D R A F T

Environmental Assessment

SDS Company LLC and Broughton Lumber Company
Northern Spotted Owl Safe Harbor Agreement

U.S. Fish and Wildlife Service

August 2012

D R A F T

Environmental Assessment
SDS Company LLC and Broughton Lumber Company Northern Spotted Owl Safe Harbor Agreement

Prepared for:

US Fish and Wildlife Service
510 Desmond Drive SE
Lacy, WA 98501

Prepared by:
ENVIRON International Corporation
Olympia, WA 98501

Date:
August 2012

Project Number:
30-28868A

ENVIRON

Contents

		Page
1	**Introduction**	**1**
1.1	Purpose and Need for Action	1
1.2	Regulatory and Planning Environment	3
1.2.1	Endangered Species Act	3
1.2.2	Migratory Bird Treaty Act	3
1.2.3	National Environmental Policy Act	4
1.2.4	State Environmental Policy Act	4
1.2.5	Washington Forest Practices Rules	4
1.2.6	Oregon Forest Practices Rules	4
1.2.7	Washington Forest Practices Habitat Conservation Plan	5
2	**Alternatives**	**6**
2.1	No Action Alternative	6
2.1.1	Timber Harvest Implementation for Spotted Owls Under Washington Forest Practices	10
2.1.2	Timber Harvest Implementation for Spotted Owls Under Oregon Forest Practices	11
2.2	Proposed Action Alternative	13
3	**Affected Environment**	**15**
3.1	Vegetation	18
3.2	Wildlife	20
3.2.1	Threatened and Endangered Wildlife	20
3.2.2	Other Special Status Wildlife	23
3.3	Land Use	27
3.4	Socioeconomics	28
3.5	Climate Change	30
4	**Environmental Consequences**	**31**
4.1	Vegetation	31
4.1.1	No Action Alternative	31
4.1.2	Proposed Action Alternative	32
4.2	Wildlife	33
4.2.1	No Action Alternative	33
4.2.2	Proposed Action Alternative	36
4.3	Land Use	59
4.3.1	No Action Alternative	59
4.3.2	Proposed Action Alternative	60
4.4	Socioeconomics	60
4.4.1	No Action Alternative	60
4.4.2	Proposed Action Alternative	61
4.5	Climate Change	61
4.5.1	No Action Alternative	61
4.5.2	Proposed Action Alternative	62
4.6	Cumulative Impacts	62

5 List of Agencies and Organizations Contacted 64

6 List of Preparers 65

7 References 66

List of Tables

Table 2-1: Non-habitat and Spotted Owl Habitat by Type on the Covered Lands
Table 2-2: Landowner Ownership by Percentage Within Spotted Owl Circles in the SOSEA's
Table 3-1: Income and Employment by County for Four-County Area
Table 4-1: Comparison of Environmental Impacts to Spotted Owls Between Alternatives
Table 4-2: Special-Status Wildlife Species Potentially Occurring in the Covered Area Affected by the Proposed Action Alternative

List of Figures

Figure 1-1: Applicant's Land and Adjacent Ownerships
Figure 3-1: Covered Lands Greater and Less Than 40 Years of Age
Figure 3-2: Covered Lands Greater and Less Than 60 Years of Age

List of Appendices

Appendix A: Special-Status Plant Species Potentially Occurring in the Covered Area
Appendix B: Special-Status Animal Species Potentially Occurring in the Covered Area

Acronyms and Terms

Applicants	SDS Lumber Company LLC and Broughton Lumber Company
APE	Area of Potential Effect
Baseline	Includes all commercial forestland that the Applicants could harvest in Washington and Oregon under State Forest Practices Rules.
BLC	Broughton Land Company
BMP	Best Management Practice
BP	Before Present
CFR	Code of Federal Regulations
Circles	Northern Spotted Owl Management Circles
DAHP	Washington Department of Archaeology and Historic Preservation
dbh	Diameter At Breast Height
EA	Environmental Assessment
Ecology	Washington Department of Ecology
Elevated Baseline	Agreed upon baseline as a result of the SHA.
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
Forest Practice Rules	Washington Forest Practices Rules
FR	Federal Register
GIS	Geographic Information System
HCP	Habitat Conservation Plan
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
ODFW	Oregon Department of Fish and Wildlife
Permit	Enhancement of Survival Permit
RCW	Revised Code of Washington
RD	Relative Density
RMZ	Riparian Management Zone
SDS	SDS Lumber Company LLC
SEPA	State Environmental Policy Act

SHA	Safe Harbor Agreement
SMA	Special Management Area
SOSEA	Spotted Owl Special Emphasis Area
spotted owl	Northern Spotted Owl
SSA	Special Set-Aside Area
State	State of Washington
tpa	Trees Per Acre
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WMZ	Wetland Management Zone
WRIA	Water Resource Inventory Area

1 Introduction

This chapter describes the purpose and need for the Proposed Action and the regulatory environment in which the action would occur.

1.1 Purpose and Need for Action

In July 2012, the SDS Co. LLC and its registered business name Stevenson Land Company (together SDS) and Broughton Lumber Company (BLC), herein referred to as the Applicants, submitted an application to the United States Fish and Wildlife Service (USFWS) for an Enhancement of Survival Permit (Permit) under Section 10(a)(1)(A) of the Endangered Species Act (ESA) (16 U.S.C. 1553 et seq.). In accordance with applicable agency regulations, the Applicants also submitted a Safe Harbor Agreement (SHA) describing conservation measures that the Applicants propose to implement to provide net conservation benefits to the northern spotted owl (*Strix occidentalis caurina*) (spotted owl).

The proposed issuance of a Permit by the USFWS is a federal action that may affect the human environment and therefore is subject to review under the National Environmental Policy Act (NEPA). Accordingly, a Draft SHA (ENVIRON 2012) and this Draft Environmental Assessment (EA) (USFWS 2012) are being made available for a 30-day public-review period.

The USFWS' purpose for this action is to conserve the spotted owl and to determine if the Proposed Action is consistent with the net conservation benefit standard required for issuance of the Permit. The need for the Proposed Action is that the USFWS must respond to the Applicants' application for the Permit.

SDS and BLC own private timberlands in Skamania, Klickitat, and Yakima Counties in Washington, and Hood River and Wasco Counties in Oregon. BLC's approximately 12,400 acres and SDS' approximately 69,200 acres are within a 35-mile radius of the SDS Lumber Company's mills located in Bingen, Washington (Figure 1-1).

SDS and BLC are interested in long-term regulatory certainty for the management of their forestlands. They believe that the current regulatory environment in Washington and Oregon does not provide certainty with respect to providing spotted owl habitat on their lands. Without the regulatory assurances available through a SHA, SDS and BLC are induced to focus on eliminating spotted owl habitat on their lands, resulting in harvest of forests over the age of 45 years, over the next 15 years. SDS and BLC would like to enter into a SHA with the USFWS with voluntary conservation measures that are expected to provide a net conservation benefit of the spotted owl, provide the Applicants with business certainty for their timber management operations, and supply to local mills.

In exchange for committing to the terms of the SHA, the Applicants would obtain an Enhancement of Survival Permit (Permit) under the ESA that would apply to the covered lands for a period of 60 years after the Permit is issued. The Applicants will implement voluntary conservation measures that are expected to provide net conservation benefits to the spotted owl. This SHA will allow the Applicants to manage their forests with the knowledge that future federal actions under the ESA will not result in additional restrictions to their management activities.

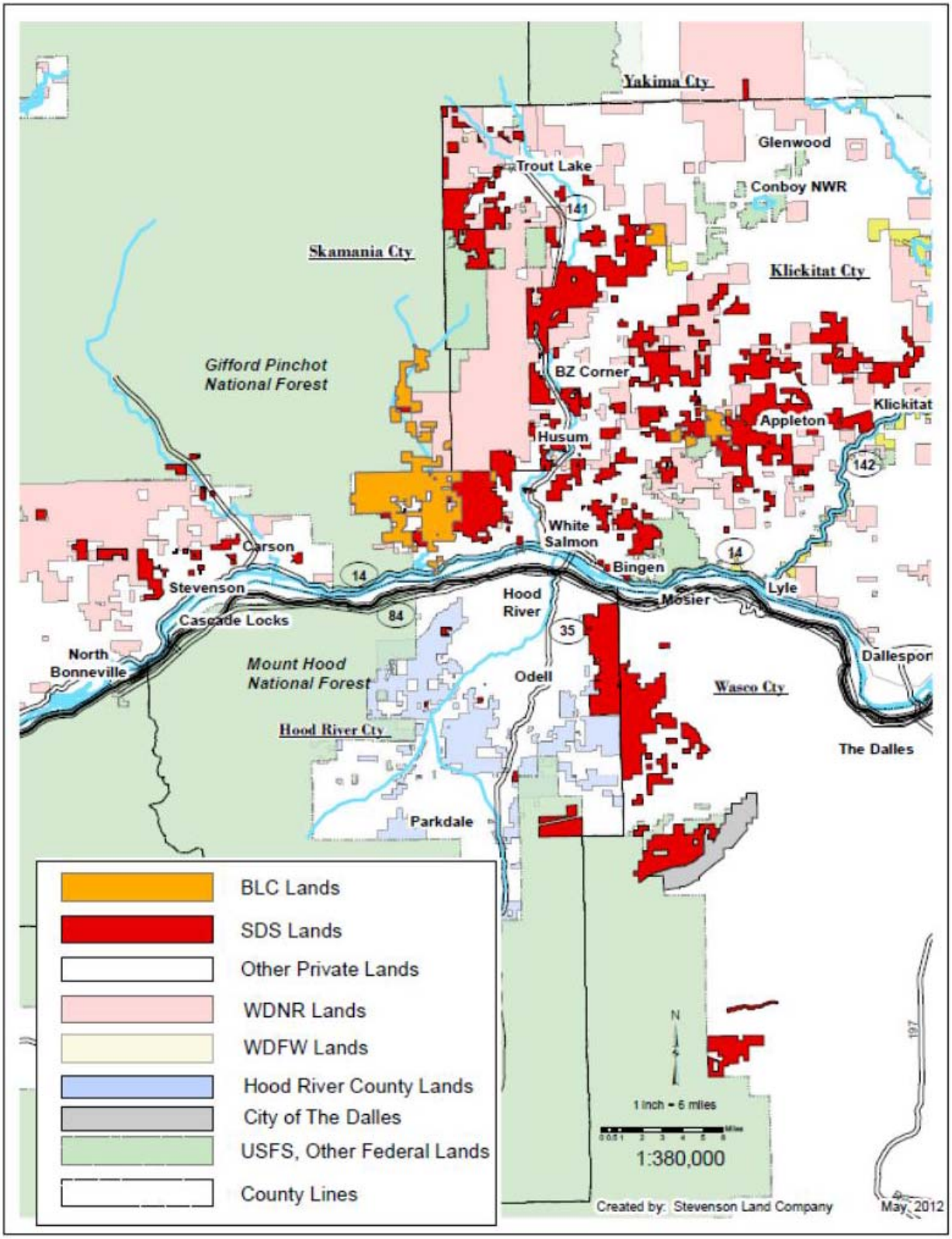

Figure 1-1. Applicant's Land and Adjacent Ownership

The USFWS will prepare a Final EA to evaluate the impacts of the proposed SHA and a No Action Alternative on the natural and human environment. The scope of the analysis in the Draft EA covers the direct, indirect, and cumulative environmental impacts of approving the SHA and issuing the Permit, and the anticipated future impacts of implementing the SHA. The following documents will also be included in the record for this proceeding and will supplement the analyses contained in the Final EA: (1) an ESA Section 7 Biological Opinion concerning Permit issuance; (2) an ESA Section 10 Statement of Findings; and (3) a NEPA analysis decision document, i.e., a Finding of No Significant Impacts.

1.2 Regulatory and Planning Environment

Several Federal and State regulations and/or laws govern the activities proposed under the SHA. A brief summary of relevant regulations is provided below.

1.2.1 Endangered Species Act

The ESA is intended to protect and conserve species listed as endangered or threatened, and to conserve the habitats on which they depend. The ESA also mandates that all Federal agencies seek to conserve endangered and threatened species and use their resources and authorities to further such purposes.

Section 9 of the ESA prohibits the “take” of Federally-listed endangered and threatened species unless authorized under the provisions of Section 7, 10(a), or 4(d) of the ESA. Section 3 of the ESA defines take as “to harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Sections 2, 7, and 10 of the ESA allow USFWS to enter into an agreement embodied in the SHA. Section 2 of the ESA states that encouraging interested parties to develop and maintain conservation programs through Federal financial assistance and a system of incentives is a key to safeguarding the Nation’s heritage in fish, wildlife, and plants. Section 7 of the ESA requires USFWS to review programs that they administer and to use such programs to further the purposes of the ESA.

A SHA under Section 10(a)(1) of the ESA, is a voluntary agreement between the USFWS and a non-Federal landowner whose land management actions provide a net conservation benefit to species listed under the ESA. In exchange for providing voluntary conservation actions for listed species, the landowner is assured that the USFWS will not require additional management activities without their consent. In addition, at the end of the SHA, landowners may return their lands to mutually agreed baseline conditions, i.e., existing Forest Practices Rules.

The Section 10 Permit associated with this SHA would authorize incidental take of the spotted owl that may occur while the Applicants conduct forest management activities. The Permit would authorize incidental take during implementation of the SHA for conducting approved forest management activities and when the Applicants are managing the covered lands to meet the elevated baseline.

1.2.2 Migratory Bird Treaty Act

The spotted owl is protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-711) (MBTA). It is USFWS policy that an ESA Section 10 permit for listed migratory

birds is sufficient to relieve the permittee from liability under the MBTA. For the MBTA, this is accomplished by having the Permit double as a Special Purpose Permit authorized under 50 Code of Federal Regulations (CFR) 21.27.

1.2.3 National Environmental Policy Act

Issuance of an ESA Section 10 permit is a Federal action as defined under the National Environmental Policy Act (NEPA), 42 U.S.C. 4331 *et seq*. and its implementing regulations (40 CFR 1500 *et seq*.). The USFWS expects that most SHAs and associated permits will result in minor or negligible effects on other environmental values or resources, including Federally-listed species and their habitats.

1.2.4 State Environmental Policy Act

The State Environmental Policy Act (SEPA) is intended to ensure that environmental values are considered during State and local agency decision making by providing information to agencies, applicants, and the public that encourages the development of environmentally sound proposals. The environmental review process involves the identification and evaluation of probable environmental impacts, and the development of mitigation measures that will reduce adverse environmental impacts. The environmental information, along with other considerations, is used by agency decision makers to decide whether to approve, approve with conditions, or deny a proposal. However, SEPA review will not be conducted because there will be no State action and a SEPA environmental review is not required for approval of a conservation plan developed to meet the requirements of ESA Section 10.

One of several purposes of this EA is to fully satisfy WAC 222-16-080 (6) (a) that requires an opportunity for public comment on the draft SHA. If the draft SHA is ultimately approved by the USFWS and a permit is issued under the ESA, the Applicant will no longer be subject to class IV special forest practice applications on the covered lands when harvesting spotted owl habitat.

1.2.5 Washington Forest Practices Rules

In 1974, the State Legislature passed the Forest Practices Act. The Forest Practices Act was designed to provide protection to forest soils, fisheries, wildlife, water quality and quantity, air quality, recreation, and scenic beauty. At the same time, the Act was intended to allow the maintenance of a viable forest products industry by regulating forest practices such as timber removal, road construction and maintenance, reforestation, and the use of forest chemicals. The Washington Forest Practices Rules, embodied in WAC Title 222, were first adopted in 1976 and apply to non-Federal and nontribal forest lands in the State. All forest landowners must conduct their forest management activities according to the Forest Practices Rules but only landowners that cut at least 5,000 board feet per year have to file a Forest Practices Application/Notification. Forest Practices Rules provide for exceptions to operating under standard rules, including Federal conservation plans authorized under Section 10 of the ESA. The Forest Practice Rules are available on the web at http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesRules/Pages/fp_rules.aspx.

1.2.6 Oregon Forest Practices Rules

In Oregon, the Forest Practices Act (ORS 527.610) identifies forest practices as any operation conducted on or pertaining to forestland, including but not limited to: (a) reforestation of

forestland; (b) road construction and maintenance; (c) harvesting of forest tree species; (d) application of chemicals; (e) disposal of slash; and (f) removal of woody biomass. The rules specifically state that compliance with the forest practices rules does not substitute for or ensure compliance with the ESA and nothing in the rules imposes any state requirement to comply with the ESA. Landowners and operators are advised that federal law prohibits a person from taking certain threatened or endangered species, which are protected under the ESA.

Forest management operations must submit to the State Forester a written plan as required by ORS 527.670(3) before conducting any operations requiring notification under OAR 629-605-0140, including those operations within (1) 300 feet of a specific site involving threatened or endangered wildlife species, or sensitive bird nesting, roosting, or watering sites; or (2) 300 feet of any resource site identified in OAR 629-665-0100 (Sensitive Bird Nesting, Roosting and Watering Resource Sites on Forestlands), 629-665-0200 (Threatened and Endangered Species that use Resource Sites on Forestlands), or 629-645-0000 (Significant Wetlands), or (3) 300 feet of any nesting or roosting site of threatened or endangered species listed by the U.S. Fish and Wildlife Service or by the Oregon Fish and Wildlife Commission by administrative rule.

Written plans required under OAR 629-605-0170 must contain a description of how the operation is planned to be conducted in sufficient detail to allow the State Forester to evaluate and comment on the likelihood that the operation will comply with the Forest Practices Act or administrative rules.

1.2.7 Washington Forest Practices Habitat Conservation Plan

In 2005, the DNR prepared a Habitat Conservation Plan (HCP) covering forest practices on non-Federal and nontribal land in Washington State. The HCP addressed the conservation needs of anadromous and native fish, and seven stream-associated amphibians (WDNR 2005). USFWS and the National Marine Fisheries Service (NMFS) approved the Washington Forest Practices HCP and provided take authorizations to the State under Section 10 of the ESA. Take authorizations apply to all landowners that apply for forest practices permits and conduct their forest management activities according to the Forest Practices Rules (Washington Forest Practices Board 2002). The authorizations cover activities within riparian areas adjacent to fish-bearing and non-fish-bearing streams, and road construction and maintenance activities. The Applicants' forest management activities that affect aquatic species are covered under the Washington Forest Practices HCP and incidental take permit, and will not be analyzed in this EA.

2 Alternatives

Two alternatives were developed as part of this EA: the No Action Alternative and the Proposed Action Alternative. Under both alternatives, forest practices would continue to be conducted in compliance with the current Forest Practices Rules in Washington and Oregon. The Forest Practices Rules for Washington (WAC Title 222), Oregon (ORS 527.610), and the Forest Practices Habitat Conservation Plan (WDNR 2005) are hereby incorporated by reference and are not described in detail except when a specific action occurring under the Proposed Action Alternative would differ from the minimum requirement of the Forest Practices Rules. Activities conducted under the No Action Alternative and the Proposed Action Alternative are compared and their differences are summarized in at the end of this chapter. The analysis focuses on forest management activities that are different between the two alternatives and the potential effects that may occur to species that rely on forested habitats on the covered lands.

Forest management activities common to both alternatives include planting after regeneration harvest and monitoring until the stand has reached a stage where it is “free to grow” (trees can outcompete other vegetation); pre-commercial thinning of stands where conditions warrant it; commercial thinning of stands to accelerate growth; conducting regeneration harvest when the stand reaches the appropriate age and conditions; road construction and maintenance; and other common forestry-related activities. Conditions under which pre-commercial thinning would occur are the same for both alternatives; however, the conditions under which commercial thinning would occur in some areas and the age at which regeneration harvest would occur are different. In addition, the Proposed Action Alternative includes additional management activities such as a snag and wildlife tree program and spotted owl nest site protection. The alternatives are described below.

2.1 No Action Alternative

Under the No Action Alternative, the proposed SHA would not be implemented and the USFWS would not issue a Permit to the Applicants. Under this alternative, the Applicants would continue to conduct their forest management activities in accordance with applicable Forest Practices Rules in Oregon and Washington (Sections 2.1.1 and 2.1.2 below), and would avoid take of the northern spotted owl by not harvesting the 4,697 acres of suitable owl that is currently restricted from harvest under Washington Forest Practices Rules.

The Applicants would implement an approximate 45-year timber-harvest rotation. When forest stands, or appropriately sized patches of forest, reach 45 years of age, they would be harvested for regeneration. SDS and BLC would conduct pre-commercial thinning, and commercial thinning would be conducted where economically practicable as part of their forest management plan, but not to accelerate spotted owl habitat growth under the No Action Alternative.

The following list briefly describes the forest management activities associated with the No Action Alternative. Not all of the conservation activities that are associated with standard Washington Forest Practices Rules (WAC Title 222) are identified below, however any that are not included would apply equally to both alternatives.

General forest management activities on commercial forests in Washington and Oregon:

- plant and monitor until “free to grow”; controlling competing vegetation as needed;
- pre-commercial thinning at 10-12 years old where conditions warrant it;
- commercial thin where economically practical, but not to accelerate Young Forest Marginal (YFM) habitat;
- monitor stand health and damage, and salvage opportunistically to recover value;
- conduct regeneration harvest at an average age of 45 years; and
- construct and maintain roads for forest management access.

Wildlife Reserve Tree Management (WAC 222-30-020):

- For each acre harvested in Eastern Washington, leave 2 wildlife reserve trees(≥10 feet tall and >10 inches DBH), 2 green recruitment trees(≥10 feet tall and ≥12 inches DBH), and 2 down logs(≥ 20 feet long and ≥12 inches diameter at small end).

Northern spotted owl habitat conservation (WAC 222-10-41, and ORS 527.610):

- Retain 2,605 acres of the highest quality suitable spotted owl habitat within 1.8 mile radius circles of owl site centers associated with SOSEAs. There are 18 of these circles that intersect with the applicants lands and a total of 4,697 acres of their lands have been identified as or are assumed to be part of this retention requirement in the White Salmon (14 circles and 3,694 acres) and Columbia Gorge (4 circles and 1,003 acres) SOSEAs;
- Retention acres identified above are to include all suitable spotted owl habitat within 0.7 mile radius circles of owl site centers associated with SOSEAs. There are eight 0.7 mile radius circles that intersect with the applicants lands in the White Salmon SOSEA (see Table 2-2);
- Outside of SOSEAS in Washington, during the nesting season, retain 70 acres of the highest quality suitable spotted owl habitat surrounding a northern spotted owl site center. Currently there are no known spotted owl activity centers on the Applicants’ lands in Washington outside of the SOSEAs; and
- In Oregon, retain 70 acres of the highest quality suitable spotted owl habitat surrounding a northern spotted owl site center. Currently there are no known spotted owl activity centers on the Applicants’ lands in Oregon.

SDS’ commercial forestland, defined as productive timberlands suitable for forestry, totals 46,244 acres in Washington and 12,141 acres in Oregon. BLC has 11,601 acres of commercial forestland in Washington (See SHA Figure 2-1 and SHA Table 3-1). The baseline includes all commercial forestland that the Applicants could harvest in Washington and Oregon under the current state Forest Practices Rules.

Under Forest Practices Rules in Oregon, spotted owls are protected only where there is an active spotted owl nesting site or activity center occupied by a pair of adult owls capable of breeding. Protection of a 70-acre core area around the spotted owl nest site is required during the breeding season. Although, there are six spotted owl sites of unknown status and occupancy on USFS land in proximity to SDS lands, none of the 70-acre cores intersect SDS lands. Oregon Department of Forestry and USFWS records indicate that there are no known spotted owl nests on the Applicants land in Oregon.

Applicants have covered lands outside of SOSEAs that consists of 47,523 acres (60% of which is in Washington and 40% in Oregon). Applicants' commercial forestland outside of SOSEAs is 38,499 acres (SHA Table 3-1). Except for the restrictions on harvest of spotted owl habitat in the SOSEAs, the Applicants may harvest all suitable habitat on their ownership in Oregon and Washington under the No Action Alternative. Therefore, under the No Action Alternative, the Applicants' current forest management regime in Oregon will focus timber harvest efforts on all stands that qualify as owl habitat with the goal of eliminating suitable spotted owl habitat within the next 10 years.

The Applicants state that due to regulatory uncertainty they have substantially increased the rate of harvest as part of their strategy to harvest their most mature stands within the constraints of the Forest Practice Rules. This includes managing their lands on a 45-year rotation, harvesting surplus habitat (in excess of highest quality 2,605 acres) within 1.8 mile circles, and harvesting all spotted owl habitat outside of the 1.8 mile circles over the next 10 years. Applicants state they are strategically harvesting the highest quality habitat as early as possible. In addition to this management approach, the Applicants are not allowing non-habitat within spotted owl circles to grow into suitable owl habitat to avoid additional regulatory burdens. Currently, across all the covered lands, the Applicant owns 12,111 acres of dispersal habitat, 18,646 acres YFM habitat, and 18,478 acres Sub-mature habitat (Table 2-1). Within the White Salmon SOSEA there are 6,168 acres of dispersal habitat, 6,685 acres YFM habitat, and 5,885 acres Sub-mature habitat. Of these acres, only 3,694 acres are considered unavailable for harvest by State and Federal regulatory restrictions because the habitat occurs within 0.7 mile radius circles and/or is considered the highest quality habitat within 1.8 mile radius circles (Section 2.11 below).

Dispersal habitat is not considered restricted from harvest. Thus, 15,044 acres in the White Salmon SOSEA are available for harvest in the next 10 years under the No Action Alternative. At the time of drafting the SHA and this EA, WDNR has not identified the restricted habitat in the Columbia Gorge SOSEA. In the absence of this data, Applicants are assuming that all of their 1,003 acres of habitat in the Columbia Gorge SOSEA is also restricted resulting in a total of 4,697 acres of habitat in the SOSEAs as restricted from harvest. All other habitat on the Applicants ownership is available for harvest under the No Action Alternative.

Table 2-1. Non-habitat and Spotted Owl Habitat by Type on the Covered Lands

Habitat Type	SDS & BLC within WhiteSalmon Sosea	All other SDS & BLC Lands	All SDS & BLC Covered Lands
Non Habitat (less than 39 yrs. old)	9,822	10,929	20,751
Dispersal (40-59 yrs. old)	6,168	5,943	12,111
Young Forest Marginal (typed by DNR & or 60-79 yrs.)[1]	6,685	11,961	18,646
Submature + (typed by DNR & or over 79 yrs. old)[1,2]	5,885	12,593	18,478
Total All Commercial Forest Acres	**28,560**	**41,426**	**69,986**
Total Habitat (40 yrs. +) Acres	**18,738**	**30,497**	**49,235**
Total Restricted Acres in Owl Sites	**3,694[3]**	**1,003[4]**	**4,697**
Total Unrestricted Acres (surplus habitat and outside owl sites)	**15,044**	**29,494**	**44,538**

1 - habitat within owl circles typed by DNR; outside of owl circles age was used to type habitat
2 - includes Old Forest Habitat
3 - 741 acres Submature & 2,953 acres YFM
4 - 313 acres Submature & 690 acres YFM in Columbia Gorge SOSEA

2.1.1 Timber Harvest Implementation for Spotted Owls Under Washington Forest Practices

The Forest Practices Rules in Washington govern timber and logging operations. A forest practice permit issued by the WDNR is required for timber operations on private and state lands. The Forest Practices Rules classify all forest practices under five categories depending upon the impact of the operation: Class I, Class II, Class III, Class IV – General, and Class IV-Special (WAC 222-16-050). Class IV Special threatened and endangered species SEPA policies are in place for spotted owls if forest practices may have a probable significant adverse impact, and therefore require an environmental impact statement (WAC 222-10-040). The Forest Practices Rules established SOSEAs in select areas of the state to provide protection to spotted owls and its habitat (WAC 222-16-086) and to inform how forest practices should be classified.

The two SOSEAs within the Applicants' lands, the Columbia Gorge and White Salmon SOSEAs, have a goal of providing a combination of demographic support and dispersal support (WAC 222-16-086; 222-10-041). Demographic support means providing sufficient suitable spotted owl habitat within the SOSEA to maintain the viability of spotted owl sites identified as necessary to meet the SOSEA goals (WAC 222-16-010). Dispersal support means providing sufficient dispersal habitat for the interchange of spotted owls within or across the SOSEA, as necessary to meet SOSEA goals. In SOSEAs or areas of SOSEAs where the goal is a combination of dispersal support and demographic support, either suitable spotted owl habitat should be maintained to protect the viability of the owl(s) associated with each spotted owl site center or a variety of habitat conditions should be provided which in total are more than dispersal support and less than demographic support (WAC 222-10-041).

Within SOSEA's, the following amount of suitable spotted owl habitat is assumed to be necessary to maintain the viability of the owl(s) associated with each spotted owl site center: all suitable spotted owl habitat within 0.7 mile of each spotted owl sites center, and a total of 2,605 acres of the highest quality suitable spotted owl habitat within the median 1.8 mile home range circle. To qualify as suitable spotted owl habitat, forest stands must either be old forest habitat, Sub-mature habitat, or YFM habitat (WAC 222-16-085). Old forest habitat provides all the characteristics needed by spotted owls for nesting, roosting, foraging, and dispersal; Sub-mature habitat provides all the characteristics needed for roosting, foraging, and dispersal; and YFM habitat provides some of the characteristics needed by spotted owl for roosting, foraging and dispersal (see SHA appendix B for definitions).

The WDNR identifies the highest quality suitable spotted owl habitat considering habitat quality, proximity to activity center, and contiguity in selecting the most suitable habitat. Spotted owl habitat identified outside of the 0.7 mile radius may support more than one owl territory.

Outside SOSEAs, during the nesting season (between March 1 and August 31), 70 acres of the highest quality suitable spotted owl habitat surrounding a spotted owl site center must be maintained (i.e. no harvest is allowed). The 70 acres for one site center may not be utilized for meeting suitable habitat needs of any other site center. Within SOSEA's in eastern Washington, the WDNR identifies all suitable habitat within 0.7 mile of the spotted owl sites

center as the highest quality 2,605 acres of habitat within the 1.8 mile home range of owl sites and all of the habitat within a 0.7 mile home range

There are 30 northern spotted owl site centers in the vicinity of the Applicants' lands in Washington, four of which are within the Columbia Gorge and 14 are within the White Salmon SOSEAs. All site centers, except for one, are located on USFS, WDNR or other private lands(See SHA Table 4-1). Generally speaking, the Applicant is a minority landowner for these owl sites. Most of the ownership within the owl sites is managed by the WDNR or the Gifford Pinchot National Forest (Table 2-2).

For each of the site centers within the SOSEAs, the best 2,605 acres of suitable habitat is excluded from harvest. Given the ownership patterns surrounding these site centers, a total of 4,697 acres of SDS and BLC lands are excluded from harvest under the No Action Alternative. This acreage includes all suitable spotted owl habitat within 0.7 mile of each site center, and that portion of SDS and BLC ownership identified as part of the best 2,605 acres of habitat between 0.7 and 1.8 miles of each site center. If SDS or BLC were interested in timber harvesting, road building, or other impacting activities on these 4,697 acres, it would be a Class IV Special forest practice and require an environmental impact statement under SEPA.

2.1.2 Timber Harvest Implementation for Spotted Owls Under Oregon Forest Practices

The Oregon Forest Practices Act protects resource sites through a notification process but the State Forester does not issue permits or approvals. Oregon Forest Practices Rules protect active spotted owl nesting sites or activity centers occupied by a pair of adult owls capable of breeding. Resource sites receive protection where the State Forester determines (a) it is an active spotted owl site and (b) the proposed forest practices conflict with the resource site. The State Forester is required to maintain an inventory of protected resource sites that are used by threatened and endangered species, including the spotted owl. A written plan is required when the State Forester determines an operation will conflict with the protection of a nesting site or when the forest operation is 300 feet from any nesting site of any threatened or endangered species. A written plan provides, among other things, protection of a 70-acre core area around the spotted owl nest site. SDS owns 19,153 total acres in Oregon while BLC does not own any land in Oregon. There are no known spotted owl nests on or in the vicinity of the Applicants land in Oregon. There are six spotted owl sites on USFS land in proximity to SDS lands, of unknown status and occupancy, but none of the 70-acre cores intersect SDS lands. Because there are no spotted owls or activity centers on SDS land in Oregon, there are no harvest restrictions under the Forest Practices Rules. All stands that qualify as owl habitat will be prioritized for harvest with the goal of eliminating it within the next 10 years.

Table 2-2. Ownership by Percentage Within Spotted Owl Circles in the SOSEA's

(Note: See Table 4-1 in the SHA for the amount of habitat within these owl circles) Source: (WDNR 2012 data)

		Within 0.7 mile radius circle			
SOSEA	**Site Name and Number**	**SDS & BLC**	**Other Pvt**	**State**	**Federal**
White Salmon	Bear Creek #828	0%	1%	98%	1%
White Salmon	Cave Creek #852	8%	22%	65%	5%
White Salmon	White Salmon River #875	2%	19%	17%	62%
White Salmon	Dry Creek WSR #734	36%	0%	64%	0%
White Salmon	Phelps Creek #874	0%	0%	87%	13%
White Salmon	Weiberg Creek #1116	18%	14%	68%	0%
White Salmon	Monte Cristo #284	0%	0%	0%	100%
White Salmon	Rattlesnake Creek #1048	9%	5%	86%	0%
White Salmon	Gilmer Creek South #753	56%	37%	7%	0%
White Salmon	Mill Creek #991	13%	0%	87%	0%
White Salmon	Moss Creek Campground # 1003	30%	9%	37%	24%
White Salmon	Moss Creek #289	0%	0%	0%	100%
White Salmon	Little Wind River- upper #824	0%	0%	0%	100%
White Salmon	Berry Creek #970	0%	0%	0%	100%
Columbia Gorge	Carson Ridge #647	0%	34%	66%	0%
Columbia Gorge	Red Bluffs #765	0%	9%	35%	56%
Columbia Gorge	Budweiser Creek #302	0%	0%	100%	0%
Columbia Gorge	Steep Creek #667	0%	0%	2%	98%
		Outside 0.7 mile and within 1.8 mile radius circle			
SOSEA	**Site Name and Number**	**SDS & BLC**	**Other Pvt**	**State**	**Federal**
White Salmon	Bear Creek #828	16%	12%	65%	7%
White Salmon	Cave Creek #852	15%	42%	33%	10%
White Salmon	White Salmon River #875	16%	28%	45%	12%
White Salmon	Dry Creek WSR #734	37%	6%	52%	5%
White Salmon	Phelps Creek #874	4%	0%	58%	38%
White Salmon	Weiberg Creek #1116	24%	9%	67%	0%
White Salmon	Monte Cristo #284	3%	0%	21%	76%
White Salmon	Rattlesnake Creek #1048	41%	13%	46%	0%
White Salmon	Gilmer Creek South #753	17%	65%	18%	0%
White Salmon	Mill Creek #991	22%	3%	75%	0%
White Salmon	Moss Creek Campground # 1003	39%	3%	42%	17%
White Salmon	Moss Creek #289	16%	7%	4%	73%
White Salmon	Little Wind River- upper #824	17%	5%	1%	76%
White Salmon	Berry Creek #970	9%	0%	0%	91%
Columbia Gorge	Carson Ridge #647	8%	63%	29%	0%
Columbia Gorge	Red Bluffs #765	12%	27%	55%	6%
Columbia Gorge	Budweiser Creek #302	7%	6%	87%	1%
Columbia Gorge	Steep Creek #667	9%	6%	83%	2%

2.2 Proposed Action Alternative

Under the Proposed Action Alternative, the SHA would be implemented over approximately 82,000 total acres of SDS and BLC ownerships in Washington and Oregon, and USFWS would issue a Permit to the Applicants for a period of 60 years. For USFWS to issue the Permit, the SHA must contain voluntary conservation measures that are reasonably expected to provide a net conservation benefit to spotted owls. The SHA must identify the baseline that will be maintained over the term of the agreement. The USFWS's SHA policy is available at: http://www.fws.gov/endangered/policy/SAFE_HAR.HTM and http://www.fws.gov/endangered/pdfs/FR/FRnoticeCCAA_SHAreg_revision.pdf. The following section briefly describes conservation measures outlined in the SHA. For a detailed discussion of these elements, please refer to the SHA (Environ 2012), (incorporated by reference).

The Applicants will implement several different silvicultural regimes to ensure the proper growth and health of conifer-dominated forest stands during this period. The Applicants' primary forest management regime will include several options for mid-rotation management, determined by a number of factors including steepness of slopes, and the feasibility of using ground-based logging equipment. The specific options for this management regime are:

- plant and monitor until "free to grow"; controlling competing vegetation as needed;
- consider the most suitable mid-rotation management:
  - no mid-rotation management,
  - pre-commercial thin at 10 to 12 years old,
  - commercial thin at 25 to 40 years old, or
  - apply both pre-commercial and commercial thinning to some stands;
- monitor stand health and damage, and salvage opportunistically to recover value;
- conduct regeneration harvest of conifer-dominated stands at approximately an average age of 60 years;
- establish special management areas:
  - leave tree areas,
  - potentially unstable slopes,
  - forested wetlands,
  - cliffs, talus slopes, rock outcrops, and caves,
  - shrublands and meadows;
  - oak forests and mixed oak-conifer forests
- establish special set aside areas (SSAs);
- provide nest site protection;
- enhance green and wildlife tree retention areas;
- implement a snag-development program; and

- maintain the elevated baseline in the SHA that includes a minimum of 9,424 acres of spotted owl habitat in the White Salmon SOSEA

Components of the Proposed Action Alternative that would not be included in the No Action Alternative are; slowing the rate of harvest on covered lands, maintaining the elevated baseline of habitat, designating two proposed SSAs with a combined total of 651 acres of older forest, commercial thinning to accelerate owl habitat development, managing an average 60-year harvest rotation age, implementation of a snag retention and development program that would enhance habitat for spotted owl prey species, and nest site protections. These are described in detail in the SHA (ENVIRON 2012).

If the proposed SHA is approved by the USFWS, the Applicants covered lands in Washington will no longer be subjected to Class IV Special forest practice applications when they harvest the highest quality spotted owl habitats identified by WAC (222-16-080 (6) (a) (iii)). The preparation of this EA is, in part, intended to provide the public an opportunity to comment and satisfy Washington Forest Practices Rules and SEPA requirements.

3 Affected Environment

Included in this analysis are elements of the natural and human environment that may significantly differ between the alternatives, or for which an analysis was required to demonstrate that the difference would not be substantial. Elements of the natural and human environment not specifically addressed are those that would not be affected by the Proposed Action Alternative (e.g., recreation) and those for which there would be no significant difference between alternatives including, but not limited to, transportation, air quality, noise, geology, and scenic resources/aesthetics.

Potential impacts on the human environment in Washington from the No Action Alternative were analyzed in the environmental impact statement prepared for the Forest Practices Habitat Conservation Plan (WDNR 2005, USFWS and NMFS 2006) and are considered to be part of the NEPA environmental baseline. Impacts to resources on the covered lands from the activities analyzed in that environmental review will not be analyzed in this EA.

The covered lands have been actively managed for over a century, most of it being roaded and first harvested in the early 1900's with second harvest activities occurring on the lands since the mid 1900's (J. Spadaro, pers comm). Small pockets of older forest (> 100yrs) are scattered in some portions of the covered lands as a result of the 1989 land exchange with the USFS as a result of the Columbia Gorge National Scenic Area Act. Some smaller fires have occurred on the covered lands, but no large scale fires have occurred (J. Spadaro, pers comm). According to Buchanan (1996), with the exception of the Little White Salmon River drainage, little is known about the fire history and ecology of the general area. Throughout much of the mid-1900's, Applicants allowed their forest lands to mature with minimal regeneration harvest occurring. As a result of this strategy, the Applicants' lands carry an inventory that is dominated by older forest age classes and larger diameter logs which is uncommon among forest industry ownerships (Figures 3-1 and 3-2).

The Applicants forest management activities are identified as covered activities (Implementation Agreement Section 2.6) in the Proposed Action Alternative and are identical to the forest management activities conducted under the No Action Alternative. Because the Proposed Action Alternative includes forest management activities designed to benefit the spotted owl, differences between the alternatives lie primarily in the amount and timing of timber harvest operations during a 60-year period, the amount of forested habitat that would or would not be harvested, the amount of forest habitat that would be allowed to develop or be actively created, and the intentional measures to facilitate development of spotted owl habitat characteristics. Thus, the alternatives differ in their effects to only a few elements of the natural and human environment, i.e., vegetation, wildlife, land-use, and socioeconomics resources. Effects to the other elements of the natural and human environment remain unchanged, that is, there is no significant difference between the two alternatives.

Applicable Federal regulations located at 36 CFR 800.15(i) define an effect on cultural resources as any "alteration to the characteristics of a historic property qualifying it for inclusion in, or eligibility for, the National Register of Historic Places." This applies to archaeology, historic, and ethnographic resources. Under both alternatives regeneration harvest, and road

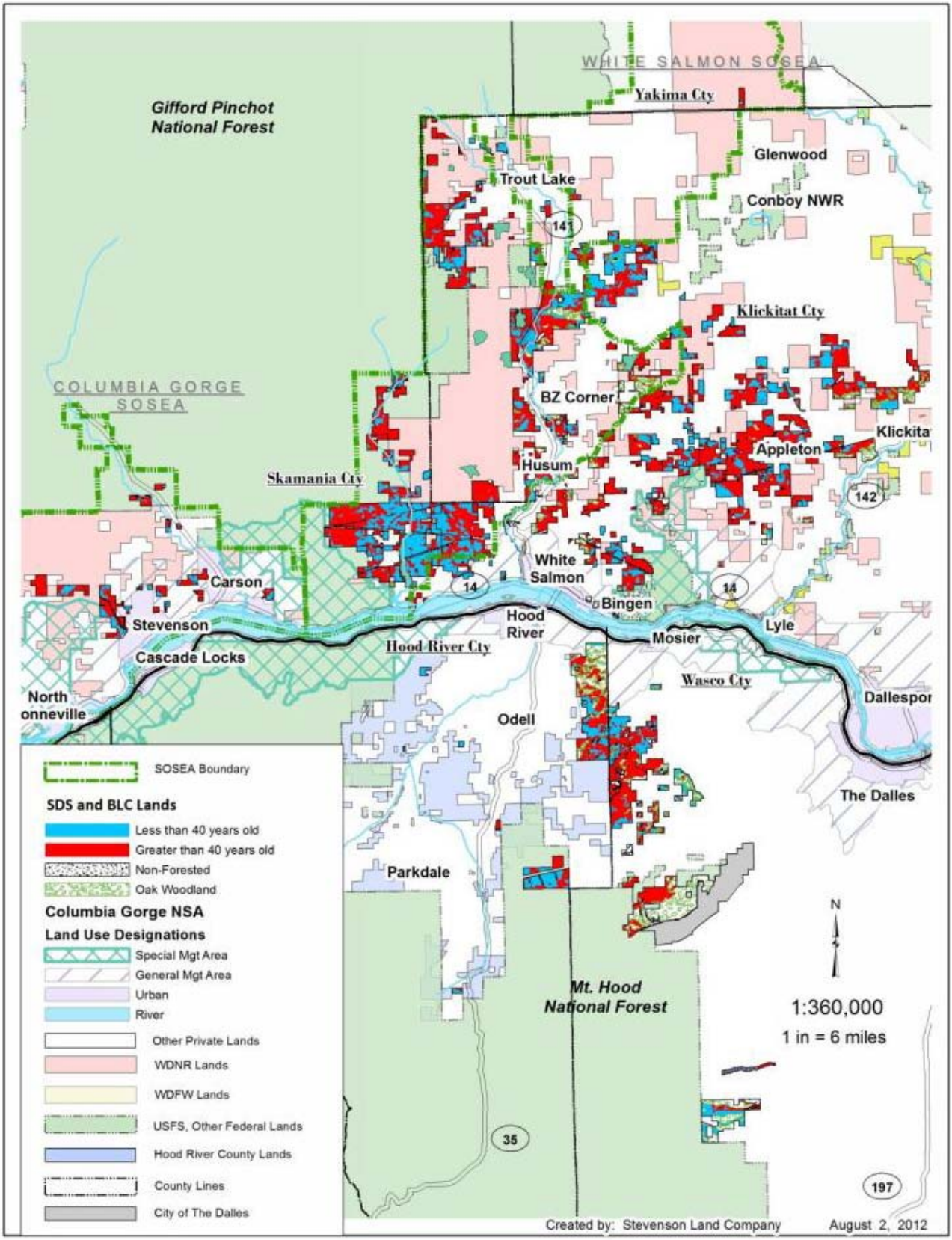

Figure 3-1. Covered Lands Greater and Less Than 40 Years of Age

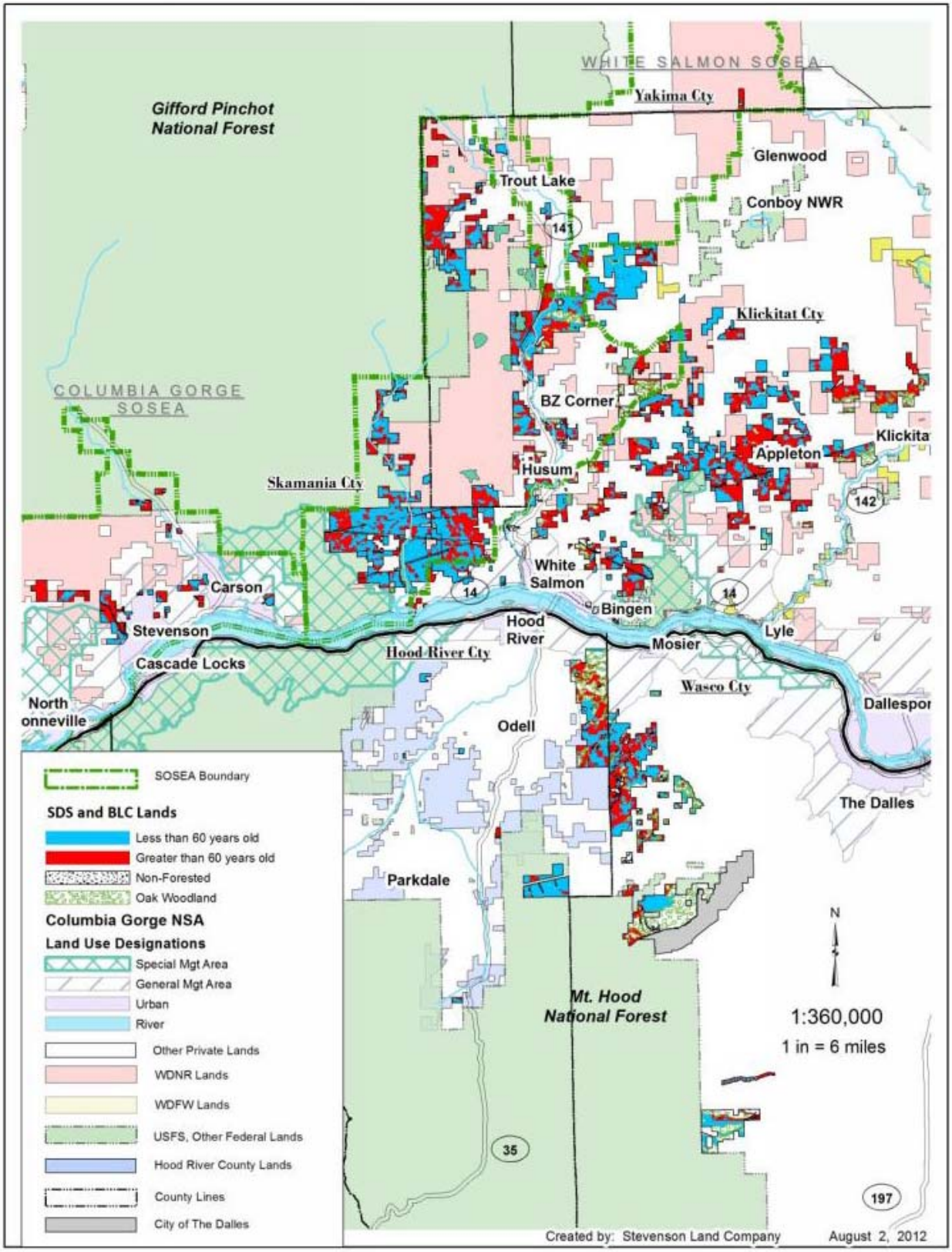

Figure 3-2. Covered Lands Greater and Less Than 60 Years of Age

construction and maintenance, would occur in the covered area. Prior to these ground-disturbing activities, the Applicants would be required to comply with regulatory requirements in both Washington (WAC 222-20-120) and Oregon (OAR 629-605-0120). In Washington, the requirements include notification of affected tribes and, if necessary, identifying cultural resources, evaluating properties in the APE, and determining effects. In Oregon, OAR 629-605-0100(2) and other rules require consultation with other agencies in their areas of expertise. For archaeological and historical sites, the consultation would be with Oregon Parks and Recreation Department. The requirements under the Forest Practices Rules would be met under either alternative and, thus, there is no significant difference.

The Columbia River Gorge National Scenic Area Act (Scenic Act) (16 U.S.C. §§ 544 *et seq.*) established the Columbia River Gorge National Scenic Area (Scenic Area) to: (1) protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge; and (2) protect and support the economy of the Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development. Part of the lower White Salmon River was also designated as a scenic river under the Wild and Scenic Rivers Act (16 U.S.C. § 1274(a)(61)). However, the Scenic Act does not create any conditions, review authority, or jurisdiction over forest practices under the Oregon and Washington Forest Practices Acts on state and private timberlands outside of the Scenic Area's special management areas (16 U.S.C. 544o(c)) nor does the Wild and Scenic Rivers Act create any conditions, review authority or jurisdiction over private lands. Furthermore, the Scenic Act and the management plan developed thereunder by the Columbia River Gorge Commission do not regulate land uses outside the Scenic Area, even if they might be visible from within the Scenic Area (16 U.S.C. § 544o(a)(10)). Here, the forest practices on private timberlands evaluated in this EA (approximately 81,600 acres) occur outside the Scenic Area's special management area and hence are not affected by the Scenic Act or the Wild and Scenic Rivers Act. The vast majority of the private timberlands evaluated in this EA are also located outside the Scenic Area. Thus, there would be no differences between the alternatives in effects on scenic resources or aesthetics for the Applicants lands in Oregon and Washington.

3.1 Vegetation

As of 1999, 95% of the entire White Salmon watershed was classified as forestland (Haring 2002). In addition to managed forestlands, this category also includes oak woodlands, grasslands, open south facing slopes, USFS wilderness areas, rock outcrops, lava flows, and woody deciduous river bottoms. When divided by upper and lower basin, in the lower basin 88% of the land is classified as forest, and in the upper basin, 95% to 98% is classified as forest. Another 4% of the White Salmon watershed is in pasture and hay land, and 0.6% is in orchards (Haring 2002).

Eighty-eight percent of the Wind River watershed falls within Gifford Pinchot National Forest. Within the lower and middle mainstem watershed encompassed by the Columbia Gorge SOSEA, the landscape is a more even mix of state, federal, and private land, with most of the USFS land as protected late successional reserve. Late successional reserves have been designated to protect and enhance conditions of late successional and old-growth forest ecosystems (Pelletier 2002).

The farthest western portions of the ownership are within wetter portions of the Cascades rain shadow, receiving approximately 75 inches of precipitation per year and support western hemlock (*Tsuga heterophylla*)/Douglas fir (*Pseudotsuga menziesii*) dominated forests (mostly within the Columbia Gorge SOSEA). Farther east, the western portions of the White Salmon SOSEA receive approximately 40 inches of precipitation per year, and Douglas fir is the dominant forest tree, with some western red cedar and grand fir also commonly occurring. In the eastern portions of the White Salmon SOSEA and lands to the east, annual precipitation is approximately 30 inches and rain shadow effects diminish the overall dominance of Douglas fir, where it now co-occurs with increasing amounts of ponderosa pine, grand fir, and other dry forest species. Bigleaf maple (*Acer macrophyllum*) and some red alder (*Alnus rubra*) are important deciduous species in many stands in the western portions of the ownership. Oregon white oak (*Quercus garryana*) becomes the dominant deciduous species in eastern portions of the ownership, where it can form almost pure stands in some areas.

The covered lands in Oregon occur in the lower Hood River, Mosier Creek, and Rock Creek drainages. Applicants' lands in Oregon are very similar in forest conditions as the eastern portions of the White Salmon SOSEA and lands to the east of the White Salmon SOSEA with annual precipitation approximately 30 inches. Douglas fir is the dominant species with grand fir, ponderosa pine and Oregon white oak as secondary species. However, Oregon white oak becomes the dominant deciduous species in eastern portions of the covered lands, where it can form almost pure stands in some areas.

A list of special-status plant species potentially occurring in the covered area was developed through review of the following: (1) listed and proposed endangered and threatened species and critical habitat, candidate species, and species of concern for Klickitat (USFWS 2012a) and Skamania Counties (USFWS 2012b) in Washington, and Hood River (USFWS 2012c) and Wasco (USFWS 2012d) counties Oregon; (2) the Washington Natural Heritage Program list of rare plants for Skamania and Klickitat Counties (WDNR 2010); and (4) the Oregon Department of Agriculture Plant Division (2012). The list of special-status plants is provided in Appendix A. None of the special-status plants are Federally-listed.

Of the endangered plants listed in Washington none are expected to be affected differently by forest management activities implemented under the two alternatives, thus, they will not be addressed further in this EA. Another 33 plant species within Klickitat and Skamania Counties, Washington, are state-listed as threatened, but only eight may occur within forest stands on the covered lands. These species are also not expected to be affected differently by forest management activities implemented under the two alternatives, thus, they will not be addressed further in this EA.

The remaining species listed in Appendix A are either state or federally listed as sensitive. Of these, the following are likely to occur in forest stands on the covered lands: tall agoseris (*Agoseriselata*), long-bearded sego lily (*Calochortuslongebarbatus* var. *longebarbatus*), golden chinquapin (*Chrysolepischrysophylla* var. *chrysophylla*), tall bugbane (*Cimicifugaelata* var. *elata*), few-flowered collinsia (*Collinsiasparsiflora* var. *bruceae*), Clackamas corydalis (*Corydalis aquae-gelidae*), clustered lady's-slipper (*Cypripedium fasciculatum*), common blue-cup (*Githopsisspecularioides*), Suksdorf's desert-parsley (*Lomatiumsuksdorfii*), Pulsifer's monkey-

flower (*Mimuluspulsiferae*), branching montia (*Montia diffusa*), Wilcox's penstemon (*Penstemonwilcoxii*). A couple, such as clustered lady's-slipper and tall bugbane, are associated with mid- to late seral Douglas fir or ponderosa pine (*Pinus ponderosa*) forests.

In Oregon, only two state listed species may occur on covered lands, northern wormword (*Artemisia campestris* var. *wormskioldii*), listed as endangered, and Tygh Valley milk vetch (*Astragalustyghensis*), listed as threatened. The former is found in riparian areas and the other is endemic to areas outside of the covered lands; neither would be expected to occur in areas subject to harvest and therefore will not be addressed further in this EA. Another 13 species are federally listed as sensitive, of which only Suksdorf's desert parsley and white meconella may occur on the covered lands.

3.2 Wildlife

A review of USFWS's listed species (USFWS 2008c) in Skamania and Klickitat Counties (Washington) (USFWS 2012a), and Hood River and Wasco Counties (Oregon) (USFWS 2010), WDFW Priority Habitats and Species database (WDFW 2008), WDFW species lists (WDFW 2011), and ODFW Threatened, Endangered, and Candidate Fish and Wildlife Species (ODFW 2012a, ODFW 2012b), identified 47 special-status wildlife species with potential to occur on the covered lands based on the known range and habitat requirements of each species. Special-status species with the potential to occur in the covered area are listed in Appendix B.

3.2.1 Threatened and Endangered Wildlife

3.2.1.1 Northern Spotted Owl

Ecology

The spotted owl lives in structurally complex forests ranging from southwest British Columbia through the Cascade Mountains and coastal ranges in Washington, Oregon, and California, as far south as Marin County (USFWS 2008, 2011). The spotted owl was listed under the ESA in 1990 because of loss of suitable habitat, primarily the mature and old growth forests that it needs for survival (USFWS 1990). Detailed accounts of the taxonomy, ecology, reproductive characteristics, and status and trends of the spotted owl are found in numerous federal documents (Courtney et al. 2004, USFWS 2008, USFWS 2011, Davis et al. 2011). The SHA also includes information on spotted owl ecology which is briefly summarized below (Environ 2012).

Habitat Status on the Covered Lands

The Applicants' forest lands are generally site class III forest lands located in the transitional forest zone of the eastern foothills of the Cascade Mountains. Forests on Applicants' lands are dominated by Douglas fir throughout the covered area. Pure Douglas fir forest stands exist in the western and central areas of the covered lands while mixed Douglas fir, grand fir and ponderosa pine forest stands exist in the eastern areas.

Stands in the covered lands were surveyed to determine at what age they met the YFM habitat definition in the Forest Practices Rules (WAC 222-16-085) (Raedeke Associates 2012). Characteristics measured included an assessment of canopy closure, presence of 70 ft. trees, presence of 2 or more layers of forest canopy, a count of intermediate trees on the plot, and an

assessment of mistletoe abundance (low, moderate, or high infection). This data was then compared with inventory data for each stand to determine if minimum thresholds for YFM (either open- or closed-canopy) were present. Results of habitat determinations are provided in Appendix C of the SHA. Given the sampling of habitat characteristics observed and the habitat enhancement methods described in the SHA, it was determined that stands that are 40 years old will meet the Washington Forest Practices Rules definition of dispersal habitat. It was also determined that stands older than 60 years will likely meet the Washington Forest Practices Rules definition of Young Forest Marginal (YFM). However, stands 50-60 years of age may qualify as YFM habitat if enhancement activities, such as commercial thinning and snag creation and/or retention, have been applied to create intermediate tree growth and snags to provide den sites.

Currently, the Applicants own 28,560 acres of commercial forest land in the White Salmon SOSEA. Of this amount, 6,168 acres is dispersal habitat, 6,685 acres is YFM habitat, and 5,885 acres is Sub-Mature habitat. Approximately 9,822 acres are considered non-habitat (<39 years old). The YFM and Sub-Mature habitat was typed by DNR and corresponds to the Applicants 60-79 year age-class and over 79 years of age, respectively. Of the habitat in the White Salmon SOSEA that is restricted from harvest, i.e., all suitable spotted owl habitat within 0.7 mile of each spotted owl sites center, and a total of 2,605 acres of the highest quality suitable spotted owl habitat within the median 1.8 mile home range circle (WAC222-10-041), 2,953 acres is YFM and 741 acres is Sub-Mature. Of the habitat in the Columbia Gorge SOSEA that is restricted from harvest, 690 acres is YFM and 313 acres is Sub-Mature habitat. Total habitat, defined by the Applicants as 40 years old and older, available for harvest in the White Salmon SOSEA, and in the remainder of the ownership is 15,044 acres and 29,494 acres, respectively (Table 2-1 and SHA Table 4-1).

There are 30 northern spotted owl site centers with circles that intersect the Applicants' lands in Washington, of which 18 are located within SOSEAs and received regulatory protection under the Washington Forest Practices Act. Of these 18, four are within the Columbia Gorge and 14 are within the White Salmon SOSEA. All site centers, except for one, are located on USFS, WDNR, or other private lands. For each of the spotted owl 1.8-mile home range radius within the SOSEAs, the highest quality 2,605 acres of suitable habitat is excluded from harvest. Given the ownership patterns surrounding these site centers, a total of 4,697 acres of SDS and BLC lands are restricted from harvest. This acreage includes all suitable spotted owl habitat within 0.7 mile of each site center, and that portion of SDS and BLC ownership identified as part of the highest quality 2,605 acres of habitat between 0.7 and 1.8 miles of each site center SDS owns 19,153 acres in Oregon while BLC does not own any land in Oregon. There are six spotted owl sites on USFS land in proximity to SDS lands, of unknown status and occupancy, but none of the 70-acre cores intersect SDS lands. Because there are no spotted owls or activity centers on SDS land in Oregon, there are no harvest restrictions under the Forest Practices Rules. Applicants are prioritizing stands that qualify as owl habitat with the goal of harvesting all within the next 10 years. The total amount of commercial forest lands in Oregon is 12,141 acres. The proportion of this acreage in YFM and Sub-Mature habitat are unknown at this time.

3.2.1.2 Grizzly Bears

Based on expert opinion and a database of sightings, the grizzly bear (*Ursus arctos horribilis*) population in the North Cascades Ecosystem was estimated to be fewer than 20 animals (USFWS 2011). It is unlikely that grizzly bears occur near the covered lands. However, the two alternatives are also unlikely to differ in the manner in which they affect grizzly bear habitat, thus, this species will not be analyzed further in this EA.

3.2.1.3 Gray Wolves

Gray wolf (*Canis lupus*) presence in Washington has expanded substantially since 2002. In July 2011, there were five confirmed packs in the state: two in Pend Oreille County (Diamond, Salmo), one in Pend Oreille and Stevens Counties (Smackout), one in Kittitas County (Teanaway), and one in Okanogan/Chelan Counties (Lookout) (Wiles et al. 2011). There were also indications of single additional packs in the Blue Mountains and North Cascades National Park, which are likely trans-boundary packs with Oregon and British Columbia, respectively. At least a few solitary wolves also likely occur in other scattered locations of Washington (Wiles et al. 2011). The Oregon wolf population is expanding and the 2011 minimum known wolf population consisted of 29 wolves with four known packs in northeast Oregon east of Interstate 84 (ODFW 2012a). The actual number of wolves in Oregon is likely greater than this minimum estimate, and the population and distribution is expected to continue to grow through natural reproduction and dispersal (ODFW 2012a). Packs typically occupy large distinct territories, 200 to 500 square miles, and defend these areas from other wolves or packs. Suitable wolf habitat is generally characterized as public land with mountainous, forested habitat that contains abundant year round prey, low road density, low numbers of domestic livestock and sheep, low agricultural use, and few people. Wolves are habitat generalists and are theoretically capable of inhabiting a wide range of ecosystems, including some that might be considered marginal. An initial analysis for Washington suggests that suitable habitat for wolves potentially occurs throughout the state, except in the Columbia Basin and Puget Trough lowlands. It is, therefore, conceivable that wolves may again occupy areas in the vicinity of covered lands in Washington and Oregon during the term of the Permit. However, the two alternatives are unlikely to differ in the manner in which they affect gray wolves or their habitat, thus, this species will not be analyzed further in this EA.

3.2.1.4 Canada Lynx

Canada lynx (*Lynx canadensis*) inhabit the northern forests of North America. In Washington, lynx are found in high-elevation forests of northeastern Washington in Okanogan, Chelan, Ferry, Stevens, and Pend Oreille Counties. A breeding population also occurred historically in the southern Cascades near Mount Adams (WDFW 2012a). About 85% of the lynx habitat in Washington is in national forests, with the remainder on state and private lands. Hair snag surveys conducted by the USFWS and the USFS from 1998 through 2002, including survey locations near the Elkhorn Wildlife Area, failed to detect Canada lynx in Oregon (ODFW 2006). Lynx distribution in western North America is closely associated with the distribution of boreal and subalpine forests. Within these forest types, lynx are most likely to persist in areas that receive deep snow and have high-density populations of snowshoe hares, the principal prey of lynx. Canada lynx are not known to occur on the covered lands and are unlikely to occur

because the covered lands do not resemble habitats commonly associated with Canada lynx. Thus, Canada lynx will not be analyzed in this EA.

3.2.2 Other Special Status Wildlife

3.2.2.1 Amphibians

Effects to seven species of stream-associated amphibians from forest management activities, including the tailed frog (*Ascaphus truei)* and Van Dyke's salamander (*Plethodon vandykei),* have already been described in the Forest Practices HCP EIS (USFWS and NMFS 2006). These species' occurrence in Washington will not be addressed in this EA. The Oregon slender salamander inhabits moist forests on the western slope of the mountains and occurs east of the Cascade crest but will not be analyzed here because they are already protected under existing rules.

The Larch Mountain salamander (*Plethodon larselli)* is on the species of concern list for Skamania and Klickitat Counties, Washington, and Hood River County, Oregon, but it is comparatively rare, and most of this species' habitat is within the Columbia River Gorge National Scenic Area (ODFW 2012b). The Cascades frog (*Rana cascadae*) is found in both the Washington and Oregon Cascades above 2,600 feet in elevation, in montane meadows, slow-moving streams, lakes, and ponds (Leonard et al. 1993). This species is widely distributed (Hallock and McAllister 2005) and could occur in appropriate habitats in the higher-elevation portions of the covered lands in both states. The Cascades frog is unlikely to be affected differently by implementation of forest management activities under either alternative. However, Larch Mountain salamander has been located in exfoliated bark piles at the base of old growth trees and could be affected differently under the two alternatives.

The western toad (*Bufo boreas*) is widely distributed over all but the most arid regions of the western United States, and can use a wide variety of habitats at elevations ranging from sea level to over 7,000 feet (Blaustein et al. 1995, Leonard et al. 1993). It could occur on covered lands in Skamania County (USFWS 2012a, WDFW 2011, NatureMapper 2012). The northern red-legged frog (*Rana aurora aurora*), on the species lists for Hood River and Wasco Counties, may frequent upland sites during the non-breeding season (NatureMapper 2012). The northern leopard frog (*Rana pipiens*) and the Oregon spotted frog (*Rana pretiosa*), a Candidate Species, are likely to occur on covered lands in Skamania, Klickitat and Wasco counties, however, both are aquatic species that would typically be confined to marshes, ponds, and perennial channels which are protected under Forest Practices Rules. These species are unlikely to be impacted differently between alternatives and, thus, will not be addressed further in this EA.

3.2.2.2 Reptiles

Specific surveys for reptiles on the covered lands are lacking. The sharp-tailed snake (*Contia tenuis)* has been verified to occur at Trout Lake in Klickitat County, and surveys indicate that it may be more common than records would indicate because of its cryptic color and habitat. Records for Washington indicate it is located in western Skamania County (WDNR 2012), however, it is unlikely to occur on the covered lands. The northern Pacific pond turtle (*Actinemys marmorata marmorata*), a species of concern in Hood River and Wasco Counties, Oregon, and the western pond turtle (*Clemmys marmorata*), a species of concern in Skamania and Klickitat Counties, Washington are associated with still water habitats in western

Washington and the Columbia Gorge and, thus, are unlikely to occur on the covered lands and will not be addressed further in this EA.

The sagebrush lizard (*Sceloporus graciosus*), occurs in Klickitat County, while its subspecies, the northern sagebrush lizard *(S. graciosus graciosus*) (Wasco), occurs in Wasco County east of the Cascade crest and along the dry margins of the Gorge. Neither would be expected to occur within wooded habitats on the Applicant's lands and will not be addressed further in this EA.

3.2.2.3 Birds

Bald eagle (*Haliaeetus leucocephalus*) nests and roosts have been recorded along the Columbia River in Skamania County, and throughout the White Salmon River watershed in western Klickitat County (Stinson et al. 2007), they will not be addressed further in this EA because there is no anticipated difference between the alternatives.

Northern goshawks (*Accipiter gentilis*) are generally associated with mature coniferous forests but will use mixed coniferous and deciduous forests as well (Seattle Audubon Society 2005).. Goshawks are on the species of concern list in all four counties containing the covered lands (USFWS 2010a, 2012a). Stands utilized by nesting goshawks are similar to those available on the covered lands, and have been found to occur on managed forests (Bosakowski et al. 1999). Thus, this species may occasionally occur on the covered lands.

Peregrine falcons (*Falco peregrinus*) nest on cliffs in the foothills of the Cascade Mountains, usually near water. While they may occur where suitable habitat is present in the covered area, they would be more likely to occur along large water bodies such as the Columbia River (Seattle Audubon 2005). Ferruginous hawks (*Buteo regalis*), like peregrines, also nest on rocky outcrops, but this species' core habitats are east of the Cascade crest and the Applicants' land base (Smith et al. 1997). Both species would be expected to occur only rarely on the covered lands and are unlikely to be affected differently by the forest management activities addressed in the two alternatives, so they will not be addressed further in this EA.

The olive-sided flycatcher (*Contopus cooperi*) has a widespread distribution that includes the Pacific Northwest (Cornell Lab of Ornithology 2012). It primarily occurs in montane and northern coniferous forests, usually at mid- to high-elevations. Within coniferous forests, it is most often associated with forest openings, forest edges near natural openings (e.g., meadows, bogs, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands (Cornell Lab of Ornithology 2012). In Oregon, this flycatcher is found in spruce and fir forests, and coniferous forests of all ages, particularly those with an uneven canopy and plenty of snags. Presence in early successional forest appears dependent on availability of snags or residual live trees for foraging and singing perches. The olive-sided flycatcher frequently occurs along wooded shores of streams, lakes, rivers, beaver ponds, bogs and muskegs, where natural edge habitat occurs and standing dead trees often are present. This species likely occurs on the covered lands.

The willow flycatcher (*Empidonax traillii*) is common in appropriate habitats such as clear-cuts, to elevations of at least 3,000 feet on both sides of the Cascades (Seattle Audubon Society

2005). They are rare along the outer coast and uncommon on the western side of the Olympic Peninsula. Migrants and non-breeders are sometimes seen in the Columbia Basin. This bird is found in willow thickets and other brushy areas near streams, marshes, or other wetlands, and in clear-cuts and other open areas with nearby trees or brush. It typically forages in the shrub layer, or in low trees. Its breeding range includes Skamania and Klickitat Counties (Seattle Audubon 2005) and, thus, is likely to occur on the covered lands.

Formerly unknown in Washington, tricolored blackbirds (*Agelaius tricolor*) have begun to be observed in Eastern Washington since 2000, including sightings in Klickitat County. They are identified on the species of concern list for Wasco County, Oregon. Given its limited occurrence in the area and preference for open marshes and rangeland, this species is unlikely to occur on covered lands (Seattle Audubon Society 2005), and will not be addressed further in this EA.

Of the three sensitive woodpecker species, all are associated with the drier oak and pine woodland habitats east of the Cascade crest. Acorn woodpeckers (*Melanerpes formicivorus*) have no suitable habitat in the vicinity of the Applicants' Oregon lands (OSU 2012), and are only known from a few sites in Klickitat County (Klickitat River, Bickleton, and Balch Lake) (NatureMapper 2012). The Lewis's woodpecker occurs in open woodlands and is known to occur north and south of the Columbia River in Klickitat County and Hood River County (Cornell Lab Ornithology 2012). The white-headed woodpecker (*Picoides albolarvatus*) is nearly extinct from western Washington and is an uncommon resident in ponderosa pine forests on the east slopes of the Cascade Mountains in Washington (NatureMapper 2012; Smith et al. 1997). It is identified on the species of concern list for Hood River and Wasco Counties, Oregon and presumably could occur on the covered lands in Oregon. Both the white-headed woodpecker and Lewis' woodpecker (*Melanerpes lewis*) are typically found in oak and Ponderosa pine forests (NatureMapper 2012; OSU 2012). All three species could occur but be comparatively uncommon on the Applicants' Oregon lands.

3.2.2.4 Mammals

Of the sensitive bat species in Appendix B, all but the spotted bat (*Euderma maculatum*), may occur in the covered areas of Washington. Core habitat for spotted bats is further north in the Ponderosa forests along the eastern Cascades; this species is therefore unlikely to be found on the covered lands (Johnson and Cassidy 1997). The silver-haired bat (*Lasionycteris noctivagans*) occurs throughout Washington and Oregon, primarily in forested zones, and probably into alpine parkland. It occurs in the Columbia Basin in small numbers which are probably migrating individuals. It is known to occur in central Skamania County and is identified as a species of concern in Hood River and Wasco Counties Oregon (ODFW 2012c). These bats are most closely associated with forests, roosting almost entirely in trees, usually snags. Except during migration, they hunt primarily within forests, at the forest edge, in small clearings, and along ponds and rivers. The silver-haired bat likely occurs in the covered lands.

The pallid bat (*Antrozous pallidus pacificus*) occurs in arid, low elevation, rocky habitats and they have both physical and behavioral adaptations to desert living. This bat species occurs only east of the Cascades, and covered lands in Washington are in the periphery of this species' range making it highly unlikely to be found on covered lands. Townsend's big-eared bat (*Corynorhinus townsendii*) is a medium-sized insectivorous bat that occupies a broad range

of moist and arid habitats. In the west, it is located in pine forest regions. Five subspecies are recognized, with only one (*C. t. townsendii*) present in Washington. This bat can forage in almost any habitat and is one of the few bat species that forage more often in upland habitats than over water. In Washington, they occur in west side lowland conifer-hardwood forest, montane conifer forest, ponderosa pine forest and woodland, shrub-steppe, riparian habitats, and open fields (Johnson and Cassidy 1997, Woodruff and Ferguson 2005, WDFW 2011). In Oregon, this bat is found throughout the state (ODFW 2012c). Based on its range and habitat preferences, it is highly likely this bat occurs on the covered lands in both states.

The Yuma myotis (*Myotis yumanensis*) has been documented in eastern Klickitat County, and the small-footed myotis (*Myotis ciliolabrum)* in southwestern Klickitat County near the Columbia River. In Oregon, the Yuma myotis is found throughout the state, while the small-footed myotis inhabits dryer areas in the eastern part of the state (ODFW 2012c). The widespread Yuma myotis is a low-elevation bat that inhabits coastal forests, ponderosa pine forests, Douglas fir forests, and arid grasslands. It is more closely associated with water than any other Washington bat. The Yuma myotis is highly likely to occur on the covered lands. However, the small-footed myotis occurs only east of the Cascades, and covered lands in Washington are in the periphery of this species ranges making it somewhat less likely to be found on covered lands in Oregon or Washington. The long-eared myotis (*Myotis evotis*) is generally distributed throughout Washington and Oregon but is probably most common in east-side forests. This is the most abundant bat in lodgepole pine forests in Washington. It occurs in humid coastal forests to semi-arid short-grass prairie, but is probably limited to water courses in arid regions. It roosts in a variety of places including trees, buildings, and caves. The long-legged myotis (*Myotis volans*) primarily inhabits forested mountain regions in Oregon and Washington, where it roosts in trees, rock crevices, cracks, and crevices in stream banks. Both these myotis species are likely to occur on the covered lands.

Townsend's ground squirrel (*Spermophilus townsendii)* is found in sage-steppe habitats and is unlikely to occur on covered lands. This species will not be analyzed in the EA. Western gray squirrels *(Sciurus griseus griseus)* occur in localized populations in Washington, including one population in Klickitat County whose range overlaps the covered lands (Linders et al. 2010).Western gray squirrels in the Klickitat region favored conifer-dominated stands over mixed oak-conifer and pure oak. These squirrels were typically observed in areas with a conifer overstory and an open understory. Western gray squirrels are found in low-elevation forested areas in parts of western and central Oregon. Though closely associated with oak woodland habitats, western gray squirrels are also found in pine, madrone and fir forests. Although they are unlikely to occur on the Applicants lands in Oregon, they could occur on the Applicants lands in Washington.

Fishers (*Martes pennant*), a Federal Candidate Species, have not been documented in the covered area (WDFW 2012). Fishers prefer dense, mature forest, although the species inhabits second-growth forests that provide ample cover (Powell and Zielinski 1994, Johnson and Cassidy 1997). Considered to be extirpated in Washington (Lewis and Hayes 2004) fishers have recently been reintroduced to the Olympic peninsula. Oregon's fisher populations were either greatly reduced or eliminated from many areas due to non-regulated trapping, accidental poisoning, and habitat loss. Fishers currently occur in two small distinct populations in

southwest Oregon. Although the Washington State recovery plan for fishers includes establishing populations in the Cascades both north and south of Interstate 90 (Hayes and Lewis 2006), given their extremely low numbers and current locations in both states, it is highly unlikely that fisher may inhabit the covered lands in the future. Therefore, this species will not be addressed further in this EA.

The North American wolverine (*Gulo gulo luscus*), listed as a Federal Candidate Species, is a carnivore that occupies arctic, alpine and subalpine habitats in the northern portions of the northern hemisphere (Copeland et al. 2010). In Washington, the wolverine historically occurred in the alpine and subalpine habitats of the Cascades, Blue Mountains, and Rocky Mountains. Ongoing research projects and recent carnivore surveys have detected wolverines in or near each of these areas of Washington. In 2009 and 2010, wolverines were photographed at seven detection stations deployed near Mt. Adams in the southern Washington Cascades. While it could not be determined if these detections accounted for more than one individual wolverine, they do confirm the continued existence of wolverines in the southern Cascades of Washington. Wolverines have been found in Oregon several times since 1936, when they had been thought to be extirpated from Oregon (ODFW 2012d). Several have been found in counties in northeast and east central Oregon. One was found in Linn County in the central Cascades. In 1990, a dead wolverine was picked up on I-84 in Hood River County. Most recently, researchers captured images of wolverines on a trail camera and confirmed wolverine tracks in the Eagle Cap Wilderness Area in Wallowa County in 2011. However, to date, there is no evidence of a breeding population of wolverines in Oregon (ODFW 2012d). It is possible but highly unlikely, given their alpine and sub-alpine habitat preferences, the wolverine would occur on the covered lands. Therefore, this species will not be address further in this EA.

3.3 Land Use

The four counties included in this study are small, primarily rural counties, which include forest production and agricultural production as the predominant land uses. Skamania County has a land area just over 1,650 square miles. The county is primarily comprised of federal forest lands, state forest lands, and private forest lands. Mt. St. Helen's National Volcanic Monument, The Gifford Pinchot National Forest, fish hatcheries, research labs and other federal government owned-facilities are included within the county. Approximately eighty five percent of the land in Skamania County is not taxable by the county. Private timber companies own other large tracts. Only about 540 acres are in agricultural production (Mill A Community Action Committee 2012). Of the approximate 1,077,365 acres in Skamania County, the Gifford Pinchot National Forest makes up 761,745 acres, with the Mount St. Helens Monument area comprising 75,627 acres. The Columbia River Gorge National Scenic Area has purchased an additional 17,501 acres within the National Scenic Area, while the State of Washington Department of Natural Resources covers 84,769 acres and Washington State Parks include 4,198 acres (Skamania County 2012).

Klickitat County has a land area of slightly more than 1,870 square miles. About half of that land is used for agricultural production. The remainder is primarily open space and forest lands (Klickitat County Public Works 2012).

There are just over 520 square miles of land in Hood River County. About half of that is national forest land, with residential lands comprising just less than one quarter of the land. The

remainder of the land is private commercial and county forest land and agricultural land (Hood River SWCD 2012).

Wasco County is comprised of nearly 2,400 square miles of land area. Over 60 percent of that land is used for agricultural production. The remainder includes a portion of Mt. Hood National Forest, as well as other forest lands, and a portion of the Warm Springs Indian Reservation (Wasco County 2012).

3.4 Socioeconomics and Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that Federal agencies identify disproportionately high and adverse human health or environmental impacts on minority or low-income individuals. Demographic data for the study area indicates that the minority population is significantly lower than in many other areas of the State (U.S. Census Bureau 2008). Low-income populations, however, are more likely to be present in the vicinity, based on the available data on poverty rates.

Except for one very small parcel in Yakima County, the covered area lies within Skamania and Klickitat Counties, Washington, and in Hood River and Wasco Counties, Oregon, all of which are sparsely populated, rural areas heavily engaged in timber and agricultural production, with economic growth occurring in tourism-related industries. No major population centers exist in the area, although several small communities, Stevenson, Carson, White Salmon, Bingen, and Lyle (Washington), as well as Hood River and Mosier (Oregon), are nearby. The combined population of the four counties is 78,943 as of the 2010 Census (U.S. Census Bureau 2010). Census data for each of the four counties indicate that the population in the area is between 83 and 93 percent white in each of the counties, 87 percent over all four counties. This compares to 77.3 percent for Washington State and 83.6 percent for Oregon.

The 2010 Census data also indicate that income in the area is below the respective State median in three of the four counties (Skamania County is 85 percent of the State median, Klickitat County is 65 percent of the State median, and Wasco County is 86 percent of the State median, but Hood River County is slightly above the State median at 104 percent of the State median). The higher income level in Hood River County is likely attributable to the lower unemployment rate in that county, along with higher-paying manufacturing jobs and the strong tourism- and services -based economy. In 2010, between 9.4 percent and 19.5 percent of the population in these four counties was earning an income below poverty level (9.4 percent in Skamania County, 9.5 percent in Hood River County, 15.5 percent in Wasco County, and 19.5 percent in Klickitat County), compared to 14 percent in Oregon and 12.1 percent in Washington (U.S. Census Bureau 2010). Other income and employment data for each of the four counties is included in Table 3-1.

Table 3-1: Income and Employment by County for Four-County Area (2011 data unless otherwise indicated)

	Skamania County, Washington	Klickitat County, Washington	Hood River County, Oregon	Wasco County, Oregon
Per Capita Income, 2010	$24,140	$21,553	$23,930	$42,133
Unemployment Rate, April 2012	10.4%	9.5%	7.0%	8.0%
Total Non-Farm Employment, 2011	2,567	5,888	10,350	9,430
Agriculture, Forestry, and Fishing	19	686	2,405*	N/A
Mining, Logging, and Construction	299	436	350	350
Leisure and Hospitality	602	433	1,910	1,080
Government	569	806	1,350	2,330

This figure is the 2010 annual employment
Sources: U.S. Census Bureau 2010, Oregon Labor Market Information System, Washington State Employment Security Department, Bureau of Labor Statistics

Multiple forces have contributed to the recent changes in the Pacific Northwest timber industry. In general, the timber industry is characterized as being highly competitive; there is a relatively low degree of concentration of production among the largest producers and there is essentially a single national price for commodity grades of lumber (Haynes 2008). In recent decades, competition has intensified with increased harvesting in the U.S. South and interior Canadian Provinces. The U.S. South now accounts for the largest regional share of U.S. timber harvest, and is expected to continue to be the largest timber-producing region of the country, accounting for half or more of total harvests (Ince et al. 2011). New technologies and increased mechanization have led to mill closures; generally, less efficient mills located near Federal forests have been closed in favor of larger more advanced facilities closer to major transportation corridors or private timberlands (Routman 2007; Haynes 2009). In addition, other forces such as endangered species protections, fluctuations in domestic consumption, shifts in international trade, and changes in timberland ownership, have contributed to changes in the Pacific Northwest timber industry. Overall, these forces have created economic incentives for private landowners to grow smaller, more uniform trees.

Klickitat and Skamania Counties have respectively realized 36% and 75% reductions in total timber harvest, and 65% and 70% decreases in forest industry employment over the period from 1990-2010 (USFWS 2012c). The number of forest industry mills, just in Klickitat and Skamania Counties alone, have dwindled from 8 mills to 2, representing a loss of over 600 direct jobs, over the period from 1990-2010. Four additional mills and approximately 500 additional direct jobs have been lost in neighboring Counties in the local area. Consequently, Klickitat and Skamania Counties have some of the highest unemployment rates in the State of Washington

(Table 3-1). Skamania County is one of five counties throughout the range of the spotted owl identified in a USFWS Economic Analysis to be the most economically sensitive to future changes in timber harvests (USFWS 2012c). These counties have a heavy reliance on continued forest management and timber harvest for economic survival. Local county government essential services, library districts, school districts, hospital districts and other essential community services depend upon forest management and timber harvest for their continued existence.

SDS Lumber has been in operation since 1946 and provides 300 direct jobs and operates the only remaining mill in Klickitat County. Similarly, there is only one remaining mill in Skamania County. These mills rely upon the sustainable management of all private forest lands in the area to provide sufficient timber to stay in business.

3.5 Climate Change

Many changes have been observed in global climate over the past century. The nature and causes of these changes have been comprehensively chronicled in a variety of recent reports, such as those by the Intergovernmental Panel on Climate Change (IPCC) (IPCC 2007) and the U.S. Global Change Research Program (http://www.globalchange.gov/). Federal agencies have acknowledged that climate is changing rapidly and have developed policies and strategic plans that address agency activities, land management, and fish and wildlife resources (USFWS 2010b; USGS 2010; USFS 2010; EPA 2010). Past and future trends in climate parameters, e.g. temperature and precipitation, have been determined through data collection and modeling. Climate changes are predictable phenomena over the long term though actual timing and intensity of such changes may vary on an annual basis.

Regionally averaged temperature rose about 1.5°F over the past century (with some areas experiencing increases up to 4°F) and is projected to increase another 3 to 10°F during this century (Mote et al. 2008). Higher greenhouse gas emissions scenarios, projected by climate models, would result in warming in the upper end of the projected range. Increases in winter precipitation and decreases in summer precipitation are projected by many climate models (Hamlet et al. 2005), though these projections are less certain than those for temperature. Impacts related to changes in snowpack, streamflows, sea level, forests, and other areas are anticipated in the coming decades in response to continued and more rapid warming (Karl et al. 2009). Two notable changes are 1) increased insect outbreaks, wildfires, and changing species composition in forests posing challenges for ecosystems and the forest products industry, and 2) salmon and other cold water species experiencing additional stresses as a result of rising water temperatures and declining summer streamflows (Karl et al. 2009).

There is no definitive information related to how the forest landscape on the covered lands in the four counties of Washington and Oregon is affected by the changes described above. However, it is assumed that impacts in these counties would be similar to those predicted for other areas and that reduced snowpack and earlier spring runoff may affect fish and wildlife resources and also make forests drier than usual, potentially increasing the risk of fire and, over time, possibly changing the vegetative composition of the landscape (Backlund et al. 2008).

4 Environmental Consequences

4.1 Vegetation

4.1.1 No Action Alternative

Under the No Action Alternative, forested stands greater than 60 years old outside the 1.8-mile spotted owl home range radius on the Applicants' ownership in Washington will be targeted for harvest if they are likely to be spotted owl habitat as defined in the Washington Forest Practices Rules. In Oregon, stands greater than 45 years of age will also be targeted for harvest. Currently, there are 18,646 acres of forest stands between 60-80 years of age (YFM) and 18,478 acres of forest stands greater than 80 years of age (Sub-Mature) in the covered lands. Under the No Action Alternative, the Applicants' will continue harvests focusing on removing spotted owl habitat. Approximately 40,000 acres of older forests will be harvested in the next 10-15 years. Harvest at this level will result in a total of 4,697 acres of spotted owl dispersal and YFM habitat remaining across all covered lands, 3,694 acres of which will be in the White Salmon SOSEA, with the remainder in the Columbia Gorge SOSEA, i.e., areas currently restricted under existing regulatory mechanisms. In the period from 20-60 years into the future, the Applicants will manage their commercial forestlands on a 45-year rotation ensuring no forest stands greater than 45 years of age occur on the landscape except in riparian buffers and other sensitive areas that require retention of trees to protect unique ecological values.

Snag retention, as they are available, and green trees retained to become older 'wildlife trees,' will be provided as required by the Oregon and Washington Forest Practices Rules under the No Action Alternative. However, these would only be the minimums required and often times do not include any snags because of forest conditions created by previous regeneration harvests.

The landscape will, thus, be a mixture of young forest age classes distributed across the landscape. Understory vegetation associated with older forests will be eliminated as these stands are harvested.

Of the special-status plant species that may occur in the covered area, only tall bugbane and clustered lady's-slipper are associated with mature forests. Under the No Action Alternative, habitat for these species would be limited and likely reduced as mature forest stands that constitutes spotted owl habitat is removed. However, it is possible that some forest stands containing these plant species will remain if they are located in or adjacent to riparian buffers or in leave tree areas required under Oregon and Washington Forest Practices Rules.

Western wahoo, which is associated with moist draws and ravines, is most likely to occur in RMZs and would receive some protection, depending on the stream type. Forest edge habitat for common blue-cup would occur along edges of early seral forest. Potential habitat for Nuttall's quillwort may be protected if it is located within an RMZ; however, if it occurs in forested wetlands it may or may not be protected because under Forest Practices Rules forested wetlands are not protected from harvest unless they are bogs. The No Action Alternative may be advantageous for branching montia, which occurs in disturbed areas, as the frequency of ground disturbance within a given area would be greater under the No Action Alternative because of the shorter regeneration-harvest rotation. This increase in frequency and

amount of ground disturbance could make it less likely that the four special-status plant species not associated with disturbed sites would persist if they currently inhabit the covered area.

4.1.2 Proposed Action Alternative

Under the Proposed Action Alternative, the Applicants would manage conifer-dominated, commercial forestlands on an average 60-year harvest rotation, normally between 50 and 70 years of age. This management approach will result in stands in the 45-70 years age range to be on the landscape, a condition that would not occur under the No Action Alternative. By protecting older forest stands as SSAs, the Applicants will ensure retention of some older forests on the landscape for the next 60 years. One SSA protects 411 acres of approximately 80 year old forest with YFM and Sub-mature habitat characteristics along the Little White Salmon River. Under the No Action Alternative, approximately 271 acres of the SSA can be harvested and another 70 acres can be partially cut (30% every ten years). The remaining 70 acres cannot be harvested under the Washington Forest Practices Rules. None of this SSA would be harvested under the Proposed Action Alternative. Another 240 acres in the White Salmon SOSEA centered around a spotted owl site, consisting of older Douglas fir forest stands and/or Oregon white oak stands with large pockets of Douglas fir forest, will also be retained for the next 60 years. This 240-acrea area is part of 346 acres within the 0.7-mile spotted owl circle that is currently restricted from harvest under the Washington Forest Practices Rules.

Commercial thinning of stands under the Proposed Action Alternative will result in stands age 50 and older becoming more structurally complex than if allowed to grow without thinning, and under the No Action Alternative these actions would not be undertaken. Implementation of a snag retention and creation program will increase habitat diversity and is intended to improve prey species habitat for spotted owls. Stands of this age or structural features will not be allowed to occur under the No Action Alternative.

The Applicants will also defer some older forest stands within the SOSEAs from harvest. Within four site centers in the White Salmon SOSEA, Applicants' will defer any habitat-removing harvest within the 0.7 mile radius circle for the first ten years under the Proposed Action Alternative. Non-habitat with habitat potential will be encouraged to be thinned or treated with snag prescriptions, and be allowed to become habitat. This will result in older forest stands remaining longer on the landscape than under the No Action Alternative.

Under the Proposed Action Alternative, in the White Salmon SOSEA, at least 9,424 acres of the Applicants' commercial forest land will remain or develop into spotted owl habitat over the duration of the SHA. This compares to the No Action Alternative of 3,694 acres of spotted owl habitat in management circles in the SOSEA.

With longer regeneration-harvest rotations, the frequency and amount of ground-disturbing activity would be slightly less under the Proposed Action Alternative than under the No Action Alternative. There would be less potential for disturbance of areas that may contain special-status plant species. Some mature forest stands would be retained because forests stands 45 to 60 years old would remain on the landscape. Harvest deferrals and protection of SSAs may also provide additional protection to special-status plant species. With extended harvest rotations, there is a greater probability that habitat for tall bugbane would develop in the covered

area, and it would persist for a longer time than under the No Action Alternative. With extended harvest rotations, the amount of forested area that is commercially thinned would increase, which could increase habitat availability for common blue-cap in areas where thinning results in creating small openings of early seral forest habitat.

4.2 Wildlife

4.2.1 No Action Alternative

Figures 4-5 through 4-8 in the SHA show spotted owl habitat retention within the White Salmon SOSEA and across all the covered lands over a 60-year time frame under a regeneration harvest regime with an average 45-year rotation under the No Action Alternative. These figures provide the basis for the following discussion of environmental consequences to species that may be affected by forest management activities that will occur under the No Action Alternative.

4.2.1.1 Threatened and Endangered Wildlife Species

Northern Spotted Owl

Under the No Action Alternative, habitat for spotted owls would be managed in compliance with the Washington Forest Practices Rules (WAC 222-10-041), Oregon Forest Practices Rules (ORS 527.610), and would not require an ITP under the ESA, due to incidental take avoidance. SDS has 46,244 acres of commercial forestlands in Washington, and 12,141 acres of commercial forestlands in Oregon. BLC has 11,601 acres of commercial forestlands in Washington (SHA Figure 2-1 and Table 3-1). Together, the Applicants own 69,986 acres classified within its inventory as commercial forest land. The baseline includes all lands that the Applicants manage in Washington and Oregon under the current Forest Practices Rules, which totals 81,587 acres.

Currently, Washington Forest Practices Rules requires spotted owl circle management and protection on private timber lands (WAC 222-10-041, WAC 222-16-050) in SOSEAs. These requirements are described in Chapter 2. There are 30 northern spotted owl site centers in the vicinity of the Applicants' lands in Washington, four of which are within the Columbia Gorge and 14 are within the White Salmon SOSEAs. All site centers, except for one, are located on USFS, WDNR, or other private lands.

The White Salmon and Columbia Gorge SOSEAs encompass approximately 54% (31,487 acres) of the Applicants' commercial forestlands in Skamania and Klickitat Counties (57,845 acres). Under current Forest Practices Rules, the Applicants could harvest all the acreage in the SOSEAs except spotted owl habitat protected by harvest restrictions associated with the SOSEAs, i.e., all suitable habitat within 0.7 mile circles and the highest quality 2,605 acres of habitat within the 1.8 mile radius. Although WDNR has completed identification of the highest quality 2,605 acres for each owl site in the White Salmon SOSEA, they have not completed identification of the highest quality 2,605 acres for each owl site center in the Columbia Gorge SOSEA. Thus, the Applicants have conservatively assumed that all current acres of habitat on their lands will be identified as part of the highest quality 2,605 acres in the Columbia Gorge SOSEA. As a result, there are 3,694 acres of spotted owl habitat restricted from harvest under the Washington Forest Practices Rules in the White Salmon SOSEA and 1,003 acres of habitat restricted from harvest in the Columbia Gorge SOSEA. Using this approach, a total of 4,697

acres of SDS and BLC lands are identified as currently restricted from harvest on Applicant's lands in the White Salmon and Columbia Gorge SOSEAs.

In Oregon, Forest Practices Rules require an evaluation of proposed forestry activities within a half mile of a spotted owl nest site or activity center. Operations must leave a minimum 70-acre "core area" consisting of the best available suitable habitat encompassing the nest site. In most cases, timber harvesting within the core area is not allowed. Forest practices inside and outside of the core area that disturbs owls' nesting behavior must be deferred until the end of the breeding and fledgling season. The Applicants have a total of 12,141 acres of commercial forestland in Oregon. Since there are no spotted owl sites on their ownership, and the 70-acre cores of sites located on USFS lands do not intersect the Applicants' lands, there are no restrictions on timber harvest of spotted owl habitat on their Oregon lands.

Over the past decade, the Applicants have regeneration harvested an average of approximately 1,500 acres annually. The Applicants report that harvests have consisted of a mixture of age classes depending upon market conditions, with an emphasis however, on older age classes with large average diameter logs that are approaching a size of limited markets.

Under the No Action Alternative, the Applicants' current forest management regime is to harvest the mature forest on their lands that are not encumbered by spotted owl protection per the Washington Forest Practice Rules. The Applicants are currently harvesting their lands on a 45-year average forest rotation age. The Applicants will continue operating at that harvest rate until they have essentially eliminated all their forest stands that are greater than 45 years of age. Harvest at this level will result in 4,697 acres of spotted owl habitat remaining on the Applicants lands that is within the 1.8 mile spotted owl circles in the two SOSEAs and that is currently restricted from timber harvest. In Oregon, lacking any restrictions on harvest of spotted owl habitat, the Applicants anticipate harvesting the habitat within the next decade. In addition to the forest management approach and shorter rotations, the Applicants are not allowing non-habitat within spotted owl circles to grow into suitable owl habitat to avoid additional regulatory burdens.

Under the No Action Alternative, new nest sites or portions of spotted owl home range circles that are discovered in the future would be managed per the requirements of WAC 222-10-041,ORS 527.610, and ESA Section 9. This would require the WDNR determining the highest quality habitat within the 1.8-mile radius circle. Timber harvest would be conducted as described above to eliminate any spotted owl habitat available for harvest under the Forest Practices Rules. However, because of the shorter harvest-rotation times that would occur under the No Action Alternative (45-year average rotation), it is unlikely that YFM habitat or Sub-mature habitat would be established in the covered area, particularly outside of RMZs or other ecologically sensitive areas subject to regulatory restrictions.

In summary, the 45-year harvest rotation interval would likely preclude the future development of YFM habitat, both within and outside 1.8 mile owl territories, because 45 years is too short of a time frame for the development of this habitat type. Not only would habitat be precluded from development with a 45-year harvest interval, if spotted owl habitat that is currently restricted from harvest is lost to natural disturbance, i.e., fire, ice storms, disease, there is no incentive to

grow replacement habitat. The possibility exists that the amount of habitat currently restricted from harvest (4,967 acres) would diminish over time as it subject to various disturbance events.

4.2.1.2 Other Special-Status Species

Larch Mountain Salamander

Habitat for Larch Mountain salamander may be impacted under the No Action Alternative, particularly talus slopes with a conifer canopy. It is likely, however, that this habitat feature would be identified during the Applicants' Wildlife Program review process and would be given priority for leave tree areas, thus minimizing impacts under the No Action Alternative. Other habitat features used by this species, such as large down logs or sloughed bark at the base of large snags are likely to occur in forested stands greater than 60 years of age. These stands will be targeted under the No Action Alternative, so it is expected that the down logs would be disturbed or degraded, and the older snags would be reduced unless they are located in an area designated for wildlife tree retention under Forest Practices Rules. These effects are likely to occur to Larch Mountain salamander on the Applicants' ownership in Skamania County, Washington and Hood River County, Oregon along the Columbia Gorge where the species is known to occur.

Goshawk

Under the No Action Alternative, most mature stands (greater than 40 years of age) would be harvested in the next decade. Goshawks would still be likely to occupy some stands throughout the ownership in Washington and Oregon, especially in and adjacent to riparian areas. They may also continue to nest in older trees in the uplands if they are included in a leave-tree patch required under Forest Practices Rules. Goshawks are known to nest in older remnant trees left in younger forested stands (Bosakowski et al. 1999). However, under the No Action Alternative, potential goshawk habitat would be reduced substantially in the next couple of decades as SDS and BLC focus on eliminating spotted owl habitat.

Olive-sided Flycatcher and Willow Flycatcher

Under the No Action Alternative, the amount of habitat available for the olive-sided flycatcher, associated with mature forest conditions with tall trees and snags, with an abundance of forest edges and clearings, would be reduced in the first couple of decades as SDS and BLC focus on eliminating potential spotted owl habitat. Habitat for this flycatcher would likely be reduced under the No Action Alternative. However, the willow flycatcher inhabits moist, shrubby areas with standing or running water, and winters in shrubby clearings and early successional growth (Cornell Lab of Ornithology 2012). Thus, this species of flycatcher would likely benefit from the No Action Alternative that is expected to result in a substantial increase in stands of early successional growth in the next couple of decades.

Woodpeckers

Under the No Action Alternative, older ponderosa pine forested stands will be regeneration harvested, and these will be prioritized for harvest in the first decade if they could potentially be used by spotted owls. This approach has the potential to reduce the quality and amount of habitat for Lewis's and white-headed woodpeckers. Some oak woodland habitat, identified as productive oak woodlands in the SHA (Environ 2012), would also be subject to harvest, thus,

reducing the habitat for acorn woodpeckers. Under the No Action Alternative, snag retention will include only the minimums required under Forest Practices Rules. Therefore, the overall quality and amount of existing habitat would likely be reduced for these three species of woodpeckers under this alternative.

Myotis Bats and Other Bats

Under the No Action Alternative, potential roosting habitat for tree-roosting bats would be limited to the RMZs and other ecologically sensitive areas that require protection under the Forest Practices Rules. Some additional roosts may occur in older trees and snags if left intact as part of the wildlife and leave tree requirements of the Forest Practices Rules. However, existing older forest stands (greater than 45 years old) are expected to be eliminated through an active plan to conduct regeneration harvest of existing or potential spotted owl habitat. Impacts on roosting habitat and hibernacula in rock outcrops may also be affected by disturbance or removal of canopy cover, which could alter the conditions of the site. Bats may forage over recently harvested areas; however, as these stands develop they are likely to become too heavily stocked for bats to easily move through them. With an average rotation age of 45 years, managed stands would not attain the understory openness or structure for suitable bat habitat under the No Action Alternative.

Western Gray Squirrel

Under the No Action Alternative, some oak woodland habitat, identified as productive oak woodlands in the SHA (Environ 2012), would be subject to harvest, thus, reducing the habitat for western gray squirrels that may exist on SDS and BLC ownership. Under the No Action Alternative, snag retention will include only the minimums required under Forest Practices Rules, which, after regeneration harvest, would leave fewer snags on the landscape. Therefore, the overall quality and amount of existing habitat would likely be reduced for the gray squirrel under this alternative.

4.2.2 Proposed Action Alternative

Figures 4-5 through 4-8 in the SHA show spotted owl habitat retention and growth within the White Salmon SOSEA and across all the covered lands over a 60-year time frame on an average 60-year rotation (range of 51 to 70 years) under the Proposed Action Alternative. These figures provide the basis for the following discussion of environmental consequences to species that may be affected by forest management activities that will occur under the Proposed Action Alternative.

4.2.2.1 Threatened and Endangered Wildlife Species

Northern Spotted Owl

Overview - Under the Proposed Action Alternative, forest management activities that would be conducted by the Applicants deviate substantially from their current forest management activities conducted under the No Action Alternative. Incidental take of spotted owl habitat would occur under the Proposed Action Alternative, both when conducting forest management activities during the term of the SHA, and potentially at the end of the SHA when lands are managed to the Elevated Baseline. The majority of the habitat that is currently restricted from harvest under the No Action Alternative would be available for harvest, and the Applicants over

time, would likely harvest it. However, the Applicants propose to slow their current rate of harvest; maintain an elevated baseline of habitat across the landscape; manage for an average 60 year harvest rotation; create SSAs that retain and create suitable owl habitat; defer harvest of owl habitat in certain areas; conduct commercial thinning that is expected to accelerate development of owl foraging, roosting and dispersal habitat; implement a snag retention and creation program that contributes to the quality of owl habitat and provides habitat for owl prey species; and provide owl nest site protections. These actions, and others associated with the SHA, are intended to provide benefits to spotted owls.

It is not the purpose of the SHA to supply old forest habitat on the covered lands that might provide an abundance of nesting habitat. Rather, the conservation approach is to provide mostly foraging, roosting and dispersal habitat distributed across the covered lands, which is intended to benefit spotted owls by providing more, and if successful, higher quality areas within which they can forage, roost, and disperse.

Except for a couple of areas (owl site #753 and the Little White Salmon set aside areas), the SHA does not put blocks of habitat into a reserve status for the Permit term. Instead, habitat is considered to be a dynamic resource that can shift locations over the duration of the SHA. Since the SHA is focused on primarily providing foraging, roosting and dispersal habitat, it is more reasonable to accomplish this goal over the 60-year term than if the goal was to provide nesting habitat.

A major theme of the Proposed Action Alternative is the concept of managing for spotted owl habitat at a scale larger than the 0.7 and 1.8 mile radius circles. Since the spotted owl listing under the ESA, the Applicants have been following Forest Practice Rules for the protection of spotted owls, both for Oregon and Washington. In Oregon it means providing a 70 acre core around an owl site. Within Washington, that means providing habitat at the 0.7 and 1.8 mile radius spatial scales. The Applicants covered lands intersect 30 spotted owl territories in Washington, of which 18 receive regulatory protection because they are located within SOSEAs. The amount of acreage owned by Applicants in these circles is presented in Table 2-2. Within the 0.7 mile radius, the Applicants own from as little as 2 percent in owl site #875 to a high of 56 percent in owl site #753. Within the 0.7 to 1.8 mile radius, the Applicants own from as little as 3 percent in owl site #284 to a high of 39 percent in owl site # 1003. The majority of the ownership within these owl management circles occurs on state and federal lands (Table 2-2).

The Proposed Action Alternative would replace owl management circles at the 0.7 and 1.8 mile scales, and instead, the Applicants would manage for habitat at three scales: 0.7 mile radius of some spotted owl sites; the White Salmon SOSEA; and at the covered lands scale. This approach acknowledges that foraging, roosting and dispersal spotted owl habitat is not a static resource that should be in permanent 1.8 mile radius reserves, but rather, this habitat is a dynamic resource over the covered lands and over time can shift in location. The covered lands appear to be able to produce YFM habitat within the 60 year time frame of the SHA, based on past logging history. Probably the majority of the covered lands that are currently in a YFM condition, were previously harvested. This previous logging history appears to indicate that YFM habitats can be managed and grown during the term of the SHA. To further try to accomplish

this, the Proposed Action Alternative has pre-commercial and commercial thinning approaches that are intended to achieve YFM habitat. The Proposed Action Alternative is intended to have some similar concepts to the emphasis-use approach described in Everett and Lehmkuhl (1996).

The Proposed Action Alternative encourages the growth of YFM habitat across the broader landscape, both within the SOSEAs and outside of them, without it acting as disincentive for the landowner. Instead of the landowner precluding its development for fear of additional restrictions, they can manage for it to meet required SHA habitat targets. Below are descriptions of the Proposed Action Alternative and how it is expected to benefit spotted owls.

Longer Harvest Rotations - Implementation of a longer harvest rotation of conifer-dominated stands, i.e., 60-year rotation as opposed to a 45-year rotation, will result in more acreage on the landscape that range from 50-70 years of age. This is notably different than the No Action Alternative for timber harvest. These stands, when commercially thinned, can develop into spotted owl YFM habitat, especially when complemented with a snag retention and creation program. A result of thinning would be an acceleration of the stand into a YFM condition that could be used by spotted owls. The additional snags and wildlife trees provided by the Applicants adds structure and diversity to the stand, and provides potential habitat for spotted owl prey, notably flying squirrels. The 60-year rotations, coupled with other forest management activities, implemented under the Proposed Action Alternative would result in an increase in spotted owl habitat quality for foraging and roosting and the amount of these habitats compared to the No Action Alternative.

The Applicants covered lands outside of SOSEAs consists of 47,523 acres (60% of which is in Washington and 40% in Oregon). Applicant's commercial forest land outside of SOSEAs is 38,499 acres. Under the Proposed Action Alternative, the 60-year rotation forestry will result in greater habitat conditions across the covered lands outside of SOSEAs than would occur under the No Action Alternative. These 60-year rotations should, on average, provide spotted owl Dispersal and YFM habitat on approximately 1/3 (12,705 acres) of these commercial forest lands in any given year. Outside of SOSEAs, there are currently no spotted owl circles or regulatory requirements for the Applicants to maintain any spotted owl habitat on their lands. Thus, providing 12,705 acres of habitat under the Proposed Action Alternative is substantially greater than the minimal amounts of scattered dispersal habitat patches aged 40-45 years that would occur under the No Action Alternative. While this benefit is likely to occur, there is no requirement that the Applicants maintain 33% of all covered lands outside SOSEAs in habitat throughout the SHA term, as there is within the White Salmon SOSEA. The Applicants state this is due to the need for operational flexibility in their forest management operations.

Special Set-aside Areas - The establishment of two SSAs located in the White Salmon SOSEA will ensure that older forests, i.e., YFM and Sub-mature habitat, will be on the landscape over the next 60 years. The Little White Salmon SSA is approximately 411 acres consisting of YFM and Sub-mature habitat characteristics along a 2.9 mile section of the Little White Salmon River. Some of this area is within a riparian zone along the river and, thus, there are limitations on harvest, per existing Forest Practice Rules. There are estimated to be 70 acres that can't be harvested and another 70 acres that can be partial cut every 10 years. The remaining 271

acres are available for harvest under the No Action Alternative. However, under the Proposed Action Alternative it would be left to mature and provide habitat for spotted owls. This SSA is expected to provide conservation benefits to the owl by retaining a dispersal corridor in this area and is consistent with, and supports past efforts to preserve habitat on USFS property immediately to the west in Late Successional Reserves and in the Columbia River Gorge Scenic Area.

A second SSA totals approximately 240 acres around the one nest site on the Applicants' covered lands (site #753; South Gilmer Creek). Recent survey efforts by WDNR have not detected spotted owls at this site, however, the site is considered active for forest practices review and the potential for spotted owl return does exist. Within the 240-acre SSA being protected by the Applicants, no timber harvest will occur for the term of the SHA. This reserve is designed to provide a sufficient nest core for any current or future occupancy by spotted owls and to further the owls' ability to continue or resume use of the site as a nesting territory. This set aside mirrors and complements nest cores established by WDNR on the remainder of the White Salmon SOSEA and links to WDNR habitat immediately adjacent to this core. Most of this set aside currently consists of YFM habitat and/or Oregon white oak stands with large pockets of Douglas fir forest. This set aside will contribute to nesting, roosting, and foraging habitat for spotted owls over the SHA term and, provided there are no significant disturbance events, this habitat should improve in quality over the 60 year permit term.

Harvest Deferrals - The Applicants' ownership comprises insignificant amounts, i.e., less than 15%, of most of the 0.7 mile radius spotted owl site centers within the White Salmon and Columbia Gorge SOSEAs , with WDNR and USFS comprising the majority of ownership inside these circles (Table 2-2). In addition, WDNR's HCP provides permanent nest area set asides on a majority of the site centers in the White Salmon SOSEA involving the Applicants' lands. Under the Proposed Action Alternative, the Applicants' will defer any habitat-removing harvest within the 0.7 mile radius circle of four site centers for the first ten years of the SHA. These four site centers are the only sites that have greater than 15% of the Applicants ownership within the 0.7 mile circle, i.e., site numbers #753 (56% of acreage), #1116 (18% of acreage), #1003 (30% of acreage), and #734 (36% of acreage). Within these four site centers, non-habitat with habitat potential will be encouraged to be thinned or treated with snag prescriptions, and be allowed to become at least YFM habitat with the SHA. The 10-year deferral in harvest of habitat is designed to not only allow benefits of the SHA to accrue prior to allowing any habitat removal in 0.7 mile circles, but also to allow this potential habitat to grow into, or be thinned to become, suitable habitat before habitat is harvested in the 0.7 mile circles. This is potential habitat that would not be allowed to develop under the No Action Alternative, the baseline under current Forest Practices Rules.

Commercial Thinning to Accelerate Habitat Development - Investigations in western Washington suggest that mid-rotation thinning, in combination with cavity-tree retention and/or creation can accelerate development of late successional habitat features in young forests (Garman et al. 2003, Beggs 2004, Lindh and Muir 2004). Thinning and cavity-tree retention have been suggested as a primary management technique for enhancing forest understory's for northern flying squirrels (*Glaucomys sabrinus*) (Carey and Johnson 1995, Carey 2000), the primary prey species of owls in western Washington (Forsman et al. 2004). Thinning of

Douglas fir forests allows for competitive release of canopy dominants and shade-tolerant understory trees, resulting in multiple canopy layers, increases in canopy depth, and enlargement of tree crowns (Oliver et al. 1991); these enhancements are associated with owl habitat, and tend to increase niche availability for breeding birds.

Under the Proposed Action Alternative, commercially thinning of qualifying conifer-dominated stands is made possible by incorporating an average 60-year harvest rotation into their forest management plan. This activity generally results in improved tree growth, with larger tree diameters, and wider spacing. The latter characteristic provides the potential for owls to move through these stands as they disperse, and to forage more effectively than an extremely dense stand. These stands also have the potential to develop into owl foraging habitat as snags and down logs are recruited. This is one of the potential benefits to owls from implementing a 60-year average rotation age for conifer-dominated stands that would not occur under the No Action Alternative.

Applying the commercial thinning prescriptions described in the SHA will expedite the development of future spotted owl habitat. All commercial thinning applications will also prescribe that some smaller sub-merchantable trees, especially shade-tolerant and hardwood species would also be retained to accelerate habitat conditions by contributing to the development of a second story and cavities. These prescriptions will result in a variable diameter distribution and an enhanced potential of meeting YFM habitat sooner than allowing this habitat to develop on its own over time.

For purposes of defining dispersal habitat under the Proposed Action Alternative, the Applicants have identified unmanaged (not thinned) conifer-dominated stands beginning at age 40 as meeting the dispersal habitat definition. In some cases, these stands also have the potential to provide foraging opportunities as unmanaged stands of this age frequently contain dead and defective trees that may provide habitat for owl prey species (Raedeke 2012).

For purposes of defining YFM habitat under the Proposed Action Alternative, conifer dominated stands age 60 or greater and conifer dominated stands age 50-59 that have been thinned under the thinning prescriptions defined herein, or are un-thinned but have had the commercial thinning snag and wildlife tree prescription applied, will be considered to be YFM. The Applicant has identified thinned, or snag treated, conifer dominated stands beginning at age 50 as having the conditions necessary to provide foraging opportunities for owls (SHA Appendix C). Thinning or snag and wildlife tree creation conducted under these prescriptions are expected to provide YFM characteristics including canopy closure, prey habitat structure, vertical diversity, and/or canopy lift, allowing owls to better utilize the stand.

Commercial thinning will be conducted across all the covered lands wherever economically feasible, to expedite the creation of new YFM habitat by age 50. Across the Applicants' entire productive forestlands (total acreage less non-productive lands, utility corridors, roads, etc.), approximately 76% of the acreage is less than 35% slope steepness and conducive to ground based harvest methods and commercial thinning. These percentages are consistent across all of the Applicants' lands, i.e., inside and outside of the White Salmon SOSEA.

In the White Salmon SOSEA, stands that are not on track to meet YFM habitat by age 50 will be evaluated for commercial thinning and/or snag creation treatments to contribute toward the minimum 16.5% of all acres within this SOSEA (4712 acres) required to be equivalent to YFM or better quality habitat. A minimum of 500 acres will be commercially thinned in the White Salmon SOSEA under these prescriptions in the first decade to provide YFM. The commitment to provide 16.5% of its ownership in the White Salmon SOSEA as YFM or better quality habitat and thin at least 500 acres in the first decade to accelerate development of the stands into YFM or better quality habitat would not occur under the No Action Alternative.

Snag Retention and Creation - The Applicants will provide conservation measures related to snag and wildlife tree development intended to enhance the foraging component of owl habitat by providing structure for owl prey species utilizing the unique mosaic of conifer and hardwood tree species available on the landscape as described in the SHA (Section 4.1.11). The snag and wildlife tree provisions will also be implemented in conjunction with commercial thinning to accelerate the stand towards meeting the YFM spotted owl habitat definition. Implementation of the snag program is expected to improve the quality of dispersal and YFM habitat by providing an increase in prey habitat. Dispersing spotted owls need to find adequate forage resources as they disperse, and the snag program is intended to improve prey habitat for that need. Adding this component to stands is intended to provide demographic support for nesting spotted owls.

One prey species that is expected to benefit from implementation of the snag program is the northern flying squirrel, which is a primary prey species for the spotted owl. Flying squirrel fitness is associated with understory vegetation diversity, dead wood, defective trees, and ectomycorrhizal truffle and lichen biomass and communities (Lehmkuhl et al. 2007). Bushy-tailed woodrats, another important prey species of the spotted owl, are also beneficiaries of providing dead wood. Under the Proposed Action, at least two snags and/or defective trees/acre will be left in the forest stand after commercial thinning to provide habitat for owl prey species and contribute to the structure of the stand necessary to qualify as YFM habitat. This forest management provision for owls would not occur under the No Action Alternative. At the time of regeneration harvest, the Applicants will retain two snags per acre (either residual or created) and leave one additional green recruitment tree (three trees per acre) which is two snags and one green tree more than what would occur under the No Action Alternative. Alternatively, the Applicants could retain and/or create additional snags at a rate of 20 per 100 acres and retain six green recruitment trees per acre at the time of regeneration harvest. These actions are expected to provide long-term benefits to spotted owls.

Habitat Across the Landscape - A subset of stands in the covered lands was surveyed to determine at what age they met the YFM habitat definition in the Forest Practices Rules (SHA Appendix B). This data was compared with inventory data for each stand to determine if minimum thresholds for YFM (either open-or closed-canopy) were present. Results of habitat determinations are provided in SHA Appendix C, which relates on the ground stand conditions to spotted owl habitat definitions.

In order to enhance net conservation benefits to spotted owls across this landscape, under the Proposed Action the Applicants will ensure a spatial and temporal distribution of owl habitat

throughout the SHA term in the White Salmon SOSEA and in other areas of important biological function. These measures include:

- At minimum, 33% (9,424acres) of all of the Applicants' commercial forest lands located within the White Salmon SOSEA will be in a habitat condition that meets or exceeds the definitions of owl habitat; no more than one-half of this acreage (16.5%) will be in the habitat definition of Eastside dispersal spotted owl habitat, and no less than one-half (16.5%) will be in the Eastside YFM spotted owl habitat definition;
- At minimum, 33% of all of the Applicants' productive forest lands within a 0.7 mile radius circles of each of the spotted owl sites #991, 1003, 1048, 753, 1116, 852 and 734 located within the White Salmon SOSEA, will be in a habitat condition that meets or exceeds the definition of Eastside YFM spotted owl habitat; and
- Prioritization of the harvest activities within these 0.7 mile radius circles as follows:
  - To the extent economically feasible, attempt to commercial thin and/or implement the provisions of the snag creation/enhancement program on non-habitat to expedite the development of new habitat as soon as possible; and
  - When conducting regeneration harvests of habitat in excess of the 33% minimum threshold, to the extent economically feasible, attempt to select harvest activities to occur in areas farthest from the site center first.

Under the Proposed Action Alternative, a minimum of 33% (9,424 acres) of the Applicants' commercial forest land (28,560 acres of commercial forestlands with potential for becoming owl habitat) will remain in habitat (½ in Eastside Dispersal (40-60 years) and ½ in Eastside YFM or equivalent (60+ years). The quantity of suitable habitat available to owls on the Applicants' lands in the White Salmon SOSEA will be almost three times greater under the Proposed Action Alternative than under the No Action Alternative.

The Applicants own only 3,103 total acres in the Columbia Gorge SOSEA (2,927 acres of which is commercial forest land). Although there is no commitment to providing 33% habitat within the Columbia Gorge SOSEA, given a 60-year rotation age it is expected that, on average, approximately 33% (967 acres) of productive acres (2,927 acres) will be habitat in most decades within the Columbia Gorge SOSEA under the Proposed Action Alternative.

Nest Site Protection - Although not highly probable given current owl behavior, it is possible that spotted owls may use alternate nest sites on a shifting or periodic basis. Under the Proposed Action Alternative, some mature and submature forest conditions will be retained and developed in riparian management zones and the SSAs on Applicant's lands. These areas, and areas of submature forests currently on the Applicants landscape that are not currently occupied by owls, may become occupied by new owls prior to regeneration harvest as a result of Applicant's forest management activities under the SHA.

If, during the course of normal operations, the Applicants discover or are informed of the presence of new owl nest sites they will implement conservation actions to help minimize any impacts of the taking for which they are authorized. The measures to be implemented under specific circumstances described in the SHA (Section 4.1.14) depend on where the new nest

site is in relation to the White Salmon SOSEA, and include protection of whatever portion of the new nest site 70-acre core is on their lands, 70-acre core harvest deferrals inside and outside the White Salmon SOSEA, and installation of nest box clusters to provide replacement nesting opportunities in the nearest habitat of sufficient size for nesting. Nest box clusters could be placed on lands not owned by the Applicants with the landowner's permission. This process can be repeated multiple times if a pair persists in the same general area over time. A nest box cluster would consist of three or more nest boxes placed in appropriate situations and would be constructed consistent with the best available science. The Applicants will also monitor the nest boxes for determining spotted owl presence and to ensure that barred owls are not using them. The Applicants, in coordination with the FWS, will assess the information to determine if barred owls are using the boxes and if so, determine how the boxes should be made inaccessible to their use. Harvest deferrals outside of SOSEAs and installation of nest box clusters, known to be successful in portions of northern California and on the Gifford Pinchot National Forest in providing alternative nest sites (E. Forsman, J. Kulig, pers. comm. to Dale Herter as cited in ENVIRON 2012), are conservation measures that would not occur under the No Action Alternative.

Habitat Within the Columbia Gorge and White Salmon SOSEA – Applicants own no habitat in 0.7 mile circles in the Columbia Gorge SOSEA. All of the Applicants' ownership in the 0.7-mile circles is within the White Salmon SOSEA and totals 1,156 acres of habitat (386 acres of Sub-Mature owl habitat and 770 acres of YFM (both Closed and Open canopied habitat). Under the Proposed Action Alternative, 916 acres of the 1,156 acres of habitat will eventually be harvested, excluding the 240-acre SSA. Approximately 285 acres in five owl circles would be available for harvest immediately. Habitat in the amount of 631 acres would be deferred for 10 years in four circles. At no time, will there be less than 33% of the Applicants productive forests in YFM habitat inside these four circles. Under the No Action Alternative, this habitat will remain in place but is subject to forest health issues or stand replacing fires.

At present, approximately 1,054 acres of the restricted habitat (best 2,605 acres plus habitat in the 0.7-mile circles) in both SOSEAs is Sub-Mature Habitat. Approximately 3,643 acres in both SOSEAs is YFM habitat (both closed and open-canopied). Under the Proposed Action, this habitat (totaling 4,697 acres) would eventually be available for harvest, excluding a portion of the 240 acre SSA. However, 8,872 acres of non-habitat in these circles will be allowed to become habitat in the future. In addition,4,712 acres of YFM or better quality habitat, and 4,712 acres of Dispersal habitat will be provided in the White Salmon SOSEA under the Proposed Action Alternative, which is 4,727 acres more habitat than would occur across all covered lands under the No Action Alternative. Under the No Action Alternative, total acreage of habitat on the Applicants lands within both SOSEAs will only amount to 4,697 acres (mostly YFM and Sub-Mature) 10 years from now.

Habitat Quality and Distribution - Under the Proposed Action Alternative, potential habitat will be managed to advance the development of YFM habitat by age 60 or earlier. In addition, stands will be protected from forest health issues and fire to ensure the commitment to retain 33% habitat the White Salmon SOSEA is achieved. Forest management actions to accelerate development of spotted owl habitat and provide a guaranteed minimum amount in the White Salmon SOSEA over the long term will not occur under the No Action Alternative.

Prey species of spotted owls often use snags or other defective trees for denning. Foraging adult owls and dispersing juvenile spotted owls require adequate prey resources to increase their chances of survival. Under the Proposed Action Alternative, the Applicants are committed to protecting and developing snags to benefit northern flying squirrels and other prey species, and ultimately, provide owls with increased prey. Providing additional snags and green trees that may become snags will improve the quality of the spotted owl habitat (YFM) under the Proposed Action Alternative when compared to implementing basic Forest Practices Rules under the No Action Alternative. Any enhancement beyond current Forest Practices Rules will only provide more habitat opportunities for prey species in Dispersal and YFM habitats, where these opportunities are often lacking.

Stands over 60 years of age (i.e., YFM and higher quality habitat) will be present longer on the Applicants' landscape under the Proposed Action Alternative. Whereas, under the No Action Alternative, these stands will continue to be targeted for immediate harvest to reduce the liability of retaining spotted owl habitat on any of the Applicants' lands. Under the Proposed Action Alternative, there will also be a corresponding reduction in the amount of forest 0 to 40 years across the landscape, and the quality and quantity of 40 to 60 year forest stands will improve as they will be allowed to age beyond those under a 45-year rotation (See SHA Section 4.3.2).

There is an assurance that 33% of the Applicants' productive forest lands will remain in spotted owl habitat in the White Salmon SOSEA under the Proposed Action Alternative. Habitat remaining and created on these lands, along with USFS and WDNR habitat reserves, will provide continued and direct support to owl territories within the White Salmon SOSEA. Under the No Action Alternative, habitat will remain static and occur only within the 1.8 mile radius owl circles within the SOSEAs, and it will never increase or be more distributed over the landscape.

Under the Proposed Action Alternative, owl habitat is likely to occur on approximately 33% of the Applicants' entire landscape because of the desire to level out stand acreage in each of the decadal divisions from age 0 to 60, i.e. approximately even amounts of six age classes. Under the No Action Alternative, virtually no habitat will occur outside of SOSEAs.

Habitat Development - Under the Proposed Action Alternative, the Applicants have committed to allow 490 acres of non-habitat (with habitat potential) to become habitat within the 0.7-mile regulatory circles of eight owl sites within the White Salmon SOSEA. Under the No Action Alternative, habitat will not be allowed to develop within these circles. A large portion (110 acres) of this potential habitat is in the Dry Creek owl circle (Site #734) and is currently at age 35 years. The 10-year deferral in harvest of habitat within 0.7 mile circles on four sites within this SOSEA is designed to allow potential habitat such as this to grow into habitat before any additional habitat acreage is harvested in the 0.7-mile circles. A portion of these 490 acres of current non-habitat will be thinned and allowed to become YFM under the SHA prescriptions during this 10 year deferral period. In addition, under the Proposed Action Alternative 7,361 acres of current non-habitat within owl circles in the White Salmon SOSEA (SHA Table 4-1), and 1,021 acres of non-habitat within owl circles in the Columbia Gorge SOSEA, for a total of 8,382 acres of non-habitat, will be allowed to grow into suitable habitat over the term of the SHA. This habitat regrowth would not occur under the No Action Alternative.

Habitat Removal - The Applicants own a total of 1,156 acres of habitat (386 acres of Sub-Mature owl habitat and 770 acres of YFM (both Closed and Open canopied) habitat inside all 0.7-mile owl circles within the White Salmon SOSEA. Under the Proposed Action Alternative, 916 acres of the 1,156 acres of habitat will eventually be harvested (excludes the Gilmer Creek-South, Site #753, 240 acre set aside) although not immediately due to the requirement to provide 33% of the SOSEA in habitat and the 10 year deferral of harvest activity within four 0.7 mile radius circles. Approximately 285 acres in five 0.7 mile owl circles within the White Salmon SOSEA are not subject to the 10 year deferral and could be available for harvest immediately. The Applicants also own habitat that is restricted from harvest in portions of owl circles between 0.7-mile and 1.8-mile radius. These circles are in the White Salmon SOSEA with 2,538 acres of restricted habitat, and four circles are in the Columbia Gorge SOSEA with 1,003 acres of restricted habitat.

Although under the Proposed Action Alternative some habitat could be harvested, several measures will be implemented to minimize the overall effects to owls. Under the Proposed Action Alternative, the Applicants' commit to provide 33% YFM or better quality habitat within a 0.7 mile radius which reduces the amount of habitat actually available for harvest. Habitat in the amount of 631 acres will be deferred from removal by harvest for 10 years in the four circles addressed above while other habitat (490 acres) is allowed to develop and commercial thinning is conducted to accelerate development of owl habitat. The SHA provides a minimum of 33% of the commercial forestry acreage as dispersal and YFM habitat (minimum of 16.5% YFM or better quality) across the White Salmon SOSEA landscape at all times. This measure results in a minimum of 9,424 acres of habitat across a broad landscape, instead of within individual circles, available for owls. In addition, the SHA provides for 33% of the commercial forest acreage to be habitat within 0.7 mile circles of the 14 spotted owl site centers in the White Salmon SOSEA, and the deferral of any removal of habitat within the 0.7 mile radius circle for the first ten years of the SHA. This is expected to contribute to the potential viability of these areas for owls determined to be important in the past by their occupancy. Forest management activities under the Proposed Action will also minimize the effects of habitat decreases by allowing 8,872 acres of what is currently non-habitat in the 14 circles in the White Salmon SOSEA and four circles in the Columbia Gorge SOSEA to develop into YFM quality habitat over the term of the SHA.

Furthermore, within the four site centers mentioned above, the Applicants will defer any removal of habitat within the 0.7 mile radius circle for the first ten years of the SHA. Thirteen of the site centers have nesting core areas of approximately 200 acres in size provided on WDNR land through their HCP. The 14th site center, located on the covered lands, will have a 240-acre nesting core provided by Applicants to support and complement the WDNR owl conservation strategy. Lastly, when harvest is allowed in any of the 0.7 mile radius circles of these 14 sites, Applicants will, where economically feasible, harvest in the areas farthest from the nesting cores first to further minimize the effect of habitat removal on owls. So, although some owl habitat within the spotted owl inner circles will be harvested under the Proposed Action Alternative, numerous measures are in place to minimize and offset any decreases in habitat and, in fact, result in more habitat well distributed across the landscape over the long term than would occur under the No Action Alternative.

Support for Existing Landscape Plans Supporting Owl Conservation - Spotted owl conservation on USFS lands near the Applicants' ownership is managed under the President's Northwest Forest Plan (USDA 1994), which essentially allows for little harvest of spotted owl habitat beyond required salvage and maintenance programs. Spotted owl management on WDNR lands intermixed with the Applicants' ownership falls under their Habitat Conservation Plan and amendment (WDNR 1997, 2004). The WDNR owl conservation strategy of preserving large nest cores (often 200+ acres) around known pair sites and retaining approximately 2/3 of remaining their lands in SOSEAs in NRF and near NRF owl habitats, allows for greater harvest of owl habitat than on USFS lands, but is still a beneficial conservative strategy. The forest management activities of the Applicants under the Proposed Action Alternative are similar to, though lesser in scale, to those being implemented under these two landscape management strategies. Thus, the Proposed Action Alternative complements and supports these adjacent owl conservation strategies.

Summary of Spotted Owl Affects for Both Alternatives – Both the No Action Alternative and the Proposed Action Alternative have some uncertainties associated with their potential implementation. Following is a brief discussion on some areas of uncertainty associated with the alternatives.

One area of uncertainty centers around the likelihood of the alternatives for providing spotted owl habitat over a 60-year time frame. The No Action Alternative essentially would continue to manage, primarily through a reserve approach, the 4,697 acres of habitat that is restricted from harvest by the current Forest Practice Rules. Whether or not this habitat would persist over the next 60 years is questionable. During that time frame, it would be subject to many potential disturbance events. Depending upon the nature and severity of the disturbance the results could range from habitat improvement to the elimination of the habitat.

Some forests on the east slope of the Cascades are experiencing severe forest health issues for a variety of reasons that are a result of historical management practices and insect infestations. One of the reasons for WDNR to have modified their HCP for spotted owl management in the Klickitat Planning Unit was to be able to address the forest health issues they were experiencing in certain areas (WDNR 2004). The forest health issues on these WDNR HCP lands were largely a result of overstocking and species composition. Recently, on July 23, 2012, the WDNR issued a proposed forest health hazard warning for Klickitat and Yakima Counties for deteriorating forest conditions due to pine and bark beetles. While the majority of the covered lands have to-date avoided these forest health issues that are occurring further north and east, the potential for repercussions from forest health issues to spotted owl habitat likely still exists for the covered lands in this area, particularly over a 60-year time frame.

There are also other forms of disturbance that could affect existing habitat, fire being a major one. Fire frequency and size has declined substantially since the 1900's primarily due to commercial logging (Wright and Agee 2004). Never-the-less, large intensive fires have occurred in the eastern Cascades, such as during the 1994 fire season, and will likely occur again, potentially affecting spotted owl habitat. In 1994, the Hatchery Complex fire burned approximately 17,000 ha of forest. Of six spotted owl territories evaluated post fires within 2.9 km of the site center, the average amount of spotted owl habitat lost was 55 percent and ranged

from 10 percent to 85 percent (Gaines et al. 1997) Over the next 60 years, it is likely that fires occurring on the covered lands could potentially eliminate some habitat. Stating an acreage figure is not possible.

Another kind of disturbance that can affect spotted owl habitat, both negatively and positively, are ice storms. For example, in February 2012, an ice storm hit the Columbia Gorge and damaged some forests on the covered lands. The Applicants are currently attempting to salvage those areas. In most cases it did not degrade owl habitat into non-habitat (J. Spadaro, pers comm.), and in this situation the event may have actually increased the number of snags. However, ice storms, taken in context with other events over a period of years, could contribute to spotted owl habitat decline. Like the other disturbances, predicting an acreage figure for this is not possible.

Under the No Action Alternative, it is not possible to state how much of the exiting owl habitat would persist over a 60-year period. However, considering the time frame and the different disturbance events that are possible to the covered lands, we anticipate that some of that habitat would not survive the 60-year term. If it is eliminated or degraded due to these events, the Applicants would be under no obligation to provide replacement habitat on their properties. Under the Proposed Action Alternative, if habitat is eliminated in an area due to a natural disturbance event, the SHA habitat thresholds are still in place. The Applicants need to at least maintain sufficient habitat to meet those targets, or grow habitat to act as a replacement that might be lost to a disturbance event. With a White Salmon SOSEA spotted owl habitat threshold approach, it is ensured that maintenance and future recruitment of spotted owl habitat over the long-term will occur. This alternative is more likely to be able to sustain and grow YFM habitat, than the No Action Alternative over a 60-year permit term. Thus, over a 60-year time frame, the Proposed Action Alternative appears to have a higher likelihood of providing YFM habitat than the No Action Alternative.

Another area that may provide some potential for uncertainty associated with the two alternatives is the scale at which spotted owl management takes place. With the No Action Alternative, existing habitat would continue to be reserved within the 0.7 and 1.8 mile management circles. The problem with this approach is that spotted owls do not have circular home ranges; the “owl circle” is simply a management convention adopted for consistent application across all ownerships and landscapes (Buchanan and Swedeen, 2005). Spotted owls typically have home ranges that exceed the boundaries of the management circle. The circle concept was never intended to be treated as an indefinite approach to spotted owl conservation, but rather was intended to assess the risk of take (J. Michaels, pers comm.). In Washington, the parties that developed the current spotted owl rules agreed that landscape planning would be more beneficial to spotted owls that the current mode of circle-by circle management (Buchanan and Swedeen 2005). The No Action Alternative does not address these important factors for conservation and, thus, there is uncertainty associated with these issues. The Applicants Proposed Action Alternative is intended to be responsive to these issues.

Under the Proposed Action Alternative, the Applicants would manage for spotted owl habitat at three scales: 0.7 mile radius of specific spotted owl sites; the White Salmon SOSEA; and at the

covered lands scale. There may be some uncertainty for managing spotted owls at these scales, perhaps more in the short term as a transition is made from the 1.8 mile management circle to a larger scale. For this transition period, the Proposed Action Alternative proposes to implement several approaches to avoid immediate affects before some benefits have accrued. To ameliorate some of these affects, the Proposed Action Alternative has identified four spotted owl sites where the Applicants have a substantial ownership within the 0.7 mile radius: 56 percent, 36 percent, 30 percent, and 18 percent, respectively. The strategy for these sites is to defer any habitat removal for the first 10 years, while non-habitat is thinned or treated with snags to become habitat. After that, the Applicants would provide at least 33 percent YFM or better quality habitat within the 0.7 mile radius of these sites and harvest some of the existing habitat. There is some uncertainty associated with this approach, if spotted owls are depending upon that habitat for their needs. However, taken in context with the surrounding lands and the Applicants ownership patterns, those affects are anticipated to be ameliorated by other beneficial actions taken by the Applicants.

There is currently a process available to landowners in Washington that allows for the regulatory removal (decertification) of spotted owl site centers, pending approval by a three-person panel, the Forest Practices Board-appointed Spotted Owl Conservation Advisory Group. The Panel makes a determination on whether owl site centers and surrounding habitat is important to the Northern Spotted Owl and occurs after the Department of Fish and Wildlife determines that surveys for Northern Spotted Owls have met survey protocols that indicate the absence of spotted owls. To date, a request to decertify an owl site has not been proposed. However, under the No Action Alternative, the Applicants could pursue this option. With the presence of barred owls over the covered lands, it is currently unknown what results spotted owl surveys might determine, but it should not be ruled out that some sites could be approved for decertification. If that outcome occurred, further habitat removal would be expected to happen within the 1.8 mile management circles. Over the 60-year period, that could amount to substantial habitat removal.

With the Proposed Action Alternative, the Applicants will not be pursuing any spotted owl decertification survey protocols. By committing to this approach, spotted owl habitat will not be harvested based on lack of current spotted owl occupancy. Over a 60-year time frame, this is expected to result in protection of more spotted owl habitat than what would occur under the No Action Alternative.

The Applicants may add or dispose of lands over a 60-year time frame. Under the No Action Alternative, it is extremely unlikely that the Applicants would purchase lands within 1.8 mile management circles that were spotted owl habitat, and not available for harvest. More likely, if they would purchase lands within the 1.8 mile management circle, it would be non-habitat and they would be extremely unlikely to allow it to mature into habitat for fear of future regulatory uncertainty. They would likely harvest it before it approached suitability for spotted owls. Under the Proposed Action Alternative, this fear of future regulatory uncertainty is eliminated. If the Applicants add lands to their holding under the Proposed Action Alternative within the White Salmon SOSEA, they still have the obligation to manage for 33 percent spotted owl habitat. Depending on the spotted owl habitat status and amount on the additional land, the Applicants could harvest it immediately, or delay harvest indefinitely.

The Proposed Action Alternative provides a dynamic approach for the conservation of spotted owl habitat. With this approach, habitat is not static, but rather over time can be re-distributed as new habitat is recruited. The majority of the forests that are considered sub-mature or YFM are probably a product of historical logging practices. With this in mind, it is believed that active forest management implementing the prescriptions of the SHA can result in YFM habitat. With the concept that YFM can be recruited over the permit term, existing sub-mature and YFM habitat will be harvested, both within and outside of existing owl circles. There is an abundance of these habitats, mostly outside of the existing owl circles (Table 2-1). . This alternative is also intended to encourage delay of harvest of habitat with the goal of leaving it on the landscape for longer time periods than what might otherwise occur.

In a 2005 report to the Forest Practices Board (Buchan and Swedeen, 2005) the authors stated that “the lack of landscape planning constitutes one of the most serious conservation challenges associated with implementation of the 1996 Spotted Owl rules.” The Applicants Proposed Action Alternative will be a complementary landscape management plan that dovetails with existing landscape management plans on State and Federal lands designed to benefit spotted owls. It provides spotted owls with habitat connectivity across the White Salmon and Columbia Gorge SOSEAs, on state, federal, and the Applicants private land ownerships. Dispersal habitat for juvenile owls, along with roosting habitat, foraging habitat and some limited nesting habitat will be provided under the Proposed Action Alternative. Most of the highest quality habitat will continue to be provided on National Forest and WDNR lands. The SOSEA goals of dispersal and demographic support, along with improved distribution of habitat within SOSEAs, will be accomplished under this alternative, while under the No Action Alternative, no beneficial forest management activities other than what is required by Forest Practices Rules will occur. Table 4-1 provides a comparison summary of impacts to the spotted owl. Although this table is similar to Table 4-3 of the SHA, it is not the same in that Table 4-1 of this EA provides a more concise description of differences between the alternatives and reflects FWS’ determination of impacts to spotted owls.

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
Landscape Management	Avoidance of harvest of 4,697 acres of suitable owl habitat within regulatory owl circles (0.7-mile core zone and best 2605 acres outside of cores). Most habitat and forest outside of these specific locations will be removed and/or not allowed to re-establish. In addition, as forest stands become habitat on other ownerships, SDS and BLC will seek opportunities to harvest previously harvest-restricted habitat. All lands outside of existing regulatory circles are managed on 45-year rotations.	Owl habitat more likely to be retained for a longer time frame and regrown across covered lands. Within the White Salmon SOSEA, a minimum of 9,424 acres of habitat (consisting of no more than 50% dispersal habitat and no less than 50% Young Forest Marginal or higher quality habitat) will be present on the landscape in any given year. At the landscape level, based on 60-year harvest rotation instead of 45 year rotation age, on average, approximately 12,705 more acres will be in dispersal and YFM habitat in any given year.	+ SHA manages at broader scale than 0.7 and 1.8 mile owl management circles, because spotted owls do not have circular home ranges. + Over time habitat within owl circles will be harvested but there will also be active forest management to produce new YFM and dispersal habitat and the overall quantity of habitat across SDS & BLC ownership will be greater under the SHA and will be provided over a broader area than without the SHA; 12,705 acres of habitat may occur across the landscape that would not without the SHA. + A landscape management approach provides greater protection for the owl from forest fires and/or forest health.
Habitat Reserves	None, but see the landscape management section above regarding no harvest areas.	1) A large, contiguous SSA will be established for the term of the SHA consisting of 411 acres of riparian habitat along the Little White Salmon River. This forest habitat will benefit numerous wildlife species, including owl prey species. It also provides spotted owl nesting, roosting and foraging habitat potential and a dispersal corridor between important habitat areas. 2) 240 acres will be retained intact as a SSA for the term of the SHA, around the one core zone (Site #753) containing a spotted owl nest site on SDS land to provide nesting, roosting and foraging	+ 651 acres of forest will be retained as a SSA under the SHA, vs. none without the SHA but see the landscape management section above. + The Little White Salmon corridor SSA will provide connectivity with habitat to the north in the Gifford Pinchot National Forest and to the south, providing a movement corridor within the SOSEA and . 411 acres of YFM & Sub Mature habitat provided, of which 341 acres could be harvested without the SHA. + The only spotted owl nest site known to occur on SDS or BLC lands will be

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
		habitat potential.	preserved along with a sufficient core to allow occupation by nesting owls. This provision complements the approach being applied to site centers on DNR lands under their HCP.
Habitat Availability in the Columbia Gorge SOSEA	The WDNR has not designated the highest quality habitat within the owl management circles, so it is unknown precisely how much habitat would result from a designation. The Applicant has assumed that all 1,003 acres of existing habitat would be placed within the highest quality habitat.	Actively manage lands and allow habitat to exist across landscape. Operation under an extended rotation age of 60 years along with other conservation measures are anticipated to provide continuing dispersal and YFM habitat through life of SHA.	-/+ Allows for harvest of habitat in regulated circles, but implements SHA provisions for habitat development over a 60 year time frame. + Active management increases likelihood of habitat recruitment and persistence in face of stochastic and changing environment.
Habitat Availability in the White Salmon SOSEA	Reduce to minimum required to be retained under forest practices rules (best 2605 habitat acres in each regulatory circle and current habitat acreage within 0.7 mile of all site centers). Maximum acres of habitat that will remain will not exceed 3,694 acres over next 10 years.	Provide 33% of SDS & BLC lands in habitat in all years within the White Salmon SOSEA (no more than ½ in Eastside Dispersal, no less than ½ in Young Forest Marginal or better quality). The total acreage will be approximately 9,424 acres. Defer removal of habitat for 10 years in 4-spotted owl circles (0.7-mile radius) in which SDS & BLC own more than 15% of the acreage in these circles. After 10 years, 33% of SDS & BLC lands within these 0.7-mile circles will remain as Young Forest Marginal or better quality habitat. Within the 0.7-mile circle of Site #753, 240 acres will be in a SSA for the term of the SHA.	-/+ Allows for some harvest of habitat in regulated circles, but provides for more habitat (9,424 acres minimum) to exist within the SOSEA, an increase of 5,730 acres of habitat retained than would occur without the SHA (Fig. 4-5); loss of 90 acres of submature habitat (Figs. 4-7 & 4-8). + 10 year deferral period on habitat removal in 4 sites will allow benefits of SHA to accrue before any habitat can be harvested in these circles. 240 acres of core nest zone habitat within Site #753 will protected for the term of the permit, similar to the owl core protections of the DNR HCP. + During the 10 year deferral of habitat removal, current non-habitat with potential to become habitat, can be thinned and

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
			enhanced to provide new habitat before other habitat is removed. -/+ 0.7-mile circles within the White Salmon SOSEA, where SDS and BLC ownership is smaller, will have some immediate potential for harvest, but area of potential harvest is unlikely to compromise site function and DNR has established core nesting zones for these sites. All sites have either DNR-established or SDS-established protected core nest zones where no harvest will occur. + 33% of SDS and BLC lands within SOSEA as habitat will ensure spatial and temporal habitat distribution throughout the SOSEA landscape. + Existing surplus habitat and potential habitat will remain on landscape longer than without SHA; 1,108 acres more YFM will be provided than what will occur without the SHA (Figs. 4-7 & 4-8). + Extended rotation ages allow future habitat to remain on landscape longer than without SHA. SOSEA. + Snag prescriptions will be used to create enhanced habitat across the landscape
Habitat Enhancement in the White Salmon SOSEA	No current reason to develop or enhance habitat	Stands that are not on track to meet Young Forest Marginal by age 50 will be targeted for commercial thinning or snag creation treatments to provide 16.5% of all habitat within this SOSEA (4,712 acres), to be equivalent to YFM or better habitat;	+ The SHA implements active forest management both within and outside the White Salmon SOSEA and encourages habitat maintenance.

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
		500 acres will be thinned in the first decade.	
Habitat Outside of the White Salmon SOSEA	Target harvest of older stands (which are anticipated to be spotted owl habitat) immediately and manage forest under a 45-year rotation. Within approximately10 years all potential habitat could be removed.	Actively manage lands and allow dispersal and YFM habitat to exist across landscape. Operation under an extended rotation age of 60 years will provide additional habitat through life of SHA. Active forest management, i.e., commercial thinning utilizing snag creation prescriptions, across the landscape is expected to create Young Forest Marginal habitat.	+ Encourages owl habitat maintenance for longer time frame than without SHA. + Extended rotation ages allow future habitat to remain on landscape longer than without SHA. + Snag prescriptions will be used to create YFM and dispersal habitat across the landscape.
Habitat distribution	Preservation of WDNR designated spotted owl habitat within existing owl management circles only.	Habitat more distributed across covered lands by implementing SHA, particularly in the White Salmon SOSEA.	+ Increased habitat distribution, particularly in the White Salmon SOSEA, increases chance of habitat persistence and development over duration of SHA
Non-habitat within 0.7-Mile Regulatory Circles	Non-habitat with potential to become habitat will not be allowed to reach an age where it could be considered habitat. The estimated amount of existing non-habitat with the 0.7-mile circles is 490 acres.	490 acres of non-habitat with habitat potential will be allowed to become habitat.	+ SHA commitments require habitat development within 0.7 mile radius circle
Non-habitat between 0.7-Mile and 1.8-Mile Regulatory Circles	Non-habitat with potential to become habitat will not be allowed to reach an age where it could be considered habitat. The estimated amount of existing non-habitat between the 0.7-mile and 1.8-mile circles is 8,382 acres.	Although spotted owl habitat at this scale is not a commitment of the SHA, it is anticipated that 8,382 acres of non-habitat in SOSEAs will be allowed to become habitat between the 0.7 and 1.8 mile circles for a portion of the 60-year SHA term.	+SHA relies on habitat maintenance and development to meet habitat thresholds. As such, dispersal and YFM habitat anticipated across a broader landscape; an increase of 8,382 acres of habitat that would not occur without the SHA.
Green-tree, and Snag Provisions	Not required to proactively create wildlife trees or snags; will implement minimum Forest Practices Rules for snag and green tree retention.	Commercial Thinning: *Prescription 1:* Two defective trees per acre will be retained; i.e., conifer snags, hardwood trees greater than 12 inches dbh and damaged or deformed live	+ The SHA commitments for snag and green tree retention prescriptions are intended to enhance owl prey habitat and create a foraging element to dispersal habitat. Snag conservation is expected to

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
		conifer trees, i.e. Type 1 wildlife reserve trees described in the Forest Practices Rules (WAC 222-16-010). *Prescription 2:* One defective tree per acre will be retained, and one snag per acre will be left or created using mechanical topping at or above 12 feet or girdling or chainsaw boring. Hardwood leave tree preference will be for trees greater than 20 inches diameter. *Prescription 3:* Two snags per acre will be left or created using mechanical topping at 12 to 18 feet, girdling or chainsaw boring. Hardwood leave tree preference will be for trees greater than 20 inches diameter. Regeneration Harvest: In addition to the Forest Practices Rules requiring two green recruitment trees and two wildlife reserve trees per acre when they are available (WAC 222-30-020), SDS will select one of the following prescriptions with hardwood leave tree preference for trees greater than 20 inches diameter during regeneration harvest: *Prescription 1:* Create additional snags at a rate of 20 per 100 acres and retain six green recruitment trees per acre. *Prescription 2:* Retain two snags per acre (either residual or created) and supplement Forest Practices Rules with one additional green recruitment tree (three trees per acre).	accelerate development of Young Forest Marginal habitat. + Over the duration of the SHA, more snags are expected to improve YFM and dispersal habitat across the covered lands.

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
Rotation Age	45 years, YFM habitat is not expected to develop in managed forests under this rotation length.	60 years; at the landscape level, under the 60-year harvest rotation, dispersal and YFM habitat will be retained.	+ Under 60 year rotations, future dispersal and YFM habitat (aged 40-60 yrs.) that develops across the landscape will be available, on average for 20 years, an increase in habitat availability of 15 years longer than under a 45 year rotation; an increase of habitat available to owls above the commitment of 9,424 acres within the WS SOSEA with the SHA (SHA Figure 4-6).
Nesting habitat	Current 4,697 acres of restricted spotted owl habitat, absent stochastic disturbances, could develop into nesting habitat.	Absent stochastic disturbances, potential nesting habitat would be maintained or developed in SSAs, for a total of approximately 651 acres. This number is an estimate because some of the 240 acres in the SSA for owl site #753 are mixed forest, and approximately 70 acres are not available for harvest along the Little White Salmon River due to the Forest Practice HCP for riparian conservation. Providing nesting habitat across the covered lands is not a goal of the SHA.	+ - Absent disturbances, the No Action Alternative would provide more nesting habitat than the Proposed Action Alternative.
Forestland Conversion	Regulatory uncertainty may be one of many factors to contribute to forestland conversions.	The SHA may contribute, in part, to maintain forest lands under the SHA.	+ Regulatory uncertainty under the ESA is removed, and thus, does not contribute to potential forest land conversions.
Spotted owl nest site protection	Spotted owl nests and associated habitat amounts protected by owl management circles, depending on whether in the SOSEA or outside of the SOSEA.	New owl site in White Salmon SOSEA: protect 70 acre core for up to 8 years, place nest boxes, Owl site shifts location in White Salmon SOSEA: protect 70 acre core for up to 6 years, place nest boxes. New owl site outside of White Salmon SOSEA: protect 70 acre core for 3 years.	- SHA provides less protection for new nest sites on covered lands within the White Salmon SOSEA than No Action Alternative, however, the goal of the SHA is to provide YFM and dispersal habitat contribution, not nesting owl sites or nesting habitat. + SHA provides more protection for new

Table 4-1. Comparison of Environmental Impacts to Spotted Owls Between Alternatives

Applicants Activity/Element	No Action Alternative Without SHA	Proposed Action Alternative With SHA	Effect (Positive +, or Negative -)
			nest sites on covered lands outside the White Salmon SOSEA than the No Action Alternative.
Forest Health	Spotted owl habitat will be concentrated in existing regulatory circles where it is kept off-limits to harvest and management. Eastside forests are prone to forest health and fire risks. Reliance on habitat in fixed locations can result in risk to owl survival due to forest health and fire events.	Spotted owl habitat will be provided in key areas and across broad landscapes. Distribution of habitat across a larger landscape will reduce risks associated with forest health events.	+ Greater habitat availability across a larger landscape will provide greater ability of owls to survive forest health or fire episodes. + Active management of forestlands and owl habitat will provide healthier forests and higher quality habitat.
Long-term Commerce	Initial push to harvest habitat will create a bubble of economic activity for the local community but result in a decline in economic potential after 10-15 years.	Less aggressive harvest regimes will create sustainable economic opportunities for the local community.	+ Acceptance of the SHA will result in more long-term job opportunities and more consistent economic potential over the long-term.

4.2.2.2 Other Special-Status Species

Larch Mountain Salamander

Under the Proposed Action Alternative, longer harvest rotations and deferrals from harvest of older stands may provide potential habitat benefits for Larch Mountain salamanders by providing forest cover for an extended period of time in areas of potential habitat where such habitat may occur outside RMZs. Prescriptions for snag conservation and development, downed-wood retention, and green-tree retention implemented under the Proposed Action Alternative may contribute to habitat for these species by providing additional down wood, sloughed bark at the base of snags, and patches of older forest distributed across the landscape. The SSAs may also provide habitat protection for these species if they include or are adjacent to suitable habitat features. Thus, under the Proposed Alternative, the quality and amount of habitat features required by Larch Mountain salamander would be better and be on the landscape longer than under the No Action Alternative.

Goshawk

Under the Proposed Action Alternative, most mature stands (greater than 40 years of age) would be harvested at a slower rate than under the No Action Alternative, and numerous stands of suitable spotted owl habitat would be deferred from harvest in the next decade. In addition, the snag retention and creation program would likely provide suitable nesting trees for the goshawk. With older stands (45-60 years of age) distributed across the landscape of the Applicants' ownership, there is a higher potential for goshawks to inhabit the covered lands than under the No Action Alternative. Overall, goshawk habitat would be higher in quality and greater in volume under the Proposed Action Alternative.

Olive-sided Flycatcher and Willow Flycatcher

Under the Proposed Action Alternative, the amount of habitat available for the olive-sided flycatcher, associated with mature forest conditions with tall trees and snags, with an abundance of forest edges and clearings, would be greater than under the No Action Alternative. Older forest stands with more snags would be available to the olive-sided flycatcher, especially in the first decade, compared to the No Action Alternative. However, the willow flycatcher inhabits moist, shrubby areas with standing or running water, and winters in shrubby clearings and early successional growth (Cornell Lab of Ornithology 2012). Thus, habitat for this species of flycatcher would likely be less under the Proposed Action Alternative when compared to the No Action Alternative because of the different levels of anticipated harvest between the two alternatives. The lower level of harvest expected under the Proposed Action Alternative will provide less early successional habitat than under the No Action Alternative, especially in the first decade. The difference, however, is not likely to be significant at the landscape level.

Woodpeckers

Under the Proposed Action Alternative, habitat for Lewis's and white-headed woodpeckers, such as older ponderosa pine forested stands will be regeneration harvested at a slower rate than under the No Action Alternative. Some older forest stands that are suitable spotted owl habitat will be deferred from harvest for the first decade. Thus, forest management activities under the Proposed Action Alternative would serve to retain the quality and amount of habitat

for Lewis's and white-headed woodpeckers on the landscape longer than under the No Action Alternative. Similar to the No Action Alternative, under the Proposed Action Alternative, patches of Oregon white oak and other deciduous species mixed within conifer forests would still be regeneration-harvested. However, since these patches provide significant value to wildlife including woodpeckers, at the time of regeneration harvest, the Applicants' will prioritize these patches of valuable habitat for inclusion as wildlife reserve tree and snag creation areas, to the extent practical and economically feasible. The snag retention and creation program under the Proposed Action Alternative, along with managing the landscape for older age classes, will provide opportunities for a higher quality habitat potential for these woodpeckers than what would occur under the No Action Alternative.

Pacific Western Big-Eared Bat and Myotis Bats

Under the Proposed Action Alternative, there would be an increase in the amount and quality of roosting habitat available for bats compared to the No Action Alternative. The extended harvest rotation, SSAs, and the snag conservation and development program are expected to improve roosting habitat for bats. The older forest age class distribution and the retention of more snags across the landscape will result in improved habitat conditions for bats. In addition, the deferrals from harvest of suitable spotted owl habitat in the first decade will ensure that higher quality habitat for bats is retained longer than what would occur under the No Action Alternative.

Western Gray Squirrel

Under the Proposed Action Alternative, patches of Oregon white oak and other deciduous species mixed within conifer forests would still be regeneration-harvested. However, since these patches provide significant value to wildlife including the western gray squirrel, at the time of regeneration harvest, the Applicants' will prioritize these patches of valuable habitat for inclusion as wildlife reserve tree and snag creation areas, to the extent practical and economically feasible. The snag retention and creation program under the Proposed Action Alternative, along with managing the landscape for retention of some oak woodland habitat (see SHA Table 3-1), will provide opportunities for a higher quality habitat potential for the western gray squirrel than what would occur under the No Action Alternative.

The special-status species that may be present in the covered area and affected by the Proposed Action Alternative differently than the No Action Alternative are shown in Table 4-2. Differences between the alternatives are noted in the "Effects" column.

Table 4-2.Special-Status Wildlife Species Potentially Occurring in the Covered Area Affected by the Proposed Action Alternative

Species Name	Status*	Probability of Occurrence	Effects
Amphibians			
Larch Mountain salamander (*Plethodon larselli)*	FS, SS	May occur	Beneficial
Birds			
Northern spotted owl (*Strix occidentalis caurina*)	FT, SE	Not currently present	Beneficial
Northern goshawk (*Accipiter gentilis*)	FS, SC	May occur	Beneficial
Olive-sided flycatcher (*Contopus cooperi*)	FS	Likely occurs	Beneficial
Willow flycatcher(*Empidonax traillii*)	FS, SS	May occur	Neutral
Acorn woodpecker (*Melanerpes formicivorus*))	FS, SM	Likely occurs	Beneficial
Lewis woodpecker (*Melanerpes lewis*)	FS, SC	May occur	Beneficial
White-headed woodpecker (*Picoides albolarvatus)*	FS, SC	May occur	Beneficial
Mammals			
Silver-haired bat (*Lasioycteris noctigagans*)	FS	Likely occurs	Beneficial
Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)	FS, SC	May occur	Beneficial
Yuma myotis (*Myotis yumanensis*)	FS	May occur	Beneficial
Small-footed myotis (*Myotis ciliolabrum*)	FS	May occur	Beneficial
Long-eared myotis (*Myotis evotis*)	FS, SM	May occur	Beneficial
Long-legged myotis (*Myotis volans*)	FS, SM	May occur	Beneficial
Western Gray Squirrel (*Sciurus griseus griseus*)	FS, ST	May occur	Beneficial

* FT = Federal threatened, FE = Federal endangered, FS = Federal (USFWS) species of concern, ST = State threatened, SE = State endangered, SC = State candidate, SS = State sensitive, SM = State monitor, SP = State protected

4.3 Land Use

4.3.1 No Action Alternative

Under the No Action Alternative, land uses and land-ownership patterns in the vicinity of the SHA covered lands would not change relative to current conditions. The Applicants would continue to manage its forestry activities according to standard Forest Practices Rules. As this would not represent any change to existing conditions, and managed timberland is an encouraged use in rural Klickitat and Skamania Counties in Washington, and Hood River and Wasco Counties in Oregon, the No Action Alternative is not anticipated to have any negative impacts on land-use patterns, land ownership, or nearby communities. If current forest practices continue unchanged no new wildlife habitat would be created relative to current conditions, thereby lessening the probability of use by owls, as well as other wildlife. In addition, under the No Action Alternative, land use designations may change in the future resulting in less

forestry land use and perhaps more for agriculture and or residential use, with a corresponding reduction in the potential for spotted owl habitat to develop.

4.3.2 Proposed Action Alternative

Under the Proposed Action Alternative, land uses and land-ownership patterns would remain as under the No Action Alternative and existing conditions. While the Proposed Action Alternative would extend the harvest rotation age over the No Action Alternative, no change in land-use patterns or land ownership would occur. However, some lands not covered under the SHA (3,226 acres) would be converted and/or used for purposes other than timber growth and harvest. These lands include those used as commercial rock quarrying, agricultural operations, existing and proposed residential uses, and a wind energy project. These excluded lands would likely be similar under the No Action Alternative. However, if land use designations were to change, or opportunities to initiate land use changes were to occur, the Applicants would be obligated to keep their forestry lands in forestry to continue to provide spotted owl habitat according to the habitat commitments of the SHA.

4.4 Socioeconomics and Environmental Justice

This socioeconomic analysis used a qualitative assessment of the adverse effects that would result from the No Action and the Proposed Action alternatives. A determination of an environmental justice impact would occur if these adverse effects were to have a disproportionate effect on a minority and low-income population. A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that would be 1) predominantly borne by a minority population and/or a low-income population; or 2) suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population.

4.4.1 No Action Alternative

Under the No Action Alternative, the Applicants would continue to manage its forestry activities according to standard Forest Practices Rules. They would continue to harvest legally accessible spotted owl habitat at an accelerated rate to ensure elimination of the habitat within the next decade. For Skamania, Wasco, and Hood River Counties, there should be no change in the socioeconomic environment. But in Klickitat County, an accelerated harvest over the next decade could have impacts to the local community, especially for the SDS Lumber Company mill and its suppliers and customers. In the short-term, the accelerated harvest could increase timber-related employment and income due to the possible need for additional employees to harvest and process the increased timber. However, after the intense harvesting is completed, it could result in lay-offs. This level of harvest activity is different than what has occurred in the past when the Applicants were harvesting their own timber, or from other ownerships, at a level that would be sustained over a long period of time, thus, ensuring a consistent flow of timber to local mills. The No Action Alternative, depending on future economic cycles, could result in reductions in future employment opportunities and incomes, however, accurately forecasting this is not possible.. Environmental justice impacts are those that would be disproportionately realized by minority or low-income populations as a result of the covered activities. However, this only applies if the percentage of minority, Hispanic, and low-income populations in the study area is meaningfully greater than the percentage of minority, Hispanic, and low-income

populations in the general population (i.e., Skamania and Klickitat Counties and the State of Washington, and Hood River and Wasco Counties and the State of Oregon). This is not the case in the study area. Therefore, there would be no environmental justice impacts associated with the No Action Alternative.

4.4.2 Proposed Action Alternative

Under the Proposed Action Alternative, minimal change is expected to the socioeconomic environment for all four counties in the area. The Proposed Action Alternative may result in sustained long-term employment opportunities consistent with current employment levels due to the proposed sustainable harvesting activities, which are expected to keep employment levels consistent in the forest industry over a period much longer than that which would be expected under the No Action Alternative. This includes continued employment levels in the harvesting and processing of timber at local mills, as well as any industries providing products and services to any sector within the forest industry.

The maintenance and improvement of spotted owl dispersal and YFM habitat on the Applicants' lands is expected to enhance movement of juvenile spotted owls across the landscape and provide demographic support to owls (predominately on National Forest and WDNR lands), which may also increase the chance of spotted owls moving across other ownerships. However, the chance of spotted owls dispersing to or occupying other ownerships is anticipated to be lower than the Applicants' lands because adjacent private and industrial owners are likely to continue to manage their forest on shorter rotations which does not facilitate maintenance or development of habitat. The anticipated young and simply structured forest stands on adjacent ownerships would not be considered suitable habitat for spotted owls, and would have no ESA restrictions on those lands, outside of spotted owl circles, if spotted owls were in the immediate area. Thus, the Applicants' SHA, while beneficial to the spotted owl on their lands, would be unlikely to increase the potential for regulatory burdens for other landowners.

As under the No Action Alternative, there would be no environmental justice impacts associated with the Proposed Action Alternative because the percentage of minority, Hispanic, and low-income populations in the study area is not meaningfully greater than the percentage of minority, Hispanic, and low-income populations in the general population(i.e., Skamania and Klickitat Counties and the State of Washington, and Hood River and Wasco Counties and the State of Oregon).

4.5 Climate Change

4.5.1 No Action Alternative

Under the No Action Alternative, global, regional, and local climate change trends are expected to continue. Climate changes resulting in increases in wildfire frequency, higher spring and summer temperatures, precipitation amount and timing of occurrence, and increased frequency and intensity of insect outbreaks may have negative effects on habitat for the spotted owl. However, the potential for insect outbreaks would be reduced with an accelerated rate of harvest and intensive forest management over the next decade.

Trees sequester carbon as they grow and, to a certain point, older trees sequester more, by volume, than do younger trees on an annual basis (Ryan et al. 2008, Washington Climate

Advisory Team 2007). Based on the current age-class distribution of forested stands in the covered area, the rate of harvest of older trees (approximately 3,500 acres/year), and assuming that trees would be harvested at an average age of 45, approximately 43% percent of the covered area would be regeneration harvested in the current decade. Based on an assumed 45-year average harvest rotation, stands would continue to be harvested in a cyclical manner and harvest would be greater in the initial decades. This would reduce the amount of carbon sequestered in the covered area as the smaller trees and seedlings planted after regeneration harvest would not sequester as much carbon as would the older trees that were removed.

4.5.2 Proposed Action Alternative

The effects of climate change on the covered lands are uncertain but, at a regional scale, would likely be similar as under the No Action Alternative. However, under the Proposed Action Alternative, trees not cut during commercial thinnings would be harvested at a later age, likely allowing for greater carbon sequestration. After the first decade, individual trees grown in this extended rotation would store more carbon than trees grown in the shorter rotations of the No Action Alternative, and may minimally and locally help to reduce levels of atmospheric carbon. In addition, the ability to manage the forest in owl habitat to prevent or reduce the impacts of insect outbreaks would have a positive effect on owl habitat development and carbon sequestration.

4.6 Cumulative Impacts

Cumulative impacts are defined under NEPA as “the impact[s] on the environment that results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

The cumulative impacts of the various activities within the scope of this EA vary little between the two alternatives. The differences between the two alternatives are related to the amount of voluntary habitat enhancement and protection measures that will occur through the Applicants’ forest management activities conducted according to Washington and Oregon Forest Practices Rules. This cumulative-impacts analysis focuses on the spotted owl conservation provisions and on forest management activities, because these are the focus of the SHA and the basis for the Federal action. The time period for analysis is the 60-year Permit duration.

The direct and indirect effects of the Proposed Action Alternative on the spotted owl, spotted owl habitat, and other elements of the affected environment were described previously. To summarize, the Applicants’ forest management activities would be conducted according to Forest Practices Rules complemented with voluntary measures that include 1) harvest rotations that are longer than the what would occur under the No Action Alternative, 2) commercial thinning to accelerate spotted owl habitat development, 3) a snag conservation and development program, 4) the establishment of SSAs, and 5) spotted owl nest site protection. These additional forest management provisions are expected to result in the development, retention, and/or enhancement of forest habitat with the potential for use by spotted owls, as well as other fish and wildlife species. The effects of the Applicants’ activities are expected to

result in a net conservation benefit to the spotted owl while no measurable effects on other elements of the affected environment are expected.

The actions occurring in and near the Applicants' covered lands are expected, for the most part, to be limited to forest management activities. There are some agricultural and small home developments scattered throughout the area. For the foreseeable future, though, timber production will likely remain the dominant industry for the area adjacent to the covered lands. The effects of the forest management activities conducted by Federal, State, and private land managers and landowners are expected to be characteristically similar but would differ in degree. For example, sediment delivery to streams from Federal lands would probably be lower than from private lands as a result of the implementation of the Aquatics Conservation Strategy riparian buffers outlined in the Standards and Guidelines for Management of Habitat for Late-Successional and Old-growth Forest Related Species within the Range of the Northern Spotted Owl, i.e. Northwest Forest Plan Standards and Guidelines (USDA and USDI 1994). The aquatic conservation strategy requires wider riparian buffers than the Forest Practices Rules and would, thus, result in greater protection of streams. Forest management activities would differ between landowners with HCPs depending on their location, landscape condition, and species addressed. The difference in the forest management activities being conducted by the land managers and landowners in the analysis area would be in the frequency and level of timber harvest, and the amount of habitat retained, enhanced, and protected. The effects on the spotted owl and natural resources in and adjacent to the covered lands would be reflective of the different forest management activities implemented by the various land managers and landowners, primarily WDNR through implementation of their HCP (WDNR 1997) and the USFS through implementation of the Northwest Forest Plan (USDI 1994).

Forested habitats in early seral stages for terrestrial species would be provided throughout the landscape in adequate amounts by timber harvest activities. Availability of this forested habitat in early seral stages is expected to remain similar to the current condition as private landowners manage their ownership under Forest Practices Rules and on a 40- to 45-year rotation. There is, and will continue to be, limited late successional forest on private lands in the area. Riparian zones may eventually provide late successional forest permeating the landscape. Although stands would grow to an average age of 60 years under the Proposed Action Alternative, these stands are not expected to function like an old-growth forest would for the spotted owl. Maintenance and development of older forest habitat would primarily occur on the adjacent state lands under the WDNR HCP and USFS lands as they are managed under the Northwest Forest Plan.

The cumulative impacts of the Proposed Action Alternative and anticipated actions by State and private land managers and landowners, as well as the USFS, is expected to result in overall improvements in habitat quality and quantity for spotted owls. Managing for spotted owl dispersal habitat and YFM habitat is expected to facilitate dispersal and demographic functions, especially within the White Salmon SOSEA.

5 List of Agencies and Organizations Contacted

Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501

Washington Department of Natural Resources
1111 Washington St. SE
Olympia, WA 98504

Yakama Indian Nation, phone conference with Phil Rigdon on June 21, 2012

6 List of Preparers

This document was prepared under the direction of the U.S. Fish and Wildlife Service (USFWS) and the Washington Department of Natural Resources (WDNR). The following individuals contributed to its preparation.

Name	**Affiliation**	**Responsibility**
Ken Berg	U.S. Fish and Wildlife Service, Supervisor, Washington Fish and Wildlife Office	Policy oversight and approval
Mark Miller	U.S. Fish and Wildlife Service, Supervisor, Division of Conservation and Hydropower Planning, Washington Fish and Wildlife Office	ESA process and technical oversight
Mark Ostwald	U.S. Fish and Wildlife Service, Project Lead/Fish and Wildlife Biologist, Washington Fish and Wildlife Office	SHA technical input and review, NEPA oversight
Jason Spadaro	SDS Lumber Company, President	SHA oversight and approval
Barb Craig	Stoel Rives LLP, Attorney	Legal oversight, Implementation Agreement preparation
Curt Smitch	Thompson Smitch Consulting, Policy Advisor	SHA policy advisor
Dale Herter	Raedeke Associates,	Spotted owl technical expert and conservation strategy development
Craig Hansen	ENVIRON International, Senior Manager	Project Manager, senior technical review, draft EA preparation
Kimberly Toal	ENVIRON International, Associate/Wildlife Biologist	Draft EA preparation

7 References

Binney, E.P. and G. E. Bradfield. 2000. An initial comparison of growth rates in the rare grass Achnatherumhendersonii, and its common associate, Poasecunda. Ecological Research. 15(2): 181–185.

Blaustein, A.R., J.J. Beatty, D.H. Olson, and R.M. Storm. 1995. The Biology of Amphibians and Reptiles in Old-Growth Forests in the Pacific Northwest. General Technical Report PNW-GTR-337. U.S. Forest Service, Pacific Northwest Research Station.

Bosakowski, T., B. McCullough, F.J. Lapsansky, M.E. Vaughn. 1999. Northern goshawks nesting on a private industrial forest in western Washington. Journal of Raptor Research. Vol. 33, No. 3, pages 240-243.

Brown, P.E., and E.D. Pierson. 1996. Natural history and management of bats in California and Nevada. Symposium sponsored by the Western Section of the Wildlife Society. November 13-15, 1996. Sacramento, California.

Buchanan, J.B. 1996. Characteristics of spotted owl nests and nest sites in Klickitat County, Washington. Unpublished report to the National Council of the Paper Industry for Air and Stream Improvement. Olympia, Washington.

Buchanan, J.B. 2004. Managing habitat for dispersing Northern Spotted Owls – are the current management strategies adequate? Wildlife Society Bulletin 32:1333-1345.

Buchanan, J. B. and P. Swedeen. 2005. Final briefing report to the Washington Forest Practices Board regarding spotted owl status and forest practice rules. WDFW, 600 Capitol Way North, Olympia, WA

Bureau of Labor Statistics. 2012. Quarterly Census of Employment and Wages. http://www.bls.gov/cew/ Accessed June 8, 2012.

Camp, P. and Gamon, J.G (eds). 2011. Field Guide to the Rare Plants of Washington. University of Washington Press, Seattle, WA. 408 pp.

Carey, A.B., S.P. Horton, and B.L. Biswell. 1992. Northern spotted owls: Influence of prey base and landscape character. Ecological Monographs 62(2). The Ecological Society of America.

Christy, R.E., and S.D. West. 1993. Biology of bats in Douglas-fir forests. General Technical Report PNW-GTR-308. Pacific Northwest Research Station, U.S. Forest Service, Portland, Oregon. 28pp.

Collyard, S. 2011. White Salmon River Watershed Fecal Coliform Bacteria Attainment Monitoring Study 11-03-046. 34 + app (72 total).

Copeland, J. P., K. S. Mckelvey, K. B. Aubry, A. Landa, J. Persson, R. M. Inman, J. Krebs, E. Lofroth, H. Golden, J. R. Squires, A. Magoun, M. K. Schwartz, J. Wilmot, C. L. Copeland, R. E. Yates, I. Kojola, and R. May. 2010. The bioclimatic envelope of the wolverine (Gulo gulo): do climatic constraints limit its geographic distribution? Canadian Journal of Zoology 88:233-246.

Corkran, C.C., and C. Thoms. 1996. Amphibians of Oregon, Washington, and British Columbia. Lone Pine Publishing, Renton, Washington. 175 pp.

Cornell Lab of Ornithology. 2012. Birds in Forested Landscapes. http://www.birds.cornell.edu/bfl/westernbirds14.html. , Accessed June 5, 2012.

Courtney, S.P., J.A. Blakesley, R.E. Bigley, M.L. Cody, J.P. Dumbacher, R.C. Fleischer, A.B. Franklin, J.F. Franklin, R.J. Gutiérrez, J.M. Marzluff, L. Sztukowski. 2004. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystems Institute. Portland, Oregon. September 2004.

Cowan, J. 2001. Request for Determination of Eligibility for the Kosmos Flat Archaeological District. Historical Research Associates, Seattle, Washington. DT117080201-18-FERC.

Curtis, R.O. 1982. A Simple Index of Stand Density for Douglas-fir. Forest Science, Vol. 28, pp. 92-94.

Desimone, S.M., and D.W. Hays. 2004. Northern Goshawk (Accipiter gentilis). Pages 6-1 to 6-16 in: E. Larsen, J. M. Azerrad, N. Nordstrom. (eds.). Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia. [Online]. Available at: <http://wdfw.wa.gov/hab/phs/vol4/nogo.pdf>

Dobkin, D.S., R.D. Gettinger, and M.G. Gerdes. 1995. Springtime movements, roost use, and foraging activity of Townsend's big-eared bat (Plecotus townsendii) in central Oregon. Great Basin Naturalist 55:315-321.

Ehrlich, P.R., D.S. Bobkin, and D. Wheye. 1988. The Birder's Handbook: A Field Guide to the Natural History of North American Birds. Simon and Schuster, Inc. New York, New York.

Everett R.L. and J. F. Lehmkuhl. 1996. An Emphasis Use Approach to Conserving Biodiversity. Wildlife Society Bulletin. 24(2):192-199.

Gaines, W.L., R.A. Strand & S.D. Piper. 1997. Effects of the hatchery complex fires on northern spotted owls in the eastern Washington Cascades. Proceedings – Fire Effects on Rare and Endangered Species and Habitats Conference, Nov. 13- 16, 1995. International Association of Wildland Fire. Coeur d'Alene, Idaho.

Grenier, J.J, and S.K. Nelson. 1995. Marbled murrelet habitat associations in Oregon. Pages 191-204 in: C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt. (eds.). Ecology and conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Pacific Southwest Research Station, U.S. Forest Service, Albany, California, 420pp.

Hallock, L.A., and K.R McAllister. 2005. Cascades Frog. Washington Herp Atlas Available: http://www1.dnr.wa.gov/nhp/refdesk/herp/. Accessed February 22, 2009. Last updated: December 2005.

Hamer, T.E. 1995. Inland Habitat Associations of Marbled Murrelets in Western Washington. Pages 163-176 in: C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt (eds.). Ecology and conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Pacific Southwest Research Station, U.S. Forest Service, Albany, California, 420pp.

Hamer, T. and S.K. Nelson. 1995. Characteristics of marbled murrelet nest trees and nesting stands. Pages 69-82 in: C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt (eds.). Ecology and Conservation of the Marbled Murrelet. General Technical Report PSW-GTR-152. Pacific Southwest Research Station, U.S. Forest Service, Albany, California, 420pp.

Haring, D. 1999. Addendum to Wind/White Salmon Water Resource Inventory Area 29 Salmonid Habitat Limiting Factors Analysis. Originally Issued July 1999. Washington Conservation Commission, Olympia, WA.

Harlow, R.F., R.L. Downing, and D.H. VanLear. 1997. Responses of Wildlife to Clearcutting and Associated Treatments in the Eastern United States. Department of Forest Resources. Clemson University. June 1997. Technical Paper 19.

Haynes, R. 2008. Emergency Lessons from a Century of Experience with Pacific Northwest Timber Markets. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. General Technical Report: PNW-GTR-747. April 2008. Accessed at http://www.fs.fed.us/pnw/pubs/pnw_gtr747.pdf on April 9, 2012.

Haynes, R. 2009. "Contribution of Old-Growth Timber to Regional Economies in the Pacific Northwest." *Old Growth in a New World: A Pacific Northwest Icon Reexamined*. Eds. Thomas A. Spies and Sally L. Duncan. Washington, DC: Island, 2009. 83-94.

Hays, D. and R.L. Milner. 1999. Peregrine Falcon. Pages 11-1 – 11-3 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species. Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington.

Hayes, G.E., and J.C. Lewis. 2006. Washington State Recovery Plan for the Fisher. Washington Department of Fish and Wildlife, Olympia. 62+ viii pp.

Hays, D.W. and R.L. Milner. 2004. Peregrine Falcon (Falco peregrinus). Pages 11-1 to 11-4 in: E.M. Larsen, J.M. Azerrad, and N. Nordstrom. (eds.). Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia. [Online]. Available http://wdfw.wa.gov/hab/phs/vol4/peregrin.htm

Herter, D. 2005. Habitat Assessment of 5 northern spotted owl circles overlapping Port Blakely Tree Farm in the Morton area. Raedeke Associates, Inc. Seattle, Washington.

Harvey, M.J. 1993. Henderson's bentgrass. In: Hickman, J.A. (ed), The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, CA.

Hood River SWCD. 2012. Hood River County Facts. http://www.hoodriverswcd.org/RLH/Chapters/HRCountyFacts.pdf , Accessed June 8, 2012.

Ince, P., A. Kramp, K. Skog, H.Spelter, and D. N. Wear. 2011. U.S. Forest Products Module: A Technical Document Supporting the Forest Service 2010 RPA Assessment. Research Paper FPL-RP-662. Madison WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

Interagency SEIS Team. 1994. Record of decision for amendments to Forest Service and Bureau of Land Management planning documents within the range of the northern spotted

owl ; Standards and guidelines for management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. Portland, Or.: Interagency SEIS Team, April 1994. Available at: http://www.or.blm.gov/ForestPlan/news&ga.pdf. Last accessed May 5, 2012.

Johnson, R.E. and K.M. Cassidy. 1997. Terrestrial Mammals of Washington State: Location Data and Predicted Distributions. Volume 3 in: K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich (eds.). Washington State Gap Analysis, Final Report. Washington Cooperative Fish and Wildlife Research Unit. University of Washington, Seattle. 304pp.

Johnson, D.H., and T.A. O'Neil. 2001. Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press. Corvallis, OR. 736pp.

Klickitat County Public Works. 2012. ArcIMS Zoning Map. http://69.30.47.122/kcmap/ Accessed June 8, 2012.

Lehmkuhl, J.F., K.D. Kistler, J.S. Begley, and J. Boulanger. 2006. Demography of northern flying squirrels informs ecosystem management of western interior forests. Ecological Applications 16(2):584-600.

Lehmkuhl, J.F., M. Kennedy, E.D. Ford, P.H. Singleton, W.L. Gaines, and R.L. Lind. 2007. See the forest for the fuel: integrating ecological values and fuels management. Forest Ecology and Management 246(2):73-80.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. Amphibians of Washington and Oregon. Seattle Audubon Society, The Trailside Series. Seattle, Washington. 169pp.

Lewis, J.C. and D. Kraege. 2004. Harlequin Duck. Pages 26-1 – 26-5 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species. Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington.

Lewis, J.C., and G.E. Hayes. 2004. Feasibility assessment for reintroducing fishers to Washington. Washington Department of Fish and Wildlife, Olympia. 70pp.

Lewis, J.C, and D.W. Stinson. 1998. Washington State status report for the fisher. Washington Department of Fish and Wildlife, Olympia. 64pp

Linders, M.J., W.M. Vander Haegen, J. M. Azerrad, R. Dobson, and T. Labbe. 2010. Management Recommendations for Washington's Priority Habitats and Species: Western Gray Squirrel (Sciurus griseus). WDFW, Olympia, WA. 26 pp.

McShane, C., T. Hamer, H. Carter, G. Swartsman, V. Friesen, D. Ainley, R. Tressler, K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the marbled murrelet in Washington, Oregon, and California. Unpublished report. EDAW, Inc. Seattle, Washington Prepared for the U.S. Fish and Wildlife Service, Region 1. Portland, Oregon. March 2004.

Mill A Community Action Committee. 2012. Skamania County. http://community.gorge.net/mill-a/skamania_county.htm, accessed June 8, 2012.

Miller, S.L., and C.J. Ralph. 1995. Relationship of marbled murrelets with habitat characteristics at inland sites in California. Pages 205-215 in: C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt. (eds.). Ecology and conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Pacific Southwest Research Station, U.S. Forest Service, Albany, California. 420pp.

Miller, G.S., R.J. Small, and E.C. Meslow. 1997. Habitat selection by spotted owls during natal dispersal in western Oregon. Journal of Wildlife Management 61:140-150.

Nagorsen, D.W. and R.M. Brigham. 1993. Bats of British Columbia. Royal British Columbia Museum Handbook. Volume 1, the mammals of British Columbia. UBC Press. Vancouver, British Columbia, Canada. 164pp.

National Marine Fisheries Service (NMFS). 2005. Endangered and threatened species: final listing determinations for 16 ESUs of west coast salmon, and final 4(d) protective regulations for threatened salmonid ESUs. Final Rule. Federal Register 70: 37160-37204. June 28, 2005.

_____. 2006. Endangered and threatened species: final listing determinations for 10 distinct population segments of west coast steelhead. Final Rule. Federal Register 71: 834-862. January 5, 2006.

National Oceanic and Atmospheric Administration (NOAA). 2012. Species Under the Endangered Species Act. NOAA Fisheries, Office of Protected Resources. May 24, 2012. http://www.nmfs.noaa.gov/pr/species/esa/ Accessed June 5, 2012.

Nordstrom, N. and R. Milner. 1997. Larch mountain salamander (Plethodon larselli). Pages 3-1 to 3-8 in: E.M. Larsen. (ed.). Management recommendations for Washington's Priority Species, Volume III: Amphibians and Reptiles. Washington Department of Fish and Wildlife, Olympia. [Online]. Available at: <http://wdfw.wa.gov/hab/vol3.pdf>

Oregon Department of Agriculture. 2012. ODA Plant Division, Plant Conservation. Portland, OR. Available at: http://oregon.gov/ODA/PLANT/CONSERVATION/statelist.shtml#Endangered_plant_species Accessed: May 21, 2012.

Oregon Department of Forestry. 1994. Forest Practices Notes: Spotted Owl. Number 8 (revised), December 1994. The Forest Practices Program, Oregon Department of Forestry, Salem, OR.

____. 2012. The Forest Practices Act. Oregon Department of Forestry, Salem, OR. Available at: http://www.oregon.gov/ODF/privateforests/fpaKeys.shtml. Accessed: May 31, 2012.

Oregon Department of Fish and Wildlife (ODFW). 2006. Elkhorn Wildlife Area Management Plan. Oregon Department of Fish and Wildlife, Salem, Oregon. October 2006. 48pp.

____. 2012a. Oregon Wolf Conservation and Management Plan, 2011 Annual Report. Oregon Department of Fish Wildlife. La Grande, Oregon. 32pp.

____. 2012b. Oregon Wildlife Species: Amphibian Species of Oregon. http://www.dfw.state.or.us/species/amphibians/. Accessed: May 22, 2012.

____. 2012c. Oregon Wildlife Species: Mammal Species of Oregon. http://www.dfw.state.or.us/species/mammals/bats.asp Accessed: June 24, 2012.

____. 2012d. ODFW News Releases. http://www.dfw.state.or.us/news/2012/February/020312b.asp Accessed: June 24, 2012.

Oregon Labor Market Information System. 2012. Unemployment Rates. http://www.qualityinfo.org/olmisj/AllRates, Accessed June 8, 2012.

Oregon State University. 2012. Oregon Wildlife Explorer. Available at: http://oe.oregonexplorer.info/Wildlife/. Accessed: May 21, 2012.

Paradiso, J.L., and R.M. Nowak. 1982. Wolves (Canis lupus and Allies). Pages 460 – 474 in J.A. Chapman and G.A. Feldhamer. (eds.). Wild Mammals of North America: Biology, Management, and Economics. First Edition. The Johns Hopkins University Press. Baltimore, Maryland.

Pelletier, G. 2002. Wind River Watershed Temperature Total Maximum Daily Load. Washington Department of Ecology Environmental Assessment Program, Publication No. 02-03-010.

Potash, L. L. 1998. Management Recommnedations for Mountain grape-fern (Botrychiummontanum W. H. Wagner). December 1998. Bureau of Land Management, Management Recommendations: Vascular Plants. Available at: http://www.blm.gov/or/plans/surveyandmanage/recommendations/vascular.php. Accessed: May 31, 2012.

Powell, R.A., and W.J. Zielinski. 1994. Fisher. Pages 38-73 in: L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski. (eds.). The scientific basis for conserving forest carnivores in the western United States. (General Technical Report RM-254.) Rocky Mountain Forest and Range Experiment Station, U.S. Forest Service, Fort Collins, Colorado. 184 pp.

Raedeke Associates. 2012. Technical Memorandum from Dale Herter to U.S. Fish and Wildlife Service. March 19, 2012. 5pp.

Ralph, C.J., S.K. Nelson, M.M. Shaughnessy, and S.L. Miller. 1993. Methods for surveying marbled murrelets in forests. Pacific Seabird Group, Technical paper #1 Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis. .

Raphael, M.G., S.K. Nelson, P. Swedeen, M. Ostwald, K. Flotlin, S. Desimone, S. Horton, P. Harrison, D. PrenzlowEscene, and W. Jaross. 2008. Recommendations and Supporting Analysis of Conservation Opportunities for the Marbled Murrelet Long-Term Conservation Strategy. Washington State Department of Natural Resources. Olympia. 337 pp.

Richardson S., M. Whalen, D. Demers, and R. Milner 1999. Ferruginous Hawk. Pages 7-1 – 7-4 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors. Management Recommendations for Washington's Priority Species. Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, Washington.

Routman, K. 2007. Forest Communities and the Northwest Forest Plan: What Socioeconomic Monitoring Can Tell Us. Science Findings (95). Pacific Northwest Research Station, USDA Forest Service.

Ryan, M., S. Archer, R. Birdsey, C. Dahm, L. Heath, J. Hicke, D. Hollinger, T. Huxman, G. Okin, R. Oren, J. Randerson, and W. Schlesinger. 2008. Chapter 3 - Land resources: Forest and arid lands. Pages 75-120 in: M. Walsh. (ed.). The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Synthesis and Assessment Product 4.3. Washington, D.C. U.S. Environmental Protection Agency, Climate Change Science Program. 362pp.

Seattle Audubon Society. 2005. Birdweb: Seattle Audubon's Guide to the Birds of Washington State. Web page. Available at: http://www.birdweb.org/birdweb/birds Accessed May 22 and June 6, 2012.

Skamania County. 2012. Skamania County Acreage Breakdown. http://www.skamaniacounty.org/assessor/assessor/skamania-county-acreage-breakdown/ Accessed June 10, 2012.

Smith, M.R., P.W. Mattocks, and K.M. Cassidy. 1997. Breeding birds of Washington State: location data and predicted distributions. Publications in Zoology No. 1. Seattle, WA: Seattle Audubon Society. 538 p.

Stinson, D.W., J.W. Watson, and K. R. McAllister. 2007. Status Report for the Bald Eagle. WDFW, Olympia, WA.

Strachan, G., M. McAllister, and C.J. Ralph. 1995. Marbled murrelet at-sea and foraging behavior. Pages 247-253 in: C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt. (eds.). Ecology and conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Pacific Southwest Research Station, U.S. Forest Service, Albany, California. 420pp

Strahorn, A.T. and E.B. Watson. 1914. Soil Survey of the Hood River-White Salmon River Area, Oregon-Washington. USDA, Washington, D.C.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A conservation strategy for the northern spotted owl. Report of the Interagency Scientific Committee to address the Conservation of the Northern Spotted Owl. USDA, U.S. Forest Service; USDI, Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service. U.S. Government Printing Office 791-171/20026, Washington D.C. May 1990.

University of Washington. 2012. Burke Museum Herbarium. Available online at: http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Castilleja&Species=rupico. Accessed May 31, 2012.

U.S. Census Bureau. 2010. Census 2010. http://2010.census.gov/2010census/ Accessed June 8, 2012.

U.S Department of Agriculture and U.S. Bureau of Land Management. 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest

Related Species within the Range of the Northern Spotted Owl. Attachment A to the Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. April 13, 1994. U.S. Government Printing Office 1994-589-111/00001 Region No. 10. Portland, Oregon. 150pp.

U.S. Fish and Wildlife Service (USFWS). 1987. Northern Rocky Mountain Wolf Recovery Plan. U.S. Fish and Wildlife Service. Denver, Colorado. 119pp.

———. 1990. Endangered and Threatened Wildlife and Plants; determination of threatened status for the northern spotted owl. Federal Register 55: 26114-26194. June 26, 1990.

———. 1992. Protocol for surveying proposed management activities that may impact northern spotted owls. Unpublished Report. Revised March 17, 1992. U.S. Fish and Wildlife Service. Portland, Oregon. 17pp.

———. 1993. Grizzly Bear Recovery Plan. U.S. Fish and Wildlife Service. Missoula, Montana. 181 pp.

———. 1997. Recovery plan for the threatened marbled murrelet (Brachyramphusmarmoratus) in Washington, Oregon, and California. U.S. Fish and Wildlife Service. Portland, Oregon. 203 pp.

_____. 1999. Endangered and threatened wildlife and plants: determination of threatened status of bull trout in the coterminous United States. Final Rule. Federal Register 64: 58910-58933. November 1, 1999.

———. 2006. Biological Opinion for the Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the State of Washington for the Forest Practices Habitat Conservation Plan (USFWS Reference: 1-3-06-FWI-0301). U.S. Fish and Wildlife Service. Lacey, Washington. May 2006.

_____. 2008. Final Recovery Plan for the Northern Spotted Owl, Strix occidentalis caurina. U.S. Fish and Wildlife Service. Portland, Oregon. xii + 142pp.

———. 2010a. Endangered Species Lists by Oregon County. U.S. Fish and Wildlife Service, Oregon Fish & Wildlife Office. Portland, Oregon. November 16, 2010. http://www.fws.gov/oregonfwo/Species/Lists/ Accessed June 5, 2012.

_____. 2010b. Endangered and threatened wildlife and plants: revised designation of critical habitat for bull trout in the coterminous United States. Final Rule. Federal Register 75: 63898-64070. October 18, 2010.

_____. 2011. Grizzly Bear (Ursus arctos horribilis) 5-Year Review: Summary and Evaluation U.S. Fish and Wildlife Service, Grizzly Bear Recovery Office, Missoula, Montana. 205 pp.

———. 2012a. Listed and proposed endangered and threatened species and critical habitat; candidate species, and species of concern by County. U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office. Lacey, Washington. Revised March 15, 2012.

———. 2012b. National Wetlands Inventory, Wetlands Mapper. Available: <http://www.fws.gov/wetlands/Data/Mapper.html>. Accessed: May 21, 2012.

———. 2012c. Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl, prepared by Industrial Economics, May 29, 2012.

U.S. Fish and Wildlife Service and National Marine Fisheries Service (USFWS and NMFS). 2006. Final environmental impact statement for the proposed issuance of multiple species incidental take permits or 4(d) rules for the Washington State forest practices habitat conservation plan. U.S. Fish and Wildlife Service, Portland, Oregon; National Marine Fisheries Services, Seattle, Washington.

U.S. Forest Service. 1992. Final environmental impact statement on management for the Northern Spotted Owl in the national forests: states of Washington, Oregon and California / Portland, Or.: U.S. Forest Service, 1992. 2 v. + 15 maps.

Utah State University. 2012. Online Herbarium. Available at: http://herbarium.usu.edu/webmanual/default.htm. Accessed June 1, 2012.

Wasco County. 2012. Wasco County Zoning Map. http://co.wasco.or.us/planning/WascoCountyZoningWebsite.pdf, Accessed June 8, 2012.

Washington Climate Advisory Team. 2007. Forestry Sector Technical Working Group, Policy Option Recommendations. Available: <http://www.ecy.wa.gov/climatechange/2008CAT_overview.htm>. Accessed: May 30, 2008.

Washington Department of Ecology (Ecology). 2011a. River and stream water quality monitoring, station list for WRIA 29. Available: <http://www.ecy.wa.gov/apps/watersheds/riv/station.asp?wria=29>. Accessed: Accessed: May 21, 2012.

———. 2011b. Water quality assessment for Washington. Available: <http://apps.ecy.wa.gov/wats08/QueryResults.aspx>. Accessed: May 21, 2012.

Washington Department of Fish and Wildlife (WDFW). 2008. Priority Habitats and Species Database. April 2008. Washington Department of Fish and Wildlife, Olympia.

———. 2011. Washington State Species of Concern Lists. Washington Department of Fish and Wildlife, Olympia, WA. http://wdfw.wa.gov/conservation/endangered/list/Mammal/ Accessed June 4, 2012.

_____. 2012a. Threatened and Endangered Wildlife in Washington: 2011 Annual Report. Endangered Species Section, Wildlife Program. Washington Department of Fish and Wildlife, Olympia. 180 pp.

———. 2012b. Fishers in Washington: Olympic fisher Reintroduction. Available http://wdfw.wa.gov/wlm/diversty/soc/fisher/reintro.htm. Accessed September 2, 2008.

_____. 2012c. Salmonscape interactive mapping website. Available at: <http://wdfw.wa.gov/mapping/salmonscape/index.html>. Accessed May 21, 2012.

Washington State Department of Natural Resources (WDNR). 1997. Final habitat conservation plan. Washington State Department of Natural Resources, Olympia. September 1997.

———. 2004. HCP Amendment No. 1. Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit. Washington State Department of Natural Resources, Olympia. April 2004.

———. 2005. Final Forest Practices Habitat Conservation Plan. Washington State Department of Natural Resources, Olympia. December 2005.

———. 2010. Natural Heritage Database, November 2010. Washington State Department of Natural Resources, Olympia.

———. 2012. Washington Herpes Atlas. Available: <http://www1.dnr.wa.gov/nhp/refdesk/herp/herpmain.html>. Accessed: May 22, 2012.

Washington Forest Practices Board. 2002. Forest Practices Rules Title 222 WAC. December 2002. Washington State Department of Natural Resources, Olympia.

———. 2004. Forest Practices Board Manual: Section 15, Guidelines for estimating the number of murrelet nesting platforms. Washington State Department of Natural Resources, Olympia. 7 pp.

Washington State Employment Security Department. 2012. Map of County Unemployment Rates. https://fortress.wa.gov/esd/employmentdata/report-content-pages/map-of-county-unemployment-rates, Accessed June 8, 2012.

Washington State Employment Security Department. 2011. Klickitat County Profile.

Washington State Employment Security Department. 2011. Skamania County Profile.

Watson, J.W., and E.A. Rodrick. 2004. Bald Eagle (Haliaeetus leucocephalus). Pages 9-1 to 9-15 in: E.M. Larsen, J. M. Azerrad, N. Nordstrom. (eds.). Management Recommendations for Washington's Priority Species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia. [Online]. Available http://wdfw.wa.gov/hab/phs/vol4/baldeagle.pdf

Wiles, G. J., H. L. Allen, and G. E. Hayes. 2011. Wolf Conservation and Management Plan for Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 297 pp.

Woodruff, K, and H. Ferguson. 2005. Townsend's big-eared bat (Corynorhinus townsendii). In J.M. Azerrad, editor. Management Recommendations for Washington's Priority Species, Volume V: Mammals Washington Department of Fish and Wildlife, Olympia. [Online]. Available http://wdfw.wa.gov/hab/phs/vol5/anpa.pdf.

Wright, C. S, and J. K. Agee . 2004. Fire and vegetation history in the eastern Cascade Mountains, Washington. Ecological Applications. 14(2) 443-459.

Appendix A

Special-Status Plant Species Potentially Occurring in the Covered Area

Special-Status Plant Species Potentially Occurring in the Covered Area

Common Name	Scientific Name	Federal	State	Habitat	Source
Henderson ricegrass	*Achnatherum hendersonii*	S	---	dry, rocky, shallow soil, in sagebrush or ponderosa pine habitats	Binney and Bradfield 2000
tall agoseris	*Agoseris elata*	--	S-WA	meadows, open woods, and exposed rocky ridge tops	Camp and Gamon 2011
Henderson's bentgrass	*Agrostis hendersonii*	S	---	vernal pool habitats	Harvey 1993
Howell's bentgrass	*Agrostis howellii*	S	---	shady woodlands and at the base of cliffs	Utah State University 2012
grand redstem	*Ammannia robusta*	--	T-WA	riparian mudflat wetlands dominated by annuals	Camp and Gamon 2011
chaffweed	*Anagallis minima*	--	T-WA	freshwater riparian areas, floodplains, around vernal pools, in mud and silty or sandy soil	Camp and Gamon 2011
Wormskiold's northern wormwood	*Artemisia borealis var. wormskioldii*	--	E-WA	shrub-steppe vegetation	Camp and Gamon 2011
Northern wormwood	*Artemisia campestris* var. *wormskioldii*	---	E-OR	rocky, sandy and cobble shoreline and banks of rivers	ODA 2012
Palouse milk-vetch	*Astragalus arrectus*	--	T-WA	grassy hillsides, sagebrush flats, river bluffs, and open ponderosa pine/Douglas fir forests	Camp and Gamon 2011
pauper milk-vetch	*Astragalus misellus var. pauper*	--	S-WA	open ridgetops and upper slopes	Camp and Gamon 2011

Ames' milk-vetch	*Astragalus pulsiferae var. suksdorfii*	S	E-WA	open ponderosa pine forests with bitterbrush (*Purshia tridentata*)	Camp and Gamon 2011
Tygh Valley milk-vetch	*Astragalus tyghensis*	---	T-OR	endemic to Tygh Valley in eastern Wasco County, Oregon south of SDS Lands; pine and sagebrush transition areas, such as dry oak and dry oak-pine savannas, bitterbrush steppe and moist margin sagebrush communities	ODA 2012
bolandra	*Bolandra oregana*	--	S-WA	moist, shady, wooded areas on cliffs near waterfalls; steep, grassy, semi-open slopes.	Camp and Gamon 2011
mountain grape fern	*Botrychium montanum*	S	---	cedar swamps in the Cascades	Potash 1998
long-bearded sego lily	*Calochortus longebarbatus var. longebarbatus*	S	S-WA	clay loams in vernally moist sites in meadows, and forest meadow edges	Camp and Gamon, 2011
dwarf evening-primrose	*Camissonia pygmaea*	S	---	unstable soil or gravel in steep talus, dry washes, banks and roadcuts	Camp and Gamon 2011
dense sedge	*Carex densa*	--	T-WA	eroding hummocks in intertidal marshland.	Camp and Gamon 2011
large-awn sedge	*Carex macrochaeta*	--	T-WA	moist or wet, open places, seepage areas and basalt cliffs	Camp and Gamon 2011
Smoky Mountain sedge	*Carex proposita*	--	T-WA	open, rocky slopes and ridges, often on talus or granite substrate, near or above timberline	Camp and Gamon 2011
cliff paintbrush	*Castilleja rupicola*	S	---	rock crevices and rocky slopes, usually above timberline.	University of Washington 2012
golden chinquapin	*Chrysolepis chrysophylla var. chrysophylla*	--	S-WA	dry open sites to fairly thick Douglas fir woodlands	Camp and Gamon 2011

tall bugbane	*Cimicifuga elata var. elata*	S	S-WA	along the margins of mixed, mature or old growth stands of mesic coniferous forest, or mixed coniferous-deciduous forest	Camp and Gamon 2011
few-flowered collinsia	*Collinsia sparsiflora var. bruceae*	--	S-WA	thin soils over basalt adjacent to or within open stands of ponderosa pine and Oregon white oak	Camp and Gamon 2011
Clackamas corydalis	*Corydalis aquae-gelidae*	S	S-WA	western hemlock (*Tsuga heterophylla*) and Pacific silver fir (*Abies amabilis*) zone from 2500 to 3800 feet.	Camp and Gamon 2011
beaked cryptantha	*Cryptantha rostellata*	--	T-WA	dry microsites within shrub-steppe habitats	Camp and Gamon 2011
Snake River cryptantha	*Cryptantha spiculifera*	--	S-WA	dry, open, flat or sloping areas in stable or stony soils with low vegetation cover; occurs with grasses and forbs	Camp and Gamon 2011
Douglas' draba	*Cusickiella douglasii*	--	T-WA	windswept rocky ridges, granitic rock screes, loose volcanic hillsides, red barren hills, rocky flats and serpentine ridges.	Camp and Gamon 2011
clustered lady's-slipper	*Cypripedium fasciculatum*	S	S-WA	mid- to late seral Douglas fir (*Pseudotsuga menziesii*) or ponderosa pine (*Pinus ponderosa*) forest with a closed herbaceous layer and variable shrub layer	Camp and Gamon 2011
fringed waterplantain	*Damasonium californicum*	--	T-WA	vernal pools, on margins of intermittent streams, in sloughs, and on mud flats in marshy places at low elevations	Camp and Gamon 2011
Howell's daisy	*Erigeron howellii*	S	T-WA	north-facing slopes with little soil development and limited development of competing vegetation	Camp and Gamon 2011
gorge daisy	*Erigeron oreganus*	S	T-WA	moist, shady basalt cliffs and ledges, typically beneath overhangs, and is often found near waterfalls.	Camp and Gamon 2011

Piper's daisy	*Erigeron piperianus*	--	S-WA	dry, open places, often with sagebrush	Camp and Gamon 2011
Oregon coyote-thistle	*Eryngium petiolatum*	--	T-WA	wet prairies and low ground, especially in places submerged in the spring and drier in the summer	Camp and Gamon 2011
common blue-cup	*Githopsis specularioides*	--	S-WA	thin soils over bedrock outcrops, talus slopes, and gravelly prairies; open habitats within forested landscape, or transition zones	Camp and Gamon 2011
diffuse stickseed	*Hackelia diffusa var. diffusa*	--	T-WA	shaded areas, cliffs, talus, wooded flats and slopes	Camp and Gamon 2011
western hedysarum	*Hedysarum occidentale var. occidentale*	--	S-WA	meadows, shrubfields, bare rock outcrops, boulder-fields, and talus-slopes	Camp and Gamon 2011
gooseberry-leaved alumroot	*Heuchera grossulariifolia var. tenuifolia*	--	S-WA	basalt cliffs and steep slopes where moist	Camp and Gamon 2011
Nuttall's quillwort	*Isoetes nuttallii*	--	S-WA	terrestrial in wet ground or seepages and in mud near vernal pools	Camp and Gamon 2011
dwarf rush	*Juncus hemiendytus var. hemiendytus*	--	T-WA	mud flats, the edge of vernal pools, and moist to wet meadows	Camp and Gamon 2011
Howell's rush	*Juncus howellii*	--	T-WA	moist areas in the mountains, basalt cliffs in riparian zones	Camp and Gamon 2011
Kellogg's rush	*Juncus kelloggii*	--	E-WA	sandy to clayey damp soils in vernal pools, seeps, and low spots in fields and meadows	Camp and Gamon 2011
inch-high rush	*Juncus uncialis*	--	S-WA	swales, moist places and vernal pools	Camp and Gamon 2011
smooth goldfields	*Lasthenia glaberrima*	--	E-WA	wet stream banks and in vernal pools	Camp and Gamon 2011

Baker's linanthus	*Leptosiphon bolanderi*	--	S-WA	bare or semivegetated areas with scattered basalt rocks in fine textured mineral soils	Camp and Gamon 2011
twayblade	*Liparis loeselii*	--	E-WA	dry rocky places, often on open slopes, growing in fine textured mineral soils	Camp and Gamon 2011
awned halfchaff sedge	*Lipocarpha aristulata*	--	T-WA	shorelines and islands below high water on silty substrates	Camp and Gamon 2011
smooth desert-parsley	*Lomatium laevigatum*	--	T-WA	crevices of the basaltic cliffs of the Columbia River and on adjacent rocky slopes of the sagebrush steppe	Camp and Gamon, 2011
Suksdorf's desert-parsley	*Lomatium suksdorfii*	S	S-WA	semi-open to open, dry rocky hillsides on moderate to steep slopes in scattered Oregon oak, ponderosa pine, and Douglas fir	Camp and Gamon, 2011
bog clubmoss	*Lycopodiella inundata*	--	S-WA	sphagnum bogs, wet, sandy places, wetlands adjunct to lakes, and swampy ground	Camp and Gamon 2011
white meconella	*Meconella oregana*	S	T-WA	open grassland, sometimes within a mosaic of forest/grassland including Douglas fir, ponderosa pine, and Garry oak	Camp and Gamon 2011
northern microseris	*Microseris borealis*	--	S-WA	wet meadows, sphagnum bogs	Camp and Gamon 2011
Cusick monkeyflower	*Mimulus cusickii*	--	T-WA	stream banks and other moist places on scree	Camp and Gamon 2011
liverwort monkey-flower	*Mimulus jungermannioides*	S	---	basalt crevices in seepage zones in vertical cliff faces and canyon walls	Camp and Gamon 2011
Pulsifer's monkey-flower	*Mimulus pulsiferae*	--	S-WA	moist, open areas, often in exposed mineral soil, in grass/forb dominated openings in ponderosa pine and Douglas fir forests	Camp and Gamon 2011
Suksdorf's monkey-flower	*Mimulus suksdorfii*	--	S-WA	fine textured mineral soils in sagebrush steppe vegetation	Camp and Gamon 2011

branching montia	*Montia diffusa*	--	S-WA	moist Douglas fir forests in the lowland and lower montane zones; may occur in xeric soil or disturbed sites	Camp and Gamon 2011
mousetail	*Myosurus clavicaulis*	--	S-WA	hard, bare, desiccated clay, in sparsely vegetated areas of shallow vernal pools	Camp and Gamon 2011
marigold navarretia	*Navarretia tagetina*	--	T-WA	open, stony or rocky places with standing water or saturated soil in early spring adjacent to ponderosa pine, Douglas fir, and Garry oak	Camp and Gamon 2011
coyote tobacco	*Nicotiana attenuata*	--	S-WA	dry, sandy bottom lands, dry rocky washes, and in other dry open places	Camp and Gamon 2011
tufted evening-primrose	*Oenothera caespitosa ssp. marginata*	--	T-WA	road cuts, dry hills, arid and rocky slopes in open and wooded areas, and in desert regions	Camp and Gamon 2011
adder's-tongue	*Ophioglossum pusillum*	--	T-WA	terrestrial in pastures, old fields, roadside ditches, and flood plain woods in seasonally wet, rather acid soil	Camp and Gamon 2011
rosy owl-clover	*Orthocarpus bracteosus*	--	E-WA	moist meadow conditions in the transition zone between wetland and upland	Camp and Gamon 2011
western yellow oxalis	*Oxalis suksdorfii*	--	T-WA	meadows and moist woods and sometimes on dry open slopes	Camp and Gamon 2011
fringed grass-of-parnassus	*Parnassia fimbriata var. hoodiana*	--	T-WA	very wet meadows with springs, streams, and ponds on low rock outcrops and on damp edges of small spring-fed ponds	Camp and Gamon 2011
Barrett’s beardtongue	*Penstemon barrettiae*	S	T-WA	crevices along basalt cliff faces, on ledges of rock outcrops, on open talus and occasionally along well-drained roadsides	Camp and Gamon 2011
Barrett's penstemon	*Penstemon barrettiae*	S	---	crevices along basalt cliff faces, on ledges of rock outcrops, on open talus and occasionally along well-drained roadsides	Camp and Gamon 2011

hot-rock penstemon	*Penstemon deustus var. variabilis*	--	T-WA	open areas on dry, thin soils over basalt.	Camp and Gamon 2011
Fuzzy tongue penstemon	*Penstemon eriantherus var. whitedii*	--	S-WA	west facing slopes of small canyons, and in dry and rocky habitats in the foothills of the Cascade Range and in the Columbia Basin	Camp and Gamon 2011
Wilcox's penstemon	*Penstemon wilcoxii*	--	S-WA	shrubby areas, open forest, forested slopes, moist soil and rocky hills	Camp and Gamon 2011
canyon bog-orchid	*Platanthera sparsiflora*	--	T-WA	open, wet areas, seeps and bogs	Camp and Gamon 2011
Wheeler's bluegrass	*Poa nervosa*	--	S-WA	rock outcrops, cliff crevices, and occasionally in talus near the base of cliffs or outcrops	Camp and Gamon 2011
great polemonium	*Polemonium carneum*	--	T-WA	woody thickets, open and moist forests, prairie edges, roadsides, and fence lines	Camp and Gamon 2011
Parry's knotweed	*Polygonum parryi*	--	T-WA	vernally moist areas in otherwise dry habitats	Camp and Gamon 2011
Dalles Mt. buttercup	*Ranunculus triternatus*	S	---	sagebrush slopes	University of Washington 2012
obscure buttercup	*Ranunculus triternatus*	S	E-WA	meadow-steppe habitat dominated by perennial xerophytic bunchgrass and perennial broad-leaved herbs	Camp and Gamon 2011
persistent sepal yellow cress	*Rorippa columbiae*	S	E-WA	near all types of bodies of water, including the Columbia River, intermittent streams, permanent lakes, wet meadows, irrigation ditches and roadside ditches	Camp and Gamon 2011
lowland toothcup	*Rotala ramosior*	--	T-WA	wet, swampy places, lakes and pond margins, and along free flowing river reaches	Camp and Gamon 2011

soft-leaved willow	*Salix sessilifolia*	--	S-WA	riparian forest, in dredge spoils, and on a silty bank at the upper edge of an intertidal zone	Camp and Gamon 2011
Oregon white-top aster	*Sericocarpus oregonensis ssp. oregonensis*	--	T-WA	open woodlands and dry, open, often rocky coniferous forest	Camp and Gamon 2011
white-top aster	*Sericocarpus rigidus*	S	S-WA	open grassland habitats	Camp and Gamon 2011
pale blue-eyed grass	*Sisyrinchium sarmentosum*	S	T-WA	meadows dominated by grasses and sedges and small forest openings	Camp and Gamon 2011
western ladies-tresses	*Spiranthes porrifolia*	--	S-WA	wet meadows, along streams, in bogs, seeps associated with ponderosa pine, Douglas fir, Garry oak	Camp and Gamon 2011
Oregon sullivantia	*Sullivantia oregana*	S	E-WA	moist cliffs, especially near waterfalls in shallow pockets of basalt-derived soils	Camp and Gamon 2011
flat-leaved bladderwort	*Utricularia intermedia*	--	S-WA	shallow ponds, slow-moving streams, and wet sedge or rush meadows	Camp and Gamon 2011
Siskiyou false-hellebore	*Veratrum insolitum*	--	T-WA	openings in thickets and mixed-evergreen forest on red clay	Camp and Gamon 2011
California compass plant	*Wyethia angustifolia*	--	S-WA	meadows and moist, open hilllsides in the Western Cascades and Columbia River gorge	Camp and Gamon 2011

* E – Endangered; T – Threatened; S - Sensitive; C - Candidate

Appendix B

Special-Status Animal Species Potentially Occurring in the Covered Area

Special-Status Wildlife Species Potentially Occurring in the Covered Area

Common Name	Scientific Name	Federal*	State	Habitat	Source
Amphibians					
Tailed frog	*Ascaphus truei*	S	---	cold, fast-flowing, perennial streams primarily in older forests	WDNR 2012
Northern red-legged frog	*Rana aurora aurora*	S	---	lowland (mostly below 3000 ft) moist forested habitats with access to water; can persist in landscapes managed for timber	WDNR 2012
Cascades frog	*Rana cascadae*	S	---	occurs on rugged terrain in high-elevation meadows and bogs	WDNR 2012
Northern leopard frog	*Rana pipiens*	--	E – WA	cattail or sedge marshes or temporary ponds with vegetation in the water	WDNR 2012
Oregon spotted frog	*Rana pretiosa*	C	E - WA	edges of lakes, marshes, springs and slow streams with emergent vegetation	ODFW 2012
Western toad	*Bufo boreas*	S	C – WA	Forests to arid shrub; breed shallow water	WDNR 2012
Oregon slender salamander	*Batrachoseps wrighti*	S	--	dependent on mature forests	ODFW 2012
Larch Mountain salamander	*Plethodon larselli*	S	S - WA	Steep, forested slopes in rocky areas	WDNR 2012
Van Dyke's salamander	*Plethodon vandykei*	S	S - WA	cool, moist habitats in forested areas; endemic to Western WA	Nordstrom and Milner (1997)
Reptiles					

Northern Pacific pond turtle	*Actinemys marmorata marmorata*	S	--		
Western pond turtle	*Actinemys marmorata*	S	E - WA	streams, ponds, lakes, permanent and ephemeral wetlands; overwinter on land and may disperse overland	Nordstrom and Milner 1997
Sharptail snake	*Contia tenius*	S	C – WA	seasonally moist habitats near water in well-exposed, south-facing slopes on the edge of forests	WDNR 2012
Sagebrush lizard	*Sceloporus graciosus*	S	C – WA	sandy habitats with shrubs and large areas of bare ground	WDNR 2012
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	S	---		
Birds					
Bald eagle	*Haliaeetus leucocephalus*	S	S – WA	Usually near water; prefers tall trees with suitable prey base	OSU 2012
Ferruginous hawk	*Buteo regalis*	S	T – WA	Forage in shrub-steppe, native prairie, hay lands, and pasture, nest on outcrops	Richardson et al. 1999
Northern goshawk	*Accipiter gentilis*	S	C – WA	can occur in all forested regions of Washington	OSU 2012
Peregrine falcon	*Falco peregrinus*	S	S – WA	Nest on cliffs near water	Hays and Milner 1999
Northern spotted owl	*Strix occidentalis caurina*	T	T - OR, E – WA		
Tricolored blackbird	*Agelaius tricolor*	S	---		ODFW & OSU 2012
Olive-sided flycatcher	*Contopus cooperi*	S	---	Forested areas with wetlands	NatureMapping 2012

Willow flycatcher	*Empidonax traillii*	S	---	Breeds in dense shrubby areas along streams, marshes and meadows; found in young forests with an extensive shrub layer	ODFW & OSU 2012
Yellow-breasted chat	*Icteria virens*	S	---	wetlands within Douglas Fir, Ponderosa Pine, and Oak habitats east of the Cascade crest	NatureMapping 2012; OSU 2012
Sandhill crane	*Grus canadensis*	---	E – WA	Breed in marshes, fields, and prairies; Known locally at Conboy Lake National Wildlife Refuge	NatureMapping 2012
Harlequin duck	*Histrionicus histrionicus*	S	---	Nest on ground or tree cavities near streams in mature forests	Lewis and Kraege 2004
Loggerhead shrike	*Lanius ludovicianus*	S	C – WA	Predominantly found in shrub-steppe and juniper habitats	OSU 2012; NatureMapping
Acorn woodpecker	*Melanerpes formicivorus*	S	---	Middle to older aged oak savannas and open oak-conifer woodlands	OSU 2012
Lewis' woodpecker	*Melanerpes lewis*	S	---	Frequents oak, ponderosa pine and riparian woodlands; nests in snags	OSU 2012
White-headed woodpecker	*Picoides albolarvatus*	S	---	Open ponderosa pine or mixed conifer forests; nests in snags	OSU 2012
Greater Sage-grouse	*Centrocercus urophasianus*	C	T	uncommon, very local, and declining in sagebrush lands in Benton and Douglas County and in the U.S Army's Yakima Training Center.	NatureMapping 2012
Mountain quail	*Oreortyx pictus*	S	---	most common in regenerating clear cuts and areas at the edge of forest clearings	OSU 2012
Band-tailed pigeon	*Patagioenas fasciata*	S	---	Low-elevation coniferous forests; requires closed canopy forests for nesting	OSU 2012

Mammals					
Pallid bat	*Antrozous pallidus pacificus*	S	---	Associated with dry areas, but also open forest types such as ponderosa pine and oak woodlands.	ODFW 2012
Townsend's big-eared bat	*Corynorhinus townsendii townsendii*	S	---	Desert scrub habitat east of the Cascades and coniferous forest west of the Cascade crest.	ODFW 2012
Spotted bat	*Euderma maculatum*	S	---		
Silver-haired bat	*Lasionycteris noctivagans*	S	---	Older forests, especially Douglas-fir/western hemlock; also ponderosa pine and juniper woodlands	ODFW 2012
Small-footed myotis bat	*Myotis ciliolabrum*	S	---	cliffs, rock outcrops, and dry slopes in arid valleys and badlands east of the Cascades. Roosts in cliff cavities, boulders, vertical banks, the ground, talus slopes, and under rocks.	NatureMapping 2012
Long-eared myotis	*Myotis evotis*	S	C - WA	coniferous forests and transition zone from forest to steppe in eastern Oregon	ODFW 2012
Long-legged myotis bat	*Myotis volans*	S	---	Montane coniferous forests, but also in lower-elevation coniferous forests, oak and mixed evergreen woodlands	
Yuma myotis bat	*Myotis yumanensis*	S	---	Closely associated with water in Ponderosa Pine forests, Douglas-fir forests, and arid grassland habitats	ODFW 2012; NatureMapping 2012
Western gray squirrel	*Sciurus griseus griseus*	S	T – WA	open forest of broadleaf, nut-bearing trees occurring in pure or mixed stands with conifers at low elevations; Garry oaks (*Quercus garryana*) an important food source	NatureMapping 2012

Townsend's ground squirrel	*Spermophilis townsendii*	S	C – WA	open sagebrush-grass habitat, but also enters pastures and abandoned fields; not associated with forested zones	NatureMapping 2012
Fisher	*Martes pennanti*	C	E- WA	mature, closed canopy coniferous forests at low to mid elevations. Riparian corridors with continuous canopies, large stands, low levels of fragmentation and a high percentage of dead and downed timber	ODFW 2012
Canada lynx	*Lynx canadensis*	T			
North American wolverine	*Gulo gulo luscus*	C			
Gray wolf	*Canis lupus*	E	E – WA	Wide-ranging generalist once common throughout OR and WA; now restricted to Cascades (WA) and Blue Mountains (OR)	ODFW 2012; Wiles et a al. 2011
Grizzly bear	*Ursus arctos horribilis*	T	E - WA	Small population (< 20) North Cascades of WA; none in OR	USFWS 2011