Parks Overstory Removal

ENVIRONMENTAL ASSESSMENT

Willamette National Forest
Sweet Home Ranger District
Linn County, Oregon

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Abstract:

This Environmental Assessment identifies the need for the proposed action, describes the analysis process and the alternatives formulated during that process. It discusses the environmental effects of each of the proposed alternatives. Three alternatives were evaluated and compared including the No Action Alternative 1. Alternative 2- Overstory Removal harvests approximately 2.1 MMBF on 181 acres of shelterwood and prelogged units in Matrix using ground-based logging methods. Unit 1 leaves 5 TPA and Units 2, 4, 5, 6 and 7 leaves 8 TPA. Alternative 3- Overstory Removal of approximately 3.2 MMBF on 237 acres of shelterwood and prelogged units in Matrix using ground- based logging methods. Units 1, 2, 4, 5, 6, and 7 leave 5 TPA and Unit 3 leaves 8 TPA. For both action alternatives there will be maintenance/reconstruction of 10 miles of existing roads, 15 new road closures and no new road construction. The Decision Notice identifies the preferred alternative.

Comments received in response to this solicitation, including names and addresses of those who comment, will be considered part of the public record on this proposed action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who only submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR Part 215. Additionally, pursuant to 7 CFR 1.27(d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under the FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The Forest Service will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied, the agency will return the submission and notify the requester that the comments may be resubmitted with or without name and address within (30) days.

Parks Overstory Removal

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Chapter 1: Purpose and Need for Action

The Willamette National Forest, Sweet Home Ranger District, is proposing the Parks Overstory Removal Timber Sale for sale fiscal year 2002 and subsequent fiscal years if more than one sale results from the analysis.

The proposed timber sale area is located in the Parks Creek Subwatershed in Linn County, Oregon. The planning area is on the east end of the District and north of Highway 20 (see Vicinity Map). The subwatershed or project area comprises 18,030 acres, including 2,530 acres of private land. There are 8000 acres in distinctive reserve land management allocations where programmed timber harvest is excluded. The 7,500 acres in General Forest and Scenic Management Allocations are where the proposed overstory removal harvest units are located.

Management Direction

This subwatershed was selected for timber management because:

- it is located in "Matrix" management area, which emphasizes timber and forest management.
- it includes units that need and would respond to further management.
- the area is included within the Upper McKenzie Watershed Analysis (completed August 1995), which identified the area as appropriate for timber harvest.
- it was identified for treatment in 2002 as part of the Sweet Home Ranger District timber sale offerings under the direction of the Willamette National Forest Land and Resource Management Plan.

The Willamette National Forest Land and Resource Management Plan (1990) as amended by the *Record of Decision (ROD) and Standards and Guidelines on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (April 1994), after this referred to as either the Forest Plan or ROD, designates most of the Parks Creek Subwatershed as "Forest Matrix". The Plan states that most timber harvest and other silvicultural activities will be conducted in matrix areas with suitable and available forest lands that have not been formally designated for other management purposes.

The subwatershed is allocated to nine Management Areas:

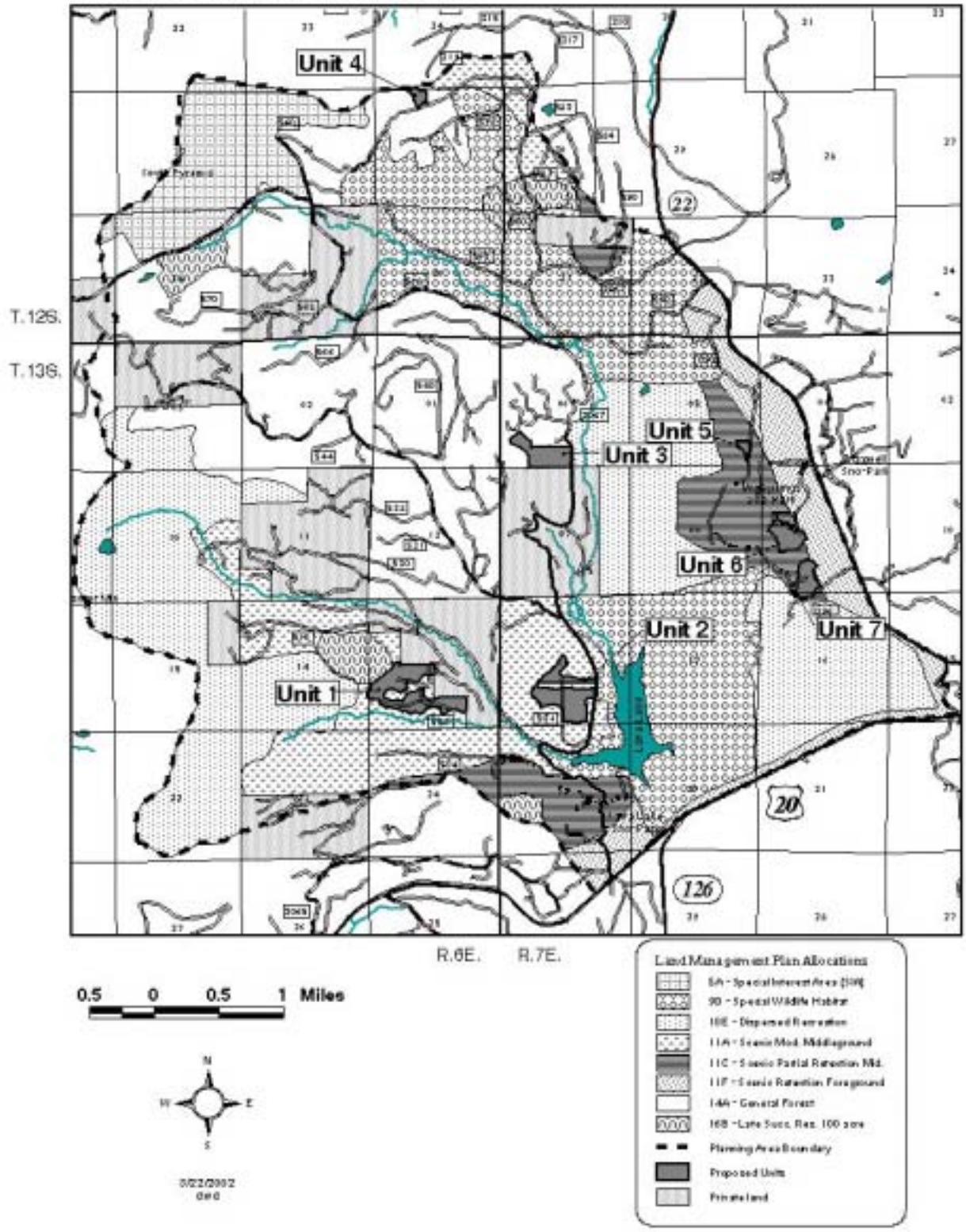
- 5a Three Pyramids Special Interest Area (SIA)
- 9d Special Wildlife Habitat (Elk Habitat)
- 10e Crescent Mountain and Lava Lake Dispersed Recreation Areas
- 11a Scenic Modification Middleground
- 11c Scenic Partial Retention Foreground
- 11f Scenic Retention Middleground
- 14a General Forest
- 15 Riparian Reserves
- 16b Late-Successional Reserve - 100 acre

Vicinity Map

Parks Overstory Removal - Figure 1

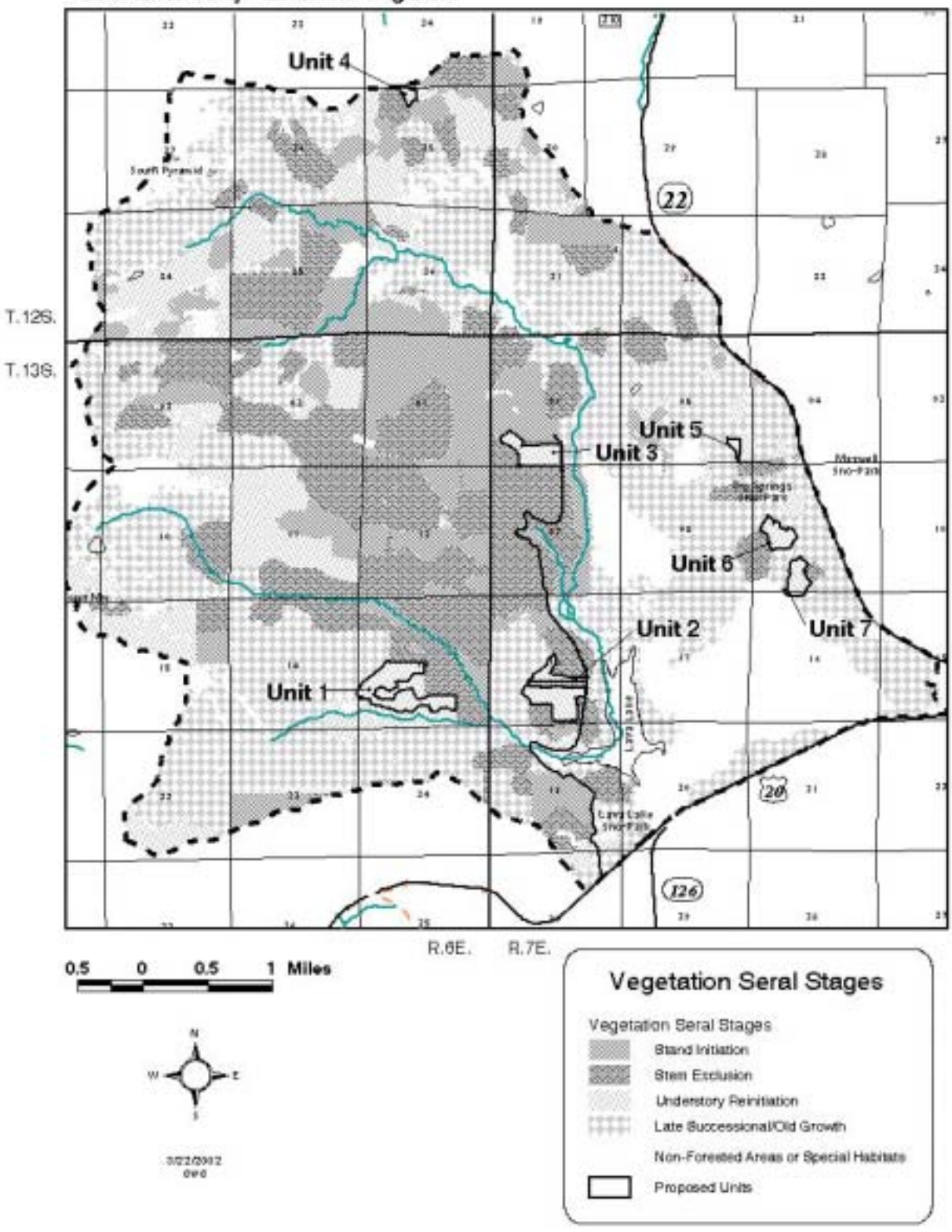
Land Management Plan Allocations

Parks Overstory Removal - Figure 2



Vegetation Seral Stages

Parks Overstory Removal - Figure 3



Four 100-acre Late-Successional Reserves (LSR) have been designated in this planning area to protect northern spotted owl nesting habitat; one is partially within the planning area. See northern spotted owl habitat key issues for full discussion on owl pairs and sites.

Potential timber harvest units fall only within Management Areas 11c, 11a, and 14a (see Land Management Plan Allocations map). The standards and guidelines associated with Management Areas 5a, 9d, 10e, 15, and 16b generally preclude timber harvest. The Upper McKenzie Watershed Analysis was completed in August 1995. Within this watershed the Parks Creek Subwatershed is located in Landform Block 2B - Western High Cascade Transition Zone, and 3 – Early High Cascade Platform. The watershed analysis recommends timber management within the Pacific silver fir (*Abies amabilis*) and western hemlock (*Tsuga heterophylla*) associations in Landform Block 2B. Pertinent recommendations include:

- "*Use management techniques to encourage early-seral stands to develop mid-seral stands attributes."* (Chap.5, p.4) and,
- *"Landscape patterns should reflect a mosaic of large and small patches (Chap.5, p.10)."*

The Upper McKenzie Watershed Analysis identified the opportunity to "use management techniques to encourage early-seral stands to develop future mid-seral attributes" (pg. 5-4). Some mid-seral attributes are complete crown closure and little ground cover of grass and herbs. In the Pacific silver fir zone, fires of varying intensities have historically created early seral habitat. Post-fire conditions included abundant dead material in the form of snags and large woody material on the forest floor. Pacific silver fir is very susceptible to fire induced mortality, whereas the co-dominant Douglas-fir is well adapted to fire events. The larger diameter Douglas-fir survives fires to provide residual overstory trees in the developing stand.

" *Forest Stand Dynamics*" written by Chad Oliver (1990) defines the following seral stages:

- **Stand Initiation stage** - After a disturbance, new individuals and species continue to appear for several years.
- **Stem Exclusion stage** - After several years, new individuals do not appear and some of the existing ones die. The surviving ones grow larger and express differences in height and diameter; first one species and then another may appear to dominate the stand.
- **Understory Reinitiation stage** - Later, forest floor herbs and shrubs and advance regeneration again appear and survive in the understory, although they grow very little.
- **Old-Growth stage** - Much later, overstory trees die in an irregular fashion, and some of the understory trees begin growing to the overstory.

Over the past 30 years, early seral habitat has been created through clearcutting. Mid seral habitat or Seral 3 Understory Reinitiation has decreased over time as stands grew into late seral (late-successional) forest or were harvested. Their patch size is now smaller and less varied. See distribution of seral stages in Table 1. Private land is included in the Distribution of Seral Stage table and map.

Table 1: Distribution of Seral Stages

Seral Stages	Parks Creek Subwatershed 18,030 acres
Seral 1- Stand Initiation	2,289 (13%)
Seral 2 -Stem Exclusion	3,791 (21%)
Seral 3-Understory Reinitiation	2,112 (12%)
Seral 4 -Late-Succ./Old-Growth	7,082 (39%)
Non Forested & Special Habitats	2,756 (15%)

The seven proposed units are mapped as seral 3- understory reinitiation, however, as altered stands they are not or may not reach either seral 4 or 1 without further management. These units do not have enough overstory and complexity in structure to qualify as old-growth and have too much overstory to classify as stand initiation.

Changes in management direction may occur prior to implementation of this project. For such changes, additional analysis and documentation will be carried out in accordance with National Environmental Policy Act (NEPA) procedures, to ensure that the project is consistent with any new management direction.

Needs for Action and Project Objectives

Each stated need for action has a defined Desired Future Condition, as reflected in measurable management objectives. Each alternative in the array, except for continuing the current conditions and management strategies as described in the "no action" alternative, must meet each of these objectives to a large degree.

There are two needs for action identified for the project area and its associated objective.

NEED 1. Silviculturally manage previously treated forest stands.

NEED 2. Provide timber to meet Willamette National Forest targets, to support the local and national economy, and to fulfill matrix objectives.

(1a) Silviculturally manage previously treated forest stands by removing the overstory in existing shelterwood harvest prescriptions to complete silvicultural prescription to release understory.
Approximately 338 acres were previously harvested between 1981 and 1992 using the shelterwood system in which the remaining overstory trees have not yet been removed. At this time 221 acres are proposed for removal due to management considerations (see Chapter 3 – Alternatives Not Considered in Detail). These shelterwood stands were created to help seedling establishment by mitigating the effects of frost pockets and reducing competition with *Ceanothus velutinus*, in addition to providing benefits to wildlife and other resources. The shelterwood stands were planted with a mix of conifer species. The understory has developed well enough to complete the shelterwood prescription by removing the remaining overstory trees. Also the overstory trees can reduce the health of understory stand and inhibit its development into late seral conditions.

Need (1a) is associated with proposed Units 1, 2, 5, 6, and 7 (Figure 2).

(1b) Silviculturally manage previously treated forest stands by removing the overstory from prelogged stands to encourage understory stands to recover to full canopy closure.
Approximately 111 acres of stands in the planning area were pre-logged between 1977 and 1992, with the majority of harvesting occurring in 1977 and 1979. At this time 54 acres are proposed for removal due to management considerations (see Chapter 3 – Alternatives Not Considered in Detail). This pre-logging system removed smaller trees (less than 24 inches in diameter), mostly

from the 1850 and 1897 fire cohorts, to minimize breakage when the larger trees were later harvested. The remaining trees, some of them greater than 250 year old, were never harvested as intended. In these stands, the overstory has an average canopy closure of less than 40%. Removing the remaining overstory trees will enhance the growth of understory trees.

Need (1b) is associated with proposed Units 3 and 4.

(1c) Silviculturally manage previously treated forest stands by implementing appropriate timber stand improvement (TSI) activities within early seral stands and treated units to accelerate development of those stands to mid-seral attributes.
The understory is dense (with the exception of Unit 3) and after removing the overstory trees will be in early seral condition. Thinning the understory will encourage the rate at which the stands would achieve mid-seral stage 3 conditions.

The proposed Prelogged and Shelterwood units generally range between 20 and 30 percent canopy closure and total about 275 acres. By and large, these units have dense regeneration of 90 percent Douglas-fir. The remainder is a mixture of western hemlock, Engelmann spruce, grand, noble and silver fir. After removal of the overstory trees as proposed, the remaining three to twenty foot tall early seral stands stage 1 and 2 should be treated to encourage rapid growth of healthy trees with appropriate stocking. However, Unit 3 has poor regeneration and will need planting to increase its quality and number of seedlings; some spot thinning of the existing understory may be needed.

Need (1c) is associated with all the proposed Units: 1, 2, 3, 4, 5, 6, and 7.

The following project objectives are for the stand types and is worded in terms of measurement outputs appropriate to each treatment activity. Each stand type and treatment type has a specific project objective.

Objective 1:

(a and b) Remove overstory canopy in 70% of the shelterwood and prelogged units identified for treatment.

(c) Treat the understory in a minimum of 70% of the stands in which the available overstory is removed in the prelogged stands and shelterwood prescriptions to move units toward mid-seral conditions (precommercial thin for timber stand improvement).

NEED 2. Provide timber to meet Willamette National Forest targets, to support the local and national economy, and to fulfill matrix objectives.

This sale would contribute to the Willamette National Forest timber target by partially fulfilling the District target for FY 2002 of 11 million board feet (MMBF). Companies within a two- to three-hour drive typically bid on timber sales offered by the Sweet Home Ranger District. Within the Sweet Home economic impact area, approximately 10% of the employment is

directly within the lumber and wood products industries.

Approximately 24% of the planning area has been harvested since 1948 by clearcut, shelterwood, or prelog methods. The average decadal harvest since the 1950s is 4 percent of the Parks Creek Subwatershed. Some of these clearcuts were initially shelterwood systems in which the overstory has been subsequently removed, leaving only residual wildlife trees.

Standards and guidelines state: "Most timber harvest (that contributing to the Probable Sale Quantity [PSQ] not taking place in Adaptive Management Areas) takes place in the matrix" (ROD Standards and Guidelines, pg. C-39). Matrix management objectives are related to managing for biodiversity by creating early successional stages through active management and commodity resource production.

This project objective is worded in terms of timber volume produced. Approximately 275 acres were delineated from previously partially harvested units. The range of volume removed will depend on resource protection requirements and the alternative selected. The possible range of volume removed is between 2 and 7 MMBF.

Objective 2:

Produce a minimum of 2 MMBF as a result of overstory removals.

Summary of Proposed Action

The Sweet Home Ranger District, Willamette National Forest proposes to offer for sale one or more commercial timber sales, the total sales treating no more than 275 acres in the Parks Creek Subwatershed. Timber will be removed from the existing shelterwood and overstory management prescriptions with ground-based logging systems as appropriate to the conditions.

Overstory removal will be applied in stands that have been previously harvested using a shelterwood prescription and where the remaining overstory trees need removal to complete the prescription and release the well-established understory. It will also be used for removing the remaining overstory trees in the prelogged areas to improve or initiate the understory. Timber stand improvement actions such as planting, fertilizing, pruning, understory release, and precommercial thinning will be conducted in shelterwood, prelogged stands and existing plantations to encourage and enhance tree growth.

There are 15 roads proposed for new closures by creating earthen berms across them and installing one gate. Five roads will have the existing closure structure modified. As a result, almost 11 miles will be closed to vehicular traffic to reduce impacts to big game. A maximum of 10 miles of road maintenance/reconstruction will occur to make limited use roads passable for project use and improve drainage for the traveled way and roadbed. Approximately 2.5 miles of paving overlay is being considered for the portions of the Lava Lake road to improve its condition. Road reconstruction emphasizes improving the current condition of the road template and prism, and spot rocking to facilitate public and project use.

Post-activity fuels will be treated within harvested units along heavily used roads, private land and managed system trails using grapple and hand piling. Planting of tree seedlings (species representative of the stand) and treatment of *Ceanothus velutinus* will be implemented where necessary.

No timber harvest is proposed for the Crescent Mountain and Lava Lake Dispersed Recreation Area (MA 10e), Wildlife Habitat Management Area (MA 9d), Three Pyramids Special Interest Area,100 acre LSRs and Riparian Reserves (MA 15).

Decisions to be Made

The Sweet Home District Ranger, based on the information and analysis presented in this Environmental Assessment, must make the following decisions:

1. Might this proposed action have significant impacts requiring analysis using Environmental Impact Statement procedures?

2. Should the area be managed for stated objectives?

3. What other resource needs for action within the sale area boundary could be funded through K-V funds generated by this sale and what are their priorities?

4. What changes to the road system should be made, specifically what roads to close and how?

Scope of Analysis and Project Consistency with the Forest Plan and ROD

This section defines the scope of analysis and provides rationale for its extent and limitations. The direction established by the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl (Attachment A to the ROD) amends the management direction contained in the 1990 Willamette National Forest Land and Resource Management Plan (LRMP) where it differed for specific resources or areas; Standards and Guidelines and land allocations in the LRMP not directly amended remain in effect (ROD S&G pg. A-2).

Riparian Reserve Widths

In the Parks Creek Subwatershed, Twelve, Crescent, Maude and Parks Creek are fish-bearing streams with year-round flow. Other creeks in the planning area are either permanently flowing non-fish-bearing streams or seasonally flowing or intermittent streams. “Intermittent streams are defined as any non-permanent flowing drainage feature having a definable channel and evidence of annual scour or deposition.” (ROD S&G pg. B-14).

The Forest Plan requires that the Riparian Reserves be removed from the programmed harvest

land base. Actual designations of Riparian Reserves are done on a project-by-project basis on the ground, rather than on LRMP planning maps prior to project planning.

"Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. Riparian Reserves include areas designated in current plans... as riparian management areas or streamside management zones and primary sources areas for wood and sediment such as unstable and potentially unstable areas in headwater areas and along streams." (ROD S&G pg. B-12, B-13).

For this project, the Riparian Reserve widths for streams will be those recommended in the ROD. For the proposed overstory removal units, which are in the Pacific silver fir series, the site potential tree height is 150 feet for permanently flowing and intermittent nonfish-bearing streams. Only Unit 1 is adjacent to a fish-bearing stream and will have a two site-potential tree 300 feet no harvest Riparian Reserve.

No harvest will be conducted in Riparian Reserves as part of any timber sales associated with this decision. This will also meet the Aquatic Conservation Objectives (see Appendix E).

"The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands." (ROD S&G pg. B-9)

Scenic

Prescriptions for some units in the project area need to consider visual quality objectives for Scenic - Modification Middleground (MA 11a), and Scenic - Partial Retention Middleground (MA 11c). These Management Allocations are in both the Highway 20 and Highway 22 viewsheds (Figures 1 & 2). The management goal for both viewsheds is to create and maintain desired visual characteristics while managing the landscape for other resource objectives, such as timber production and watershed protection (LRMP pgs. IV-201, 205). This direction has not been superseded by the ROD Standards and Guidelines. Prescriptions for both management areas are more restrictive than those for Matrix/General Forest lands.

The viewshed boundaries are based on what can be seen from Highways 20 and 22 when all the trees are removed from the landscape. This bare land analysis was completed for the Forest Plan using fairly coarse topographic map files, which failed to recognize subtle landform features. Due to actual topography and the screening provided by mature forest along these highways, today's highway traveler cannot see the viewsheds within the planning area.

The original landscape would offer form, line, color and texture elements very much influenced by topography changes, notably ridge lines and drainages, and vegetation patterns created predominantly by previous wildfires. The Upper McKenzie Watershed Analysis visualizes a

natural landscape pattern composed of large and small patches of forest in various development stages. The short-term fire frequency pattern was estimated at 40 years. Such a frequency would certainly create a mosaic of vegetative patches in the planning area.

For MA 11a, the Forest Plan sets a maximum size for even-aged regeneration harvest units at 30 acres, unless justifiable reasons exist for exceeding the size limitation. This standard helps define a disturbance scale that is compatible with natural surroundings to meet a viewshed's desired future condition. Unit 1 and 2 are harvest units within MA 11a that exceed 30 acres. These units cannot be easily seen from Highway 20 and 22. However, they may be glimpsed from a distance while descending from the Santiam Pass area. The harvest prescriptions are presently shelterwood with an average of 22 % residual canopy closure. The existing reproduction ranges from 4 to 20 feet in height and will generally remain on site. These units are already counted as created openings since they are existing shelterwoods. Further removal of the remaining overstory would release to understory to increase its growth. Because of the residual stand remaining after harvest of the overstory this action does not meet the definition for regeneration harvest so size limit does not apply.

For MA 11c, the maximum size for even-aged regeneration harvest units should be 15 acres, unless justifiable reasons exist for exceeding the size limitation. Completing silvicultural prescriptions on shelterwood units may be a case for exceeding this standard. Units 6 (29 acres) and 7 (25 acres) are shelterwood units that exceed the unit size limitation. Both units possess overstory canopy closures averaging less than 18% with healthy understory layers of saplings and pole-sized trees. The remnant overstory is competing with the understory and retarding growth rates in the next generation of trees.

Spreading out the treatment of these units over a longer time scale (by splitting the treatment areas into smaller blocks) to meet the unit size restriction will lengthen vegetative and hydrologic recovery while providing very little visual impact mitigation. Neither unit can be seen from Highway 22 due to topographic and vegetative screening. The risk of losing the vegetative screening in the near term (next 10 years) through timber harvest is low given the prominence of this popular winter recreation area and the more restrictive scenic management requirements adjacent to Highway 22.

Having a healthy understory of saplings and pole timber in these units will help to minimize the short-term visual contrasts between treated stands and adjacent lands. Finally retention of riparian reserves, wildlife trees, buffers around Survey and Manage species, and mature forest averaging greater than 60% canopy closure will mask any contrast created by harvesting overstory trees in these shelterwood units.

No units will be harvested in 11f – Scenic Retention Foreground.

Two other standards that need review for this project address the maximum amount of land within scenic management areas that can be in a disturbed condition. These standards are: MA-11a-09 (LRMP pg. IV-202) and MA-11c-08 (LRMP pg. IV-206). Both standards set this maximum, 24% for MA 11a and 20% for MA 11c, at twice the decadel harvest level. These

standards were created to mitigate excessive harvest levels prior to adoption of the current Forest Plan and affect harvest levels during the first 10 years since adoption of the Forest Plan. We are now beyond the first decade. The disturbed area is currently 2% in MA 11c for the North Santiam Highway viewshed containing Units 5, 6, and 7. The disturbed area for the South Santiam Highway viewshed is currently 1% in MA 11a containing Units 1 and 2.

A harvest unit in MA 11a remains in a disturbed condition until regeneration reaches 4.5 feet tall. Harvest units in MA 11c are recovered after regeneration reaches 15-20 feet tall. Units 1, 2, 5, 6, and 7 are existing shelterwoods and as such have already been counted in a disturbed condition upon their initial harvest entry, which occurred in the late 1980's. The regeneration in Unit 1 has almost reached 4.5 feet tall. Unit 2 had two harvest entries in the early and late 1980's, natural and planted regeneration now averages 20 feet tall. Units 5, 6, and 7 have an average regeneration height of seven feet. Removal of more of the remaining overstory trees does not change its disturbed status but it does release the young understory trees from competition for light and nutrients, enhancing the young trees ability to reach the recovery height requirements. In addition, approximately five wildlife trees per acre of the overstory trees will remain in the units. These trees will also help moderate visual appearances.

Consistency Conclusion

The proposed project is completely consistent with the Willamette National Forest LRMP as amended.

Public Involvement Efforts and Results

The Sweet Home Ranger District prepared a Project Initiation Letter dated February 1, 2001 detailing the proposed actions and issues and mailed it to over 100 people, agencies and organizations who either have expressed an interest in the area or project, or who might be interested. Recipients included Santiam Wilderness Committee, Oregon Natural Resource Committee, Oregon Department of Fish and Wildlife, and the City Manager of Sweet Home. In response we received correspondence from Forest Conservation Council, Friends of the Earth, American Lands Alliance, and Oregon Natural Resource Committee. We have also spoken over the phone to a representative from the Santiam Wilderness Committee and Cascadia Wildlands Project. We have received phone requests for information concerning this sale from persons in the surrounding communities.

Bryan Bird of the Forest Conservation Council from Santa Fe, New Mexico wrote: *"We are concerned with the adverse effects of commercial logging and the damage and loss of ecosystem service values associated with standing or otherwise intact forest ecosystems."* Other issues of concern stated are: opportunity costs of logging, timber sale activities may jeopardize the viability of MIS and TES species, and request a restoration only alternative.

Eric Espenhorst of Friends of the Earth from Seattle, Washington stated*: "The Districts should include the full, strict implementation of the Aquatic Conservation Strategy in each of the action*

alternatives…full protection of old-growth forest…conduct a thorough economic analysis including the social cost and benefits of each alternative…"

George Sexton of the American Lands Alliance from Eugene Oregon wrote: *"We are encouraged that the Parks timber sale appears to limit timber harvest to stands that have been entered in the past. We hope that by focusing management in previously entered stands, the District can avoid the cutting of pristine native forests and the need to construct new logging roads."*

Two letters from Leeane Siart and Ron Constable from Oregon Natural Resources out of Eugene Oregon were received. They wanted certain issues considered when writing the EA. Some of these issues were: road building, old-growth, fish & wildlife, water quality, and Lynx.

The Willamette National Forest quarterly mailer, "Forest Focus" is mailed to over 400 individuals, groups and/or industry representatives. The proposed Parks Overstory Removal was included in all issues from August 2000 to Spring of 2002.

All correspondence and full text of the letters are available at the Sweet Home District Office.

Unit 1

Unit 1

Unit 2

Chapter 2: Issues/Affected Environment

To help focus planning efforts, the interdisciplinary analysis team used public scoping results and field reconnaissance to identify issues. Key issues are used to develop more than one action alternative. Since the proposed units have already been managed the "no action" alternative (Alternative 1) represents not modifying the units further. The action alternatives need to meet the set of objectives to a great degree while addressing the key issues in different ways.

Additional issues, some of specific concern from the public, many of them associated with Forest Plan standards and guidelines, legal requirements, and localized resource concerns, are mainly addressed by mitigation measures which are typically common to all action alternatives. The last section of Chapter 2 is Other Issues, which are important to discuss but for one reason or another will not be analyzed beyond this chapter.

In addition, all the issues contain a component of the affected environment or what is the existing condition for that resource.

The year of the initial harvest and the existing silvicultural condition for the proposed units is summarized in the following table.

Table 2: Parks Units Existing Condition

Unit	Acres	Existing Silvicultural Prescription	Legal Location	*Existing Overstory – TPA, Age, CC, DBH	*Existing Understory – TPA, Height
1	90	Shelterwood in 1989	T.13S., R.6E., S.13	20 TPA, 155 yr, 25%, 26″	1000 TPA, 4′ Planted 1990
2	71	Shelterwood in 1981 & 1989	T.13S., R.7E., S.18	15 TPA, 250 yr, 20%, 36″	500 TPA, 20′ Planted 1990
3	45	Prelogged in 1977	T.13S., R.7E., S.6	30 TPA, 250 yr, 40%, 32″	100 TPA, 3′
4	9	Prelogged in 1979	T.12S., R.6E., S.25	25 TPA, 250 yr, 35%, 36″	700 TPA, 2′
5	6	Shelterwood in 1988	T.13S., R.7E., S.5	13 TPA, 250 yr, 20%, 36″	350 TPA, 5′ Planted 1989
6	29	Shelterwood in 1989	T.13S., R.7E., S.9	11 TPA, 200 yr, 15%, 40″	300 TPA, 8′ Planted 1989
7	25	Shelterwood in 1988	T.13S., R.7E., S.9	11 TPA, 250 yr, 15%, 40″	450 TPA, 7′ Planted 1989
Total	**275**				

TPA = Trees Per Acre, CC = % Canopy Closure, DBH = Diameter Breast Height
**The numbers are estimated averages for the units. For example, Unit 3 has an average 30 TPA but the range for that Unit is about 10 to 40 TPA, which also applies to the corresponding range for the other variables. Unit 3 (Unit 4 is similar) has the widest range and Units 5, 6, and 7 narrowest about 5 to 15 TPA.*

Key Issues

Northern Spotted Owl Habitat

The U.S. Fish and Wildlife Service has listed the Northern Spotted Owls (*Strix occidentalis)* as a threatened species in the Pacific Northwest. Suitable spotted owl habitat refers to nesting, roosting, and foraging habitat and generally consists of forested stands over 80 years old, multi-storied with sufficient snags and down wood, and canopy closure generally exceeding 60%. Forested stands on the Willamette National Forest containing trees with an average of >18" diameter, >60% canopy, and some level of dead and down woody material may be considered foraging habitat but not nesting habitat.

Only dispersal habitat consist of forested stands 40 to 80 years old, canopy closure of 40 to 60%, and average tree diameter of 11 inches or greater. Dispersal habitat is used by spotted owls to navigate between stands of suitable habitat and by juveniles to disperse from natal cores.

Proposed harvest units in this timber sale are located within the home range (1.2 mile radius), or will haul past, six historic known spotted owl pairs. Four owl sites in the planning area have a one hundred acre Late-Successional Reserves (LSRs) identified around them of the best available habitat as required in the Forest Plan. One of these 100 acre LSRs is only partially within the planning area as shown on the Land Management Plan Allocations map (Figure 2). Another owl pair in the planning area is within the no harvest Dispersed Recreation allocation area. The sixth owl pair is in a LSR adjacent to but outside the planning area boundary. These small LSRs will function as stepping-stones of habitat across the landscape for species dependent on older forests. No timber harvest is allowed within the LSRs.

Table 3: Northern Spotted Owl Habitat

	Unit	Acres
Suitable Habitat	3	6
Dispersal Habitat	2	26
	3	10
	4	5
Suitable & Dispersal Subtotal - 47		
Non-Suitable and	1	90
Non-Dispersal	2	45
	3	29
	4	4
	5	6
	6	29
	7	25
Non Owl Habitat Subtotal - 228		
Total Acres		275

The proposed units are not suitable spotted owl habitat due to low canopy closure, except for approximately 6 acres in Unit 3. The units do contain varying amounts of dispersal habitat. Suitable owl habitat is nesting, roosting, and foraging habitat. Dispersal habitat for spotted owls is 41 acres in Units 2, 3, and 4. Non-suitable and non-dispersal habitat for owls is 228 acres in Units 1-7. Because of the varying densities of the trees in the units some units have multiple spotted owl habitat types (see Table 3). The varying densities of the trees and its associated canopy closures determine the habitat types for spotted owls. These canopy closures are estimated.

Noise disturbance from logging activity or log haul could affect owl pairs during the nesting season (March 1 through September 30). Disturbance can occur from any activity producing above-ambient noise within 0.25 mile (1.0 mile for blasting and 0.5 mile for aircraft) of owl nests during the nesting season.

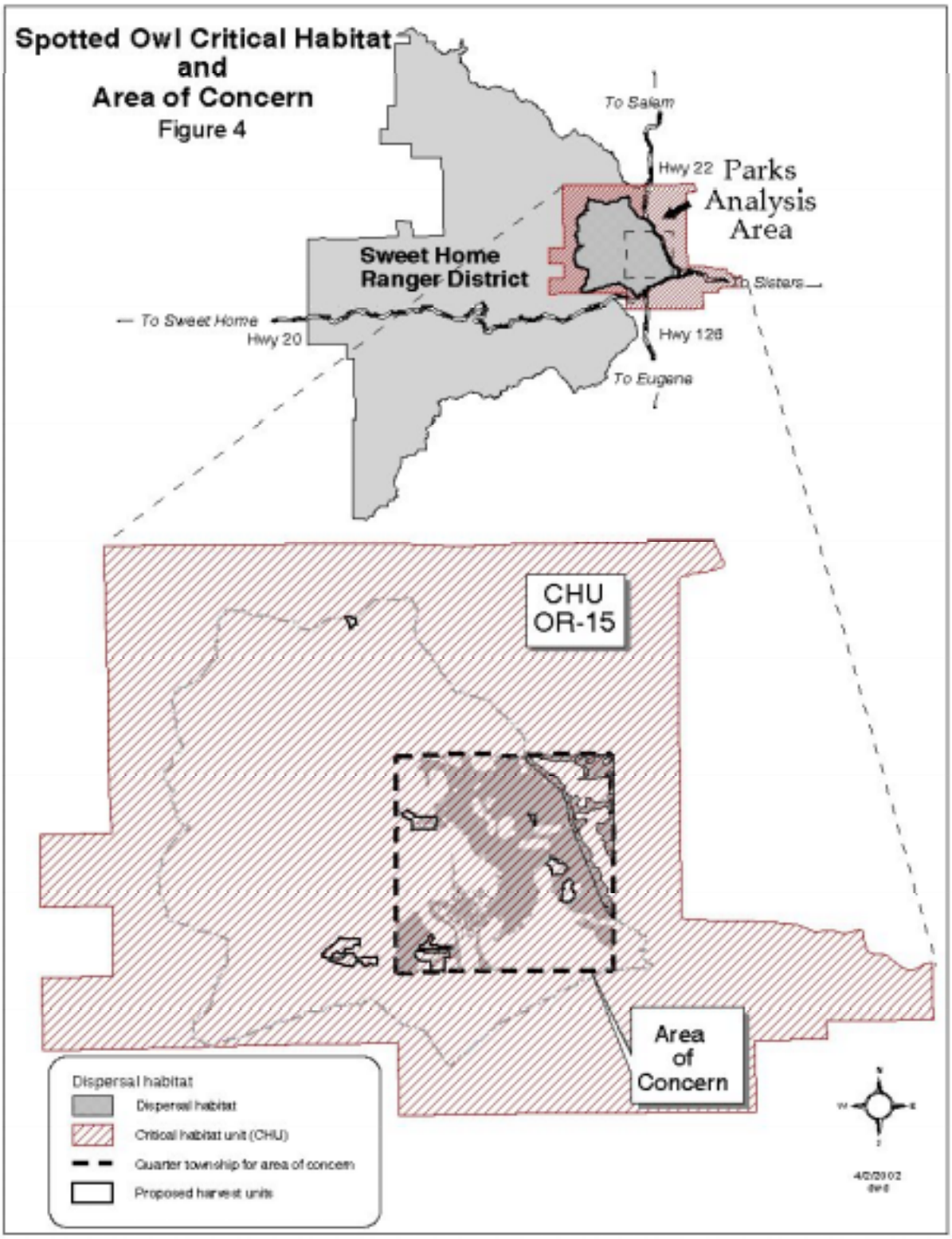
Spotted owls are affected by habitat loss or modification and disturbance. By standard practice, no harvest-associated operations are allowed from March 1 to July 15. After July 15 and before September 30 consultation with the U.S. Fish and Wildlife Service is required for timber harvest.

Critical Habitat

The U.S. Fish and Wildlife Service have designated Critical Habitat Units (CHU) across the range of the northern spotted owl. The physical and biological features (referred to as the primary constituent elements) that support nesting, roosting, foraging, and dispersal are essential to the conservation of the species (Depart. of Interior, 1992). One CHU (OR-15) is located in the Parks Creek area and overlaps the planning area. Timber harvest within the units proposes to remove dispersal habitat in Units 2, 3 and 4. See map Figures 4 and 5.

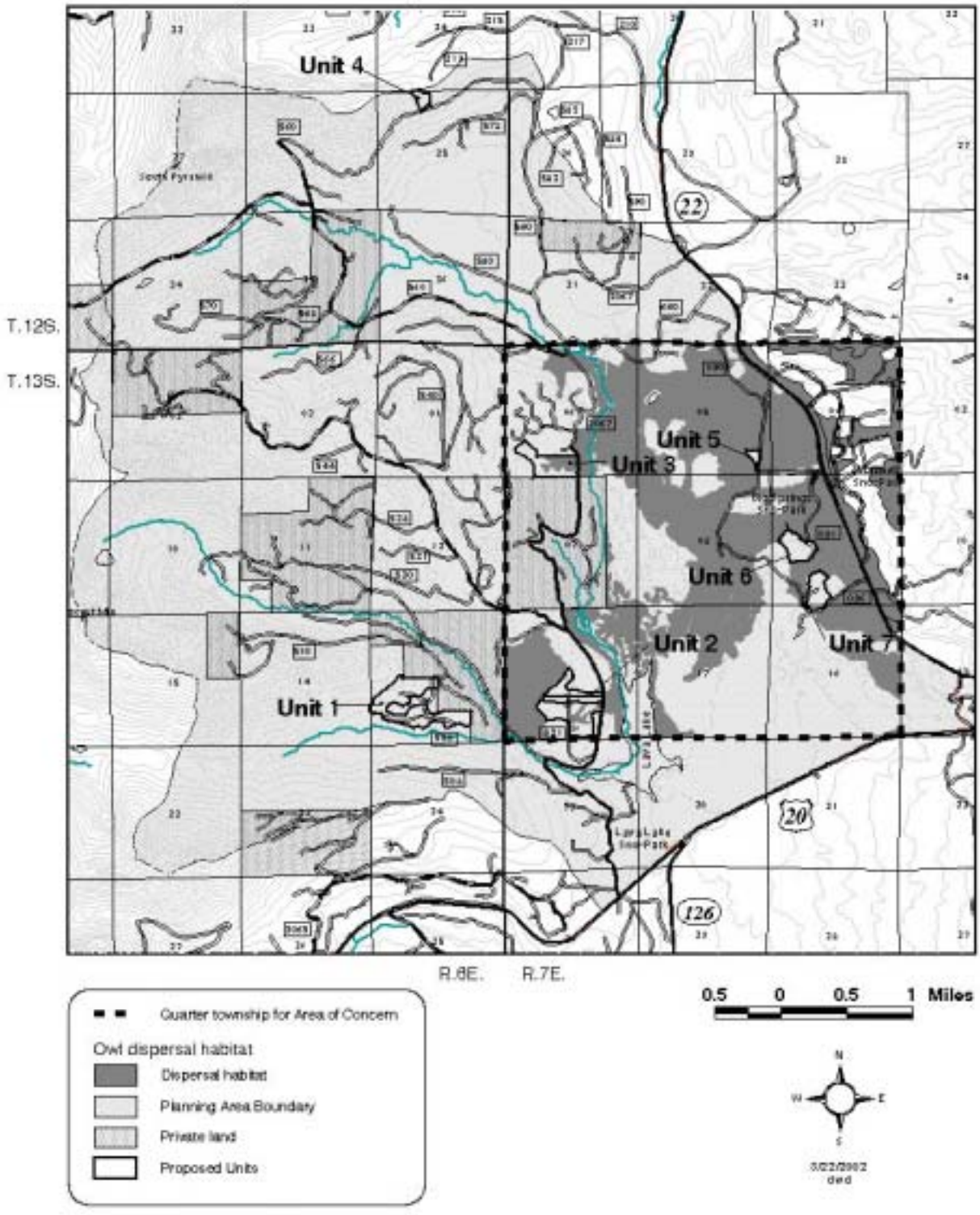
Area of Concern

An Area of Concern (AOC) has been identified in the vicinity of Santiam Pass, encompassing portions of the Detroit, McKenzie, and Sweet Home Ranger Districts. It overlaps the CHU in the same area. This area is believed to be limiting in its ability to facilitate dispersal for spotted owls both north/south and east/west. Timber harvest can occur but a minimum of 50% of each quarter township must provide dispersal habitat for spotted owls. Units 2, 3, 5, 6, and 7 are located within this area of concern in quarter township T.13S., R7E., Northwest. This quarter township currently consists of 66 percent dispersal habitat for spotted owls.


Spotted Owl Critical Habitat
and
Area of Concern
Figure 4
To Salem
Hwy 22
Parks
Analysis
Area
Sweet Home
Ranger District
Sisters
To Sweet Home
Hwy 20
Hwy 126
To Eugene
CHU
OR-15
Area
of
Concern
Dispersal habitat
Dispersal habitat
Critical habitat unit (CHU)
Quarter township for area of concern
Proposed harvest units

Owl Dispersal Habitat in Area of Concern

Parks Overstory Removal - Figure 5



Old-Growth Trees

The proposed Parks Overstory Removal units do not contain intact old-growth forests due to prior shelterwood harvests, prelogging, or salvaging. However, the overstory trees that remain in six out of seven units are greater than 200 years old and range in diameter from 32 to 40 inches; there is a range of 11 to 30 trees/acre of this size in the proposed units. Trees of this age and size may individually be considered old-growth, despite the lack of complex attributes contained in intact old-growth stands. The harvest of old-growth forests and trees has become a controversial issue that is national in scope.

Ecologically, the proposed overstory removal units are not functioning as intact old-growth forest. The stands lack the high number of snags, down wood, and multistoried canopies typical of old-growth forest. Canopy closure from the overstory ranges from 15% to 40%. The interior of the stands is open and exposed to more light, wind, and temperature extremes than would be found in undisturbed forest stands. Many of the understory species are indicative of early seral conditions and some of the species that have persisted since the initial harvest have sun-scalded leaves or have developed greater leaf pigmentation. If these stands are left as is, they may eventually recover much of the structure and function of intact forest, however, in their current state, they do not provide interior old-growth habitat.

The standards and guidelines in the Forest Plan require the identification and ranking of old-growth stands using ecological criteria (LRMP pg. IV-78). Ecologically significant old-growth ratings (ESOG) were developed in response to the Northwest Compromise legislation of 1989 (Section 318) and Forest Plan direction. The ratings range from 1 to 19 with each old-growth stand becoming more significant or receiving a higher number as they: 1) become larger, 2) become wider, 3) meet all characteristics listed in Pacific Northwest Research Note 447 and 4) are occupied by spotted owls. Table 4: Old-Growth Definition lists the requirements of ESOG under the PNW-447 "*Interim Definitions for Old-Growth Douglas-fir and Mixed-Conifers Forest in the Pacific Northwest and California*"(Franklin et al.1986).

Table 4: Old-Growth Definition

Old-Growth Stand Characteristics From PNW-447:	Live Trees: Douglas-fir ≥ 8 per acre of trees > 32-in diameter at 200 years old
	Live: Tolerant associates (western hemlock, western redcedar) ≥ 12 per acre of trees >16-in diameter
	Canopy - Deep multilayered canopy
	Snags - Conifer snags ≥ 4 per acre which are > 20-in diameter and 15 ft tall
	Logs - Logs ≥ 15 tons per acre including 4 pieces per acre ≥ 24-in diameter and > 50 ft long

The proposed units for overstory removal do not meet ESOG or PNW-447 definitions.

The social issues surrounding old-growth include its spiritual and intrinsic value and its relative scarcity compared to pre-settlement times. Ripple (1994) estimates that 71% of western Oregon's forests were in large-forest class prior to European settlement and Booth (1991) estimated that 61% of western Oregon's forests were old-growth before logging began. Current estimates put old-growth at about 10% of the historic levels once found in the Pacific Northwest. The public concern for old-growth has been reflected in changing management, including the Forest Plan and its emphasis on old-growth dependent species. There are many groups and individuals that seek an end to all harvest of old-growth.

Roads

Two main issues have surfaced around access and travel management (Roads) within the planning area. The first is mitigating resource effects related to roads, while retaining a suitable transportation system to meet access needs. The second is achieving road maintenance goals with reduced funding sources. These two issues have been recently addressed with Interim Directive No. 7710-2001-3 for the Forest Service Manual for Transportation Atlas, Records, and Analysis. In general, the Interim Directive requires the implementation of a forest-scale roads analysis and clarifies local manager's discretion and flexibility when implementing roads analysis. The Willamette Forest Roads Analysis was completed in October 1998. While the Parks Creek planning area was not identified as a Subwatershed of Concern in the roads analysis, there are areas where there are high road densities that have negative affects on elk. In the Forest Roads Analysis Map 6, the Maude high emphasis area shows the road density exceeds Big Game Objectives by < 1 mile/square mile (Maude high emphasis also in Elk/Snag Emphasis Areas – Figure 6). To meet big game objectives roads will be proposed for closure.

Most of the planning area is well roaded, having an average open road density of about 2.4 miles/square mile. This road system is generally stable due to the gentle terrain in the planning area. The Forest Roads Analysis (1998) access and travel management designation are Primary, Secondary, and Local roads. Local roads (not designated as Primary or Secondary) are candidates for reduced maintenance standards, decommissioning, or obliteration. Most of the roads in the planning area are local roads. The designation of roads can be found in the INFRA Forest Travel Routes database and also in the District files. The database and corresponding files also contain the existing maintenance level of each road and its objective level. Un-classified roads are discussed in the Forest Roads Analysis and after intended use are typically decommissioned or slated for closures.

While discussed in greater detail in other sections, roads have recognized effects on resources across the subwatershed. Within this planning area, resource effects of greatest concern are reduced wildlife habitat values and potential harassment, and the spread of non-native species down open road corridors. Another concern is the risk of human-caused fires.

This project can provide funding to reduce open road density and resource effects, but must consider access needs over the next 20 years when selecting candidate roads. Road access benefits public visitors, adjacent private landowners, project contractors, and agency staff. Reducing open road density typically occurs by closing and rehabilitating, decommissioning or obliterating non-essential roads. To date, open road densities have been reduced in this planning area by closure and rehabilitation.

Closing a road restricts motor vehicle traffic with a barrier. Rehabilitation can take the form of planting native plants on road beds, stabilizing cutbanks or fillslopes, and/or improving a road's drainage system. Decommissioning a road most often includes a closure, creating waterbars, and seeding or planting the roadbed, but it can also include removing culverts and/or ripping up the roadbed with subsoiling equipment. And finally, road obliteration generally involves recontouring the slope across the roadbed to remove the road's drainage system (to restore natural surface flows) and to restore the land's productivity.

Meeting road maintenance needs is impacted by shrinking road budgets and access needs by the public and private landowners in areas adjacent to the planning area. All work on cost share roads needs to be coordinated with the private landowner that shares in the cost of maintaining common roads on the district. The Parks Creek planning area has 29 miles of cost-share roads. Fortunately most of the roads are stable and require less effort to maintain than roads in other areas of the district.

A maximum of 10 miles of road maintenance/reconstruction is proposed to make limited use roads passable for project use and improve drainage for the traveled way and roadbed. Road maintenance/reconstruction consist mainly of spot rocking, brush cutback, blading, and cleaning the ditches of the road. However, dry weather haul could be required to avoid the need and cost for spot rocking reconstruction.

In addition, approximately 2.5 miles of road asphalt overlay is being considered for the paved portions of the Lava Lake Road (Road 2067). The overlay is on Forest Road 2067 from the junction with Road 525 crosses and north to Unit 3. Road reconstruction emphasizes improving the current condition of the road template to facilitate project use. However, timber haul for this portion of the road could be rerouted to avoid the cost of asphalt overlay.

Approximately 2.5 miles of road asphalt is also being considered for the unpaved portions of the Lava Lake Road, north of Unit 3 and south of Highway 22. Paving the road is recommended and would have positive effects on recreational use and limit disturbance from dust along the road. However, the estimate cost for paving is about $250,000. The timber haul route for Unit 4 uses only a portion of Road 2067 that needs paving and very little volume will be hauled over this portion of the road. The existing gravel portions, with an additional 4 to 6 inch lift of gravel, are sufficient to support haul for Unjit 4. Another funding source will have to be developed to pave the remaining graveled pieces on the Lava Lake road.

Finally a travel management issue has developed on the road network near the Big Springs Snopark. A number of short spurs or local roads have been linked together to create a winter trail system for skiers and snowmobiles. This trail system has started to attract ATV recreation traffic, though the trail system is not designed for such use. A separate analysis will be conducted to determine strategies for controlling undesirable motorized use on the ski trail system.

Issues Used to Develop Mitigation Measures

Big Game

Big game species within the planning area include Roosevelt elk, mule deer, black-tailed deer, cougar, and black bear. Timber harvest projects can modify habitat, change the percentage of each habitat type (forage, hiding, thermal, optimal thermal), disrupt species through increased human presence, and increase human access for hunting and poaching.

Roosevelt elk and black-tailed deer use the area from spring through early winter, or until the snow depth drives them out. Mule deer migrate from the east side of the Cascades during the early summer and back in late fall. Cougars prey on both deer and elk and move in and out of the planning area depending on the food supply. Black bears are omnivorous and prefer forests with dense understory for food and cover, but often forage in clearcuts and natural openings. They are year round residents in the planning area, overwintering in caves or tree cavities. The planning area is within deer and elk summer range.

The planning area lies within two high and one moderate emphasis big game management areas developed in cooperation with Oregon Department of Fish and Wildlife. In order to evaluate whether habitat quality is being maintained or enhanced, emphasis areas are evaluated according to the 1986 Wisdom model for Western Oregon. This model provides a systematic way to evaluate and monitor elk habitat. This model has four variables: cover quality, forage quality, road density, and size and spacing of cover and forage. Using an equation in the model, Habitat Effectiveness (HE) values are calculated for each of the variables for projects modifying elk habitat. Some of the existing habitat variables are not at the desired Forest Plan objectives and may be improved by this project. See Elk/Snag Emphasis Areas map – Figure 6 and Table 5: Current Elk Habitat Effectiveness.

The seven units proposed for this project all currently provide low quality forage habitat for deer and elk except for approximately six acres of thermal cover in Unit 3. All units are within big game summer range. Big game use is heaviest in Units 6 and 7, likely due to the closed road system and adjacent cover. The remaining units have fair to light use when compared to Units 6 and 7. Unit 4 is adjacent to the Parks Creek Special Habitat Area. Units 1, 4, 6, and 7 are within road closure areas.

Table 5: Current Elk Habitat Effectiveness

	Frost (Moderate)	Maude (High)	N.F. Parks (High)
Units	5, 6, 7	1, 2, 3	4
HE overall	0.51	0.45	0.55
HE forage	0.36	0.26	0.33
HE cover	0.62	0.46	0.63
HE roads	0.47	0.39	0.48
HE size & spacing	0.65	0.91	0.93
Current Open Road Density (mile/square mile)	2.14	2.97	2.03
Total Miles	32.5	35.2	19.3

The habitat effectiveness objective for each of the four variables (cover quality, forage quality, road density, size and spacing of cover and forage) should be within the range of > 0.5 to 1.0 for high emphasis areas and > 0.4 to 1.0 for moderate areas (Forest Plan, LRMP IV-69). The overall habitat effectiveness value should be > 0.6 for high emphasis areas and > 0.5 for moderate emphasis areas.

The habitat effectiveness values are currently below Forest Plan objectives for some of the variables (Table 5: Current Elk Habitat Effectiveness). This project has the potential to improve both the road and overall values but not the forage and cover values. Miles of open roads and open road density within each emphasis area is summarized in Table 22: Open Road Density. Roads open to vehicular traffic could affect big game populations. Any vehicular traffic increases the likelihood that elk will avoid adjacent habitat (Wisdom et al. 1986). To achieve a habitat effectiveness value within the range of > 0.5 to 1.0 for roads, the road density needs to be approximately two miles of open road/square mile or less.

Parks Creek Special Habitat Area (9d), located at the north end of the planning area, is one of several high quality, biologically diverse habitats located throughout the forest landscape. This area contains wet meadows, old-growth forests, small openings, flat terrain, and security to provide high quality elk habitat from early spring to winter.

Roads located within this special habitat are closed year-round to traffic to provide security and allow maximum use of the habitat by wildlife. Logging activity within or log haul through this area should be done in a manner that minimizes impacts on big game.

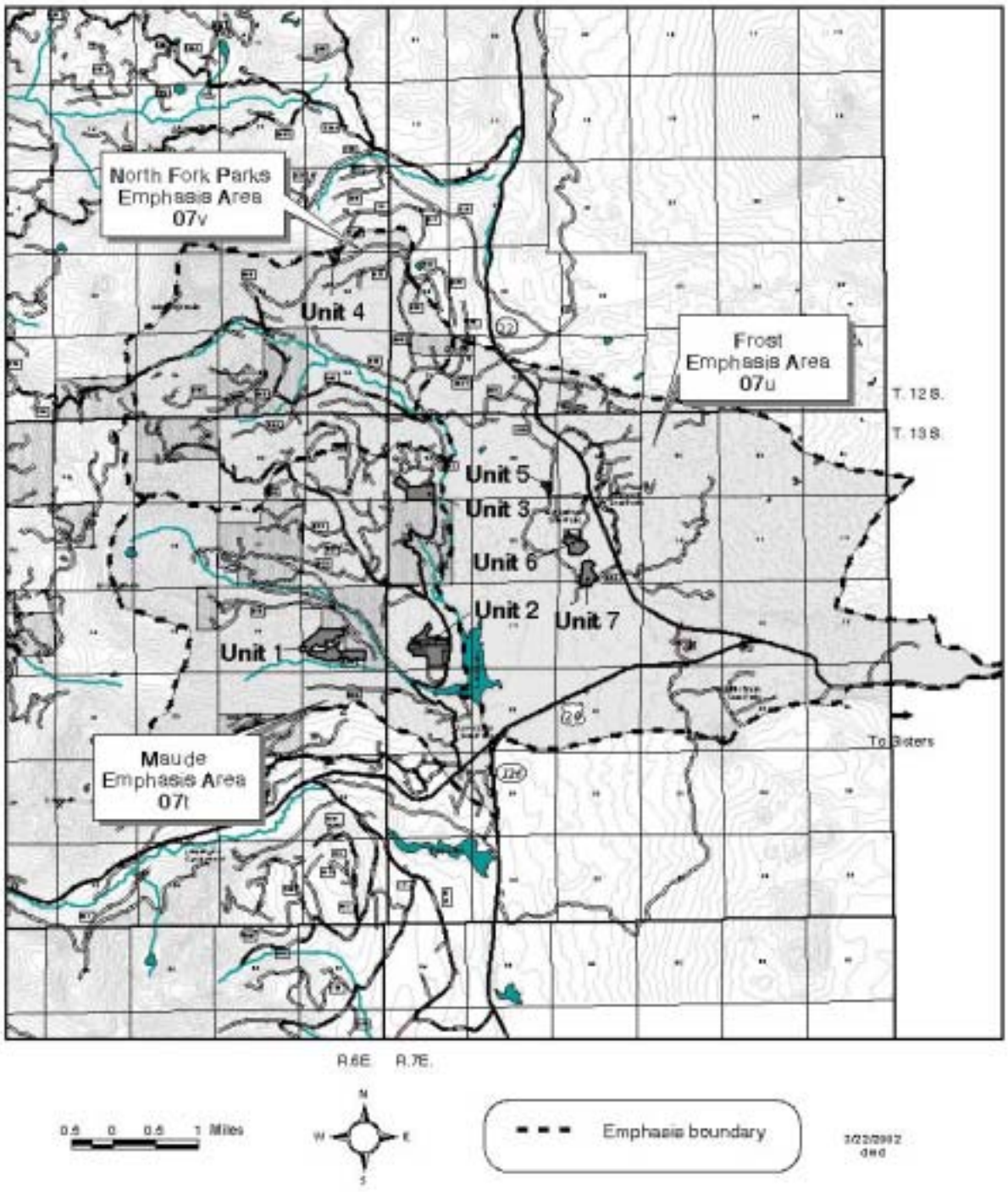
Canopy Closure and Understory Development

The Parks Creek Planning area supports mostly the Pacific silver fir (*Abies amabilis*) plant association series. The Pacific silver fir association grows on cool moist sites (Hemstrom et al, 1987). Although true fir represents the dominant ecological tree species should the vegetation communities proceed through ecological successional stages to climax communities, the current forest stands are actually dominated by Douglas-fir (*Pseudostuga menziesii*) mixed with scattered western hemlock, Pacific silver fir, grand fir (*Abies grandis*), western white pine (*Pinus monticola*), noble fir (*Abies procera*), and Engelmann spruce (*Picea engelmannii*).

The overstory canopy closure in the shelterwood and prelog units is generally below 40%. Development of an understory layer is being delayed or stagnated in areas of 20% or greater canopy closure. Competition for light and water will cause the understory to grow at the rate of about 25% of an open grown stand on the Sweet Home Ranger District (Ken Loree per. com.). A study done on the Challenge Experimental Forest in California has a 50% reduction in Douglas-fir seedling growth (Hobbs et al. 1992). A masters thesis done by Marianne Wampler (1993) in western Washington states “The relative height growth of understory Douglas-fir was reduced to 60% or less when the overstory consisted of 30 trees per acre or more, 150 sq. ft. basal area or more, or a canopy closure of 40 percent or more.” Clearly the overstory slows the growth of the understory. The plant association guide for Pacific silver fir/big huckleberry/beargrass predicts dominant Douglas-fir will reach 96 feet at age 100 (Hemstrom 1987). A related increase in diameter is expected. In order to develop greater than 40% canopy closure of trees greater than 11” in diameter for northern spotted owl dispersal habitat in the shortest timeframe the overstory canopy closure should be reduced. See Spotted Owl Area of Concern for further discussion of 50-11-40 standard.

Elk/Snag Emphasis Areas

Parks Overstory Removal - Figure 6



Competing and Unwanted Vegetation

Competing Vegetation

The following two legal documents guide the treatment of competing and unwanted vegetation in the Pacific Northwest Region:

- 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 concerning adequate analysis and evaluation of preventative techniques; how well treatments meet goals and objectives; impacts and long term site productivity; and environmental and human risks.

Ceanothus velutinus (*Ceanothus* sp.) is a species with potential to compete with reforestation efforts in this planning area. The seeds of this shrub stay in the soil for long periods of time and germinate in response to heat. Lower densities of germination can be expected with low intensity broadcast burns and sunlight. *Ceanothus* sp. on the site following disturbance provides a benefit due to the nitrogen fixation quality of the brush species.

Recent reforestation efforts in the area have been successful using the following preferred preventative strategies for establishing conifer seedlings in areas of potential *Ceanothus* sp. competition:

- Not burn
- Pile slash and burn piles
- Use cool burns where broadcast burning is necessary to meet other resource objectives.
- Hand pull the *Ceanothus* sp. seedlings (when small) around conifer tree seedlings while maintaining *Ceanothus* sp. on the site between the conifers.
- Minimize competition by removing all *Ceanothus* sp. within 4 feet radius of conifer seedlings.

Unwanted Vegetation: Noxious Weeds

Noxious weeds and other invasive non-native species often require soil disturbance to get established. Timber harvest, road construction and associated activities provide ample disturbed mineral soil that can lead to weediness. Weed seeds may be transported into into the area on logging and road building equipment and subsequently on any vehicle using the road after it is constructed. The increased light found along roadsides, combined with continue disturbance from traffic, allow roads to serve as corridors for weed invasion (Parendes 1994).

The Parks Overstory Removal sale area has many existing roads and weeds have already become established in the area. Harvest activity is likely to exacerbate the weed problem. One of the

most serious weeds present in the area is tansy ragwort (*Scenecio jacobaea*). This species has in recent years spread upwards in elevation and is moving eastward toward the high Cascade wilderness areas and to the eastside of the Cascades. Insect control agents, such as the cinnibar moth and tansy flea beetle, that have been effective at lower elevations have not established at the higher sites despite repeated attempts to introduce them.

Fuels/Fire

The Parks planning area ecosystem is in a Type Two Natural Fire Regime characterized by infrequent (10-200 yrs) high intensity fires that occasionally reach a very large size.

Historical fire occurrence data specific to the area records the mean return interval for high intensity fires at 100-200 years and the mean return interval for frequent low intensity fires at 18-80 years. This calculates the risk for fire starts (ignition) at low to medium. The topographic features (approx. 0-15% slope and aspects) of these units present a "low hazard" in their relationship to fire behavior. Fires in the Parks Creek Subwatershed have resulted in a mosaic of small patches.

The sale area units portray Fire Behavior Fuel Model 8 and National Fire Danger Rating (NFDRS) fuel model H that describes a healthy stand with generally sparse undergrowth and a thin layer of ground fuels. Small pockets within these units resemble concentrated fuel loadings of Fire Behavior Fuel model 10. These fuel models estimate fuel loadings in the < 3 inch dead and live (critical to fire behavior) ranging from 5-12 tons per acre. Fires in fuel model 8 are typically slow-burning with low flame lengths in mild weather conditions. The pockets of heavier fuel loadings in Fuel Model 10 will increase the intensity of fire behavior. There is more natural seedling understory in these sale units than is typically described in these fuel models. This understory has the potential to act as a fuel ladder creating crown fire events where fire travels through the tree canopies being pushed by strong prevailing tree top winds.

The sale area gets a large amount of recreational use and two of the proposed units are adjacent to private land (Units 1 and 3). Increased use multiplies the risk or adds to the concern of human caused fire ignitions. Timber harvest in the proposed units may increase fuel loads in the >3 inch dead woody component to 12-15 tons per acre. Using the BEHAVE Fire behavior prediction model post harvest fuel loadings on a 80 degree day, winds at 6 mph could produce four foot flame lengths creating a 2-3 acre fire within a half hour should a fire start initially go undetected. The combination of higher risk due to recreational use within the sale area and increased fire hazard (fuel loadings) threatens the safety of the public, the integrity of public and private property, air, weather and visual qualities.

Air Quality

Conditions affecting air quality should wildfire or prescribed burning occur are wind flows that come from three directions: northwest, southwest and easterly. Average wind speed is five miles per hour with predominate winds northwest to southwest during fire season (July-September) having the capacity to disperse smoke. In the fall these western slopes are affected by dominant strong east winds that have shaped the large fire history of the area. Air movement

through all levels of the atmosphere is generally good and inversions are usually not a problem in the area. This watershed is characterized by relatively clean air.

The dominate westerly transport winds may travel to the Cascade Crest and the Mt. Jefferson Wilderness, the closest sensitive class 1 air-shed, which is 10 miles from the planning area. Further east and south is Mt. Washington Wilderness, and the Three Sisters Wildernesses also class 1 airsheds. Burning occurring up wind of these airsheds is generally restricted from July 1st to September 15th. The communities of Sisters and Bend lie 50-70 miles on the lee side of the Cascades to the east and are sensitive to direct west wind transports during burning events. The communities of Sweet Home, Detroit and Idanha reside down drainage from the Parks Creek area to the north and southwest 12-40 miles and the Willamette Valley to further west. These usually are not in the dispersion path of smoke carried by the dominant westerlies of the area but potentially could be affected by strong fall easterly winds.

Highway 22 lies as close as a quarter mile east of units in the sale. It would be considered a potentially sensitive area if fire produced enough smoke to be a visual obstruction for drivers.

Air quality in mountainous surroundings of the Parks Creek area is very good and there are no activities that significantly impact this location. The exception is spring and fall burning that may impact the area only a day or two at a time.

Heritage Resources

Archaeological sites, including indigenous and historic debris, trails, and use/occupation locales require protective measures to minimize or eliminate the risk of damage or loss of important information. Data contained in indigenous context may contribute to the understanding of first Nation(s) use of the area in terms of cultural chronology, resource exploitation, trading patterns, and environmental change/human adaptation among others.

Historic sites may contain data important to the understanding of the early Euro-American use of the area, including exploration, trapping, travel route development, and initial Forest Service administrative sites/activities.

Known heritage resources within the planning area include several historic trails. The Forest Plan states: “Eligible historic sites and historic trails shall be maintained and/or adverse effects shall be mitigated...Protective measures may range from complete avoidance of the site and protection of the environmental setting to mitigation procedures which conserve the historic or scientific values” (LRMP pgs. IV-87-88). Anticipated historic values associated with the previously harvested units are possible blazed trees within or adjacent to historic trails. If blazed trees are found in the proposed units these trees will not be removed.

Recreation

The Parks Creek Subwatershed is very popular for a variety of recreation activities in the summer, fall and winter seasons. Summertime visitors seek out trailheads in the basin to reach peaks along the Old Cascades Crest. Pyramids and South Pyramid Creek and Crescent Mountain

trails are all accessed off Forest Roads 2067 or 2067-560. Other visitors come to Big Springs Snopark in the summer to ride trails on mountain bikes. Visiters also come into the area to escape the summer heat in the Willamette Valley and camp along Parks Creek or other popular dispersed sites. Berry picking in late summer is another popular activity in this area.

In the fall, a high number of hopeful hunters invade the area for several months to pursue deer or elk. Most of these visitors stay at one of many dispersed campsites along the road systems. Units 1, 2, 5, and 7 have recent dispersed campsites in or near them. Hunters rely on forest roads to access dispersed campsites and hunt areas. Proposals to close spur roads to meet other objectives will reduce vehicle access for hunters. Road closures can also create better hunting opportunities on short spur roads.

And finally in the winter, skiers and snowmobilers explore trail systems out of the Big Springs Snopark. Ski trails follow closed roads or old logging spurs through the forest close to the snopark. Snowmobile trails follow open and closed road systems throughout the planning area. The snopark also serves a large number of travelers as a rest area during their travels across the mountains.

Most recreation visitors are influenced by forest conditions (setting) when selecting locations to visit or stay. Resource projects like timber sales can negatively effect recreation use patterns in an area, if precautions are not taken to mitigate project modifications of forest conditions and operations disturbance to area visitors.

Potential Impacts to Facilities and Setting:

- Log haul and skidding for proposed Units 5, 6, and 7 could directly damage trails out of the Big Springs Snopark.
- Harvesting may remove trees that have trail markers for winter trails.
- Silvicultural prescriptions change the character of a landscape where many visitors recreate. Such a change could affect recreation visitors during all seasons of use. This change can vary from loss of vegetation in the foreground views or gain in background views to textural impacts to landscape views of travelers through the area.
- Harvest operations could damage established dispersed campsites in select units.
- There will be reduced vehicle access for visitors on roads selected for closure.

Harvest operations could also negatively impact recreation traffic in the planning area if scheduled during popular use periods (late summer, fall, mid-winter). This issue is discussed further under the resource scheduling issue.

Resource Scheduling

The planning area provides important habitat for Sensitive and Threatened species and big game. There are also many recreation activities within the area such as berry picking, hunting, and cross-country skiing. Timber harvest operations at certain times of the year could negatively affect wildlife species and recreational use. Some of these conflicts would be the increase in

noise levels affecting both wildlife and the public, increased vehicle activity behind closed gates that hunters select for walk-in hunting, disruption of dispersed camping, changing snow conditions required for cross-country skiing and snowmobiling, and potential safety concerns. Sufficient time will need to be scheduled in order to allow for economical harvest of the timber. This issue will not be analyzed further but will be incorporated into mitigation measures and the implementation plan. Table 6 displays the different times that are critical for specific resources.

Table 6: Resource and Operations Timeline

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Habitat Protection for Northern Spotted Owls March 1 to July 15			*Units 1,3, &4									
Elk Calving Season May 1 to June 15					* Unit 4							
Snow Mobile & Ski Season Dec. 1 to March 15												
High Cascade Deer Rifle Hunting Season Sept. 9 to Sept. 16												
Cascade Elk Rifle Hunting Season Oct. 20 to Oct.27												
Cascade Deer Rifle Hunting Season Sept. 29 to Oct. 19 & Oct. 27 to Nov. 7												
Cascade Deer, Bow Hunting Season Aug. 25 to Sept. 23& Nov. 17 to Dec. 9												
Primitive Weapons Elk Hunting Season Nov. 10 to Nov.16												

**Except where specifically stated all units are affected by seasonal operating restrictions.*

Sensitive Wildlife Species

Habitat for some wildlife species identified on the Regional Forester's Sensitive species list does exist within or adjacent to the proposed units. One species, Oregon slender salamander (*Batrachoseps wrightii*), has been located within the proposed units.

Seventeen Region 6 sensitive wildlife species were evaluated to determine if they or their habitat would be impacted by this project. No habitat exists for 13 of the 17 species (least bittern,

bufflehead, harlequin duck, peregrine falcon, yellow rail, black swift, tricolored blackbird, California wolverine, Pacific fisher, Cascade torrent salamander, foothill yellow-legged frog, Oregon spotted frog, and Northwestern pond turtle). Habitat does exist for 4 species (Baird's shrew, Pacific shrew, Pacific fringe-tailed bat, Oregon slender salamander).

Snag Habitat and Down Wood

Wildlife trees provide habitat for cavity dependent species (woodpeckers and other birds), spotted owl nesting, and spotted owl prey such as flying squirrels.

When the proposed units were partially harvested approximately 20 years ago, snags and down wood were viewed as potential safety and fire hazards and important items to "salvage" or remove from the forest. There was little understanding of the value of these habitats in the environment or to wildlife. Most of the snags, defective trees, and large down wood were removed during the partial harvest.

Since the initial timber harvest, some trees within the proposed units have died or blown down resulting in varying amounts of snag and down wood habitat scattered throughout the units. Most of this habitat will be retained during final overstory removal. The additional snag and down wood habitat needed after timber harvest is completed will come from the standing trees.

Forest Plan standards require snags be retained within harvest units and throughout the subdrainage at a minimum 40% of the potential population of primary cavity excavators. In addition, habitat for two species (black-backed woodpeckers and flammulated owls) identified within the Northwest Forest Plan, require habitat be retained for the full 100 % population potential for these species. Retention of snag habitat for black-backed woodpeckers and other primary cavity excavators would also provide suitable habitat for flammulated owls.

The 40% level in the Pacific silver fir or true fir series requires an average of 2.1 snags per acre (including 100% snags for black-backed woodpeckers and flammulated owls) in decay classes I, II, or III and greater than 20 feet tall. In addition, green replacement trees will need to be retained to replace the current level of snags as they decay and fall down. Dead defective and live green trees retained for current snag habitat and future replacement snag habitat shall be greater than 18" diameter or the largest size available within the stand being treated. Snags with the largest diameter should be selected whenever possible. A minimum of 4.5 snags and green trees per acre (TPA) are required to provide for wildlife tree habitat.

For green-tree and snag retention patches in matrix, Forest plan standards require a minimum 15% of each stand be retained over multiple rotations for those species that require very old forests.

For dead and downed woody material, Forest Plan standards require 240 linear feet of downed logs greater than or equal to 20 inches in diameter

Table 7: Snag and Down Wood Habitat Requirements per Unit

Habitat	Required	Existing Average	Needed Average
Snags/acre*	4.5 TPA	1 TPA	3.5 TPA
Down Wood	240' (3 TPA)	120' (1.5 TPA)	1.5 TPA
Total	7.5 TPA	2.5 TPA	5 TPA

**Use Green Trees for future Snags*

and greater than 20 feet long per acre be retained in matrix. There are approximately 120 linear feet per acre average existing down now. The seven Units currently average one snag per acre or 20% of snags required. These existing snags plus green trees will be retained to provide the required 40% in each unit (see Table 7).

The following information explains the current snag level for the Maude, North Fork Parks and Frost snag analysis areas. All three areas exceed the minimum 40% required snag level.

Table 8: Existing Snag Habitat per Analysis Area

Current Snag Density	Maude	N.F. Parks	Frost
Snags/acre	2.2	2.4	2.5
40% required snag level	45%	49%	51%

Units 1, 2, and 3 are located within Maude (07t) analysis area (see Elk/Snag Emphasis map). This area contains 7, 355 acres of which 1548 acres are private land. Timber harvest has been concentrated primarily within the north half and along the east edge. These areas have very few existing snags or down wood. There is a large block Seral 4 habitat in the southwest corner and along the south boundary of the analysis area with high concentrations of snags and down wood. Approximately 377 acres in the higher elevation along the west boundary is rocky meadow containing few large snags or down wood. There is a total of 5254 acres in Seral 1, 2, 3, or 4 habitat on public lands within the analysis area that is used to calculate snag density. The current snag density is approximately 45 percent or 2.2 snags/acre averaged for the 5254 acres. The vast majority of these existing snags are within intact forests since most of the existing managed stands did not have snags or down wood retained when they were logged. Very little of the early seral habitat contains large snags or down wood. To maintain populations of snag-dependent wildlife, snags need to be provided in each successional stage of a plant community (Brown 1985). The same would be true for down wood-dependent wildlife.

Unit 4 is located within North Fork Parks (07v) analysis area. This analysis area totals 5986 acres of which 909 acres is private land and 507 acres are wet or rocky meadows with few snags or large down wood. Timber harvest has occurred throughout the analysis area. Parks Creek Special Wildlife Habitat Area in the center and the Pyramid Area in the northwest corner contain the largest block of intact forests with high numbers of snags and down wood. The snag density on public lands within the analysis area is currently 49 percent or 2.4 snags/acre. Most snags are within intact forests but there are recent timber harvest units that also retained snags and down wood.

Units 5, 6, and 7 are located in Frost (07u) analysis area. This area totals 12,411 acres of which 71 acres is private, 3,105 acres is lava, and 317 acres are meadow. The large areas of lava have widely spaced, small trees with few snags and down wood. The lava acres will not be included in snag density calculations. There is a total of 8,955 acres in seral 1, 2, 3, or 4 habitat on public lands within the analysis area that is used to calculate snag density. Timber harvest has occurred primarily along Highway 22, running through the center of the analysis area. Much of the remaining older forests on gentle or flat slopes have been salvage logged in the past, further reducing snag and down wood habitat. The snag density on public lands within the analysis area is currently 51 percent or 2.5 snags/acre. Most snags are within intact forests but there are recent harvest units that retained snags and down wood. The amount of early seral habitat with snags and down wood is limited.

Soils and Geology

The Parks Creek Subwatershed lies along the western margin of the High Cascades physiographic region. Rocks are volcanic in origin and generally Pliocene (five million years) or younger in age. Soils are generally glacial in origin, stable and productive. All the proposed units are located on Landtype 66, a deep to very deep, nonplastic soil derived from volcanic ejecta, glacial till, and outwash. Surface soils are thin sandy loams, and subsoils are thick gravelly or cobbly sandy loams. Depth to bedrock is usually greater than 6 feet. Typically, Landtype 66 occurs on gentle, smooth side slopes of less than 40%. In the proposed units, sideslopes range from near zero to about 30%. Slope instability is not a concern with these units. The Landtype is well drained where permeability is rapid in the surface soils, and rapid to slow in the subsoils. Because of high infiltration rates, overland flow is generally uncommon.

All the proposed units were previously salvaged or prelogged with ground-based logging systems. Designated skid road locations may have been required on a few units (1 and 2), but for most other units, this contract requirement was not considered when they were harvested. Consequently, compaction from the ground-based equipment in some units may be at the upper limit of what is acceptable by regional standards or may exceed current Forest standards. Some compaction has been naturally ameliorated over time by root growth, animal borrowing, and freeze/thaw. Some remains. Compacted skid roads located along or parallel to swales may act as surface drainages during periods of high run off, usually at snow melt, because of the reduced infiltration from excessive compaction. This situation can be exacerbated when heavily compacted skid roads intersect the road drainage of rocked system roads at culverts.

This entry will provide the opportunity to rehabilitate areas, adversely affected by the previous activities. Because of the fine-grained, non-plastic nature of these soils, they respond well to subsoiling and will return to near typical densities when treated. Previously subsoiled areas on this landtype have reduced or eliminated the potential for over land flow in compacted areas. With an aggressive subsoiling campaign with this entry, soil compaction should be reduced to levels that meet current Forest standards, and surface drainage systems can be returned to near normal.

Survey and Manage Species

Surveys were conducted for Survey and Manage Species in accordance with current protocols. These species include vertebrates, fungi, lichens, bryophytes, and mollusks. They are afforded protection under the Forest Plan, as amended by the *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001). Protection measures are developed for each site using published management recommendations and professional judgment.
Species are categorized according to their rarity and types of surveys required, as follows:

- **A** – Rare species for which pre-disturbance surveys are practical; manage all known sites and do strategic surveys.
- **B** – Rare species for which pre-disturbance surveys are not practical; manage all known sites and do strategic surveys.

- **C** - Uncommon species for which pre-disturbance surveys are practical; manage high-priority sites and do strategic surveys.
- **D** - Uncommon species for which pre-disturbance surveys are not practical; manage high-priority sites and do strategic surveys.
- **E** – Rare species for which the status is undetermined; manage all known sites and do strategic surveys.
- **F** – Uncommon species for which the status is undetermined; do strategic surveys only.

Several Survey and Manage species were found that require protective measures (manage all known sites). These species are listed in Table 9. Additional Survey and Manage species were located, however, these do not warrant protection under the Forest Plan, because they are in Category F. Wildlife species requiring surveys for this project are great gray owl (*Strix nebulosa*), red tree vole (*Arborimus longicaudus*), and two mollusk species (*Megomphix hemphilli* and *Pristoloma articum crateris*). A complete list of species for which surveys were conducted is in the Sweet Home Ranger District Parks Overstory Removal project files.

Table 9: Survey and Manage Species Found Requiring Protective Measures

Species Group	Species Name	Common Name	Number of Sites	Category
Lichen	*Nephroma occultum*	cryptic paw	5	A
Fungi	*Polyozellus multiplex*	blue chanterelle	1	B
Fungi	*Clavariadelphus truncatus*	truncate club coral	2	D
Fungi	*Ramaria celerivirescens*	coral mushroom	2	B
Fungi	*Ramaria* sp. *nov*	coral mushroom	2	-
Bryophyte	*Rhizomnium nudum*	moss	4	B

Protective measures for Survey and Manage species are developed for each site using published management recommendations and professional judgement. The management recommendations used in this analysis are:

- *Management Recommendations for Bryophytes, Version 2.0, 1998.*
- *Management Recommendations for Survey and Manage Lichens, Version 2.0, 2000.*
- *Management Recommendations for Survey and Manage Fungi, Version 2, 1997.*

Lichens, Fungi and Bryophytes

A Survey and Manage lichen requiring protective measures is located in the proposed units. *Nephroma occultum* is a foliose lichen found at five locations in the project area. In all cases, it was found growing on the north or east side of Pacific silver fir boles.

Five species of Survey and Manage fungi requiring protective measures were found. *Polyozellus multiplex* is a dark purple chanterelle that grows in association with conifer trees. Removal of the host trees through timber harvest and other activities is the most serious threat to the species (Castellano and O'Dell 1997). *Clavariadelphus truncatus* is an orange club coral that was found at two locations in the project area. *Ramaria celerivirescens* is coral that was found at two

locations, and *Ramaria* sp. nov. is an undescribed species, also found at two locations. All of these fungi develop mycorrhizal relationships with conifer trees and are therefore dependent on the survival of their host trees. Timber harvest, windthrow and disturbance to the soil are threats to their persistence.

One Survey and Manage bryophyte requiring protective measures was located. *Rhizomnium nudum* is a moss that inhabits forest soil or humus at mid to high elevations, often near seepy areas. Activities that alter microsite characteristics or hydrological conditions may negatively affect this species.

Great Gray Owl

Within the range of the Northern spotted owl, the great gray owl is most common in coniferous forests adjacent to meadows. Surveys to determine occupancy are required in habitat that is above 3000 feet in elevation, within mature stands with greater than 60% canopy cover, and within 1000 feet of meadows larger than 10 acres.

Great gray owls are also known to use shelterwoods and plantations on the Willamette National Forest for foraging, depending on the density of brush and the level of gopher activity.

One pair of great gray owls has been documented in the vicinity of the proposed units. The proposed units do provide some foraging habitat. Units were surveyed for two seasons and no great gray owls were found.

Bat Species

Sites commonly used by bats for roost sites and hibernacula include caves, mines, snags and decadent trees, wooden bridges and old buildings. Provisions for retention of large snags and decadent trees are included in the standard and guideline for green tree patches in the matrix. Caves and abandoned mines, wooden bridges and buildings require additional protection measures to ensure their value as habitat is maintained. There are no known caves, abandoned mines, wooden bridges or buildings within the project area.

Other Issues or Affected Environment

Canada Lynx

The Canada lynx (*Lynx canadensis)* is listed as a threatened species across its range in the contiguous United States under the Endangered Species Act. This member of the cat family is adapted to deep snows and cold winters characteristic of the boreal forests of North America but can also be found in spruce, subalpine fir, and lodgepole pine habitat in the western United States (Koehler and Britel 1990). Both snow conditions and vegetation type are important factors to consider in defining lynx habitat. Lynx have large feet and long legs, an adaptation to deep, soft snow. They are closely associated with snowshoe hares (*Lepus americanus*), their primary food source (Koehler and Aubry 1994). In the western United States, lynx generally occur above the 4000 foot elevation level. Although the lynx is considered to be rare throughout the Cascade Range the Northwest Forest Plan called for surveys prior to habitat altering projects.

Surveys were developed by Dr. John Weaver of the Wildlife Conservation Society based on the natural check-rubbing behavior of cats to collect hair for DNA analysis. The Forest conducted surveys to protocol from 1998 – 2001. In 1998 a Regional Strategic Survey was completed on seven grid areas using the accepted hair snare method. During the following three years (1999-2001) the Forest conducted surveys using the National Lynx Survey protocol in two separate grid areas. Initial DNA analysis of the cat hair collected in 1998 on the Sweet Home Ranger District indicated it was lynx. Subsequent analysis by a second laboratory of the 1998 sample did not confirm the sample as lynx. As a result of the second laboratory analysis results, the 1998 lynx locations are considered to be unverified (Regional Office Memo 2001). No lynx were detected from surveys in 1999 or 2000. DNA analyses of 2001 survey samples have not yet been completed.

The area in the vicinity of this project has snow conditions that would not be very advantageous to lynx. Most of the project area is below the 4000 foot level. Brief warming periods and then freezing during the winter creates a hard crust on the snow. In addition, snowmobile use in the area compacts the snow. Crusting or compaction of snow may reduce the competitive advantage lynx have over other predators (Buskirk et al. 1999a).

Two sightings of what is thought to be lynx by the public along the east boundary of the District are also unverified. It is believed that these are random sightings of individuals that wander into the area, likely from higher elevations to the east. Recent habitat analysis indicates that suitable habitat does not exist to provide for a breeding population on the Willamette National Forest (Lynx Habitat Mapping Direction 2000). This issue will not be analyzed further.

Consultation and Coordination with Indian Tribal Governments (Executive Order 13084 and Indian Sacred Sites Executive Order 13007)

The Confederated Tribes of the Siletz and Grand Ronde and Kalapooya Sacred Circle Alliance were notified of the project during the scoping of issues and concerns as part of the public participation process. No comments were received back from these groups. No specific sacred sites have been identified in the proximity of the proposed units. No impacts, as outlined in the American Indian Religious Freedom Act, are anticipated upon American Indian social, economic or subsistence rights.

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 or habitation to the project area is the City of Sweet Home, (population 7000) some forty miles west of the Parks Overstory Removal units. This community contains some low-income people and some minority persons. No disproportionate impacts to the citizens of Sweet Home are anticipated. All contracts offered by the Forest Service contain Equal Employment Opportunity requirements.

Fisheries

The Parks Creek Subwatershed is a confined basin. Only native cutthroat trout, sculpin species and introduced Eastern brook trout reside in the basin. There is no current, or historic essential habitat for bull trout, or Endangered Species Act listed spring chinook salmon and winter steelhead fish species in this basin. Only Unit 1 is adjacent to a fish-bearing stream and the unit boundary will be outside the Riparian Reserve. The other proposed units are outside or not adjacent to fish-bearing streams. Non fish-bearing streams adjacent to harvest units will have one site class tree height, no-harvest riparian reserve. Riparian reserves are established to meet Aquatic Strategy Objectives, which include maintaining or enhancing in-stream habitat conditions. This project should not have adverse affects on these species that are also called Management Indicator Species and Recreational Fisheries (Executive Order 12962).

Hydrology

The Parks Creek Subwatershed is composed of the Maude (07T); Frost (07U); and North Fork of Parks (07U) planning subdrainages which are part of the Upper McKenzie Watershed. These areas were examined in the Upper McKenzie Watershed Analysis. The forests in the Parks Creek Subwatershed are still relatively intact, due to limited timber harvest and special management within the Crescent and Lava Lake Dispersed Recreation Area, Three Pyramids Special Interest Area, Late-Successional Reserves, and the Wildlife Habitat Management Area. Timber management has occurred in 24 percent of the National Forest land within the subwatershed and on most of the private land within the area.

Aggregate Recovery Percentage (ARP) is used to evaluate the relative measure of the hydrologic recovery of a watershed. This model estimates the proportion (percent) of the stands in a watershed considered to have enough tree canopy closure to intercept and hold snow within their canopies (greater than 70% canopy closure). The model indicates the effects of tree canopy removal on snow accumulation, snow melt, and stream flows within a basin. ARP values can range from 0% for a basin recently completely clearcut to 100% for a basin supporting at least 70% canopy closure and at least 8-inch average diameter trees.

The area is above midpoint ARP levels, and the potential for generating sediment is low to moderate. The threshold or midpoint ARP value for subdrainages within the Parks Creek Subwatershed are: Maude 65%, Frost 60% and North Fork Parks 65%. The proposed activity will not affect the current ARP levels. Beyond the original harvest entry and with the final overwood (Shelterwood) removal the percentage levels do not change.

Channel conditions within the project area are stable and the density of channels is low in the subbasin. Most draws have no channel characteristics. Over 95 percent of the numerous wet spots and ponds or wetlands have no surface drainage. These small wetlands are not in or adjacent to the proposed units and will not be affected by the overstory removal. Typical stream characteristics in the area include low gradient side slopes (average 20%) and low gradient channels (average 5%) draining the runoff from snow melt.

Clean Water Act 303(d)

The water quality of the Parks Creek Subwatershed is high. All the main streams within this subwatershed drain into Lava Lake. Lava Lake is a closed basin. Some beneficial uses associated with Lava Lake are recreation and aquatic organisms. No streams within the Parks Creek Subwatershed are listed as 303(d) streams or considered by the State to be water quality limited. The Clean Water Act Section 303(d) requires the Oregon Department of Environmental Quality (DEQ) to identify those water bodies that are not meeting or likely to meet State water quality standards.

Aquatic Conservation Strategy Objectives

"The Aquatic Conservation Strategy was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands." (ROD S&G pg. B-9) Riparian reserves are established only along those perennial and intermittent streams associated with proposed harvest units identified in this EA. Only Unit 1 is adjacent to a fish-bearing stream and the unit boundary will be outside the Riparian Reserve. The other proposed units are outside or not adjacent to fish-bearing streams. Non fish-bearing streams adjacent to harvest units will have one site class tree height, no-harvest riparian reserve. Implementation of the Parks Creek Subwatershed Overstory Removal timber sale is not anticipated to retard or prevent attainment of the Aquatic Conservation Strategy Objectives (see Appendix E: ACSO).

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 WNF Plan to facilitate management of all species are summarized in the following table. Specific habitat features in the Parks Creek Subwatershed exist for spotted owls, pileated woodpeckers, pine martens, big game, and cavity excavators. Some habitat for these species will be affected and will be discussed in Chapter 4 Environmental Consequences. Fisheries are discussed in the previous section. There is no suitable habitat in the subwatershed for bald eagles and peregrine falcons

Table 10: Management Indicator Species

Indicator Species	Habitat Feature	Selection Criteria
Spotted Owl	Old-growth and mature conifers	Ecological Indicator; Federal Register List of T&E 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

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 environmental analysis evaluate the effects of actions on migratory birds. A variety of migratory or neotropical birds are known to occur within the Parks Creek project area. Species most likely to occur are associated with more open forest communities. Species requiring a closed forest canopy and or moderate to high levels of snag habitat do not occur due to previous timber harvest in these proposed units.

Threatened, Endangered and Sensitive Plants

This is not an issue as no TE&S plants are located in or adjacent to proposed units.

Unit 3

Unit 4

Chapter 3: Alternatives

The purpose of the alternatives chapter is to display *"…the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among the options by the decision maker and the public."* FSH 1909.15,22.3(5.).

This chapter contains the no action alternative, description of action alternatives, alternatives not considered in detail, project objective analysis, economic analysis, mitigation measures common to all alternatives and maps and tables comparing action alternatives.

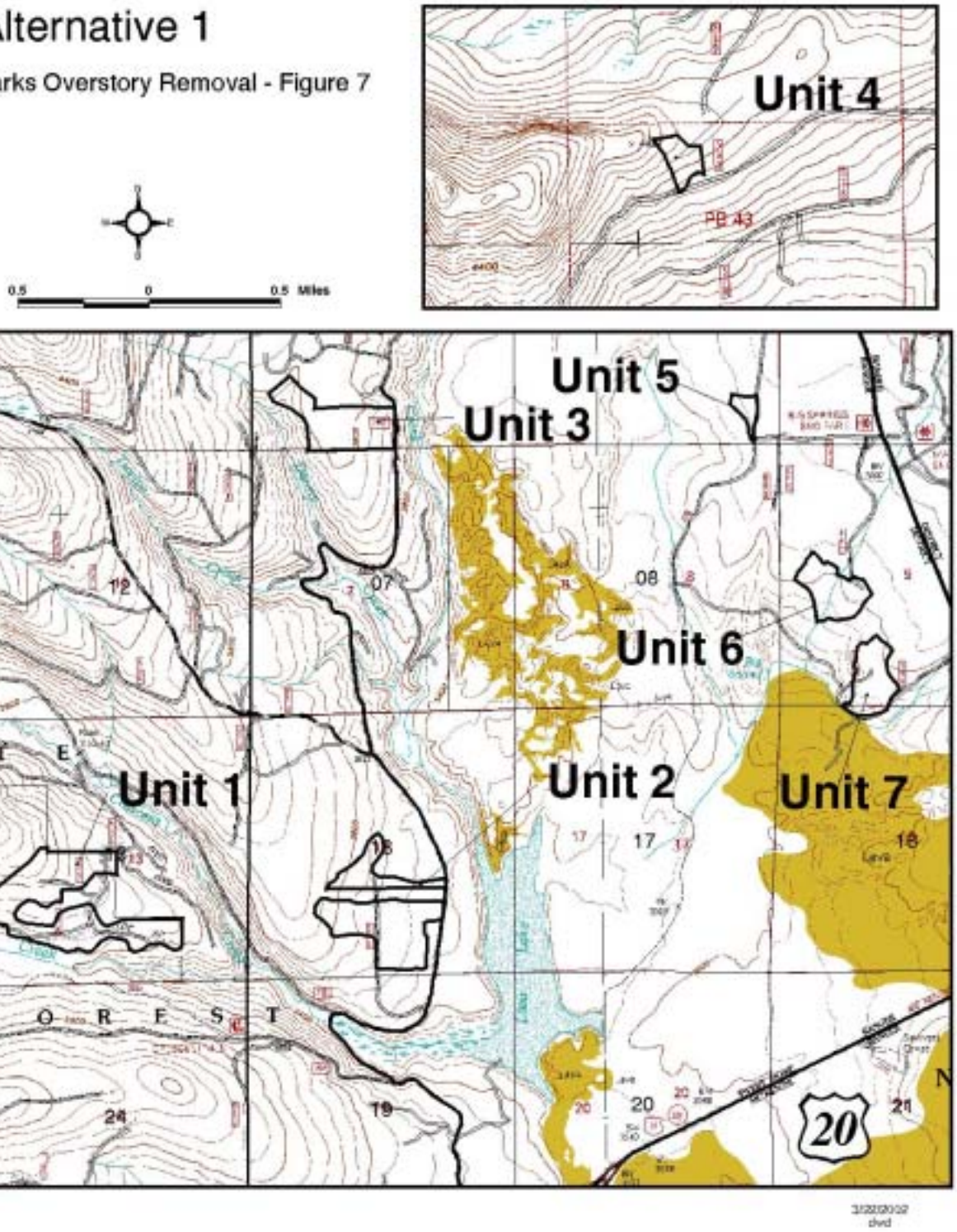
Table 11: Alternative Volume Comparison

Units	Alternative 1	Alternative 2			Alternative 3		
	Acres	Acres	MBF/ Acre	Total MBF	Acres	MBF/ Acre	Total MBF
1	90	81	15	1215	81	15	1215
2	71	41	11	451	67	15	1005
3	45	0	0	0	25	8	200
4	9	4	27	108	9	30	270
5	6	4	8	32	4	12	48
6	29	26	5	130	26	9	234
7	25	25	5	125	25	9	225
Totals	275	181		2061	237		3197

Acres are reduced from the original treated acres due to owl habitat for Unit 3 and Survey and Manage requirements. See Table 3: Northern Spotted Owl Habitat in Chapter 2 and Table 13: Plant Survey and Manage Species in Mitigation Measures Common to Action Alternatives in this Chapter.

Alternative 1

Parks Overstory Removal - Figure 7



Alternative 1

No Action Alternative

This alternative includes baseline information for understanding the changes associated with the action alternatives. A great deal of the baseline information has already been presented in an analytical manner in the discussions of the needs for action and the issues in Chapters 1 and 2 of this EA. The remaining baseline information, specific to the Key Issues and Needs for Action, will be presented in the description of the No Action Alternative. See Alternative 1 map.

The No Action Alternative would continue the current condition. See Table 2 in Chapter 2 for existing stand condition. These previously harvested units retained a smaller portion of the original stand to either provide shelter for the subsequently planted tree seedlings or as a prelude to optimize further timber harvest. At this time the growth of the understory trees are reduced in comparison to open grown seedlings. To retain all the shelterwood trees would further inhibit the growth of the understory trees to varying degrees. Since the prelogged units are not intact stands the retention of the large trees would hinder the growth of the younger trees in the stand. Damage to the understory will increase over time if overstory removal is delayed.

However, leaving large overstory trees would retain current levels of old-growth structure on 275 acres; including 41 acres of dispersal habitat and six acres of suitable habitat for northern spotted owls. The Parks Creek Subwatershed is 18,030 acres. About 15,274 acres are classified as forested including private land but since we do not have records for private land (2,530 acres) this is an approximation. The rest of the acres in the subwatershed are meadows, lakes or water bodies, lava, and miscellaneous openings. Currently, on Forest Service land, there are 7,082 acres of old-growth forest or suitable habitat (greater than 21” diameter) and 2,112 acres of spotted owl dispersal habitat (9” to 20.9” diameter). The remainder of the forested land is seedling to pole size trees.

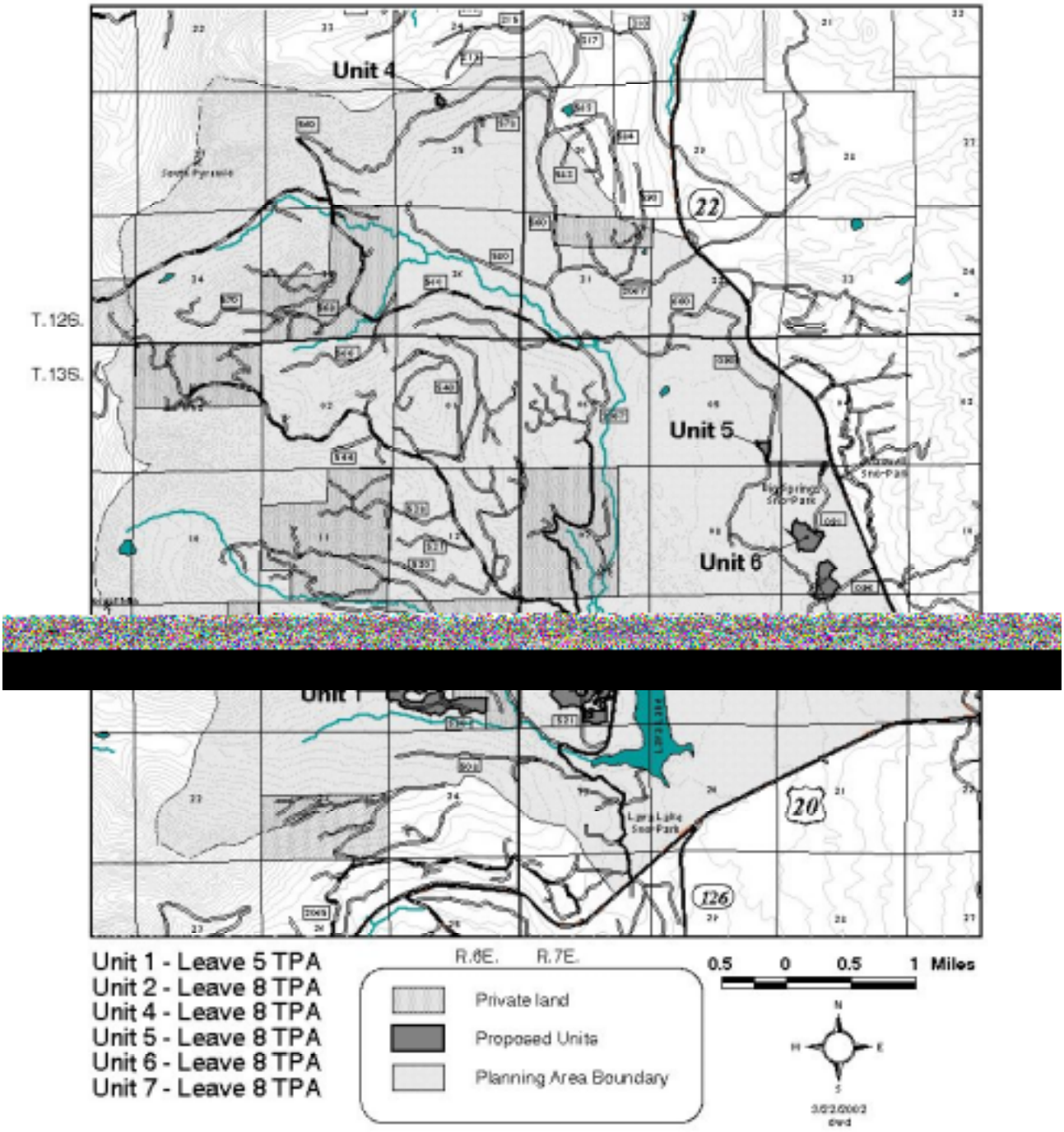
Funding would not be generated from Knutson-Vandenberg (KV) collections from the timber sale for sale area improvements and wildlife habitat management. Some improvements are thinning of adjacent overstocked stands and closing of roads to reduce wildlife disturbance and weeds. See Appendix B: KV Collections for further information.

The Matrix Management allocation is where most timber management is to occur. With present harvest targets and the current resource situation, flexibility to defer action in one place and move to another is minimal. Any benefit of deferring in one vicinity would be offset by the added impact to another. Since the stands in the affected areas were previously logged, deferring treatment may mean fragmenting untreated stands in another area, which may have higher watershed and wildlife values.

The No Action Alternative would not meet the Purpose and Need for Action or the Forest Plan Standards and Guidelines for fulfilling Matrix objectives.

Alternative 2

Parks Overstory Removal - Figure 8



Unit 1 - Leave 5 TPA
Unit 2 - Leave 8 TPA
Unit 4 - Leave 8 TPA
Unit 5 - Leave 8 TPA
Unit 6 - Leave 8 TPA
Unit 7 - Leave 8 TPA

Alternative 2

Alternative 2 was designed to maintain a greater overstory presence of trees in excess of two hundred years of age while removing enough overstory to encourage understory development. It also maintains all six acres of suitable northern spotted owl habitat and 41 acres of dispersal habitat. This alternative will keep about eight trees per acre (TPA) in clumps except as required for cavity nesting habitat in the treated acres. Two trees per acre will be subsequently topped for snags. Research Note PNW-447 (Franklin et al. 1986) defines 8 TPA greater than 32" as one stand characteristic of old-growth and a recent doctorial thesis by Nathan Poage (2001) cites 6.7 TPA greater than 40" diameter Douglas-fir. Since Unit 1 has trees that average 155 years of age and are not considered old enough to be technically old-growth, only this unit will retain five TPA. See Alternative 2 map.
The trees in the understory will be pre-commercially thinned to hasten the development of the stands. Some areas disturbed by yarding may require replanting.

While retaining eight overstory TPA provides more old-growth structure it also retains more shade and reduces the understory growth than Alternative 3. Since the overstory trees are large the shading effect increases the time it will take for the understory to develop into dispersal habitat. To offset the shading effect, trees chosen to remain will be clumped where possible.

It's also important to note that additional acres will be retained to protect Survey and Manage species. Approximately 24 acres have been identified for protection of these species and will not be harvested. See Mitigation Measures for Survey and Manage.

Approximately 177 acres of shelterwood prescription stands and four acres of prelogged stands will be partially harvested with this alternative. Volume produced from this alternative is 2061 MBF. Yarding systems for this entry will be ground-based and include skidding or shovel yarding. Over the snow logging is acceptable but needs to be coordinated with recreation for Units 5, 6, and 7.

All perennial non-fish-bearing and intermittent streams will have riparian reserves of one site potential tree height on either side. A one-site potential tree height is 150 feet in the Pacific silver fir series. Only Unit 1 is adjacent to a fish-bearing stream and the unit boundary will be outside the 300-foot Riparian Reserve.

KV projects listed in Appendix B are also part of this alternative.

No new road systems will be constructed. About 10 miles of road maintenance/reconstruction work is proposed that includes cutting roadway vegetation, clearing ditch and drainage structures of obstructions, spot rocking and blading roadbed surfaces to reestablish the road template. After required maintenance the roads will provide better drainage for the traveled way and roadbed and access for vehicles for this project and other users.

There are 15 roads proposed for new closures by creating earthen berms across them and installing one gate. Five roads will have the existing closure structure modified. Almost 11 miles

0f the 20 roads affected will be closed to vehicular traffic to reduce impacts to big game. The roads to close are listed in Table 12 and shown on the roads closures map Figure 9.

Table 12: Proposed Road Closures within the Parks Creek Analysis Area has the following Road Designation abbreviations.

Access and Travel Management Designation (D):

- P = Primary
- S = Secondary
- L = Local

Maintenance Level (ML) and Objective level (OL):

- 5 - for high passenger car road
- 4 - for passenger car moderate user comfort
- 3 - for passenger car low user comfort
- 2 - maintained for high clearance vehicles
- 1 - closed roads

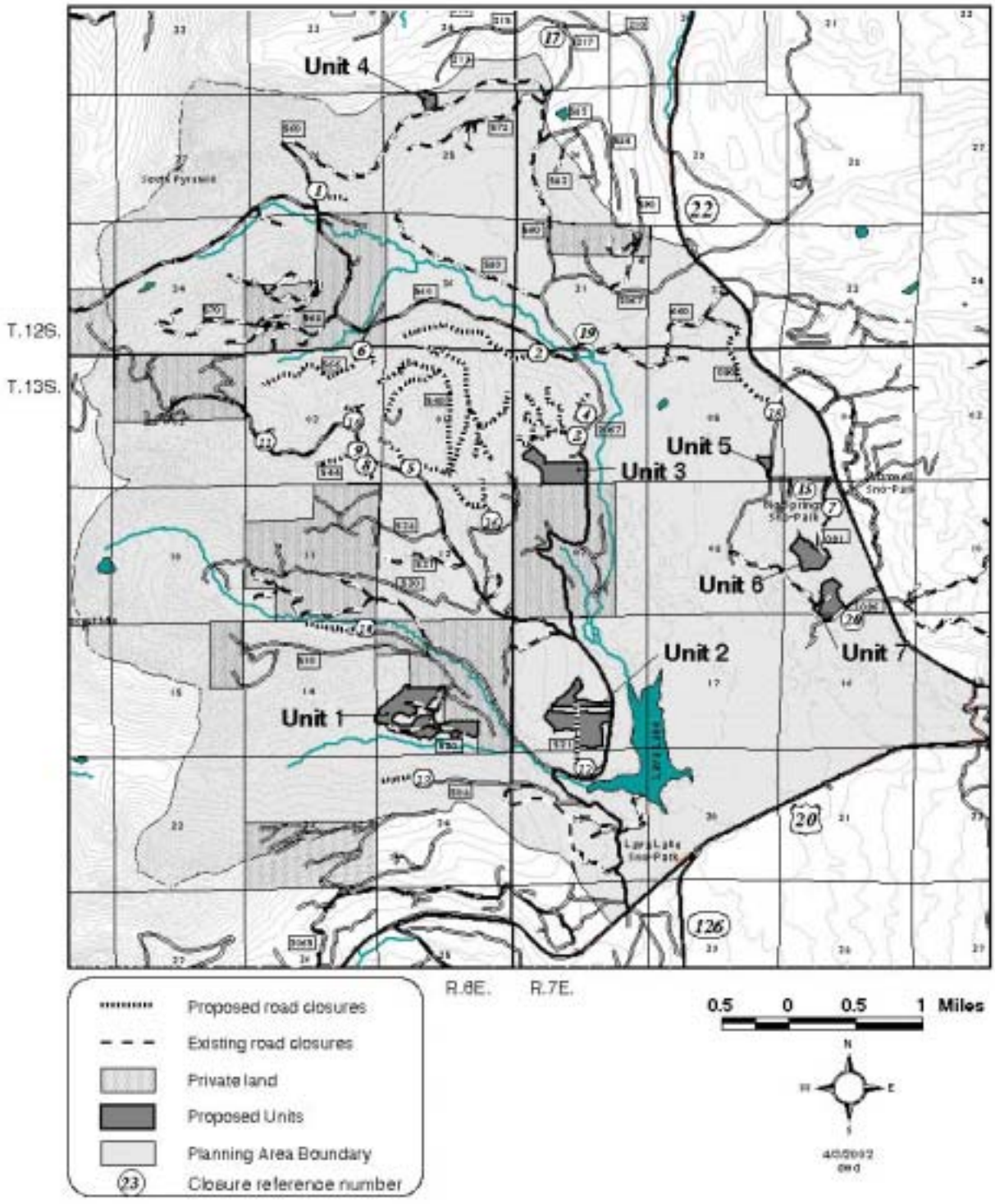
At this time the Forest Roads Analysis terminology is being updated concerning Key Forest Travel Routes. In the future Primary and Secondary will be referred to as Key Forest Roads. Also functional classification will be Arterial, Collector, and Local.

Table 12: Proposed Road Closures within the Parks Creek Analysis Area

Map #	Road # And Locater	Road Designation ML, OL, D	Closure Type	New or Existing Closure	Closure Funding Source	Closure Priority	Closure Road Miles	Cost Share	Recreation
1	575 off 560	2, 1, L	Berm	New	Wildlife	High	.19	No	OK
2	562 off 560	2, 1, L	Berm	New	Wildlife	High	1.13	No	OK
3	550 off 2067	2, 1, L	Berm	New	KV- alt 3 WL-alt 2	High	1.38	No	OK
4	Spur off 2067	Un-classified	Berm	New	Wildlife	High	.13	No	OK
5	540 off 525	2, 1, L	Gate	New	Wildlife	High	4.19	No	Create disp. site just in Section 1
6	566 off 560	2, 1, L	Berm	New	Wildlife	High	.47	Yes	Create disp. site at property line
7	091 off 090	2, 1, L	Berm	Existing	KV	High	0	No	Replace after harvest
8	Spur off 525	Un-classified	Berm	New	Wildlife	Mod.	.13	No	OK
9	544 off 525	2, 1, L	Berm	New	Wildlife	Mod.	.25	No	OK
10	546 off 525	2, 1, L	Berm	New	KV Crescent Danny	High	.19	No	OK
11	Spur off 525	Un-classified	Berm	New	Wildlife	Mod.	.13	No	OK
12	521 off 2067	2, 1, L	Berm	New	KV	High	.5	No	Just beyond disp. site
13	508 off 2067	2, 1, L	Berm	New	KV	Mod.	.25	No	Just past trailhead
14	Spur off 510	2, 1, L	Berm	New	Wildlife	Mod.	.5	Yes	At property line OK
15	093 off 090	2, 1, L	Berm	Existing	KV	Mod.	0	No	Fix berms at disp. site
16	528 off 527	2, 1, L	Berm	New	Wildlife	Mod.	.63	No	Create disp. site
17	317 off 560	2, 1, L	Berm	Existing	Wildlife	High	0	No	Two berms-grade 315 road-snowmobile
18	090 past Unit 5	2, 1, L	Berm	New	KV	Mod.	.75	No	Keep disp. Sites-snowmobile
19	660 off 2067	2, 1, L	Berm	Existing	Wildlife	Mod.	0	No	Replace gate w/berm-snowmobile
20	096 off High 22	2, 1, L	Berm	Existing	KV	High	0	No	Move berm east ski trail
							10.82		

Existing and Proposed Road Closures

Parks Overstory Removal - Figure 9



Alternative 3

Alternative 3 was designed to remove the overstory, in excess of the required five wildlife trees per acre, to encourage greater understory development. Six acres of suitable habitat and 10 acres of dispersal habitat for the northern spotted owls will be maintained in Unit 3. Eight TPA will also be retained in the non-owl habitat of Unit 3. These provisions for Unit 3 are to maintain the benefits of adjacent owl habitat and to provide more residual old trees as possible lichen distribution source. This alternative will keep about five trees per acre (except Unit 3) in clumps except as required for cavity nesting habitat. Two trees per acre will be subsequently topped for snags. See Alternative 3 map.

The trees in the understory will be pre-commercially thinned or planted to hasten the recovery of the stands. Unit 3 will require planting to increase the number of conifers in the understory. Some areas disturbed by yarding may require replanting.

Additional acres will be retained to protect Survey and Manage species. Approximately 24 acres have been identified for protection of these species and will not be harvested. See Mitigation Measures for Survey and Manage.

Approximately 203 acres of shelterwood prescription stands and 34 acres of prelogged stands will be partially harvested with this alternative. Volume produced from this alternative is 3197 MBF. Yarding systems for this entry will be ground-based and include skidding or shovel yarding. Over the snow logging is acceptable but needs to coordinate with recreation for Units 5, 6, and 7.

All perennial non-fish-bearing and intermittent streams will have riparian reserves of one site potential tree height on either side. A one-site potential tree height is 150 feet in the Pacific silver fir series. Only Unit 1 is adjacent to a fish-bearing stream and the unit boundary will be outside the 300-foot Riparian Reserve.

KV projects listed in Appendix B are also part of this alternative.

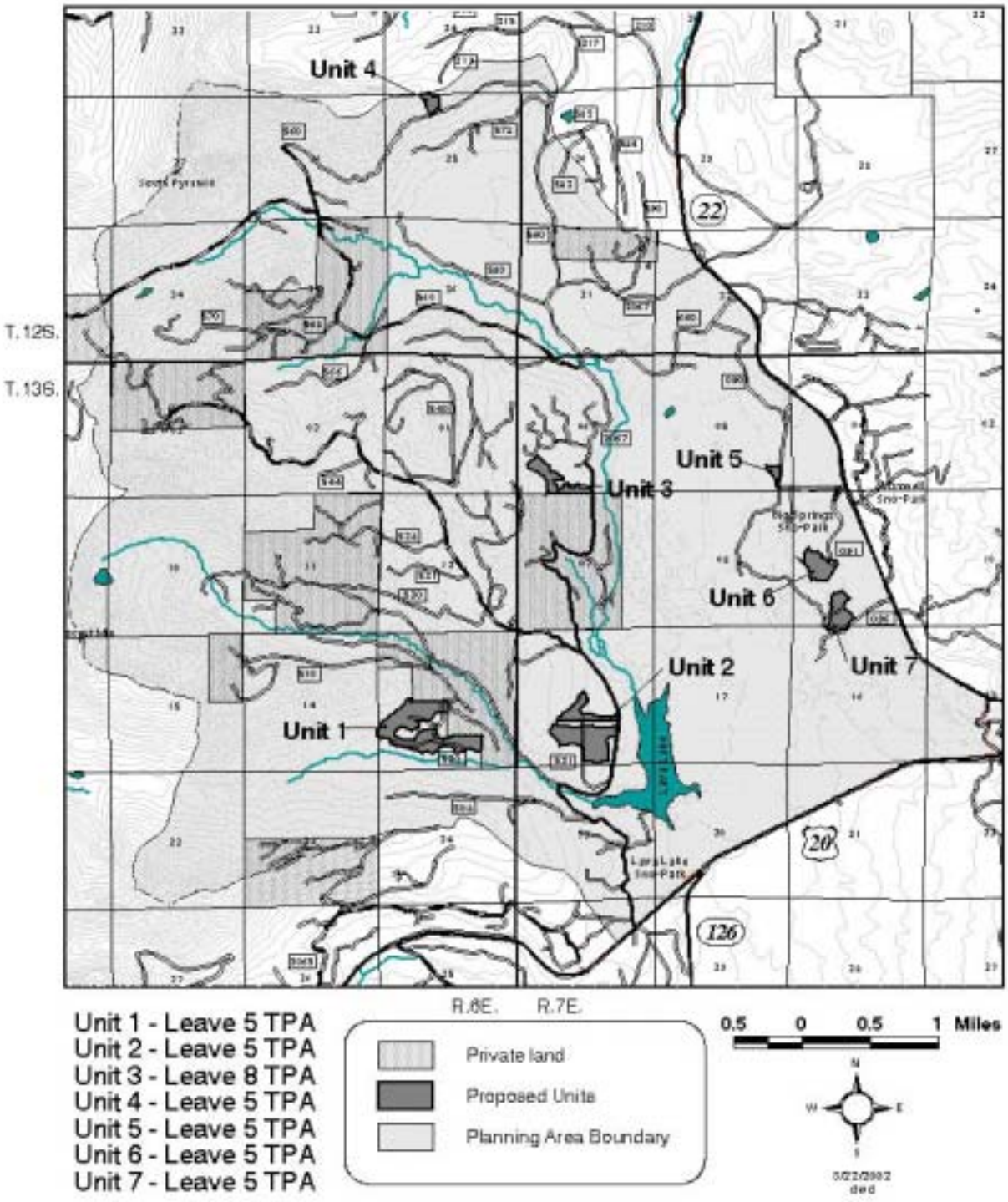
Only with the harvest of Unit 3 is approximately 2.5 miles of road asphalt overlay proposed. The overlay is on Forest Road 2067 where the 525 crosses and north to Unit 3.

No new road systems will be constructed. About 10 miles of road maintenance/reconstruction work is proposed that includes cutting roadway vegetation, clearing ditch and drainage structures of obstructions, spot rocking and blading roadbed surfaces to reestablish the road template. After required maintenance the roads will provide better drainage for the traveled way and roadbed and access for vehicles for this project and other users.

There are 15 roads proposed for new closures by creating earthen berms across them and installing one gate. Five roads will have the existing closure structure modified. Almost 11 miles of the 20 roads affected will be closed to vehicular traffic to reduce impacts to big game. The roads to close are the same as Alternative 2 and listed in Table 12 and on map Figure 9.

Alternative 3

Parks Overstory Removal - Figure 10



Unit 1 - Leave 5 TPA
Unit 2 - Leave 5 TPA
Unit 3 - Leave 8 TPA
Unit 4 - Leave 5 TPA
Unit 5 - Leave 5 TPA
Unit 6 - Leave 5 TPA
Unit 7 - Leave 5 TPA

Mitigation Measures Common to Action Alternatives

The following mitigation measures address Forest Plan standards and guidelines as well as the adverse effects on resources identified in the issue statements in Chapter 2. These mitigation activities apply to all action alternatives unless another mitigation measure is specifically identified in a particular unit prescription in the Implementation Plan – Appendix A. Also listed are common mitigations that apply to a specific unit regardless of alternative.

Canopy Closure and Understory Development

- Group residual overstory trees where feasible to minimize competition with understory conifers.

Competing and Unwanted Vegetation

Competing Vegetation

Trees of selected species represented in the stands will be planted in units where necessary at a rate to ensure adequate stocking. Surveys will be conducted to determine if *Ceanothus velutinus* is suppressing regeneration, and treatment (manual removal) will be conducted where necessary.

The preferred method of treating *Ceanothus* sp. is to cut the brush by hand and use windrowing, piling, lop and scatter or a combination thereof based on site-specific considerations of what is most cost-effective. It is more selective than herbicides and broadcast burning and better preserves scattered existing trees than the other options.

Unwanted Vegetation: Noxious Weeds

- Noxious weeds will be surveyed and removed where possible in harvest units, and along adjacent road systems.
- Minimize areas of disturbance during road reconstruction.
- Berm or gate any new roads to reduce disturbance and incoming weed seed due to vehicular traffic.
- Fire lines should be hand-constructed rather than machine-constructed to reduce soil disturbance.
- All road construction and logging equipment will be pressure washed prior to working in the area in accordance with C Clause C6.343(Option 2) *Cleaning of Equipment.*
- KV dollars will be collected for surveying and controlling noxious weeds on all harvest units and roads in the planning area.
- Obtain gravel for road reconstruction from a weed free rock source.
- Seed all disturbed areas, including subsoiled skid roads, to reduce weed establishment.

Elk/ Big Game

Refer to (Chapter 2) Table 6: Resource and Operations Timeline.

- No operating in Unit 4 during elk calving from May 1 to June 15.

Fuels/Air Quality

- Post-activity fuels will be hand piled in units along roads, trails and private land heavily used by hunters and recreationists (Road 2067) to reduce fuel loading to Forest Plan standards. The maximum LRMP standard for fuel loading is 43 tons per acre, with a minimum of 7-11 tons per acre for downed logs in the 0 to 3 inch DBH category; 8-12 tons per acre in the 3 to 9 inch DBH category, and 18-20 tons per acre in the greater than 16 inch DBH category. All burning will be conducted in the spring consistent with the Oregon Department of Forestry requirements.
- Firewood will be provided from harvest units wherever possible to meet local needs.
- Unit 3 will be grapple piled to reduce fuel loading and for site preparation for tree planting.

Heritage Resources

- Protect eligible sites. Implement contract provision C6.24 in the event that Heritage Resources are encountered during project implementation.
- If blazed trees are found within or adjacent to historic trails in the proposed units these trees will not be felled and removed.

Recreation

Refer to (Chapter 2) to Table 6: Resource and Operations Timeline.

- Minimize ski trail tread damage by avoiding wet weather operations or by waiting until the ground is frozen with a suitable snow cover.
- Designate skid trails and decking areas to minimize new ground disturbance in ski trail corridors used in harvest operations.
- Damage to trails and lost trail markers due to harvest operations will be repaired and replaced by funding through KV authority. Similar funding can be acquired to relocate or reconstruct dispersed recreation sites damaged by logging operations.
- Close forest roads 2200-091 and –096 after operations as part of logging contract or as a post-sale KV project.
- Select leave trees near recreation trails or dispersed recreation sites whenever possible to minimize loss of existing forest conditions.
- Timber Sale operations will not occur on the weekends during ski season December 1 to March 15.
- Timber Sale operations will not occur on the weekends during hunting season.

- There will be no operations behind closed gates during High Cascades deer hunt, opening weekend of general deer season, and Cascade elk rifle season (see Resource Scheduling issue).

Sensitive Wildlife Species

- The Oregon slender salamander was found at 13 locations in units 1, 2, 3, and 7. These locations will be protected with a minimum 75-foot no-harvest buffer. Where appropriate leaving grouped wildlife trees around these sites will meet the no-harvest buffer requirement.

Snag Habitat and Down Wood

- Wildlife trees will be left at 4.5 Trees per Acre (TPA). Trees of the largest DBH should be selected whenever possible. Wildlife trees will be protected during logging operations to serve as habitat for cavity nesters. After the sale, two trees per acre will be topped to create snag habitat in timber sale units.
- Down wood will be left at a minimum 240 linear feet per acre.
- Green Tree Retention will be in the interior of Units 1 and 3 and exterior of the other units.

Soils

- Only existing skid roads will be utilized, and will be subsoiled at the completion of harvest activities.
- Culverts along the major road systems should be reviewed, and wherever possible, water should be dispersed instead of concentrated.
- At the completion of harvest activities, tractor skid roads that are not part of the designated transportation system shall be ripped or subsoiled to return the site to near original productivity.
- Erosion control measures will be implemented as soon as possible after soils have been disturbed. All ripped and subsoiled areas will be seeded with native seed mix.

Spotted Owl

Refer to (Chapter 2) Table 6: Resource and Operations Timeline.

- Units 1, 3 and 4 are identified in the spotted owl issue and shall have limited operating seasons to protect nesting spotted owls from March 1 to July 15.

The following guidelines apply to the use of all motorized equipment:

- For verified pair locations, operating restrictions shall apply until non-nesting has been verified. If non-nesting is verified, restrictions may be waived. (FW-173, LRMP pg. IV-73).
- Terms and conditions in the Biological Opinion for Fiscal Year 2003 Habitat Modification projects in Critical Habitat Units.

Survey and Manage Species

Survey and Manage species will be protected in Units 1, 2, 3, 5, and 6 with no harvest buffers. See Appendix A for Unit specific information.

Table 13: Plant Survey and Manage Species

Species Name	**Category**	**Unit Number (s)**	**Number of Sites**	**Buffer Width (ft)**	***Acres**
Clavariadelphus truncatus	D	1	2	300	2
Nephroma occultum	A	5,1 6	3 4	150 150	2.5 3.5
Polyozellus multiplex	B	1	1	300	3
Ramaria celerivirescens	B	2 3	1 1	300 300	1 6
Ramaria sp. *nov.*	--	2	2	300	3
Rhizomnium nudum	B	1	4	300	3
Total					24

** Acres are approximate due to species buffer width overlap with other species and unit boundaries.*

Economic Analysis

All proposed action alternatives show a positive return to the treasury. All acreage and costs used are estimates. Short-term dollar costs and incomes have been used to provide relative economic values associated with each alternative. Values are not meant to be comprehensive because of the difficulty of assigning values to resource many benefits.

Timber values from a recent overstory removal timber sale of comparable timber were used for this comparison.

Table 14: Economic Analysis

	Alternative 2	**Alternative 3**
Gross Value ($750/MBF)	2061 MBF * $750 = $1,545,750	3197 MBF * $750 = $2,397,750
Associated Costs	$675,329	$1,187,134
Cost/Benefit Ratio	2.3	2.0
Present Value	$870,421	$1,210,616

Table 15: Logging Costs

	Alternative 2	**Alternative 3**
Tractor Logging ($100 / MBF)	2061 MBF * $100 = $206,100	3197 MBF * $100 = $319,700

Table 16: Road Costs

	Alternative 2	**Alternative 3**
***Road Maintenance / Reconstruction ($20,000 / mile)**	10 miles $200,000	10 miles $200,000
****Asphalt Overlay On 2067 from JCT 525 to Unit 3 ($100,000 / mile)**		2.5 miles $250,000
Total Road Costs	$200,000	$450,000

**Road Maintenance/Reconstruction will consist mainly of spot rocking, brush cutback, blade road and clean ditches on gravel roads. This cost could be reduced if we require dry weather haul, spot rocking would not be necessary.*
***An alternative would be to restrict the haul to the north to bypass this portion of asphalt, avoiding the additional cost, however, the cost of a 4 to 6" lift of gravel would be required on the unpaved portions of the Lava Lake road to the north.*

Table 17: Fuels Treatment Costs

	Alternative 2	Alternative 3
Grapple Pile ($730 / Acre)		25 acres * $730 /Acre $18,250
Hand Pile ($820 / Acre)	27 acres * $820 /Acre $22,140	27 acres * $820 /Acre $22,140
Total Fuels Costs	$22,140	$40,390

Table 18: Total Associated Costs

	Alternative 2	Alternative 3
Logging Costs	$206,100	$319,700
Road Costs	$200,000	$450,000
Fuels Treatment Costs	$22,140	$40,390
Total KV Costs *	$247,089	$377,044
Total Costs	$675,329	$1,187,134

** See Appendix B: KV Collections Total KV Collections by Alternative Table*

Alternatives Not Considered in Detail

Units Not Considered in Detail

Harvest within the Scenic- Retention Foreground Allocations

Initial project scoping had identified about 449 acres of partially harvested stands (338 acres of shelterwood and 111 acres of prelog) in the planning area that could be available for final harvest and matched the purpose and need for the project. Those identified stands occurring within the Scenic-Foreground Retention allocations (MA-11f) for the Highway 20 and 22 viewsheds were subsequently dropped from further consideration.

Shelterwood and prelogged acres in this allocation were dropped because they lacked sufficient volume once 10 trees per acre were marked for retention to meet scenic standards. Additionally a large prelogged unit next to the Lava Lake Snopark was dropped to avoid harvest impacts around the snopark until neighboring units have recovered from past regeneration harvest.

Harvest adjacent to Horse/Cattle Corral

Another prelogged and shelterwood unit off the Lava Lake Road and near the old horse/cattle corral was also dropped. The shelterwood is adjacent to a riparian area and requires a 150 no harvest buffer. The prelogged unit is at or near the 5 TPA required for wildlife trees to harvest.

Harvest within the Fisher Point Subwatershed

Part of the Fisher Point Subwatershed was initially included within the project's planning area because it uses the same road system as the Parks Creek area and contains several large shelterwood units that would benefit from overstory removal.

These shelterwood units were dropped from further analysis in this project because the Fisher Point Subwatershed is physically part of the North Santiam Watershed. The rest of the planning area drains into the Upper McKenzie River Watershed. Including these units would have made analysis unnecessarily complex as the potential issues in the two watersheds are significantly different, especially in terms of fisheries and water quality for the City of Salem.

The district will likely analyze harvest options for the Fisher Point shelterwood units in a future project, possibly in coordination with the Detroit Ranger District.

Restoration Alternative

An alternative that was purely restoration was not included. The overstory removal alternatives will provide more light and less competition for the sapling trees hastening understory growth development towards mature forest. Other aspects of restoration were considered in the action alternatives such as: riparian planting, road closures, and noxious weed control.

Project Objective Analysis by Alternatives

The following discussion analyzes how the alternatives meet the project objectives discussed in Chapter 1.

Objective 1:

(a and b) Remove overstory canopy in 70% of the shelterwood and prelogged units identified for treatment.

(c) Treat the understory in a minimum of 70% of the stands in which the available overstory is removed in the prelogged stands and shelterwood prescriptions to move units toward mid-seral conditions (precommercial thin for timber stand improvement).

The shelterwood units total 221 acres and the prelog units total 54 acres for a total of 275 acres. The shelterwood stands, Units 1, 2, 5, 6, and 7, were created to help seedling establishment and natural regeneration by mitigating the effects of frost pockets. The hardy seedlings have now grown to saplings and are now competing with the overstory for light and nutrients. This competition with the overstory slows the saplings growth. Pre-logged Unit 4 has a similar condition. Only the acres that have overstory removed will have the understory thinned. Thinning the understory would encourage the rate at which the stands would achieve mid-seral

conditions. Pre-log Unit 3 has poor understory and will be planted to increase its number of trees per acre and vigor.

Table 19: Objective Comparison by Alternative

Objectives	Alt 1	Alt 2	Alt 3
1a: 70% Shelterwood	0	80% 177 ac	92% 203 ac
1b: 70% Prelog Removal	0	7% 4 ac	63% 34 ac
1c: 70% Understory Treatment	0	66% 181 ac	86% 237 ac
2: 2 MMBF Timber Volume	0	2,061	3,197

Alternative 1
The "No Action" Alternative 1 does not meet Objectives 1a, b, and c because it does not silviculturally treat any of the identified units

Alternative 2
For this alternative there is greater retention of the shelterwood overstory on 26 acres in Unit 2 for owl dispersal habitat, in addition to 8 TPA for all the units. This greater retention than Alternative 3 will slow the growth of the understory. However, the grouping of these residual large trees will offset some competition effects to some of the saplings. A total of 177 acres out of 221 (80%) potential shelterwood acres are treated for Objective 1a. For Objective 1b only four acres of Unit 4, leaving 8 TPA, and none of Unit 3 are purposed for harvest. Alternative 2 leaves the overstory on the remaining 50 acres of prelogged units for old-growth structure, and dispersal and suitable owl nesting habitat.

For Objective 1c, there are 275 acres proposed for thinning the understory of the shelterwood and prelog units. Alternative 2 treats 181 acres or 66% of the proposed acres. Another 9% of the acres are untreated due to Survey and Manage species protection, which substantially meets Objective 1, especially in the shelterwood units.

Alternative 3
Alternative 3 removes more of the shelterwood and prelog overstory trees than Alternative 2. Five trees per acre are retained for Wildlife requirements of snags and down wood for all units. For Objective 1a, Alternative 3 treats 203 acres of shelterwoods (92%). Total acres retained for Survey and Manage species protection is 24 acres.

For Objective 1b, this alternative removes the prelog overstory on 34 acres in the two units leaving 5 TPA for Wildlife trees in Unit 4 and 8 TPA for Unit 3. The overstory in six acres of Unit 3 is retained for suitable owl nesting habitat and 10 acres for dispersal owl habitat. A Survey and Manage species and an interior Green Tree Retention area is also located within these untreated 16 acres in Unit 3. Unit 3 will also be planted in areas where the understory is deficient after the overstory is removed.

For objective 1c Alternative 3 treats a total of 237 acres out of 275 total acres that exceeds the objective at 86 percent.

Objective 2:
Produce a minimum of 2 MMBF as a result of overstory removals.

Standards and guidelines state: "Most timber harvest (that contributing to the Probable Sale Quantity [PSQ] not taking place in Adaptive Management Areas) takes place in the matrix"

(ROD Standards and Guidelines, pg. C-39). Matrix management objectives are related to managing for biodiversity by creating early successional stages through active management and commodity resource production. Both action alternatives meet this objective.

Alternative 3 produces 36% more timber volume than Alternative 2. This is because Alternative 3 treats more acres and leaves three less TPA (except Unit 3 – 8TPA) than Alternative 2.

Unit 5

Unit 6

Unit 7

Chapter 4: Environmental Consequences

This chapter provides the information necessary for making an informed choice between the alternatives. This chapter analyzes the environmental consequences of each alternative by issue. A table that compares alternative effects by main issues, outputs and objectives is provided at the end of the chapter.

Northern Spotted Owls

There are six spotted owl pairs (0664, 0667, 2445, 2965, 4099, 4396) located within and adjacent to the planning area. All six sites have been documented and protected for a number of years. Five pairs are within the planning area.

Alternative 1

Under this alternative there would be no habitat loss or disturbance in the home ranges of the six owl pairs. Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure within the dispersal and non-dispersal habitat will likely decline over time from exposure and wind throw until the understory develops further. As these stands develop into suitable owl habitat, the large trees retained after the initial harvest entry will provide the large tree, snag, and down wood components of owl habitat.

Alternative 2

This alternative will harvest trees in the non-dispersal habitat. All suitable and dispersal habitat will remain. Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure within the dispersal habitat will likely decline over time from exposure and wind throw until the understory develops further. Harvesting the non-dispersal habitat may also increase potential for blowdown in the remaining habitat; however, grouping of the remaining wildlife trees may alleviate that potential. As the dispersal habitat develops into suitable owl habitat, large trees retained after the initial harvest entry will provide the large tree, snag, and down wood components of owl habitat. The amount of suitable habitat within the home range of each owl pair will not change.

Disturbance to owl pairs 0664, 0667, 2965, and 4396 will likely occur. Logging activity, including log haul, will be scheduled outside the critical nesting season (March 1 through July 15) but could occur during the remainder of the nesting season resulting in a **may affect, not likely to adversely affect** determination. This project will be consulted on with the U. S. Fish and Wildlife Service and terms and conditions of the Biological Opinion will be adhered to.

Alternative 3

This alternative will remove both dispersal and non-dispersal habitat. The six acres of nesting, roosting, and foraging (suitable) habitat in Unit 3 will remain as the Green Tree Retention (GTR) area for this unit. There will be approximately 31 acres of dispersal habitat removed in Units 2, and 4 (see Table 3). Units 2 and 4 are located on the outside edges of the home ranges of owls 2445 and 4099 and so removal of this dispersal habitat should have little impact. However,

harvesting the dispersal habitat will increase the size of the non-dispersal openings and force spotted owls to go around these units rather than through. These two units have managed stands adjacent that can function as dispersal habitat. The managed stand next to Unit 4 will be fertilized with funds generated from this sale to increase tree growth and the quality of the dispersal habitat. Unit 3 is located close to the core of owl 2965 but does not connect to any additional owl habitat within the home radius. By not harvesting the dispersal habitat in Unit 3 the six-acre block of suitable habitat will not be isolated. The west side of the home radius for this owl is largely non-suitable habitat. The amount of suitable habitat within the home range of each owl pair will not change.

Disturbance to owl pairs 0664, 0667, 2965, and 4396 will likely occur (see Table 20). Logging activity, including log haul, will be scheduled outside the critical nesting season (March 1 through July 15) but could occur during the remainder of the nesting season resulting in a **may affect, not likely to adversely affect** determination. The following table identifies those owls that could be affected by this project.

The only additional project planned in the future that may affect habitat for owls 0664 and 0667 is a bridge replacement on Detroit Ranger District.

Table 20: Owls Affected By Habitat Loss Or Disturbance.

Owl Pair	Ac. Of Dispersal Habitat Removed			Acres of Suitable Habitat w/in 1.2 miles	Units w/in 1.2 miles	Units w/in 0.7 miles	Units w/in 0.5 miles
	Alt 1	Alt 2	Alt 3				
0664	0	0	0	1863	*	none	none
0667	0	0	0	1545	*	none	none
2445	0	0	26	1426	1, 2	none	none
2965	0	0	0	1285	3, 5	3	3
4099	0	0	5	1975	4	none	none
4396	0	0	0	1294	1	1	1

**Possible disturbance due to log haul past owl nests.*

Spotted Owl Critical Habitat

Critical habitat Unit OR-15 overlaps the planning area. The physical and biological habitat features that support nesting, roosting, foraging, and dispersal are essential to the conservation of the northern spotted owl (Depart of Interior 1992). Spotted owl habitat consist of four components: (1) Nesting, (2) roosting, (3) foraging, and (4) dispersal. Stands with 40 percent canopy closure or greater are assumed to be used by spotted owls for dispersal across the landscape. Stands with a 60 percent canopy closure or greater are assumed to be used by spotted

owls for nesting, roosting, and foraging. Degradation or removal of suitable and/or dispersal habitat within a CHU will have a negative effect on critical habitat.

Alternatives 1 and 2

There will be no degradation or removal of suitable or dispersal habitat within the CHU in these two alternatives. Only stands with less than 40 percent canopy closure will be removed in alternative 2. There will be no effect on critical habitat.

Alternative 3

Alternative 3 will harvest trees in all stands within the units that have less than 40 percent canopy closure, except for Units 2 and 4 that have portions of the unit that range between 40 and 60% canopy closure. These portions within Units 2 and 4 with higher canopy closures are considered owl dispersal habitat and approximate 31 acres. Within CHU OR-15, there are 30,610 acres that could provide dispersal habitat but only 20,847 currently does, including the 31 acres within Units 2 and 4. The remaining 9,763 acres are younger stands that currently have an average tree diameter of less than 11-inch dbh. This project will remove approximately ¼ of 1% of the current dispersal habitat within the CHU. It is estimated this reduction of 31 acres of dispersal habitat is easily replaced annually within the 9,763 acres of young managed stands growing into dispersal habitat. The only additional project planned in the future within this CHU that could affect dispersal habitat is the South Pyramid timber sale located on the Sweet Home Ranger District and the bridge replacement on Detroit Ranger District.

Removal of dispersal habitat will have a slight negative effect on critical habitat resulting in a **may affect likely to adversely affect** determination. This project is included within the FY2002/2003 Terrestrial Biological Assessment (BA) addressing habitat modifications for the Northern spotted owl in Critical Habitat Units (CHU) and will be consulted on with the U. S. Fish and Wildlife Service and terms and conditions of the Biological Opinion will be adhered to.

Spotted Owl Area of Concern

The Santiam Pass area of concern has the potential to be a biological bottleneck for north/south and east/west spotted owl dispersal. Spotted owl dispersal habitat, calculated on a ¼ township basis within the area of concern, must meet the 50-11-40 rule (Fiscal Year 2000 Biological Opinion, 2/14/2000). This rule requires stands of trees that average at least 11 inches dbh and have at least 40 percent canopy closure on at least 50 percent of Federal lands. Only Units 2, 3, 5, 6, and 7 are located within this area of concern in one ¼ township (T.13S R.7E NW). This ¼ township currently has 66 percent of Federal lands in habitat suitable for owl dispersal. Units 1 and 4 are outside the Area of Concern.

Alternatives 1

There will be no degradation or removal of suitable or dispersal habitat within the area of concern. Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure in the overstory trees will not increase but will likely decline over time from exposure and wind throw. The understory will eventually grow into dispersal habitat but it could take a long time, greater than 50 years. Some type of natural thinning of the understory would have to occur. A dense understory of trees competing for light and water is not a stable situation.

Some of the stressed understory trees would die from competition, insects, snow breakage, fire, or overstory trees blowing down killing some of the understory.

Alternatives 2

This alternative will harvest trees in only those stands that currently have less than 40% canopy closure and do not provide spotted owl dispersal habitat. The understory will be thinned following removal of the overstory. The treated acres should become spotted owl dispersal habitat in 30 – 40 years. This alternative will create additional dispersal habitat within the units much sooner than would occur naturally. A total of 96 acres will be treated within the area of concern.

Alternative 3

Alternative 3 will remove 26 acres of dispersal habitat in Unit 2 within the area of concern. The overstory on an additional 110 acres of non-dispersal habitat will also be removed in Units 2, 3, 5, 6, and 7 (134 ac minus 20 for survey and manage and 4 riparian reserve protection). The total of 147 acres of understory will be thinned following removal of the overstory.

Removing the 26 acres of dispersal habitat will reduce the amount of dispersal habitat within the ¼ Township from 66 percent to 65 percent, well above the minimum 50 percent required to meet the 50-11-40 rule. The 147 acres treated should become spotted owl dispersal habitat in 30 – 40 years.

There are no additional projects identified for the future within this ¼ Township that would reduce dispersal habitat.

Old-Growth Trees

Alternative 1

Old-growth (large-diameter) trees will not be harvested in Alternative 1, the No Action Alternative. Ecologically, the proposed overstory removal units are not functioning as intact old-growth forest. The remaining overstory trees in these shelterwood and prelogged stands will likely slow the growth of the understory trees, however, their presence may also lead to more shade tolerant species in the understory. If these units remained undisturbed by either human activity or nature, the existing overstory will continue to grow slowly. The overstory trees will contribute litter to the forest floor and nitrogen-fixing lichens growing in the canopy will fall and contribute usable nitrogen to the ecosystem. The pockets of Pacific silver fir (*Abies amabilis*) currently found in the stands will grow slowly, providing dense hiding cover for animals and habitat for a multitude of diverse species.

If succession were allowed to proceed over hundreds of years, the stands may attain old-growth forest characteristics. For most of the units where there are existing old-growth trees some of them would die and become snags or fall to the ground to slowly decompose and become nurse logs. This will create openings for more light to generate understory growth thus building structural diversity. The pace that this would happen will vary depending on current stand

conditions and future forest dynamics. Over a long time there is a potential for fires or windstorms to occur and change the entire composition of the stands.

The social implications of harvesting old trees are avoided in this alternative; however, more trees would need to be harvested elsewhere to fulfill timber targets. At present, Forest policy directs most scheduled timber harvest to take place in matrix and managed stands like these.

Alternative 2

Under Alternative 2, 181 acres of shelterwood and prelogged stands will be harvested, leaving approximately eight trees per acre, except in Unit 1 (see Chapter 3). About 3 to 17 trees per acre will be harvested depending on the unit. Trees in Unit 3 would not be harvested in this alternative and Units 2 and 4 are smaller than in the other action alternative. These acres are being retained in this alternative because some of these areas are functioning as dispersal habitat for northern spotted owls. The portion of Unit 3 that is not dispersal habitat will also be retained. Unit 3 is bordered on three sides by plantations that extend for a mile or more. Retention of more old-growth trees may increase dispersal of some lichen species into the surrounding landscape as these plantations mature. The portion of Unit 3 in riparian reserve will be maintained for all alternatives. To the east of Unit 3 is about 1000 acres of no harvest recreation area; 8000 acres of the 18,000 Parks Creek Subwatershed is in no-harvest LRMP allocations within the Matrix.

Alternative 2 addresses the social concern surrounding the harvest of old trees by retaining those acres that are the most ecologically intact of shelterwood and prelog stands and by cutting fewer trees per acre.

Alternative 3

Alternative 3 harvests 237 acres leaving approximately five trees per acre (TPA), except Unit 3 leaves 8 TPA. About 6 to 22 TPA will be harvested depending on the unit. The difference in acres is due to the partial harvest of Unit 3 and more acres in Units 2 and 4 as compared to Alternative 2. Three more trees per acre will be harvested in six of the seven proposed units. This alternative will have more impact on old-growth trees, and subsequently to the present spotted owl dispersal habitat in Units 2 and 4, and potential habitat for other diverse species. The removal of these structural components through timber harvest will remove snags and down wood that is in excess of Forest Plan wildlife requirements from the future stands.

However, more light and less competition for the sapling trees will increase the rate that the understory will grow into mature forest from its existing condition. Six of the seven proposed units contains 300 to 1000 TPA of understory. Unit 3 has an average 100 TPA of understory because of the heavier shading overstory. Unit 3 will retain the most concentrated grouping of older trees. Unit 3, although less than in Alternative 1 and 2, is still a source for dispersion of some lichen species to the adjacent plantations.

Alternative 3 addresses the social concerns related to harvest of old trees by not harvesting ecologically intact stands elsewhere. Additionally, 5 to 8 TPA are being left for wildlife requirements.

Roads

Alternative 1

If the No Action Alternative is selected the road improvements and closures are less likely to be completed. A limited amount of wildlife and other administrative dollars are available to close the highest priority roads. Road maintenance dollars have been on a downward trend for the Forest Service over the past several years. Road maintenance on these roads will decrease and will need to be prioritized for limited road dollars. Money for road improvement projects are even more difficult to find.

Alternatives 2 and 3

Both the action alternatives will reconstruct/maintain 10 miles of road consisting of spot rocking, brush cutback, blading, and cleaning the ditches of the road. With the implementation of the timber sale, limited use roads will be enhanced for visitor use, project use, and drainage will be improved for the traveled way and roadbed.

In Alternative 3, pavement overlay on Lava Lake Road from the junction of the 525 road to Unit 3 will be implemented or if timber is hauled north the unpaved gravel portions of the Lava Lake Road will get a 4 to 6 inch lift of gravel that is from a weed-free rock source. Either action will improve that travel surface.

Proposed road closures and their effects are the same for both action alternatives though the timing may be different. Road 2067-550 will be closed with wildlife funds for Alternative 2 and KV funds for Alternative 3. Closing 15 local roads will decrease big game harassment (see Big Game discussion), limit vehicle access to people who may use those roads and their dispersed camping sites (see Recreation), and decrease road maintenance cost. The other five existing closures will be modified to meet administrative purposes such as: redirecting traffic, re-berm after timber sale use and modify existing closure for snowmobile access in the winter. See Existing and Proposed Road Closures map (Chapter 3).

Big Game

Units 1,2, 3, and 4 are within high emphasis big game management areas (07T, 07V) and Units 5, 6, and 7 are within a moderate emphasis big game management area (07U). *A Model to Evaluate Elk Habitat in Western Oregon* is used to monitor projects occurring within the emphasis area boundaries and for monitoring trends in achieving habitat effectiveness objectives. Habitat conditions will be maintained or enhanced within each emphasis area to meet these objectives and support the potential populations of deer and elk. The habitat effectiveness objective for each of the four variables (cover quality, forage quality, road density, size and spacing of cover and forage) should be within the range of > 0.5 to 1.0 for high emphasis areas and > 0.4 to 1.0 for moderate areas (Forest Plan, LRMP IV-69). The overall habitat effectiveness value should be > 0.6 for high emphasis areas and > 0.5 for moderate emphasis areas.

Table 21: Elk Habitat Effectiveness Values

	Alt 1	Alt 2	Alt 3
Frost (07U) Moderate Emphasis			
HE overall	0.51	0.51	0.51
HE forage	0.36	0.36	0.36
HE cover	0.62	0.62	0.62
HE roads	0.47	0.48	0.48
HE size & spacing	0.65	0.65	0.65
Maude (07T) High Emphasis			
HE overall	0.45	0.47	0.47
HE forage	0.26	0.26	0.26
HE cover	0.46	0.46	0.46
HE roads	0.39	0.45	0.45
HE size & spacing	0.91	0.91	0.91
North Fork Parks (07V) High Emphasis			
HE overall	0.55	0.57	0.57
HE forage	0.33	0.33	0.33
HE cover	0.63	0.63	0.63
HE roads	0.48	0.55	0.55
HE size & spacing	0.93	0.93	0.93

Alternative 1

There will be no improvement to the habitat effectiveness values for the four variables. Values currently below Forest Plan objectives will remain so. Proposed road closures to meet road density objectives will not be implemented. Vehicular disturbance will reduce deer and elk use in habitat adjacent to open roads. Forage habitat within the proposed units will become hiding cover in a few years further reducing the forage variables.

Alternatives 2 and 3

These two alternatives provide an opportunity to improve both the road and overall habitat effectiveness values within each of the three analysis areas. Habitat effectiveness values for roads will still exceed Forest Plan objectives in North Fork Parks 07V and Frost 07U after the closures are in place. The habitat effectiveness value for roads in Maude 07T will be improved but still not meet Forest Plan objectives.

Roads were selected for closure if they did not access private land or recreational use areas, were short spurs, already partially closed by brush, or were parallel road systems. Most roads proposed for closure are less than one mile long (see Chapter 3 – Table 12). The longest road proposed for closure is 2067-540 in T. 13S, R. 6E, section 1. This square mile of habitat was received in a land exchange and currently contains 4.19 miles of open road. A gate is

proposed to close the entire road system, improving road values in both Maude and NF Parks Area.

Cover and forage values will remain the same in each of the emphasis areas but the planned pre-commercial thinning will help maintain forage within the units by keeping the stands open for a longer period of time. The planned fertilization projects will improve forage quality within the units but not enough to affect the model.

Closing some of the roads in each emphasis area will improve the overall habitat effectiveness values but they will still be below Forest Plan objectives of > 0.6 in the two high emphasis areas.

Improving habitat for deer and elk, primarily through road closures, will also improve habitat for cougars and bears. Human disturbance will be reduced and foraging opportunities will increase.

Table 22: Open Road Density

	Alt 1	Alt 2	Alt 3
Frost (07U) Moderate Emphasis			
Miles road closed	0	0.9	0.9
Miles of open road after closures	32.5	31.6	31.6
Open road density after closures	2.14 mi/ sq mi	2.08 mi/ sq mi	2.08 mi/ sq mi
Maude (07T) High Emphasis			
Miles road closed	0	7.0	7.0
Miles of open road after closures	35.2	28.2	28.2
Open road density after closures	2.97 mi/ sq mi	2.38 mi/ sq mi	2.38 mi/ sq mi
North Fork Parks (07V) High Emphasis			
Miles road closed	0	5.9	5.9
Miles of open road after closures	19.3	13.4	13.4
Open road density after closures	2.03 mi/ sq mi	1.41 mi/ sq mi	1.41 mi/ sq mi

Canopy Closure and Understory Development

Understory Development

The removal of the overstory in excess of five trees per acre and subsequent snag creation for Alternative 3 will allow the understory to develop at more rapid pace than Alternatives 1 and 2. Releasing the understory from competition with the overstory for light and nutrients will facilitate better growth. More acres will develop at an increased pace towards northern spotted owl dispersal habitat.

Windthrow

Alternative 1

All the proposed units have had some level of timber harvest. "*All harvest cutting practices can increase the potential for windthrow*"(Kohm et al. 1997). Some minimal blow down has occurred in all the units with heavier windthrow spots in Unit 2, 3 and 6. The existing trees in these units have been standing after harvest for 10 to over 20 years depending on the unit and are generally wind firm.

Alternatives 2 and 3

Residual trees left in both action alternatives (eight trees/acre in Alternative 2 and five trees/acre in Alternative 3) will likely be more susceptible to windthrow than they currently are because more than half of the existing trees will be harvested, which will further open up the stand. However, sound dominant trees and deep-rooted species such as Douglas-fir are more likely to survive or minimize windthrow. Even if some of them do blow down, down wood is an component of structurally diverse forests.

Competing and Unwanted Vegetation

Competing Vegetation

Alternative 1

The existing understory in Unit 1 is overtopped by *Ceanothus velutinus.* Development of the understory will continue to be diminished.

Alternatives 2 and 3

The effects on competing and unwanted vegetation for Unit 1 will be the same in both action alternatives. The seedlings in Unit 1 will be released at a 10-foot spacing. All *Ceanothus velutinus* will be cut within one-half the height of the tree and less than four feet from the tree by severing it at ground level.

Unwanted Vegetation: Noxious Weeds

Alternative 1

The no action alternative presents the least risk of introducing weeds into the area. Noxious weeds thrive on soil disturbance and open habitat; no soil disturbance would occur under Alternative 1 and weed seeds would not be introduced via equipment, vehicles, or gravel. However, KV monies for weed surveys and control will not be available for the Parks Creek area.

Alternatives 2 and 3

The risk of introducing or increasing noxious weed populations in the planning area varies with each alternative; however, all action alternatives increase the likelihood of increased noxious weed presence. Generally, ground disturbance from road reconstruction, creation of temporary roads and landings, ripping of skid roads, harvest activity and fuels treatment all contribute to increasing the risk of weed invasion. Subsequent subsoiling of landings and skid roads is another avenue of weed seed introduction. Reconstruction of roads may require additional gravel, which, depending on the rock source, may be contaminated with weed seeds. Further, the early seral conditions, in this case resulting from overstory removal, are preferred by many weed species and harvest equipment and vehicles spread their seeds. Existing populations of weeds in the units will spread quickly given their preference for open areas.

Alternative 2 has a slightly decreased risk of weed invasion compared to Alternative 3, primarily because fewer acres are affected.

The collection of KV monies to survey and control noxious weeds in both action alternatives helps to mitigate the increased risk of weed establishment.

Fuels/Fire

Both of the action alternatives will result in an increased fire and fuels hazard. The post harvest fuel loadings will exceed Willamette NF Standards and Guidelines FW-212 of 0"-3" diameter of 7-11 tons per acre. This fuel loading will provide a necessary component for increasing the intensity of wildfire should one start. With this increase of ground fuels, the results of a fire in a worst case scenario has the capability of adversely altering the stand, soils, wildlife and its habitat, visual effects, biodiversity, aquatic environment, and the recreational values of the area.

Underburning, a cost effective treatment will not be viable due to the intolerance of the young trees left in the stands. Most of the units have a high density existing understory that is susceptible to fire or burning. Only Unit 3 has low trees per acre of understory. Where the fuels exceeds the Forest standards for tons per acre grapple piling will be used for Unit 3 (proposed only in Alternative 3). For the other units hand piling will be used to reduce the fuel loading along high-risk areas such as roads. It will not be economically feasible to treat the activity-generated fuels of the sale in its entirety.

Untreated harvest activity fuels will decay over time due to the wet "mountain rain shadow" climate that exists and will present a short term fire risk of approximately 5-8 years.

Alternative 1

This alternative will not implement any timber harvesting activities. The existing fuel components will remain as is for the next few years barring any natural disturbance. By not implementing any harvest or slash disposal activities in these stands, they will start to deteriorate over time which will increase the natural fuel loadings and, consequently, increase the potential for stand-replacing fire should a fire go undetected or escape initial attack. Interval for a stand-replacing fire in this area is around 200 years.

Alternative 2

With greater retention of large diameter trees in the overstory the hazard for crown fire exists. The encouragement of understory development will increase ladder fuels and the probability of crown fire. Post-harvest ground fuels will increase and the drying of these fuels from canopy open to sunlight will encourage a fire environment. However, fuel treatment of high-risk areas should reduce the probability of ignition of a stand-replacing fire. Hand-piling will occur in units next to heavily used roads, trails, and private land thereby reducing some of the risk of ignition.

Alternative 3

The removal of the overstory in excess of five trees per acre will reduce the hazard and probability of crown fire. Ground fuel loadings will be heavier than in Alternative 2 due to more volume being removed and the canopy will be even more open than Alternative 2 promoting the drying of fuels and creating a conducive fire environment. Hand-piling will occur in units next to

heavily used roads. Unit 3, only proposed in this alternative, will have grapple piling of excessive fuel loadings. Again as in Alternative 2, fuel treatment of high-risk areas should reduce the probability of ignition of a stand replacing fire.

Air Quality

Minimal smoke is expected to be produced by burning the hand piles produced in either action alternative. In addition the timing of the burns will follow Oregon Smoke Management Plan which will curtail the effect on air quality in Class I airsheds. Other activities associated with this project are expected to have only very local, short-term effects on air quality, mainly by generating dust.

Heritage Resources

The effects on heritage resources from this project will remain constant for all alternatives being considered. Known Heritage properties will be avoided, buffered or otherwise subject to appropriate mitigation from harmful effects (see Chapter 3 - Mitigation Measures). Any further or unforeseen mitigation efforts will be considered in consultation with the State Historic Preservation Office (SHPO).

Hydrology

Alternative 1

Alternative 1 involves no action at this time. This is the lowest risk to hydrology, water quality and stream channels. Recovery of the stand will be slower due to the shade potential of the overstory and the ability of the canopy to intercept snow will be hindered due to this slower recovery. No adverse effects are anticipated as a result of this alternative.

Alternative 2

Hydrologically this alternative has no affect due to the low density of the remaining trees on the site. Snow accumulation on these units currently responds as an opening. The hydrology is predominantly snow related and is expected to remain unchanged.

Stream channels within the area will have full leave riparian reserves. No change is expected to occur as a result of the cutting of the stands next to the riparian reserves. Short-term impacts to intermittent channels may occur upon development of the logging plan due to intermittent crossing needed to yard the material to the landing. These crossings will be pre-approved and will be designed to reduce impacts to the channel (perpendicular crossings create the least disturbance). Due to the nature of the soil in these stands, skid roads could develop into tributary stream channels. To avoid this, erosion control measures including water bars, mulching, and timing control will be utilized to reduce any impact to the existing stream network. Also subsoiling the skid roads will minimize potential of adding to the stream network. No adverse impacts to the stream channels are expected provided that Best Management Practices are implemented.

The effects to water quality are expected to remain unchanged due to the implementation of Best Management Practices. These practices will determine the skidding pattern, erosion control methods, and season of operations. Provided these Best Management Practices are followed the Clean Water Act requirements will be met.

Alternative 3

The affects to hydrology and water quality are similar to Alternative 2. No adverse impacts are anticipated provided Best Management Practices are followed.

The affect to stream channels is accentuated due to the additional volume being removed over the pre-designated skid trails and additional acres being treated. This accentuation however is still within state standards provided Best Management Practices are followed. The effect is the additional passes of logs over a given route and the tendency for snowmelt to follow these established paths and extend the stream network. Management practices of erosion control ripping to reduce compaction in skid roads and proper drainage of these skid roads will reduce the risk of this effect.

Cumulative Effects

Cumulative effects associated with the proposed management are minor as a result of the way the units were previously designed and the lack of subsequent activity within the smaller watersheds associated with the units. The area is a snow dominated region and is at the upper elevation of the rain on snow events. The Parks Creek Subwatershed is a closed basin that drains into Lava Lake. No adverse cumulative effects are anticipated to result from either action alternative. There may be some beneficial long term effect from encouraging healthy development of the understory.

Aquatic Conservation Strategy Objectives (ASCO)

For this project, the Riparian Reserve widths for the existing stream types will be those recommended in the ROD (S&G pg C-30). For the proposed overstory units, which are in the Pacific silver fir series, the site potential tree height is 150 feet for permanently flowing nonfish-bearing streams and intermittent streams. Only Unit 1 is adjacent to a fish-bearing stream and will have a two-site potential tree height Riparian Reserve of 300 feet.

No harvest will be conducted in Riparian Reserves as part of any timber sales associated with these alternatives. Implementation of the Parks Creek Subwatershed Overstory Removal timber sale(s) is not anticipated to retard or prevent attainment of the Aquatic Conservation Strategy Objectives (ACSO) provided full riparian reserves are implemented as stated in the alternatives section of Chapter 3. See Appendix E: Aquatic Conservation Strategy Objectives for full discussion.

Management Indicator Species

Habitat features exist in the planning area only for spotted owl, pileated woodpecker, pine martens, and cavity excavators. The following discussion is for pine martens and pileated

woodpeckers. Effects on spotted owls were discussed earlier in this chapter. The effect on cavity excavators is discussed in the section on snag habitat and down wood.

Mature and old-growth forests provide feeding, resting, and breeding areas required by pileated woodpeckers and pine martens. Each of these species will also use other seral forest conditions. Shelterwoods and prelog units can provide foraging habitat for pileated woodpeckers and forest canopy cover for marten. Marten prefer forests with closed canopies but will use more open areas if sufficient down wood exists (Csuti et al 1997).

Alternative 1
Under this alternative there will be no reduction in habitat for pileated woodpeckers, and marten. The amount of snag and down wood habitat within the proposed units will increase over time from natural mortality, snapouts, and blowdown. The increase in decaying wood will provide additional foraging areas for pileated woodpeckers and ground cover for marten.

Alternative 2 and 3
Table 23 summarizes the amount of pileated woodpecker and marten habitat, including shelterwood and prelog units, within each analysis area and amount removed by alternative. The proposed units provide only marginal habitat for these two species due to previous timber harvest, except for units 2, 3, and 4. These units are more intact stands with fair amounts of down wood.

Table 23: Pileated and Marten Habitat

Pileated Woodpecker & Pine Marten	Habitat Removed		
	Alt 1	Alt 2	Alt 3
Maude (07T)			
Acres habitat removed	0	122 (2.6%)	173 (3.7%)
Acres habitat remaining	4719	4597	4538
Frost (07U)			
Acres habitat removed	0	55 (0.8%)	55 (0.8%)
Acres habitat remaining	6741	6686	6686
North Fork Parks (07V)			
Acres habitat removed	0	4 (0.1%)	9 (0.3%)
Acres habitat remaining	2937	2933	2928

Alternative 2 will remove a total of 181 acres of habitat within the three analysis areas and alternative 3 will remove 237 acres. There will be a 2-3 percent reduction in 07t analysis area and less than 1 percent reduction in 07u and 07v analysis areas. Pileated woodpecker use within the units will decline after the canopy is removed, since they tend to avoid openings when foraging. They may still use edges of the units for foraging and concentrated wildlife trees and GTR's. Marten use will also be reduced but they may still use portions of the units, depending on concentrations of down wood and development of the understory. Down wood creation will benefit martens.

Migratory Birds

Alternative 1

There will be no impacts to migratory birds. Species diversity and bird population changes will be dependent on natural and human-caused disturbances, primarily wild fire. More subtle

changes will occur through time as the overstory tree canopy declines, snags are created or blow down, and a dense understory develops or stagnates.

Alternatives 2 and 3

These two action alternatives will further reduce the overstory tree canopy and thin out the dense understory. This will create a more open forest community than what currently exists, benefiting some bird species. It may also allow increased predation on these species. The current snag habitat will be retained and additional snags created, resulting in a benefit to both primary and secondary cavity dependent bird species. Fewer large trees will be available for future snags.

Timber harvest activities during the spring and summer may impact nesting birds through disturbance and habitat modification. However, seasonal operating restrictions do exist for spotted owls from March 1 to July 15 (see Mitigation Measures Common to Action Alternatives) that will provide some level of protection to other nesting species as well.

Recreation

Alternative 1

No adverse effects on Nordic trails or dispersed recreation sites are expected under this alternative. The forest landscape around these trails and sites will develop into a multi-story forest overtime and improve scenic conditions. This alternative will also not create interruptions or disturbances to recreation use patterns from logging activities.

While no impacts to recreation opportunities are expected, this alternative also does not generate funding opportunities to improve recreation trails and access roads.

Alternative 2

This alternative proposes to harvest trees in six of the seven proposed units, and to leave more than the minimum number of overstory trees for habitat needs. Trail surface impacts will occur through the felling and hauling of downed trees in units 4, 5, 6 and 7. Such impacts will be repaired using a contract clause or post-sale KV project.

Dispersed recreation sites in units 1, 2, and 5 may be physically impacted by harvest activity under this alternative. Physical site impacts occur when trees are felled into or yarded through a dispersed site. Such damage will be repaired or dispersed sites relocated using a post-sale KV funding.

An important recreation impact under this alternative is alteration of the forest setting around trails and dispersed recreation sites. Removing large overstory trees and trampling understory vegetation reduces the attraction of forest settings to visitors. While setting impacts may exist for only 5-10 years, no immediate mitigation besides moving the trails or sites will be effective. Fortunately the scale of setting changes on the landscape from the proposed units is relatively small. Users of the ski trails from Big Springs Snopark will notice the greatest change due to harvesting in units 6 and 7. Mountain bikers or hunters on this trail system are likely to be more affected by harvest activities than skiers, as snow masks the ground effects left from logging.

Conversely, removal of large overstory trees within winter trail corridors can improve snow conditions on these trails. Large trees intercept snow in their canopies and create icy patches when snow melts off the canopies and tree wells later in the season. So while removing large trees has a negative effect on the forest setting near trails, it often improves snow conditions on trails.

Road closures proposed by both action alternatives will displace or relocate recreation use in the planning area. Hunters will be most affected by these access changes. Loss of vehicle access to dispersed sites will be mitigated with replacement sites in the same area. Table 12 (Chapter 3) describes which road closures affect dispersed sites and the proposed mitigation. By reducing vehicle access to parts of the planning area, this alternative limits hunters that rely on their vehicles, while expanding walk-in hunting opportunities for others off these closed roads. Closures off Forest Road 2067-525 will create the most change in access.

Alternative 3

Impacts to recreation opportunities under this alternative are expected to be similar to those described under Alternative 2, though the extent of these impacts may be slightly greater. By harvesting more acres and retaining fewer trees per acre, Alternative 3 increases the potential to create noticeable impacts to trails, dispersed sites, and the scenic quality of the forest setting.

Once again physical impacts to trails and dispersed campsites will be mitigated through reconstruction or relocation. Increasing harvest acres in units 2, 3, and 4 will only have a limited change in forest setting impacts over conditions described in Alternative 2. This change will be most apparent to snowmobile riders on Forest Road 2067 and 2067-560, and to fall hunters setting up a base camp off the local road 521 through Unit 2.

Removing more trees per acre in all harvest units will create more noticeable changes on the forest setting than described under Alternative 2. These changes also have a greater chance of affecting visitors because it occurs in all harvest units. Higher harvest levels may create more impacts to understory vegetation, a significant contributor to the forest setting, though these impacts should be short-lived. Visitors on trails from Big Springs Snopark will be most affected by removing overstory trees in units 5, 6 and 7, due to their slow travel speed and the proximity of trails to three units.

Similar to Alternative 2, this alternative should also improve snow conditions on ski trails by removing large overstory trees hanging over the trails. Road closures proposed by both action alternatives will displace or relocate recreation use in the planning area. Hunters will be most affected by these access changes. Loss of vehicle access to dispersed sites will be mitigated with replacement sites in the same area. By reducing vehicle access to parts of the planning area, this alternative limits hunters that rely on their vehicles, while expanding walk-in hunting opportunities for others off these closed roads. Closures off Forest Road 2067-525 will create the most change in access.

Sensitive Wildlife Species

Habitat for four R6 sensitive wildlife exists in the units but only the Oregon slender salamander was found during surveys of this habitat.

Alternative 1

There will be no impact to sensitive wildlife species.

Alternatives 2 and 3

Though no individuals were found, the action alternatives may impact Baird's shrew, Pacific shrew, and Pacific fringe-tailed bat, either through disturbance or habitat modification. See Biological Evaluation for details on these species.

The Oregon slender salamander was found at 13 locations in units 1, 2, 3, and 7. This salamander is endemic to Oregon and typically occurs under bark, and moss in mature and second-growth Douglas-fir forests (Csuti 1997). Bark heaps at the base of snags and down wood appears to be very important. To limit impacts to this species, known locations will be protected with a minimum 75-foot no-harvest buffer. Wildlife trees will be left within these sites. No disturbance after logging is completed should occur with the exception of snag and down wood creation and pre-commercial thinning. The sites will be monitored after harvest to see if the buffers are effective in maintaining habitat requirements.

Snag Habitat and Down Wood

Alternative 1

There will be no immediate changes in snag density or down wood in any of the three analysis areas. In time, additional snags and down wood will be created within the proposed units from snapouts and blow down. There will be no increase in the available early seral habitat containing large snags and down wood.

Alternatives 2 and 3

The proposed units currently average approximately one snag/acre. Most of these snags will be retained through the timber harvest. Additional snags will need to be created after timber harvest from the existing trees to maintain the minimum 40 percent or approximately 2 snags/acre in each unit. These additional snags will increase snag density in all three analysis areas. This increase will be approximately one percent in Maude, and less than one percent in Frost, and North Fork Parks. Even more importantly, these snags will provide additional habitat for snag dependent species in early seral habitat, such as western bluebirds.

Down wood in decay class 1 and 2 logs that is currently available and meets the minimum size will remain on site after timber harvest. Most of the units will require additional down wood created from the standing trees to meet the minimum 240 linear feet/acre. This additional down wood will benefit those organisms that use this habitat structure. In addition, all down wood that is already on the ground will be retained and protected from disturbance to the greatest extent possible.

Soils and Geology

Alternative 1

There is little or no substantive effect to soils or geology in the No Action Alternative. Existing erosion rates and slope stability will be maintained. Old roads and skid trails would continue to vegetate; existing compaction will slowly ameliorate as freeze/thaw and biotic agents acted on the soil. Duff and litter layers will slowly continue to accumulate.

Alternatives 2 and 3

The Forest Plan acknowledges the irreversible and irretrievable commitments of resources as a result of decisions to use, modify, or impact non-renewable resources. The utilization of rock resources for road construction or reconstruction is an example of irreversible resource loss, and an irretrievable loss of soil productivity occurs with the establishment of a transportation system. Even so, both action alternatives propose mitigations, such as designated skid roads, subsoiling and waterbars, to assure compaction amounts and off-site erosion stay below levels prescribed in the Standards and Guides for the Forest Plan. In a similar manner, grapple piling for Unit 3 (Alternative 3) will be required to meet duff retention measures to insure long term productivity is maintained. The "per acre" effects between Alternative 2 and 3 are very similar. They are anticipated to meet standards and maintain productivity and stability. The only difference is that Alternative 3 operates on 56 more acres.

Survey and Manage Species

Alternative 1

There will be no effect to Survey and Manage species in the No Action Alternative. Undetected sites of these species will not be impacted by timber harvest, and habitat for Survey and Manage species will continue to exist in these stands. Habitat will actually improve as the stands regain some structure and complexity.

Alternative 2 and 3

Survey and Manage species are afforded protection in the action alternatives, therefore, there should be no detrimental effects to any of the species for which locations are known and buffers are provided. Refer to Table 13 in Chapter 3 for species that were found and the prescribed buffer width. Inadvertent loss of Survey and Manage species may occur under Alternatives 2 and 3 in sites that are undetected, despite the units having been surveyed to protocol. The negative impacts to Survey and Manage species habitat are more in Alternative 3, in which the minimum number of trees will be left on 237 acres except for Unit 3. These acres may no longer provide habitat to Survey and Manage species other than those known sites that are protected.

The number of acres harvested under the action alternatives will be reduced due to buffers for Survey and Manage species. Approximately 17 acres will be retained in Alternative 2 for Survey and Manage species and 24 acres will be retained in Alternative 3.

Summary Comparison Table

Table 24: Comparison of Objectives, Effects on Main Issues and Outputs by Alternatives

Objectives:	Alt 1	Alt 2	Alt 3
Objectives 1a, 1b and c: 70% Shelterwood & Prelog Removal, & Understory Treatment	0	66% (181/275)	86% (237/275)
Objective 2: 2 MMBF Timber Volume	0	2.1 MMBF	3.2 MMBF
Effects:			
Northern Spotted Owls: -Acres Suitable habitat removed -Acres Dispersal habitat removed -Critical Habitat Unit OR-15 -Area of Concern, 50-11-40 habitat	 0 0 No effect 66%	 0 0 No effect 66%	 0 31 May effect, Likely to adversely affect 65%
Old-Growth Trees Removed	0	3 to 17 TPA	6 to 22 TPA
Roads Closures: Road Asphalt Overlay Lava Lake Rd.	0 0	15 new closures 5 modified closures 0	15 new closures 5 modified closures 2.5 miles
Outputs:			
Reforestation and Mitigation KV Collections	0	$64,767	$96,843
Other KV Opportunities: 1) Road Berms 2) Dispersed Recreation Site Enhancement 3) Riparian Planting 4) Firewood 5) Precommercial Thinning in Units 6) Fertilization of Units 7) Mineral Blocks 8) Precommercial Thinning In Adjacent Managed Stands 9) Fertilization In Adjacent Managed Stands 10) Pruning In Adjacent Managed Stands	0	$181,822 See KV Appendix B	$280,201 See KV Appendix B

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Appendix A: Unit Treatment Prescriptions

This is a summary derived from Chapter 3. For more specific information about these prescriptions refer to Mitigation Measures Common to Action Alternatives.

Table 1: **Unit Specific Prescriptions**

Unit Number	Acres	Operating Season limits	Special Habitat Protection	Fuels Prescription
1	81	March 1st to July 15th for Northern Spotted Owl. Restrict the last two weeks of October for elk season	S&M Bryophyte, 4 sites, 300' buffer from site; S&M Fungi, 4 sites, 3 with 300'; S&M Lichen 2 sites; Maude Cr 300' buffer for Unit 1	Hand-pile within 2 chains of private land to north and east 13 acres
2	41 Alt 2 67 Alt 3	Same as Unit 1	S&M Fungi, 3 sites, 300' buffer from site; 150' buffer for wetland	Hand-pile within 2 chains of FR 2067 and 1 chain on either side of FR 521 6 acres
3	25 Alt 3 Only	Same as Unit 1	S&M Fungi, 1 site, 300' buffer from site – inside suitable & Dispersal –16 ac. of protection plus Riparian Reserve about 4 ac. total about 20 ac.	Grapple pile
4	4 Alt 2 9 Alt 3	Same as Unit 1, in addition restrict from July 15th through August 25th for other hunting seasons		Hand-pile within 2 chains of FR 560 1 acre
5	4	Same as Unit 1	S&M Lichen, 2 sites, 150' buffer from site	None
6	26	Same as Unit 1	S&M Lichen, 3 sites, 150' buffer from site	Hand-pile within 1 chain either side of ski trail 5 acres
7	25	Same as Unit 1		Hand-pile within 1 chain of FR 096 (ski trail) 2 acres

Group wildlife trees in clumps around 6” to 13” silver fir to protect the silver fir from damage during yarding operations. Save the small diameter silver fir in the intermediate canopy layer where feasible.

Leave 4.5 wildlife trees per acre of which no more than 2 can be snags at this time (estimate that there is 1 snag per acre at this time so up to 3.5 additional green trees/acre may be necessary).

Leave 240 linear feet per acre over 20” in diameter or larger (estimate there is about 120 feet down at this time so an additional 120’ (about 1.5 TPA) may need to be designated).

In Unit #3 leave an additional 3 trees per acre for wildlife.

If any additional wet sites are identified during layout they will require a full riparian reserve.

Appendix B: Knutson-Vandenberg Collections

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…"*

Silviculture KV

Essential KV

Unit 3 will require reforestation with appropriate coniferous species in Alternative 3. Four acres of existing plantation L62 (vegis stand # 3001984) will require replanting, adjacent to Unit 2. Stocking surveys will be completed for the first three years after reforestation to assess survival. The areas that are disturbed during logging activities will need to be planted with coniferous species representative of the overstory. As an estimate 5% of the acres will be planted. Alternative 2 is 181 acres (5% will be 9 acres) and Alternative 3 is 212 acres (5% will be 11 acres) omitting Unit 3, which is already planned for planting (25 acres). No exams will be needed for planting the openings.

Table 1**: Total Essential KV Collections by Action Alternative**

	Alternative 2	Alternative 3
Acres of Planting ($520/acre)	13 ac. $6,760	40 ac. $20,800
Acres of Exams ($8/acre) For Three Years	4 ac. X 3 yrs $96	29 ac. X 3 yrs $696
Total Essential KV by Alternative	$6,856	$21,496

Timber Stand Improvement KV Projects

TSI projects will be completed for managed stands within the planning area including precommercial thinning to enhance species diversity and increase the growth rate of dominant trees, aerial fertilization to improve stand vigor, and pruning to add value to stands for future harvest.

KV collections may only be made for those stands within sale area boundaries, generally within ¼ mile of the planned units. Money to complete TSI projects for the other managed stands will have to come from future projects or money appropriated by Congress.

All units planned for a precommercial thin or aerial fertilization have been surveyed for *Bridgeoporus nobillissimus*, a Survey and Manage Species.

Table 2: **Managed Stands Within The Projected Sale Area By Alternative**

Stand	Ref#	Last TRT	Planned TRT	Year	With Unit	Acres*	Alternative
Treatments within Planned Units							
3001889	L77	RPL 1992	SPC	2007	1	81	2, 3
3001889	L77	RPL 1992	SRL	2003	1	81	2, 3
3001881	L95	RPL 1992	SPC	2005	2	22	2, 3
3001924	L96	SPC 1996	SPC	2003	2	(19) 45	2, 3
3001039	NA	HPR 1978	SPC	2003	4	(4) 9	2, 3
3001502	L87	RPL 1991	SPC	2005	5	4	2, 3
3001624	L90	SPC 1997	SPR/SFL	2008	6	26	2, 3
3001696	L91	RPL 1991	SPC	2005	7	25	2, 3
(155) 186 ACRES OF SPC, 81 ACRES OF SRL, 26 ACRES OF SPR/SFL							
3001984	L62	RPL 1985	SPC	2003	2	4	2, 3
3001064	L83	SRL 1999	SPC	2003	4	29	2, 3
3001064	L83	SRL 1999	SRL	2003	4	29	2, 3
33 ACRES OF SPC and 29 ACRES OF SRL							
Treatments within Existing Plantatations							
3001957	L4	SPC 1987	SPR/SFL	2003	2	29	2, 3
3001937	L5	RPL 1972	SPR/SFL	2003	2	40	2, 3
3001833	L6	RPL 1969	SPR/SFL	2003	2	65	2, 3
3004396	L36	SPC 1995	SPR/SFL	2008	2	10	2, 3
3001937	L37	SPC 1987	SPR/SFL	2003	2	5	2, 3
3001009	L49	SPC 1997	SPR/SFL	2008	4	37	2, 3
3001022	L131	SPC 1996	SPR/SFL	2008	4	19	2, 3
3001058	L149	SPC 1997	SPR/SFL	2008	4	12	2, 3
3001511	L88	SPC 1997	SPR/SFL	2008	5	9	2, 3
3001651	L80	SPC 1996	SPR/SFL	2008	6	44	2, 3
3001709	L100	SPC 1991	SPR/SFL	2003	7	13	2, 3
3001523	L35	SPC 1990	SPR/SFL	2003	3	7	3
3001417	L53	RPL 1969	SPR/SFL	2003	3	77	3
3001507	L61	SPC 1997	SPR/SFL	2008	3	22	3
3001418	L64	SPC 1997	SPR/SFL	2008	3	147	3
(283) 536 ACRES OF SPR/SFL							

**Numbers in parenthesis are for Alternative 2 when different from Alternative 3.*
RPL - Certified as restocked with conifer species.
HPR – Prelog of smaller trees to reduce breakage during overstory removal.
SFL - Fertilization; SPC - Precommercial thinning; SPR - Pruning; SRL -Release

Table 3: **Total Timber Stand Improvement Opportunities**

	Alternative 2	**Alternative 3**
Acres of Precommercial Thinning (SPC) Release (SRL) ($205/acre)	155 Acres of SPC within units 81 Acres of SRL within units 33 Acres of SPC outside units 29 Acres of SRL outside units 298 Total Acres * $205/Acre $61,090	186 Acres of SPC within units 81 Acres of SRL within units 33 Acres of SPC outside units 29 Acres of SRL outside units 329 Total Acres * $205/Acre $67,445
Acres of Fertilization (SFL) ($110/acre)	26 Acres of SFL within units 283 Acres of SFL outside units 309 Total Acres * $110/Acre $33,990	26 Acres of SFL within units 536 Acres of SFL outside units 562 Total Acres * $110/Acre $61,820
Acres of Pruning (SPR) ($238/acre)	26 Acres of SPR within units 283 Acres of SPR outside units 309 Total Acres * $ 238/Acre $73,542	26 Acres of SPR within units 536 Acres of SPR outside units 562 Total Acres * $238/Acre $133,756
Total TSI KV by Alternative	$168,622	$263,021

Table 4: **Total Silviculture KV Collections by Action Alternative**

	Alternative 2	**Alternative 3**
Essential KV	$6,856	$21,496
TSI KV	$168,622	$263,021
Total Silviculture KV by Alternative	$175,478	$284,517

Wildlife KV

Snags will be created within the units and adjacent riparian areas by topping after logging is complete. An average of 2 snags/acre will be created in all harvest units. An average of 1.0 trees/acre will be felled in all units to create large down woody debris after all logging and slash burning is complete.

Road Closures

Two gates will need maintenance for planned haul routes, at a cost of $500.00 per gate.
In each alternative 50 mineral blocks will be placed within the sale area.

Monitoring for habitat effectiveness will be completed with both action alternatives for the Oregon Slender Salamander, a R6 sensitive species. Monitoring will be completed after harvest to assess effectiveness of the buffers at a cost of $10.00 per acre.

Table 5: **Total Wildlife KV collections by Alternative**

	$/unit	**Alternative 2**	**Alternative 3**
Snag Creation	$55 ea.	362 snags $19,910	474 snags $26,070
Tree Felling	$26 ea.	181 trees $4,706	237 trees $6,162
Close Roads	$500 ea.	6 closures $3,000	7 closures $3,500
Gate Maintenance	$500 ea.	2 gate $1,000	2 gates $1,000
Mineral Blocks	$10 ea.	50 blocks $500	50 blocks $500
Sensitive Species Monitoring	$30 ac.	66 ac. $1,980	117 ac. $3,510
	Total	$31,096	$40,742

Six roads will be closed using a berm in Alternative 2. Seven roads will be closed using the same method in Alternative 3. These roads are listed in Table 12 in Chapter 3.

Botany KV

Noxious Weed Survey And Control
Ground-disturbing activities, including timber sales and road construction, increase the amount of habitat suitable for non-native, invasive plant species. Vehicles and logging equipment can contribute to the spread of these species by inadvertently carrying weed seed into the area on tires, caked-on mud, and undercarriages. 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). See Figure 6 for the location of all Noxious Weed KV projects.

The cost of noxious weed control is $10.00/acre within proposed units and $20.00/acre within 30 feet of roads within one-quarter mile of planned units ($11.00 per acre average). Each acre will be treated once a year for five years.

Native Plant/Seed Collection And Planting
All miles of reconstructed roads within one-quarter mile of a unit, designated skid roads and landings will be planted with native seed. Native grass/forb seeding: $600/acre ($15/lb blue wildrye at 20 lb/acre plus labor and overhead)

Table 6: **Total Botany KV by Alternative**

	Alternative 2	**Alternative 3**
Noxious Weed Control	193 acres @ $11.00 for five years $10,615	251 acres @ $11.00 for five years $13,805
Native Planting	30 acres @ $600 $18,000	37 acres @ $600 $22,200
Totals	$28,615	$36,005

Recreation KV

Many closed roads provide excellent hunting area opportunities free from the disturbance of vehicles. When deciding to close new or existing roads in the watershed to meet desired resource objectives, closure devices (gates or berms) should be located to retain access to an existing or potential dispersed recreation site. Preferably this site is not too far up the road from its junction with the main road. If a suitable dispersed site cannot be left open or created near the closure device, then the closure location should allow convenient parking for day use of the closed road area. Five dispersed sites near planned berms will be created or improved at a cost of $500 per site in both action alternatives.

Table 7: **Total Recreation KV by Alternative**

	Alternative 2	**Alternative 3**
Rehabilitate Dispersed Site	$2,500	$2,500

Soils KV

Tractor yarding is proposed for all units. Compaction from a ground-based logging system during this entry and existing compaction from previous harvest will need sub-soiling. One acre of sub-soiling per 10 acres of unit or about 10% will be collected for sub-soiling to mitigate compaction. Sub-soiling could be required to meet best management practices for erosion control and soil productivity. Sub-soiling cost is $300 per acre.

Table 8: **Soils KV by Alternative**

	Alternative 2	**Alternative 3**
Subsoiling acres	18	24
Total	$5,400	$7,200

Hydrology KV

Unit 3 has an interior stream. Harvest of this unit is only proposed in Alternative 3. Native coniferous species will be planted to improve the general riparian condition. Cost of planting will be $520 per acre.

Table 9: **Hydrology KV by Alternative**

	Alternative 2	**Alternative 3**
Riparian planting	$0	**(4 acres)** $2,080

Firewood KV

To administer firewood collection for public use $2000 per timber sale will be necessary. Up to two sales may occur with this EA.

Table 10: **Total KV Collections by Alternative**

	Alternative 2	**Alternative 3**
Silviculture – Essential	$6,856	$21,496
Silviculture – TSI	$168,622	$263,021
Wildlife KV	$31,096	$40,742
Botany KV	$28,615	$36,005
Recreation KV	$2,500	$2,500
Soils KV	$5,400	$7,200
Hydrology KV	$ 0	$2,080
Firewood	$4,000	$4,000
Total Cost	$247,089	$377,044

KV Prioritization

First priority KV projects are essential KV (required reforestation) such as:

Tree Planting, Reforestation Exams and Replanting.

Second priority KV projects are to meet mitigation requirements:

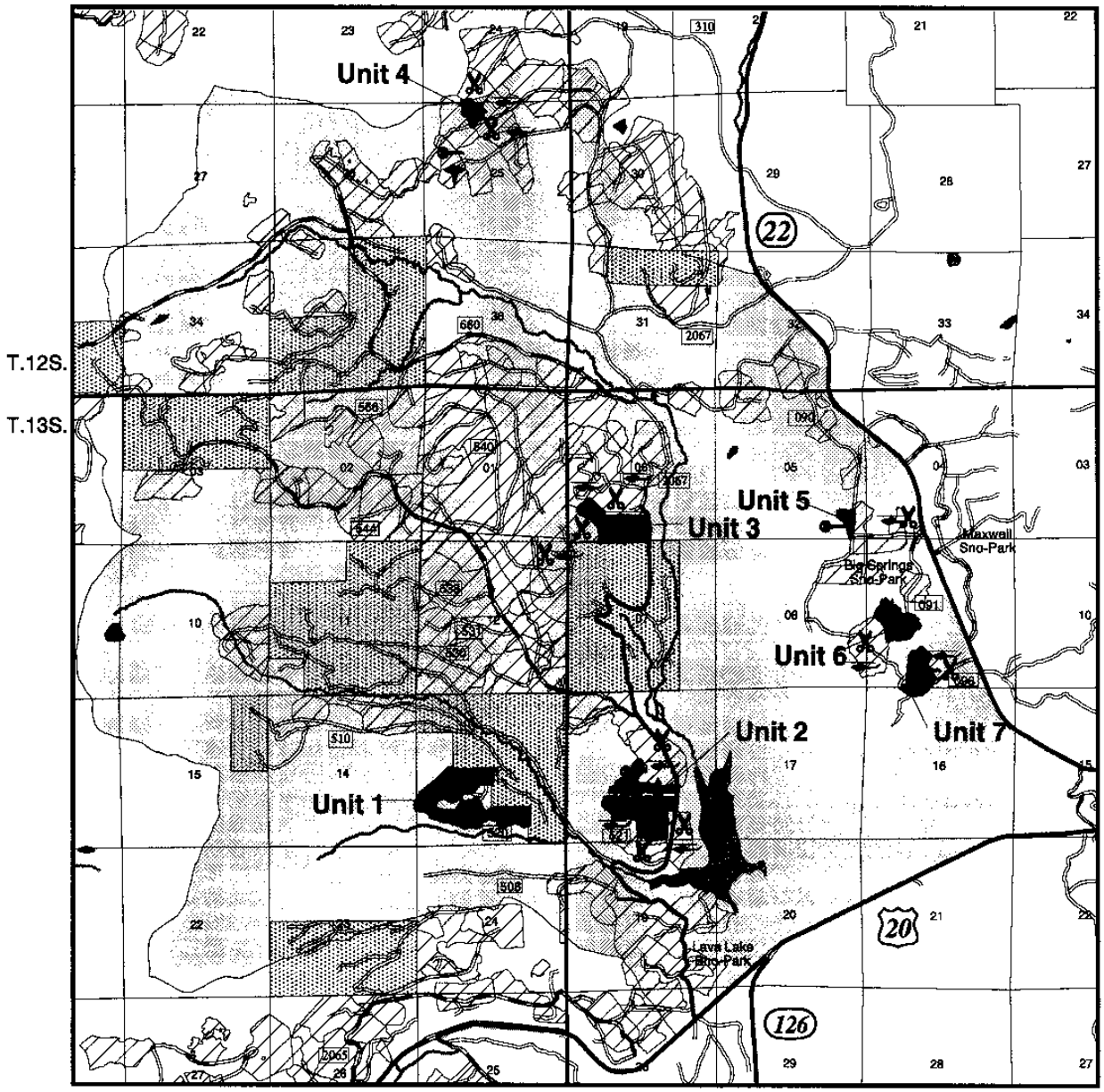
Weed Control, Snag Creation, Felling for Down Woody Material, Subsoiling of skid roads used this time, Sensitive Species Monitoring, Native Seeding of Skid Roads, Landings and Reconstruction.

Third priority projects are opportunities and will be ranked as follows:

(1) Sub-soiling skid roads from past yarding operations
(2) Road Berms
(3) Dispersed Recreation Site Enhancement
(4) Riparian Planting
(5) Firewood
(6) Precommercial Thinning in Units
(7) Fertilization of Units
(8) Mineral Blocks
(9) Precommercial Thinning In Adjacent Managed Stands
(10) Fertilization In Adjacent Managed Stands
(11) Pruning In Adjacent Managed Stands

KV Timber Stand Improvement Map

Parks Overstory Removal



- Private land
- Proposed Units
- Planning Area Boundary
- Existing Managed Stands

- Tree Planting and Exams
- Manual Release
- Precommercial Thinning
- Conifer Pruning
- Aerial Fertilization

N
W E
S

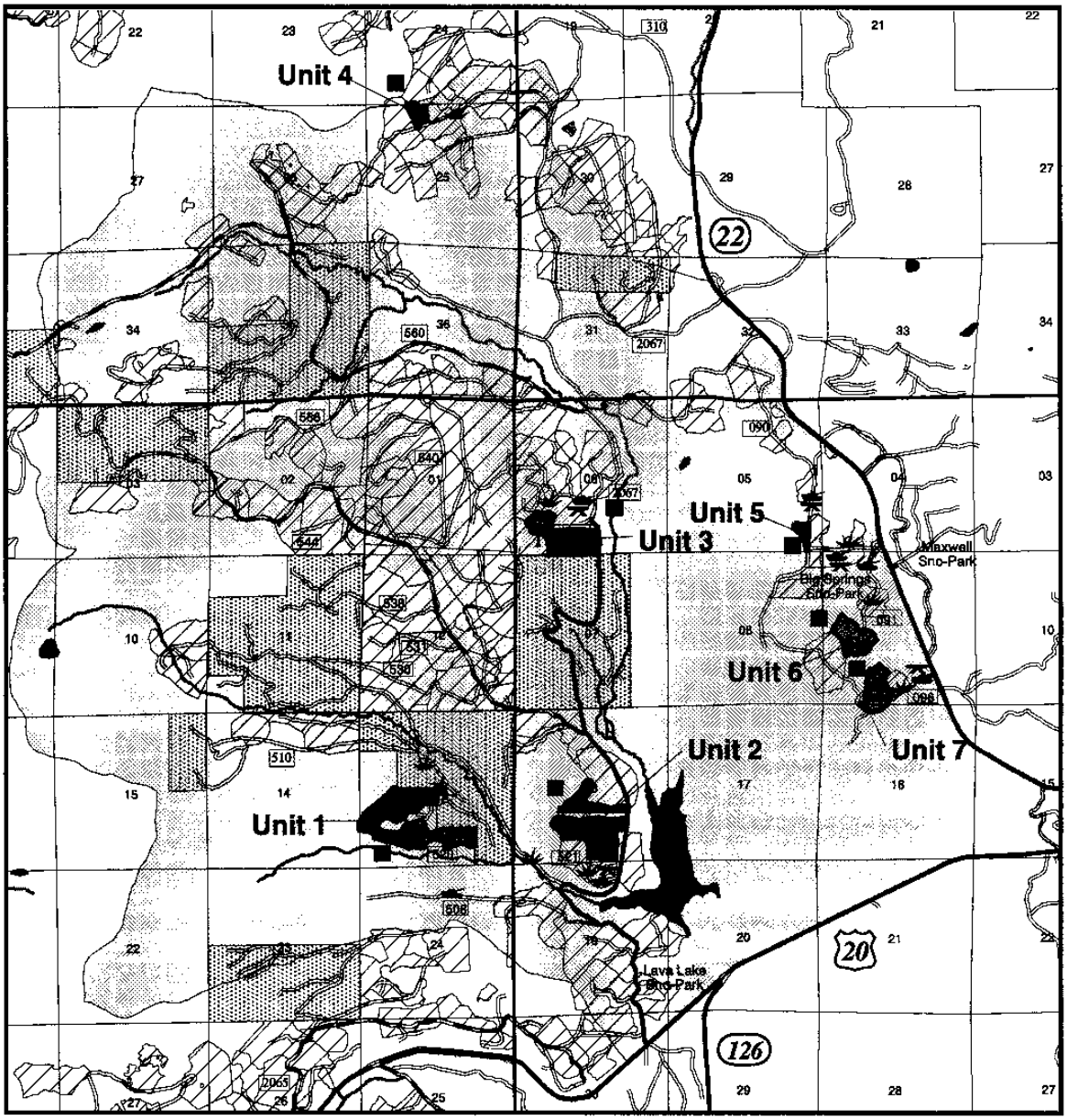
0.5 0 0.5 1 Miles

4/17/2003

KV Other Resources Map

Parks Overstory Removal

Snag Creation, Falling For Down Woody Debris, Subsoiling, Sensitive Species Monitoring, Firewood Administration and Weed Control Projects Are Interior to All Proposed Units



- Private land
- Proposed Units
- Planning Area Boundary
- Existing Managed Stands

- Close Roads With Berm
- Gate Maintenance
- Mineral Blocks
- Native Species Planting
- Rehablitate Dispersed Site
- Riparian Planting

N W E S

0.5 0 0.5 1 Miles

4/17/2002
KDL

Appendix C: Monitoring

Monitor Oregon Slender Salamanders

Oregon slender salamanders were located in Units 1, 2, 3, and 7. These locations will be monitored after completion of the sale to determine effectiveness of the no-harvest buffers. The questions that will be monitored are:

- Are the microhabitat components (litter, coarse woody debris, live and dead vegetation) still apparent?
- Have microhabitat components been disturbed?
- Can conditions be improved by additional down wood creation or precommercial thinning the understory?

Non-destructive sampling techniques will be used to determine if the salamanders continue to use the known sites. Additional sampling will be completed outside these sites where timber harvest occurred to determine if they persist after timber harvest.

Appendix D: Biological Evaluation

Parks Overstory Removal Timber Sale

Sweet Home Ranger District, Willamette National Forest

Fish and Wildlife Biological Evaluation

Prepared By: **/s/ Todd Buchholtz** **July 30, 2002**
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BIOLOGICAL EVALUATION

INTRODUCTION

Proposed management activities addressed in Parks Overstory Removal Timber Sale Environmental Assessment 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 Oregon chub, Canada lynx, Northern spotted owl, Northern bald eagle, Upper Willamette River Chinook, Upper Willamette River steelhead, and Columbia River bull trout. The Oregon chub is endangered and the remaining six species are threatened (USDA Forest Service, Pacific Northwest Region, 8/17/2000). The Parks Overstory Removal planning area contains designated critical habitat for Northern spotted owls.

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, and Cascade torrent salamander.

ALTERNATIVES

Table 1 identifies possible units for timber harvest. The canopy closure and trees per acre are averaged for each unit. There are pockets where the canopy closure or trees per acre are higher or lower. Each of the units had some type of timber harvest approximately 20 years ago where the overstory was thinned out and most of the snags and down wood were removed. The resulting canopy closure varied from 0 – 60%. Since then, the understory has developed and some of the remaining trees in the overstory have died or blown down. Approximately 6 acres in Unit 3 currently has a canopy closure of around 60% but the remainder of this unit and the remaining units are much less. Each of the units curently average one large snag and 120 linear feet of large down wood per acre.

One no-action (alt. 1) and two action (alt. 2 & 3) alternatives have been identified. Activities that may affect PETS species through disturbance or habitat modification are listed below. All acreage and mileage figures are estimates.

1) Timber harvest with associated activities on 177 acres of shelterwood and 4 acres of prelogged in alternative 2 and 203 acres of shelterwood and 34 acres of prelogged in alternative 3.

2) Precommercial thinning or release on 298 acres in alternative 2 and 329 acres in alternative 3.

3) Aerial fertilization on 309 acres in alternative 2 and 562 acres in alternative 3.

4) Snag creation on 362 trees in alternative 2 and 474 trees in alternative 3.

5) Tree falling to create down wood on 181 trees in alternative 2 and 237 trees in alternative 3.

6) Road maintenance/reconstruction on 10 miles in alternatives 2 and 3.

7) Road berms constructed to close 14 roads in alternatives 2 and 3.

8) Road gate installed to close one road in alternatives 2 and 3.

The year of the initial harvest and the existing silvicultural condition for the proposed units are summarized in the following table.

Table 1: Parks Overstory Removal Proposed Units-Existing Condition

Unit	Acres	Existing Silvicultural Prescription	Legal Location	*Existing Overstory –TPA, Age, CC, DBH	*Existing Understory – TPA, Height
1	90	Shelterwood in 1989	T.13S., R.6E., S.13	20 TPA, 155 yr, 25%, 26″	1000 TPA, 4′ Planted 1990
2	71	Shelterwood in 1981 & 1989	T.13S., R.7E., S.18	15 TPA, 250 yr, 20%, 36″	500 TPA, 20′ Planted 1990
3	45	Prelogged in 1977	T.13S., R.7E., S.6	30 TPA, 250 yr, 40%, 32″	100 TPA, 3′
4	9	Prelogged in 1979	T.12S., R.6E., S.25	25 TPA, 250 yr, 35%, 36″	700 TPA, 2′
5	6	Shelterwood in 1988	T.13S., R.7E., S.5	13 TPA, 250 yr, 20%, 36″	350 TPA, 5′ Planted 1989
6	29	Shelterwood in 1989	T.13S., R.7E., S.9	11 TPA, 200 yr, 15%, 40″	300 TPA, 8′ Planted 1989
7	25	Shelterwood in 1988	T.13S., R.7E., S.9	11 TPA, 250 yr, 15%, 40″	450 TPA, 7′ Planted 1989
Total	**275**				

**The numbers are estimated averages for the units.*
TPA = Trees Per Acre, CC = % Canopy Closure, DBH = Diameter Breast Height

Table 2 identifes each of the PETS species and the affect this projest will have on them. Only those species that may be disturbed or habitat affected are discussed in greater detail.

There is no habitat for wildlife species 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,

There is no habitat or essential habitat for fish species Upper Willamette River Chinook, Upper Willamette River steelhead, Columbia River bull trout, and Oregon chub.

Table 2: 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-LAA
Bald Eagle	HNP			
Peregrine Falcon	HP	Surveyed	Potential	No Impact
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			
Fish				
Oregon Chub	HNP			
Upper Willamette River Chinook	HNP			
Upper Willamette River Steelhead	HNP			
Columbia River Bull Trout	HNP			

HP = Habitat present
HNP = Habitat not present
*MA-LAA = **M**ay Effect, **L**ikely to **A**dversely **A**ffect*
*MA-NLAA = **M**ay Effect, **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 that is known to occur within the Parks Overstory Removal planning area. A critical habitat unit

(CHU) and an area of concern (AOC) for this species has been identified within the 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 sufficient snags and down wood, and canopy closure generally exceeding 60%. Forested stands containing trees with an average of >18" diameter, >60% canopy, and some level of dead and down woody material may be considered foraging habitat but not nesting habitat.

Dispersal habitat 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. Dispersal habitat is used by spotted owls to navigate between stands of suitable habitat and by juveniles to disperse from natal cores.

Habitat previously removed through timber harvest and road building on both private and public lands has fragmented the remaining owl habitat within the planning area. The edge effect from openings on the remaining habitat has created favorable habitat conditions for great horned owls, a predator of spotted owls, and barred owls, which compete with spotted owls for breeding territories.

The current habitat conditions within the proposed units are listed in Table 3.

Table 3: Existing Habitat Condition

Unit	*Acres of NRF Habitat	**Acres of Dispersal Habitat	***Acres of Non-dispersal Habitat	Total Unit Acres
1	0	0	90	90
2	0	26	45	71
3	6	10	29	45
4	0	5	4	9
5	0	0	6	6
6	0	0	29	29
7	0	0	25	25
Total	**6**	**41**	**228**	**275**

**NRF = nesting, roosting, foraging habitat. **Habitat currently with canopy closure of 40 – 60%. ***Habitat currently with canopy closure of less than 40%.*

Direct/Indirect Effects

Alternative 1

Under this alternative there would be no habitat loss or disturbance in the home ranges of the six owl pairs (Table 4). Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure within the dispersal and non-dispersal habitat will likely decline over time from exposure and wind throw until the understory develops further. As these stands develop into suitable owl habitat, the large trees retained after the initial harvest entry will provide the large tree, snag, and down wood components of owl habitat.

There will be no degradation or removal of suitable or dispersal habitat within the CHU or AOC. Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure in the overstory trees will not increase but will likely decline over time from exposure and wind throw. The understory will eventually grow into dispersal habitat over time, possibly as much as 50 years. Some type of natural thinning of the understory would have to occur. A dense understory of trees competing for light and water is not a stable situation. Some of the stressed understory trees would die from competition, insects, snow breakage, fire, or overstory trees blowing down killing some of the understory. This will allow the remaining trees to grow quicker.

Alternative 2

This alternative will remove the non-dispersal habitat. All suitable and dispersal habitat will remain. Habitat currently functioning as suitable or dispersal habitat will continue to do so. Canopy closure within the dispersal habitat will likely decline over time from exposure and wind throw until the understory develops further. Harvesting the non-dispersal habitat may also increase potential for blowdown in the remaining habitat. As the dispersal habitat develops into suitable owl habitat, large trees retained after the initial harvest entry will provide the large tree, snag, and down wood components of owl habitat. The amount of suitable habitat within the home range of each owl pair will not change.

Disturbance from the logging operation will likely occur to owl pairs 0664, 0667, 2965, and 4396. Logging activity, including log haul, will be scheduled outside the critical nesting season (March 1 through July 15) but could occur during the remainder of the nesting season resulting in a **may affect, not likely to adversely** affect determination. Consultation with the U. S. Fish and Wildlife Service will be required.

There will be no degradation or removal of suitable or dispersal habitat within the CHU. Only stands with less than 40 percent canopy closure will be removed. There will be **no effect** on critical habitat**.** Precommercial thinning and aerial fertilization will help to develop the understory into dispersal habitat after this project is complete.

In the AOC, this alternative will remove only those stands that currently have less than 40% canopy closure and do not provide spotted owl dispersal habitat. The understory will be thinned following removal of the overstory. The treated acres should become spotted owl dispersal habitat in 30 – 40 years. This alternative will create additional dispersal habitat within the units much sooner than would occur naturally. A total of 96 acres will be treated.

Alternative 3
This alternative will remove both dispersal and non-dispersal habitat. The six acres of nesting, roosting, and foraging (suitable) habitat in Unit 3 will remain as the Green Tree Retention (GTR) area for this unit. There will be approximately 31 acres of dispersal habitat removed in Units 2 and 4 (see Tables 3 and 4). Units 2 and 4 are located on the outside edges of the home ranges of owls 2445 and 4099 and so removal of this dispersal habitat should have little impact. However, harvesting the dispersal habitat will increase the size of the non-dispersal openings and force spotted owls to go around these units rather than through. These two units have managed stands adjacent that can function as dispersal habitat. The managed stand next to Unit 4 will be fertilized with funds generated from this sale to increase tree growth and the quality of the dispersal habitat. Unit 3 is located close to the core of owl 2965 but does not connect to any additional owl habitat within the home radius. By not harvesting the dispersal habitat in Unit 3 the six-acre block of suitable habitat will not be isolated. The west side of the home radius for this owl is largely non-suitable habitat. The amount of suitable habitat within the home range of each owl pair will not change.

Disturbance to owl pairs 0664, 0667, 2965, and 4396 will likely occur. Logging activity, including log haul, will be scheduled outside the critical nesting season (March 1 through July 15) but could occur during the remainder of the nesting season resulting in a **may affect, not likely to adversely affect** determination. Consultation with the U. S. Fish and Wildlife Service will be required.

In the CHU, this alternative will remove all stands within the units that have less than 40 percent canopy closure plus approximately 31 acres of dispersal habitat in Units 2 and 4. This CHU contains 30,610 acres that could provide dispersal habitat but currently only 20,847 does, including the 31 acres within Units 2 and 4. The remaining 9,763 acres are younger stands that currently have an average tree diameter of less than 11 inch DBH. This project will remove approximately ¼ of 1% of the current dispersal habitat within the CHU. It is estimated this reduction of 31 acres of dispersal habitat is easily replaced annually within the 9,763 acres of young managed stands growing into dispersal habitat. Precommercial thinning and aerial fertilization will help to develop the understory into dispersal habitat after this project is complete.

Removal of dispersal habitat within the CHU will have a negative effect on critical habitat resulting in a **may affect likely to adversely affect** determination. Consultation with the U. S. Fish and Wildlife Service will be required. This project is included within the FY2002/2003 Terrestrial Biological Assessment (BA) addressing habitat modifications for the Northern spotted owl in Critical Habitat Units (CHU).

In the AOC, this alternative will remove 26 acres of dispersal habitat in Unit 2. The overstory on an additional 110 acres of non-dispersal habitat will also be removed in Units 2, 3, 5, 6, and 7. A total of 147 acres of understory will be thinned following removal of the overstory.

Removing the 26 acres of dispersal habitat will reduce the amount of dispersal habitat within the ¼ Township from 66 percent to 65 percent, well above the minimum 50 percent required to meet

the 50-11-40 rule. The 147 acres treated should become spotted owl dispersal habitat in 30 – 40 years.

Table 4: Owls Affected By Habitat Loss Or Disturbance.

Owl Pair	Ac. Of Dispersal Habitat Removed			Acres of Suitable Habitat w/in 1.2 miles	Units w/in 1.2 miles	Units w/in 0.7 miles	Units w/in 0.5 miles
	Alt 1	Alt 2	Alt 3				
0664	0	0	0	1863	*	none	none
0667	0	0	0	1545	*	none	none
2445	0	0	26	1426	1, 2	none	none
2965	0	0	0	1285	3, 5	3	3
4099	0	0	5	1975	4	none	none
4396	0	0	0	1294	1	1	1

**Possible disturbance due to log haul past owl nests.*

Cumulative Effects

Cumulative effects result from the incremental impacts of past, present, and foreseeable future actions that remove spotted owl habitat. The Parks Overstory Removal planning area has a long history of habitat removal through timber harvest and road building on both private and public lands. These actions have not only removed suitable spotted owl habitat but have also reduced the effectiveness of the remaining habitat by decreasing the size of the remaining stands and increasing the edge effect on interior forest habitat. This has allowed spotted owl predators and competitors to increase.

The only additional project planned in the foreseeable future on public land that may affect habitat for these owls is a bridge replacement on Detroit Ranger District. The only additional project planned in the future that could affect dispersal habitat in CHU OR-15 is the South Pyramid timber sale located on the Sweet Home Ranger District and the bridge replacement on Detroit Ranger District. The private land has all been harvested in the past 30 - 40 years

PEREGRINE FALCON

The Peregrine falcon (*Falcon peregrinus anatum)* is a Region 6 Sensitive Species.

Existing Condition

The Peregrine falcon require nest sites of sheer cliffs usually exceeding 75 feet in height overlooking fairly open areas with sufficient avian prey.

The Peregrine falcon is known to occur on the Sweet Home Ranger District and possibly in the Parks Overstory Removal planning area.

Marginal nest sites are available within approximately two miles of Unit 4. Foraging habitat within the planning area is considered to be good due to the diversity of habitats available from past timber harvest.

Direct/Indirect/Cumulative Effects
Potential nest sites were surveyed to protocol in 1998, 2000, and 2002. Peregrine falcons were not detected.

This project will not affect potential nest sites and will improve diversity of habitats over time. For the Peregrine falcon and it's habitat, a **no impact** determination for all alternatives was made.

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 1997). They often utilize down wood or ground litter in riparian and uplands. They feed on a variety of invertebrate species.

It is thought to occur on the Sweet Home Ranger District and possibly in the Parks Overstory Removal planning area but have never been located.

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 it's 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 alternatives 2 and 3. 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 to occur on the Sweet Home Ranger District and possibly in the Parks Overstory Removal planning area but has never been located.

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 it's 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 alternatives 2 and 3. 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 will be retained and additional created.

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 it's 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 alternatives 2 and 3. 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 use 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 the adjacent Districts.

Units proposed for timber harvest are likely too open and have too little down wood to be used by fisher. The units proposed for silviculture treatments do provide some marginal habitat, particularly the riparian areas.

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 it's 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 alternatives 2 and 3. 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 bark, and moss in mature and second-growth Douglas-fir forests (Csuti 1997). Bark heaps at the base of snags and down wood appears to be very important.

The Oregon slender salamander was located at 13 different locations in Units 1, 2, 3, and 7. Likely it occurs within other locations in the proposed units as well as units proposed for silvicultural treatments.

Direct Effects
To limit impacts to this species, known locations will be protected with a minimum 75 foot no-harvest buffer. No disturbance after logging is completed should occur with the exception of snag and down wood creation and precommercial thinning. Individuals in undetected locations 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 it's 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 alternatives 2 and 3. 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 1997). They are dependent on nearly continuous access to cold water and can be found moving about in forests during wet weather.

It is thought to occur on the Sweet Home Ranger District and possibly in the Parks Overstory Removal planning area, however no sightings have been recorded.

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 it's 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 alternatives 2 and 3. This impact should be of short duration.

Appendix 1: References for Parks Overstory Removal Timber Sale Biological Evaluation. These were used to provide information summarized in Table 2 and were used to determine potential impacts/effects of proposed projects.

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File Code: 2670 **Date:** 11 July 2002
Route To:

Subject: Botanical Biological Evaluation for Parks Overstory Removal Timber Sale

To: Suzanne Schindler/Project Files

Alice Smith, Botanist /s/ Alice Smith Date July 11, 2002

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 will remove the overstory on approximately 200 acres in the Parks Subwatershed on the Sweet Home Ranger District, Willamette National Forest. Units proposed for treatment are located in T. 13S., R. 6 E., Sec 13, T. 13S., R. 7E., Sec 5, 6, 9, and 18, and T. 12S., R. 6E., Sec 25.

The no-action and two action alternatives have been identified. Alternative 2 will result in the harvest of approximately 181 acres of shelterwood and prelogged stands in six units. Alternative 3 will result in the harvest of approximately 237 acres of shelterwood and prelogged stands in seven units.

Risk Assessment Process

The Biological Evaluation is a 6-step process to evaluate possible effects to Threatened, Endangered, and Sensitive (TES) species. The six 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 TES species.

4. Analysis of the significance of the project's effects on local and entire populations of TES species.
5. If step 4 cannot be completed due to lack of information, a biological investigation is required.
6. Conferencing or informal/formal consultation with FWS is initiated at appropriate stage as outlined in FSM 2673.2--1, or is otherwise arranged through formal channels.

Evaluation of effects for each species may be complete at the end of step #1 or may extend through step #6.

Table 1 displays the stepped process used for TES species and which steps were necessary to complete the impact evaluation for each species considered. Steps 5 and 6 are not included in the table but are discussed in the species narratives when applicable. Attachment 2 lists the field reconnaissance survey levels in relation to potential of a TES species occurring within the project area. Attachment 3 explains the risk assessment process.

Table 1: Summary of BE Process for Sensitive Plant Species in Parks Overstory T.S.

Species	Step#1 Prefield Review	Step#2 Field Recon.	Step#3 Risk Assessment	Step#4 Analysis of Significance
Agoseris elata	habitat present	level B	no conflict	no impact
Arabis hastatula	habitat not present			
Arnica viscosa	habitat not present			
Asplenium septentrionale	habitat not present			
Aster gormanii	habitat not present			
Aster vialis	habitat not present			
Botrychium minganense	habitat present	level B	no conflict	no impact
Botrychium montanum	habitat present	level B	no conflict	no impact
Botrychium pumicola	habitat not present			
Calamagrostis breweri	habitat not present			
Carex livida	habitat not present			
Carex scirpoidea var. *stenochlaena*	habitat not present			
Castilleja rupicola	habitat not present			
Cimicifuga elata	habitat not present			
Coptis trifolia	habitat not present			
Corydalis aqua-gelidae	habitat not present			
Frasera umpquaensis	habitat not present			
Gentiana newberryi	habitat not present			
Iliamna latibracteata	habitat present	level B	no conflict	no impact
Lewisia columbiana var. *columbiana*	habitat not present			
Lycopodiella inundata	habitat not present			
Montia howellii	habitat not present			

Ophioglossum pusillum	habitat not present			
Pellaea andromedaefolia	habitat not present			
Polystichum californicum	habitat not present			
Potentilla villosa	habitat not present			
Romanzoffia thompsonii	habitat not present			
Scheuchzeria palustris var. *americana*	habitat not present			
Sisyrinchium sarmentosum	habitat present	level B	no conflict	no impact
Utricularia minor	habitat not present			
Wolffia borealis	habitat not present			
Wolffia columbiana	habitat not present			

DISCUSSION

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

Tall Agoseris (*Agoseris elata*)
Status: 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 for tall agoseris was found in the planning area.

C. Field Reconnaissance
A high intensity level B survey was completed in the summer of 2000.

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

Gray Moonwort (*Botrychium minganense*)
Status: R-6 Sensitive

A. Range and Habitat
The gray moonwort is a North American species; its distribution is patchy, being found in Canada, from the Great Lakes to Colorado and from California north to Oregon. This plant is found on Mt. Hood NF and the Sweet Home RD of Willamette NF. Its habitat is moist, flat, often western redcedar-dominated forests at middle elevations. It can be found from June though August.

B. Pre-field Review
Suitable habitat does exist within the Parks Overstory Removal planning area.

C. Field Reconnaissance
A level B survey was completed. Surveys were conducted in the summer of 2000.

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

Mountain Moonwort (*Botrychium montanum*)
Status: R-6 Sensitive

A. Range and Habitat
The mountain moonwort is a western North American species, found in British Columbia, Washington, Oregon and Montana. In western Oregon it has been found on the Mt. Hood NF and the Sweet Home RD of the Willamette NF. It has been found in moist flats dominated by western red-cedar at middle elevations. It has also been found beneath incense cedar on dry slopes. The mountain moonwort can be found from June though August.

B. Pre-field Review
Suitable habitat does exist within the Parks Overstory planning area.

C. Field Reconnaissance
A level B survey was completed. Surveys were conducted in the summer of 2000.

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

California globe mallow (***Iliamna latibracteata)***
Status: 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 Parks Overstory planning area.

C. Field Reconnaissance
A level B survey was completed. Surveys were conducted in the summer of 2000.

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; 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 Parks Overstory planning area.

C. Field Reconnaissance
A level B survey was completed. Surveys were conducted in the summer of 2000.

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 1999).** 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			RO
Arnica viscosa	S	2			RS
Asplenium septentrionale	S	2			RO
Aster gormanii	D	1			RS
Aster vialis	S	1	LT	SofC	CF
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			RZ,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 catagorized 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 forested 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: **Risk Determination**

Risk Assessment

Consequence of Adverse Effect From a Particular Activity

Low: None or questionable adverse effect on habitat or population. No cumulative effects expected.

Moderate: Possible adverse effects in habitat or on population. Cumulative effects possible.

High: Obvious adverse effects on habitat or population. Cumulative effects probable.

Likelihood of Adverse Effect From a Particular Activity

None: Activity will not affect habitat or population (no further assessment needed).

Low: Activity controllable by seasonal or spatial restrictions and not likely to affect habitat or populations.

Moderate: Activity not completely controllable or intense administration of project needed to prevent adverse effects on habitat or population. Adverse effects may occur.

High: Activity not controllable and adverse effects on habitat or populations likely to occur.

Risk Index

Step 1: Identify level of consequences and likelihood of adverse effects and apply values.

None	= 0
Low	= 1
Moderate	= 5
High	= 10

Step 2: Multiply level of consequences times likelihood.

Step 3: Use the resulting value to determine the following:

Value	Action
0	Proceed with project.
1-10(1)	Proceed as planned. Informal consultation.
25(2)	Modify project if feasible to reduce risk. Formal consultation if risk not reduced.
50-100	Project must be modified, cancelled, or have further analysis done. Formal consultation if project proceeds.

(1) All references to formal consultation apply only when federally listed species are involved.
(2) Subsequent activities in the assessment with index of 25 or more must be modified if previous effects have not been mitigated.

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Appendix E: Aquatic Conservation Strategy Objectives

8/2/02

ACSO 1. *Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

There is currently a diversity of complex watershed and landscape features in the area, ranging from Parks Creek, Lava Lake, smaller wetlands, creeks and ponds to barely discernable intermittent streams. Only Unit 1 is adjacent to a fish-bearing stream and the unit boundary will be outside the Riparian Reserve. The other proposed units are outside or not adjacent to fish-bearing streams. Non fish-bearing streams and wetlands adjacent to harvest units will have one site class tree height, no-harvest riparian reserve. Alternative 3 will remove most of the remaining overstory on 237 acres in the matrix land allocation and outside of full riparian reserves. Harvesting outside of riparian reserves is not expected to diminish watershed and landscape scale features. The entire project will involve only 1 percent (237/18,030) of the Parks Subwatershed and an even smaller percentage of the 230,000 acres of the Upper McKenzie Watershed Analysis area. Alternatives 2 proposes fewer acres for overstory removal and along with the "No-Action" Alternative 1 will have no affect on watershed or landscape scale features.

The Upper McKenzie Watershed Analysis (1995) recommends various management techniques or procedures to accomplish landscape level conditions. Pertinent recommendations include:

- "*Use management techniques to encourage early-seral stands to develop mid-seral stands attributes.*" (Chap.5, p.4) and,
- *"Landscape patterns should reflect a mosaic of large and small patches (Chap.5, p.10)."*

The proposed project was developed with those recommendations in mind. Removal of the overstory will allow the understory to develop, thus, encouraging early-seral stands to develop mid-seral stand attributes.

ACSO 2. *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Spatial and temporal connectivity within and between watersheds will be maintained through the implementation of riparian reserves. Two streams and a wetland have been identified and will have no-harvest riparian reserve buffers. Unit 1 will have a 300-foot buffer, Unit 2 will have a 150-foot wetland buffer and Unit 3 will have 150-foot no-harvest buffer on the channel. Under both action alternatives reserves will maintain the existing stand and treatment outside these reserves will allow for accelerated growth of the understory and diversity of habitat. If any additional wet sites are identified during layout they will be buffered.

Untreated acres will buffer live water and will allow for chemically and physically unobstructed routes for life history requirements of aquatic and riparian-dependent species to remain intact. In addition to the riparian reserves there are 8000 acres of no harvest allocations in the subwatershed that will aid in the maintenance of long-term spatial connectivity.

ACSO 3. *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Physical integrity of the aquatic system should be maintained through the utilization of *General Water Quality Best Management Practices* (BMPs, 11/1988, PNR) under all alternatives. Specific BMPs utilized for physical integrity include:

Timber Harvest Unit Design (T-2). Objective: *To prevent downstream water quality degradation by the timely identification of areas with high erosion potential and adjustment of harvest unit design*. Such sensitive soil areas were identified and not included in harvest unit layout. The Timber Sales Officer will halt harvest activities should any un-detected high erosion potential sites be encountered during harvest operations.

Streamside Management Designation (T-7). Objective: *To designate a riparian area or zone along streams and wetlands where prescriptions are made that will minimize potential adverse effects on nearby logging and related land disturbance activities on water quality and beneficial uses*. Riparian reserves are identified and will not be disturbed by harvest operations.

Erosion Control Measures on Skid Trails (T-16). Objective: *To protect water quality by minimizing erosion and sedimentation derived from skid trials.* Timber yarding systems will be ground based and include skidding or shovel yarding. Only existing skid roads will be utilized, and will be subsoiled at the completion of harvest activities. Erosion control measures will be implemented as soon as possible after soils have been disturbed. All ripped and subsoiled areas will be seeded with native seed mix. At the completion of harvest activities, tractor skid roads that are not part of the designated transportation system shall be ripped or subsoiled to return the site to near original productivity. Soil disturbance will be minimized. No ground-based equipment will cross fish and or non-fish bearing streams.

Slope Limitations for Tractor Operations (VM-1). Objective: *To reduce gully and sheet erosion and associated sediment production by limiting tractor use.* The mitigation measures are the same as T-16. Tractor Operation Excluded from Wetlands and Meadows (VM-2). Objective: *To limit turbidity and sediment production resulting form compaction, rutting, runoff concentration, and subsequent erosion.* Culverts along the major road systems will be reviewed, and wherever possible, water will be dispersed instead of concentrated to limit compaction and subsequent runoff and erosion problems.

These practices maintain the physical integrity of the aquatic system through designation of parameters in the prescriptions (e.g. maintenance of root strength, channel bank stability).

No new stream road crossings are planned for this project.

ACSO 4. *Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Water quality parameters for this objective relate to this project's effects on temperature, chemistry and suspended loads. All timber operations are outside of the riparian reserves in both action alternatives and are expected to maintain stream temperatures at their current levels and through time. Canopy closure will be maintained to ensure stream shade.

Biological, physical and chemical integrity of water quality will be maintained through utilization of the BMPs described in ACSO 3. Maintaining trees contributing to bank stability, and buffering live steams during fertilization activities are examples of the recommendations utilized to protect biological, physical and chemical integrity.

ACSO 5. *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

The aquatic ecosystems that occur in and adjacent to the units were influenced by the harvest practices of the past and natural disturbance regimes. A diversity of locations of large wood and large diameter standing trees are the result of prelogging or salvage logging in Unit 3 where only the smaller diameter trees were removed. The riparian reserve for Maude Creek is outside and south of Unit 1 and portions were not harvested as part of the original shelterwood unit. Currently, vegetated slopes are reducing sediment input and reducing the effects of peak flows on the channel bank erosion by reducing snow accumulation typically found on hillsides following clearcutting. Aquatic ecosystems evolved under this scenario will be maintained through the prescriptions designated and are expected to be improved due to the increased growth of the stand understory. Sediment input into the streams will only be episodic and of small magnitude following management activities in Alternatives 2 and 3. No change in sediment delivery is expected under Alternative 1.

The total of ten miles of road reconstruction and use during harvest activities may lead to a negligible, short term, increase in the road and haul related sediment contribution the sediment regime. Improved road drainage features, spot rocking and blading roadbed surfaces to reestablish the road template will mitigate this potential addition to the sediment regime. The relatively gentle low-grade slopes of the Parks area terrain will also moderate sediment erosion potential. Upon completion of harvest activities tractor skid roads will be waterbarred, seeded and or scarified and planted to meet the decommissioning guidelines outlined in the Northwest Forest Plan and Forest Roads Analysis. In addition, there are 15 roads proposed for new closures by creating earthen berms across them and installing one gate.

ACSO 6. *Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

In-stream flows are addressed in the Forest Plan and the Upper McKenzie Watershed Analysis for this area. Documentation with the watershed analysis is limited in its discussion and addresses a wider examination area to the east (Chapter 3, page 84). In-stream flow portions of this question are evaluated through the Willamette National Forest Plan FW-113, FW-111, FW-093, and FW-089. By utilizing these standards and guidelines during project implementation, it is anticipated the in-stream flows will be maintained sufficiently to sustain riparian, aquatic, and wetland habitats, and to retain patterns of sediment, nutrient, and wood routing under all alternatives.

Cumulative effects associated with the proposed management are minor as a result of the way the units were previously designed and the lack of subsequent activity within the smaller watersheds associated to the units. The area is a snow dominated region and is at the upper elevation of the rain on snow events. The Parks subwatershed is a closed basin that drains into Lava Lake. No adverse cumulative effects are anticipated to result from either action alternative. There may be some beneficial long term effect from encouraging healthy development of the understory.

ACSO 7. *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.*

Channel conditions within the project area are stable and the density of channels is low in the subbasin. Most draws have no channel characteristics. Over 95 percent of the numerous wet spots and ponds or wetlands have no surface drainage. Small wetlands in or adjacent to the proposed units will not be affected by the overstory removal due to protective measures (eg. Designated skid trails, directional felling). Typical stream characteristics in the area include low gradient side slopes (average 20%) and low gradient channels (average 5%) draining the runoff from snow melt. No floodplains are found within the project area. The project's effect on downstream floodplains and wetlands is negligible due to its location and the prescriptions proposed.

ACSO 8. *Maintain and restore species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.*

No harvest will be conducted in the Riparian Reserves as part of any timber sales associated with the action alternatives. The reserves will maintain the composition and diversity of the riparian plant communities.

Down wood will be left at a minimum 240 linear feet per acre in the proposed units in addition to 4.5 wildlife trees per acre. Knutson-Vandenberg dollars will also be collected to improve the general riparian condition by planting native coniferous species and restore vegetative composition by implementing weed control measures.

ACSO 9. *Maintain and restore habitat to support well distributed populations of native plant, invertebrate and vertebrate riparian dependent species.*

The BMPs described in ACSO 3, mitigation measures and no timber operations in the riparian reserves should minimize impacts to riparian dependent native plants, invertebrate and vertebrate species. The Parks Subwatershed is a confined basin. Only native cutthroat trout, sculpin species and introduced Eastern brook trout reside in the basin. There is no current, or historic habitat for bull trout, or Endangered Species Act listed spring chinook salmon and winter steelhead in this basin. Only Unit 1 is adjacent to a fish-bearing stream and is being protected with a 300'riparian reserve.

Native plant riparian-dependent species within the reserves will be maintained in its existing condition and may only be affected by natural disturbance. Affects to plants beyond the reserves are expected to be minimal. The interiors of the stands are open and exposed to more light, wind, and temperature extremes than would be found in undisturbed forest stands. Many of the understory species are indicative of early seral conditions and some of the species that have persisted since the initial harvest have sun-scalded leaves or have developed greater leaf pigmentation.

Epiphytic lichens and mosses will benefit both from green tree retention, as well as the larger trees that will result from the growth and release of the understory. Species requiring down wood, including fungi, lichens, mosses, and a variety of animals will be provided habitat by maintaining existing down wood and creation of new down wood.

Roads can be barriers to movement for some terrestrial species such as salamanders, and mollusks. The total of ten miles of road reconstruction and use during harvest activities may have short-term adverse affects to the migration behavior of these species. These affects will end upon completion of harvest activities and closure and rehabilitation of the roads in question.