yarding across one drainage with intermittent stream flow, interior to Unit 1. This crossing site uses an existing skid trail opening, over a log "culvert", a relic from the initial stand treatment in this area. Using the existing site will minimize any new soil disturbance, particularly since there is also a requirement that the equipment place logging slash (branches) in front of them on all skid trails. However, there is a low probability that a minimal amount of newly disturbed soil may result in a short-term increase in sediment delivery to this intermittent stream channel. Approximately 20 feet of the stream channel will be directly affected at this crossing. It is estimated that this additional sediment will be entrained within less than 100 feet downstream from the crossing, as the channel downstream from this crossing has abundant levels of small and large woody material, and will serve as an effective filter. This sediment would have to move downstream 1.2 miles before it would directly affect listed fish habitat.

SUMMARY:

This activity will only have a very minimal, additive, indirect effect on overall condition for this group of indicators. Since the baseline condition for these indicators is Not Properly Functioning, any degradation *could* result in negative effects to fish (fish are more sensitive to any increases in fine sediment levels due to the degraded baseline condition). However, it is expected that the increases associated with this project are insignificant and/or discountable, and the project will also have some positive effects to the indicator in the long-term (due to road maintenance) and will not result in any change in the growth or survival of the listed fish.

Large Woody Material

The baseline condition is variable for most stream reaches within the potentially affected watersheds. Most streams surveyed by ODFW found <80 pieces of wood per mile, (ranging from 15-80), and these numbers include wood pieces smaller than the minimum values used in the NOAA matrix. The upper reaches of Wiley Creek contained as many as 150 pieces per mile. Small tributaries to Wiley Creek which were surveyed also contained 150 to 300 pieces of wood per mile. However, the extremely low levels of large wood in streams used by spring chinook salmon and winter steelhead lead to a determination that these two 6th field watersheds are in a Not Properly Functioning condition. Future recruitment of woody material to these larger streams will also be negatively affected by the current land management practices on non-federal land. Recruitment levels on Federally managed lands may have also been affected by past management, however, current management of these lands should allow for the establishment of mature overstory vegetation in the future, and future recruitment of wood to streams should occur at natural rates.

This indicator may be affected at the site-scale by the implementation of this project. Three of the project elements have the potential to decrease the number of potential stream recruitment trees in the action area: 1) timber felling combined with 2) timber yarding, and 3)

road construction and decommissioning. The potential effects are minimal, and are not expected to be of the extent where they will affect ESA listed fish or their habitat, as described below.

Timber Felling and Yarding

The combination of these two elements will lead to the felling and removal of trees classified as potential stream recruitment trees. A potential stream recruitment tree is one which is located within approximately one site potential tree height of any stream channel or within potentially unstable areas where the trees could be delivered downslope during slope failure or mass movement type events. Removal of these trees will have some effect on the number of trees available for possible recruitment into stream channels at some point in the future. This project has the potential to have a very limited effect to this indicator as discussed below.

Proximity Units 1, 2 and 4a have planned riparian tree harvest and removal from intermittently flowing stream reaches. These units are at least 0.3 miles upslope from the nearest streams occupied by ESA listed fish.

Probability The trees to be removed are small sized, young trees (40-45 years old, 60-90 feet tall, 8-12 inches dbh), along the outer portions of three intermittent stream channels. The fifty foot no-harvest buffer to be implemented with this project will allow the retention of almost all of the trees that potentially could have been recruited to these channels. Further than 50 feet from these intermittent streams, the prescription will allow approximately half of the trees to be removed. This project will treat approximately six acres of this outer portion of the riparian reserve, and will remove approximately half of the trees. Some of the trees removed from this distance from the channel would have been potential candidates (although at a very low probability) for direct recruitment to the adjacent intermittent stream channel. The loss of these candidates will potentially affect the woody material levels of the affected stream reaches over the next few decades. The affected channels do not provide fish habitat, but the wood would have served for sediment retention and velocity reduction/channel armoring on the intermittent channel, which could have an indirect effect on erosion and subsequent sediment delivery rates. Therefore it is expected that tree removal from within riparian reserves will have lead to the degradation of this indicator which will persist for the next 50 years until new trees are established to replace those harvested. This degradation is limited to the site scale along the 0.1 miles of affected stream channel. The action will also provide some beneficial effect to wood recruitment in that it will increase the growth rates and vigor of the remaining trees, which will grow to a larger size and, when they fall into the stream, will provide larger sized woody material, which is more stable if and when it is ultimately transported via debris torrent to the downstream fishbearing reaches.

The site specific, direct effects to the local drainages are very slight as only a minimal percentage (<1%) of the overall riparian reserve in the drainages will be affected by this project. The remaining reserves are in varying stages of development, so there will be a steady source of direct recruitment as these stands continue to age and die.

Effects to the 6th field watersheds due to the implementation of this project are more diluted, therefore will be less measurable. Only 0.04% of the riparian areas (all ownerships) in the two watershed will be treated with this project. However, it should be noted that the majority

of the riparian areas in this watershed are under private management, and these riparian areas do not receive the same level of protection as Federally managed reserves.

Effects to listed fish or their habitat are expected to be non-measurable and insignificant. Very few of the trees identified for removal from within the riparian reserves are large enough to have provided stable structure to the larger river system utilized by spring chinook or steelhead. The probability that any one of the trees scheduled for removal would have fallen into the intermittent tributary, and been available for downstream transport during a debris torrent, and then also been retained within the occupied habitat, is very low. Additionally, since riparian stands will be only partially treated, and no trees will be removed from within 50 feet of the streambank, it is expected that there will be adequate woody material left on site to provide for the woody material recruitment needs.

Wood removal from outside the riparian reserve could also affect the rate of wood recruitment to streams. This project was designed to avoid timber harvest within headwall areas, or unstable slopes, the primary landform areas that provide woody material during debris flow events. Sideslope gradients are low (0-30%), so many of the trees to be removed outside of riparian reserves would not have traveled far downslope if/when they naturally fell, so none of these trees had the potential to move into stream channels. Therefore it is expected that tree removal from outside of the riparian reserves will have a neutral effect on this indicator.

Road Construction

This project will construct a few short sections of road within Unit 2. This construction will require the felling and removal of trees. None of this removal will occur within riparian reserves, and will all occur on stable slopes, therefore none of the trees removed are considered potential stream recruitment trees. This project element will have no effect on this indicator.

Summary:

This activity will only have a very minimal indirect effect on overall watershed condition for this indicator. Since the baseline condition for this indicator is Not Properly Functioning, any degradation of this indicator could result in adverse effects to fish (fish are more sensitive to any decreases in woody material levels due to the degraded baseline condition). However, it is expected that the effect to this indicator at the ESA fish habitat scale, is insignificant, and will not result in any change in the growth or survival of the listed fish, and therefore categorized as discountable.

Peak / Base Flow and Disturbance History/Regime

The baseline condition of these indicators is Not Properly Functioning. Approximately 50 percent of the watershed is currently in an early seral stage, primarily due to timber harvest and road construction. Most of this watershed consists of privately owned timber lands, which are managed under a short rotation to maximize timber production, and this intensive land management has been persistent for most of the last century due to its low elevation and proximity to mills in Sweet Home.

Peak / Base Flows: Past and current land management has likely led to increased water yields and subsequent channel degradation and direct/indirect adverse effects to listed fish occupying habitat in this watershed. It is expected that future land management in this

watershed will continue to include intensive timber management on private lands, so flow levels and timing will likely continue to be affected and not return to natural conditions.

Since the baseline conditions are already likely resulting in some adverse effect to the listed fish in the watershed (increased frequency or extent of redd scour, potential adverse effect on the timing of adult migration, or juvenile out-migration, potential reduction in summer base flows and subsequent increased stream temperature and risk of stranding of juveniles, etc.), any additive degradation in the condition of this indicator due to the implementation of this project would likely exceed the negligible or discountable thresholds and result in the "take" of listed fish due to reduced juvenile survival, reduced spawning success, or reduced egg-fry survival.

Timber harvest and road construction are the project elements that have the potential to effect this indicator. The limited amount and short duration of the new road construction, and the low impact silvicultural prescriptions associated with this project will likely have only a very minimal, unmeasurable effect to this indicator, as discussed below.

Proximity Tree harvesting and road construction are located at least 0.3 miles upstream from the nearest ESA fish habitat. Changes to this indicator are often easily transmitted downstream, so proximity is not extremely relevant in this discussion of potential effect.

Probability The felling of trees associated with the silvicultural thinning of forest stands and minimal road construction will likely cause a slight reduction in evapotranspiration, subsequently increasing water availability at the individual tree scale. Since this is only a partial stand treatment, the trees remaining on site will likely increase their water uptake, and ameliorate most or all of the increase water at the site scale. All of the units are within the "rain on snow" elevation range (Table 3), typically between 2,000 and 4,000 feet in the Western Cascades. The thinning prescription does not leave large created openings, so the proportion of snow held by the canopy as opposed to accumulating on the soil surface will not be affected as much as with regeneration harvesting. Vegetative condition modeling, which can be used as a surrogate for predicting effects to peak and base flows, was completed for this project (Aggregate Recovery Percentage: ARP model). This modeling predicted an extremely minor (0.06%) change in vegetative recovery for the action area immediately following treatment.

Magnitude The 0.06% expected change in vegetative condition should not affect stream flows to the point where the change would be detectible, and is not of the magnitude where downstream cumulative increases would be expected.

Only 0.2% of the watershed will be affected by this thinning treatment. Other factors that will reduce the effect of the harvest on stream flows include the fact that stream channels adjacent and downstream from the units are buffered by non-treated areas. It is likely that these buffers will also reduce the probability of increased water yield being expressed as increased stream flows. Finally, listed fish are utilizing habitat lower in the watershed, so the site level effect from this activity will likely be diluted by the time the listed fish are exposed to the effect. The effect to listed fish or their habitat is likely to be insignificant, and therefore categorized as neutral.

Disturbance History/Regime: Timber management projects affect vegetation and soil condition, therefore the implementation of this project will lead to a small increase the

disturbance history of a watershed, and this indicator will have a slight negative impact. The magnitude of this degradation is low due to the low-impact design of the project, which incorporates a moderate thinning prescription, utilizes low impact yarding techniques, and primarily uses the existing road network. The duration of the effect is short (< 10 years), with an expected rapid increase in the health and growth of the retained trees and minimal soil disturbance associated with the yarding. Therefore, when viewed at the 6th field watershed scale, it is expected that the slight negative effect on the baseline condition will not result in any indirect negative effect on any of the habitat indicators, and will not result in adverse effects to the listed fish or their habitat.

Temperature

Wiley Creek is a 303d listed stream for temperature, and has mean 7 day average temperatures which typically exceed 70°F in summer months in Wiley Creek, and 68°F in Little Wiley Creek. This indicator is classified as Not Properly Functioning for both 6th field watersheds.

Timber felling is the only project element that may have an effect on this indicator, since other project elements will not affect shade-providing vegetation.

Proximity Although this project will potentially remove some overstory shade next to intermittent streams, the treated units are located at least 0.3 miles upslope from the nearest ESA fish occupied habitat, and this distance will likely lead to a dilution of any effect to these fish.

Probability and Magnitude This project will remove overstory vegetation from the outer portions of three riparian reserves associated with intermittent streams, likely leading to a reduction in stream shade for these areas. The extent of any expected increase is related to the magnitude of the shade removing activity, which in this case is very low. Only six acres will be thinned, and 65% percent of the canopy cover in riparian reserve treatment areas will be retained, and the trees closest to the stream channel (0-50 feet) will all be retained. Therefore, it is expected that there will be only a very slight change in stream shading. This slight change in stream shading is not expected to result in a measurable increase in stream temperature at any scale.

Additionally, concerns over stream temperature are highest during the warmer summer months, where lethal or sub-lethal temperature thresholds on aquatic organisms are more likely to be exceeded. Streams adjacent to managed units for this project do not have surface flow during most of the summer (classified as intermittent). Typically, concerns over elevated stream temperatures are highest during the summer months as this is usually when there is the highest probability of exceeding effect thresholds for fish. Since the affected streams will not have surface water during this time period, the effect of shade removal will be much less than removal of shade over a perennially flowing stream. The effect of shade removal to subsurface water is very minimal. Any unforeseen effect on stream temperature will be of short duration, it is expected that the thinned canopies will likely close to pre-treatment levels within 10-20 years.

Therefore, it is predicted that stream temperatures will not be increased at the site-scale, immediately downstream from the project units, and there will be no cumulative increase in temperature expressed to stream reaches further downstream, and certainly no increase in

stream temperature 0.3-1.2 miles downstream where stream reaches are utilized by spring chinook and winter steelhead. The effect to the indicator is categorized as neutral.

Road Density & Location; Drainage Network

The analysis of this indicator typically serves as a surrogate for a cumulative or aggregate effects analysis. The BLM GIS roads layer shows 275 miles of road in the Wiley Creek watershed, 70 miles in the Little Wiley Creek 6th field, and 205 miles in the Upper Wiley Creek 6th field. Existing road densities are very high (Little Wiley = 4.1 mi/mi^{2}, Upper Wiley = 4.4 mi/mi^{2}) and there are many drawbottom roads. The high road density leads to many ditch relief culverts and subsurface water interception with road cuts. This increases the watershed drainage network. Therefore, the baseline condition for both of these indicators is evaluated as Not Properly Functioning.

The road construction project element will have a small effect on these watershed indicators, as described below.

Proximity The new road construction will occur 1.2 miles upstream from ESA listed fish habitat.

Probability Due to the description of this indicator, any increase at any scale would have a negative effect on this indicator, and since this project will construct some temporary roads (<0.1 miles), it is likely that this indicator will be affected.

Magnitude Although this project will construct some temporary roads (<0.1 miles), because of the dilution effect of calculating a density at the 6th field watershed scale, the short-term increase in road density is insignificant. The location of the new road construction, outside of riparian reserves will not cause any degradation to the location portion of this indicator. The new temporary road construction will not cross any streams, or require the placement of any relief culverts, therefore there will be no increase in the extent of the drainage network.

Duration The effect will be short-term, since the road will be decommissioned at the end of the two month operating season.

Summary Effects are expected to be short-term, insignificant, and not of the magnitude to lead to effects to listed fish or their habitat, and therefore categorized as neutral.

Riparian Reserves

The riparian areas (technically not reserves in most of this watershed due to 96% private ownership) have been highly disturbed by past road construction and timber harvest. The extent has not been quantified, but a review of aerial photographs for the watersheds indicates that at least half of the reserves have been impacted. Based on this information, it is determined that the riparian areas in the two watersheds are not properly functioning. Reserves on Federal lands will continue to be restored over time, however it is likely that other riparian areas in the watershed will be impacted by future management.

The timber felling and yarding project elements will affect this indicator, as described below.

Proximity The riparian thinning will occur on intermittent channels, 0.3-1.2 miles upstream from habitat utilized by spring chinook salmon or winter steelhead.

Probability This project does manage a portion of the riparian reserve, by thinning six acres of the 14,926 acres of riparian reserve in this drainage (0.04%)). The thinning is expected to create a minimal, short-term negative effect on the riparian condition (soil disturbance,

reduction in shading, etc.), followed by long-term positive effects (increase plant vigor, reduced competition, increased diversity, etc.).

Magnitude The magnitude of this negative effect and the long term positive effect is low due to the limited size of the proposed treatment in riparian reserves (six acres).

Summary It is probable that there will be only insignificant or discountable effects to this indicator, and certainly the effects will not be of the extent where ESA listed fish will risk exposure.

Chemical Contamination/ Nutrients

The baseline condition of this indicator is not known, however there are no obvious sources for contamination in most of the watershed (the city of Sweet Home is located at the mouth of the watershed), so this indicator is classified as Properly Functioning.

All five of the project elements utilize gasoline powered equipment, so each have the potential to affect this indicator, as discussed below.

Proximity Project elements occurring within harvest units are located 0.3-1.2 miles upslope from the nearest ESA listed fish habitat. Road maintenance and timber transportation occur immediately adjacent to ESA listed fish habitat.

Probability The probability of fuel spill and subsequent contamination of ESA listed fish habitat is very low based on past monitoring of this type of activity.

Magnitude Gasoline powered vehicles will be operating within the riparian reserve of a few intermittent streams. Vehicles will not be refueled within the reserves, and a fuel spill plan will be in place to minimize effects should an unplanned event occur. The listed fish occupy habitat 0.3-1.2 miles downstream from harvest units, so it is very unlikely that any fuel spills would be of the magnitude to reach perennially flowing streams, let alone occupied habitat.

Summary Monitoring of this type of activity reveals that fuel spills rarely occur, and if they do, they are limited in magnitude and duration. Effects to this indicator are best classified as neutral.

Physical Barriers

The baseline condition of this indicator is unknown. Observations of the existing road network and intersections with streams utilized by anadromous fish seem to indicate that there are no passage barriers present. However, due to the lack of information, and the high road density and large amount of drawbottom roads, the baseline condition of this indicator will be rated as At Risk.

This project will not install new or modify existing culverts on any fishbearing streams, therefore the project will have a neutral effect on this indicator.

Refugia

The baseline condition of this indicator is Not Properly Functioning, due to past and current harvest within riparian areas utilized by the listed fish, and high road densities, especially with the high levels of drawbottom roads.

There is no refuge habitat near the project units, so the harvest and road construction activities will not directly affect the existing refugia. Roads used for timber haul do approach and cross existing refugia, however the effects from this activity are not expected to lead to

disturbance or degradation of this habitat. Effects to this indicator are best classified as neutral.

Pool Frequency / Quality, Large Pools, Width/Depth Ratio, Streambank Condition, Off-channel Habitat and Floodplain Connectivity

A 1994 survey of 11.5 miles of Wiley Creek and two minor tributaries by the ODFW indicated the following baseline condition of these indicators:

Pools: 16 pools per mile, average stream width of 8.5 feet. **Not Properly Functioning**

Width to Depth Ratio: 23.4 **Not Properly Functioning**

Streambank Stability: 2.7% eroded. **Properly Functioning**

Off-channel Habitat: 4% of total area was in side channels, road restriction. **Not Properly Functioning**

Floodplain Connectivity: No data from survey, road restriction. **Not Properly Functioning**

It is expected that the implementation of this project will have very small, site-scale negative effects on wood recruitment, stream flows, and sediment delivery rates. These are the primary elements that affect the downstream habitat parameters listed above. Therefore, it can be expected that these indicators will be slightly affected immediately downstream from project units or road crossings, but because of the low magnitude of the effects, and the large distance downstream to habitat utilized by listed fish, they will result in a determination that there will be a neutral effect on habitat elements used by these species.

Summary of Effects to Listed Fish or Their Habitat.

The above discussion of the expected effects that this project will have on each indicator, resulted in the conclusion that there is a low probability that this project will have any adverse effects to the listed fish or lead to negative impacts to their habitat. It is not expected that this project will impact the growth and survival of any life history stage of these two fish species, or if these effects occur, that they will be insignificant and not measurable.

Cumulative Effects. Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. [50 CFR §402.02]. Approximately 96% of the Wiley Creek watershed is privately owned. Private land in the Wiley Creek watershed is primarily owned by timber companies. Most of these private timberlands have been previously harvested and replanted. These companies are now actively managing these plantations to reduce stocking levels with commercial thins and regeneration harvest. It is expected that this extensive timber management will continue in the near future, and that there will be associated negative impacts to fish habitat.

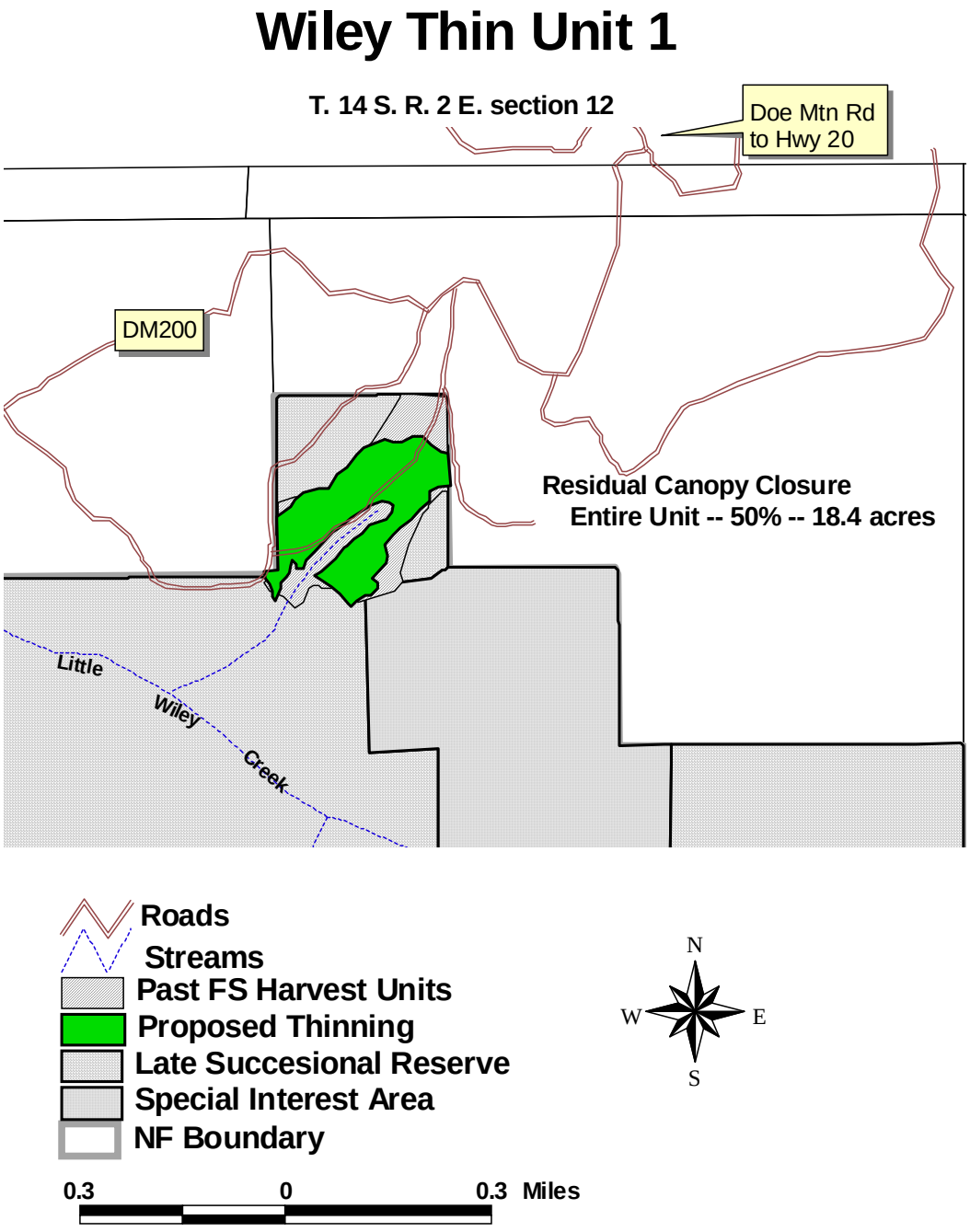
Aggregate Federal Effects. There are no other proposed federal actions for which a Biological Assessment has been submitted contemporaneously with this BA for ESA consultation, which would affect the ESA action area for this project. All ongoing actions with potential adverse effects (where ESA consultation has been concluded), and effects of completed federal actions, are included in the environmental baseline for each indicator and have been considered in this analysis.

FISH BA REFERENCES

NOAA Fisheries BRT, 2003 (draft). Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead.

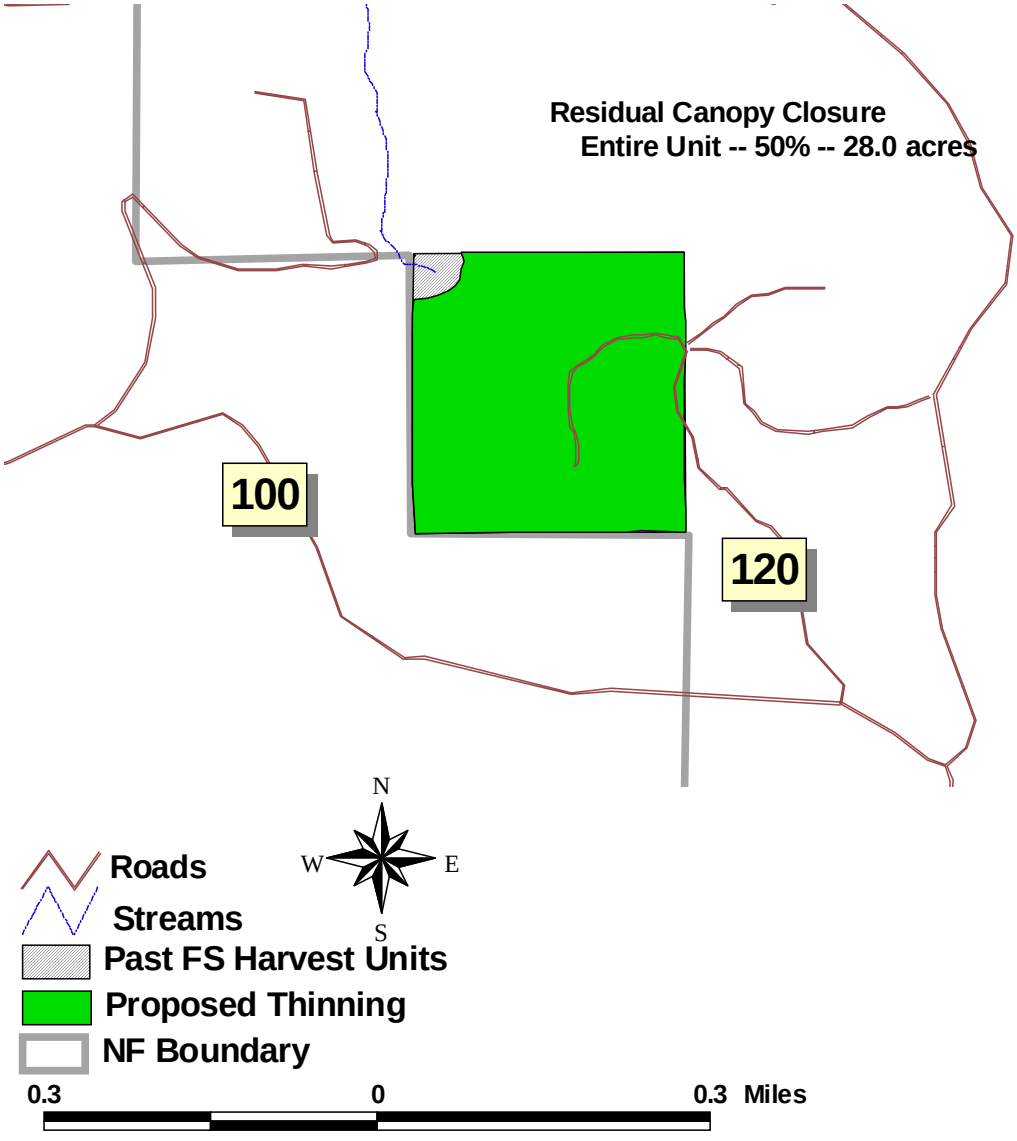
Schroeder et al 2002. Oregon Department of Fish and Wildlife. Annual Progress Report, Fish Research Project, Oregon. Spring Chinook Salmon in the Willamette and Sandy Rivers. Project number F-163-R-08.

APPENDIX D: WILEY THIN HARVEST UNITS



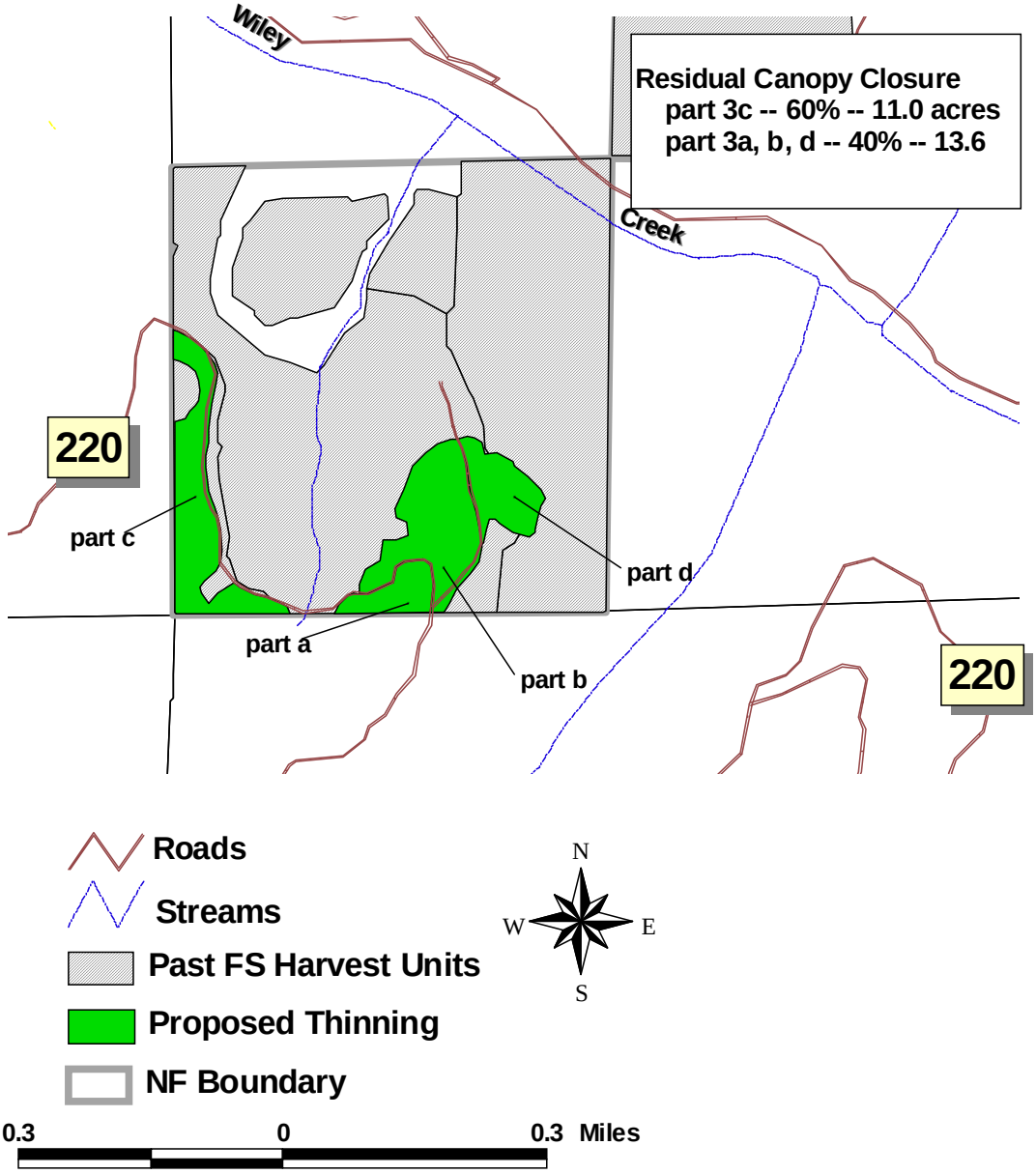
Wiley Thin Unit 2

T. 14 S. R. 2 E. section 15

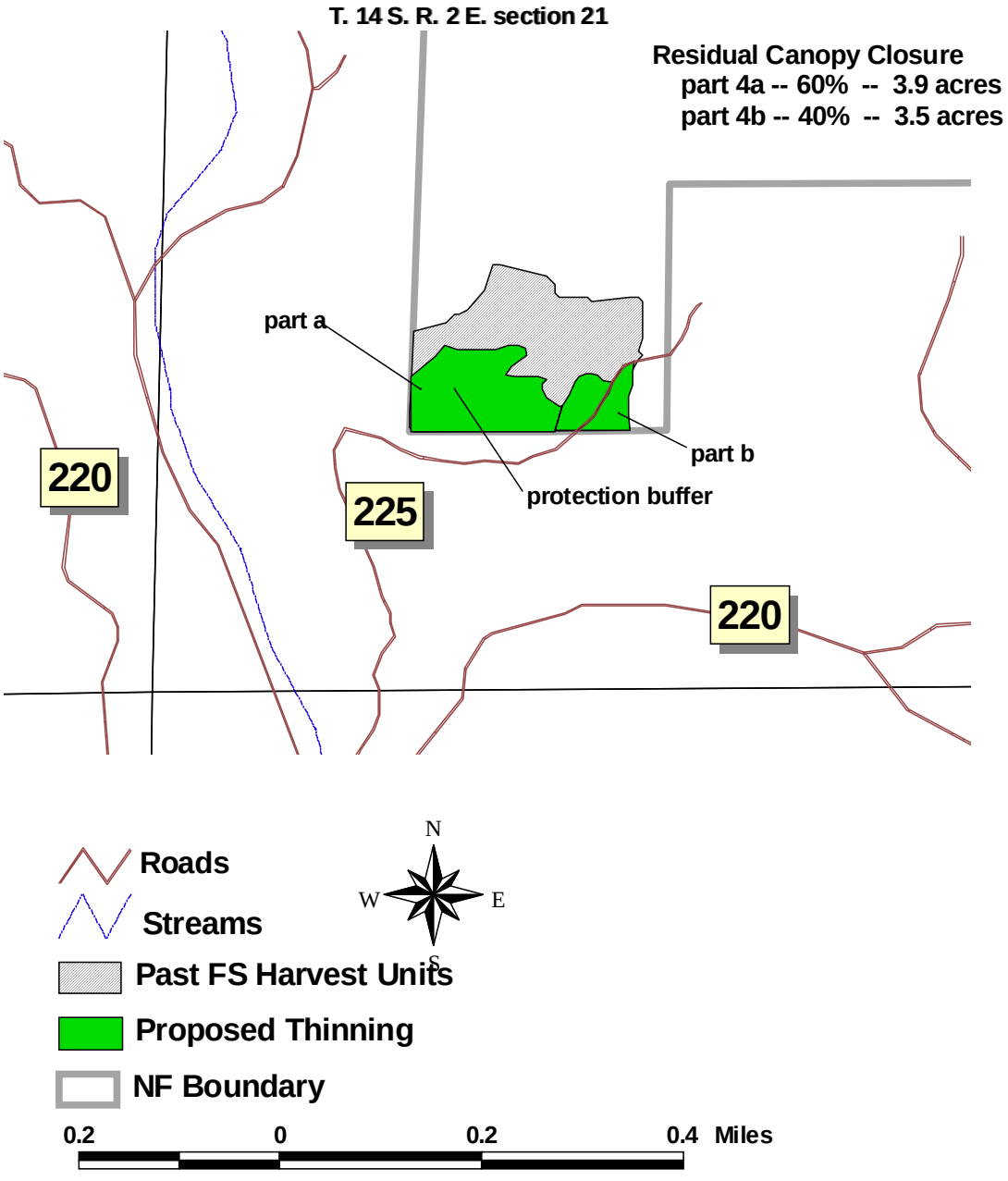


Wiley Thin Unit 3

T. 14 S. R.2 E. section 26



Wiley Thin Unit 4



APPENDIX E: WILEY THIN K-V COLLECTIONS

The Knutson-Vandenberg Act of June 9, 1930 (ch.416.46 Stat. 527, as Amended:16 U.S.C. 576-576b)
"...protecting and improving the future stand productivity of the renewable resources of the forest land on such sale area, including sale area improvement operation, maintenance and construction, reforestation and wildlife habitat management."

Timber Stand Improvement (TSI)

The following timber stand improvement treatments are prescribed for the units listed below in accordance with the Forest Plan.

Tree planting with native species is planned to improve structure and diversify stand age and species. In Unit 4 there is a 1.4-acre area dominated by mistletoe infected Western hemlock. This area will be thinned to less than 30% canopy closure and underplanted with Western white pine, Douglas-fir and Western redcedar.

Precommercial thinning is prescribed to enhance species diversity, prolong early seral stage stand structure, increase growth rate of dominant trees, and reduce stand densities to Regional and Forest guidelines. See Table D-1 and the following map for managed stand information and location of precommercial thinning opportunities. Release is prescribed to reduce competition with brush species. Red alder will be cut to improve growth and survival of seedlings.

Pruning is prescribed on approximately 70 trees per acre of the future crop trees to increase stand structural diversity and increase value of clear wood on any pruned trees that are harvested in the future See Table D-1 and the following map for managed stand information and location of pruning opportunities. No pruning will be completed on units that are of the right age and species composition within the LSR. No final removal is planned within the LSR so the investment would not be recaptured in the future.

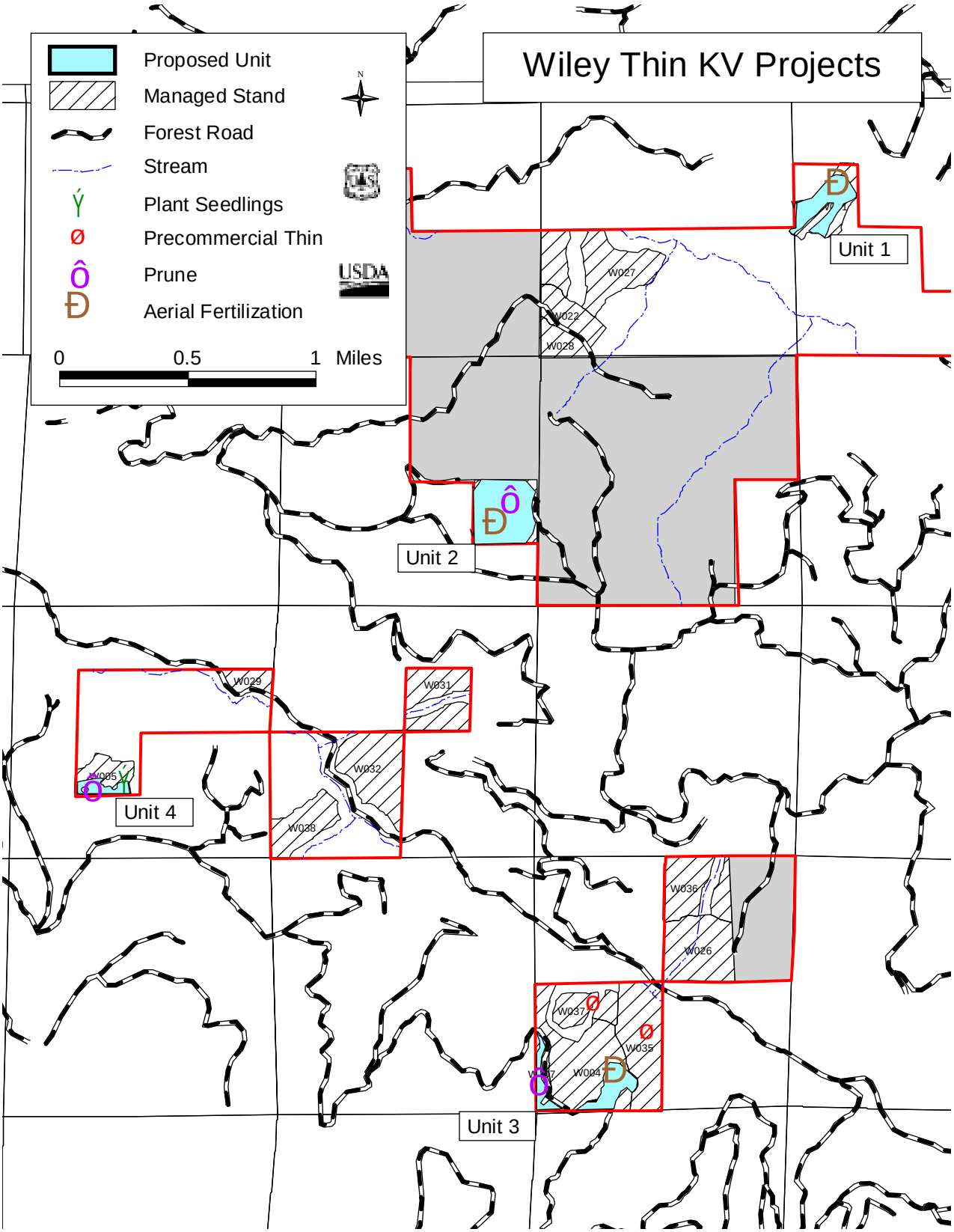
Aerial fertilization is prescribed at a rate of approximately 440 lbs. per acre, according to Regional and Forest guidelines. Fertilization will increase tree growth and improve forage conditions for wildlife. See Table D-1 and the following map for managed stand information and location of aerial fertilization opportunities.

Table D-1: *TSI Needs By Stand (see the following map) for Alternative 2*

Treatment	Thinning Unit	Stand Ref. Number	Acres	Year Planned	Total Cost and acres
Tree Planting $520 per acre	**4**	**W5**	**2**	**2006**	**$1,040 2 acres**
Precommercial Thinning/Release $410 per acre	**4**	**W35 W37**	**49 17**	**2006 2006**	**$27,060 66 acres**
Pruning $238 per acre	**2**	**W2 W2A**	**28**	**2007**	**$14,042 59 acres**
	3	**W7 W4**	**24**	**2007**	
	4	**W5**	**7**	**2007**	
Aerial Fertilization $110 per acre	**1**	**W1 W8**	**18**	**2007**	**$7,700 70 acres**
	2	**W2 W2A**	**28**	**2007**	
	3	**W7 W4**	**24**	**2007**	

Table D-2: *Timber Stand Improvement Needs by Alternative*

	Alternative 1	Alternative 2
Tree Planting	**0**	**$1,040**
Precommercial Thinning /Release	**0**	**$27,060**
Pruning	**0**	**$14,042**
Aerial Fertilization	**0**	**$7,700**
Total	**0**	**$49,844**


Wiley Thin KV Projects
Proposed Unit
Managed Stand
Forest Road
Stream
Plant Seedlings
Precommercial Thin
Prune
Aerial Fertilization
0
0.5
1
Miles
N
USDA
Unit 1
Unit 2
Unit 3
Unit 4
W027
W022
W028
W029
W031
W032
W005
W038
W036
W026
W037
W035
W034

Soil

Processor/Forwarder (ctl) yarding is proposed for portions of all units. Sub-soiling could be required to meet best management practices for erosion control and soil productivity. A collection will be made for 10% of the total acres in each unit with processor/forwarder yarding. There are 80 acres in Alternative 2. Sub-soiling will be completed soon after harvest. Afterward, subsoiled areas will be seeded twice to ensure revegetation.

Table D-3: *Total Soils Needs by Alternative*

	Alternative 1	**Alternative 3**
Sub-soiling at $400 per acre	**0**	**7 acres $3,200**
Seeding with Native Species	**0**	**14 acres $8,400**
Total	**0**	**$11,600**

Wildlife

Snags will be created from retained leave trees after logging is completed. Two trees per acre will be retained for future snag habitat in the matrix units; four trees per acre will be retained in Unit 1, which is in an LSR. Topping the larger sized Douglas-fir will create an average of two snags per acre. The cost of topping is $50.00 per tree to be done the year logging will be completed, FY 2006.

Three trees per acre will be retained to provide future down wood in areas currently deficient. An average of three trees per acre will be felled in the matrix units; six trees per acre will be felled in Unit 1, which is in an LSR. The cost of falling trees is $26.00 per tree and should be delayed as long as possible to take advantage of any trees that blow down after logging.

Table D-4: *Total Wildlife Needs by Alternative*

	Alternative 1	**Alternative 2**
Tree Topping at $50 per tree 2 per acre 57 acres 4 per acre 18 acres	**0**	**186 trees** **$9,300**
Tree Falling at $26 per tree 3 per acre 57 acres 6 per acre 18 acres	**0**	**279 trees** **$7,254**
Total	**0**	**$16,554**

Botany

Noxious Weeds
Ground-disturbing activities, including commercial thinning and road construction and reconstruction, encourage the spread of noxious weeds by increasing light, providing a mineral soil seedbed, and spreading weed seed. Vehicles and logging equipment can inadvertently spread weed seed by carrying it into the area on tires and caked on mud. KV monies are collected to survey the project area annually for five years for the presence of noxious weeds and to control their spread. Control methods will include manual removal and the release of insects for biological control. Herbicides are used only as a last resort and may only be used in accordance with the *Willamette National Forest Integrated Weed Management EA* (USDA Forest Service 1999).

The cost of noxious weed survey and control is $6.00/acre for commercial thinning and $20.00/acre for road construction and reconstruction. A collection for 2 acres at $20.00 per acre will be added to each unit for road weeding, and in Unit 1 the entire road will be collected at the rate of $20 per acre for an additional 2 acres. In addition to the road acreage will be the unit acreage and a collection for five years of monitoring.

Monitoring
Ramalina thrausta in Unit 4 will be monitored for long-term persistence. Cost of monitoring will be $400 for two surveys in years one and five after harvest is complete.

Table D-5: *Total Botany Needs by Alternative*

	Alternative 1	Alternative 2
Acres Commercially Thinned $6.00/acre	**0**	**75 acres, for five years $2,250**
Acres of Reconstructed or Constructed Road $20.00/acre	**0**	**10 acres for five years $1,000**
Monitoring	**0**	**$800**
Total	**0**	**$4,050**

Firewood

A collection will be made to provide firewood for public use after the timber sale. The estimated the cost of coordinating the sale of firewood from this project is $2,500.

Collection Summary

Table D-6: *Total KV Project Needs By Alternative*

	Alternative 1	Alternative 2
Timber Stand Improvement	**0**	**$49,842**
Soil	**0**	**$11,600**
Wildlife	**0**	**$16,554**
Botany	**0**	**$4,050**
Firewood	**0**	**$2,500**
Total	**0**	**$84,546**

KV Project Priorities

In the event that the proposed timber sale does not generate sufficient funds to cover all recommended KV projects, projects will be funded in the following priority:

- Noxious Weed Control
- Seeding and Sub-soiling of Skid Roads
- Sensitive Species Monitoring
- Snag and Down Wood Creation
- Precommercial Thinning of Other Managed Stands
- Fertilize Commercially Thinned Stands
- Prune Commercially Thinned Stands
- Firewood Coordination