



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

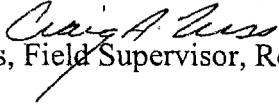
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August 21, 2006

### Memorandum

To: Tim Reuwsaat, District Manager, Medford District BLM, Medford, OR

From:  Craig Tuss, Field Supervisor, Roseburg Field Office, Roseburg, Oregon.

Subject: Formal consultation on activities that may affect listed species on public lands administered by the Medford District BLM ( District) during fiscal years 2006 through 2008 (FY 06-08) (FWS Log #: 1-15-06-F-0162).

This document transmits the Fish and Wildlife Service's (Service) biological opinion (Opinion) based on our review of the proposed forest management activities scheduled to occur on lands administered by the District during FY 06-08, and their potential impacts to listed species including the threatened northern spotted owls (*Strix occidentalis caurina*) (spotted owl) and their designated critical habitat. This Opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973 as amended (16 U. S.C. 1531 *et seq.*) (Act).

The enclosed Opinion includes a finding that implementation of the proposed actions would not jeopardize the continued existence of the spotted owl, nor result in the adverse modification of spotted owl critical habitat.

In accordance with regulation, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agencies' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation of formal consultation.

If you have any questions regarding this Opinion, please contact Cynthia Donegan at 541-957-3469.

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Biological Opinion  
on  
Medford District BLM FY 2006-2008 Management Activities  
(FWS Reference Number 1-15-06-F-0162)

U.S. Department of the Interior  
U.S. Fish and Wildlife Service  
Roseburg Field Office  
August, 2006

Signature: Craig A. Tuss  
Craig A. Tuss  
Field Supervisor

Date Signed: 8/21/06

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**DEFINITIONS**

Land Use Allocations:

**Congressionally-Reserved Areas** are lands with congressional designations that preclude timber harvest. The Rogue Wild and Scenic River is the only Congressionally-Reserved area on the District.

**Late-Successional Reserves** are managed to protect and enhance habitat conditions for late-successional and old-growth related species. These reserves are designed to maintain a functional, interacting late-successional and old-growth ecosystem.

**Adaptive Management Areas** are managed to develop and test new management approaches to integrate and achieve ecological and economic health, and other social objectives.

**Riparian Reserves** are areas along all streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis.

**Matrix** consists of those federal lands not in the categories above. There are two Matrix land use allocations on the District:

#### North General Forest Management Area

- Retain on average 6-8 trees per acre (modified even-aged systems)
- Retain on average of 12-15 trees per acre (for shelterwood)
- Retain on average 16-25 trees per acre (structural retention systems) in scattered or clumped distribution

#### Southern General Forest Management Area

- Retain on average 16-25 trees per acre in scattered or clumped distribution

#### Activity Periods:

The breeding period of the northern spotted owl is March 1 - September 30.

The critical breeding period of the northern spotted owl is March 1 - June 30.

#### Species Sites:

A spotted owl site is defined as a location with evidence of continued use by spotted owls, including: breeding, repeated location of a pair or single birds during a single season and /or over several years, presence of young before dispersal, or some other strong indication of continued occupation. A spotted owl site may include one or more activity centers (i.e., nest site). A provincial home range is defined by a circle located around an activity center, which represents the area owls are assumed to use. Provincial home range radii vary in length based on the physiographic Province in which it is located: Coast Range = 1.5 miles, Klamath = 1.3 miles, and Western Cascades = 1.2 miles.

A Known Owl Activity Center (KOAC) for the northern spotted owl is a designated reserve protecting approximately 100 acres of the best habitat adjacent to a nest site or activity center for all spotted owl sites known prior to January 1, 1994 on BLM Matrix lands.

#### Habitats:

Capable habitat for the spotted owl is habitat that is either currently suitable or that can become suitable in the future.

Dispersal habitat for the northern spotted owl consists of forest lands generally greater than 40 years of age with canopy closures of 40 percent or greater and an average diameter at breast height of 11 inches or greater. Spotted owls use dispersal habitat to move between blocks of suitable habitat; juveniles use it to disperse from natal territories. Dispersal habitat may have roosting and foraging components, enabling spotted owls to survive, but lack structure suitable for nesting. The unit wildlife biologist makes site-specific determinations and delineations of dispersal habitat.

Suitable habitat for the northern spotted owl consists of habitat used by owls for nesting, roosting and foraging (NRF). Suitable habitat also functions as dispersal habitat. Generally this habitat is 80 years of age or older, multi-storied and has sufficient snags and down wood to provide opportunities for nesting, roosting and foraging. The canopy closure generally exceeds

60 percent. The unit wildlife biologist makes site-specific determinations and delineations of suitable habitat.

Critical Habitat for the northern spotted owl was designated in Federal Register 57 and includes the primary constituent elements that support nesting, roosting, foraging, and dispersal. Designated Critical Habitat also includes forest land that is currently unsuitable, but has the capability of becoming suitable habitat in the future (FR57 (10):1796-1837).

#### Habitat Modifications:

Downgrade habitat means to alter the function of spotted owl suitable habitat so that the habitat no longer supports nesting, roosting, and foraging behavior. Downgraded suitable habitat will support spotted owl dispersal.

Remove habitat means to alter known spotted owl suitable or dispersal habitat, so that the habitat no longer supports nesting, roosting, foraging, or dispersal.

Degrade NRF or dispersal habitat means to affect the quality of spotted owl suitable or dispersal habitat without altering its structure and function as defined above. Degraded NRF habitat retains large trees, multi-storied canopy, standing and down dead wood, diverse understory adequate to support prey, and may have some mistletoe or other decay. Degraded dispersal retains its structure and function as defined above.

#### Effects Determinations:

##### Spotted Owl

The effects determination for the degradation of suitable NRF or dispersal habitat may affect, is not likely to adversely affect the spotted owl because spotted owls will be able to use the stand post-treatment in the same way as before implementation.

Downgrading NRF habitat means will alter the function of spotted owl suitable habitat so that the habitat no longer supports nesting, roosting, and foraging behavior, and is therefore considered a may affect, likely to adversely affect action, as this activity changes the way a spotted owl may use the affected stand post-treatment.

Removal of habitat will alter spotted owl NRF or dispersal habitat, so that the habitat no longer supports nesting, roosting, foraging, or dispersal. This activity may affect, is likely to adversely affect the spotted owl as they will not be able to use the stand for many years post-treatment.

##### Spotted Owl Critical Habitat

Critical habitat degradation means that primary constituent elements are removed or reduced in quantity or quality but would continue to provide all primary constituent elements of CH. Degradation of critical habitat may affect, is not likely to adversely affect the spotted owl critical habitat.

Critical Habitat removal means that primary constituent elements are removed or reduced in quantity or quality such that the stand (as the species would use it) is no longer NRF or

dispersal. Removal of critical habitat may affect, is likely to adversely affect spotted owl critical habitat.

## CONSULTATION HISTORY

On February 10, 1994, the Service issued the Bureau of Land Management (BLM) and the Forest Service a non-jeopardy biological opinion (Log #1-7-94-F-14), in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S. C. 1531 *et seq.*)(Act), addressing the adoption of the Northwest Forest Plan (Plan) and its effect on listed species and critical habitat within the range of the spotted owl. That biological opinion did not address incidental take of listed species. Such analyses were deferred to future, project-scale consultations where more site-specific information would be available on baseline (action area) conditions and project-related activities.

On October 20, 2003, the Service issued a non-jeopardy/non-adverse modification biological opinion on the program of activities planned by the Forest and the Medford District BLM (District) for Fiscal Years (FY) 2004-2008 (Log # 1-15-03-F-511) (USFWS 2003a).

On June 14, 2006 the Service received a request from the Forest and the District (collectively referred to as the Action Agencies) requesting consultation on a program of activities scheduled to occur during FYs 2006-2008. Some of these proposed actions are in addition to those originally consulted on and addressed in the Service's October 20, 2003 biological opinion referenced above. The request also included actions originally consulted on, planned for, but not implemented in FY 2004-2008. This resulted in a significant change to the proposed action originally addressed in the Service's October 20, 2003 biological opinion. On that basis, the Forest and the District requested reinitiation of consultation under section 7 of the Act.

In the original consultation request, the Action Agencies asked for separate consultation documents. In response to that request, this Opinion will analyze those FY 06-08 actions that ***may affect, are likely to adversely affect*** listed species and their designated critical habitats proposed by the District. Separate consultation documents will be issued to the Forest.

Due to errors in that document, the Action Agencies made necessary corrections and submitted an amended joint Assessment to the Service on August 2, 2006.

The amended Assessment, dated August 2, 2006 (USDA/USDI 2006), analyzed effects of a three-year program of work planned by both the Forest and the District.

## BIOLOGICAL OPINION

This biological opinion (Opinion) does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

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## DESCRIPTION OF THE ACTION AREA

The Action Area has been defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402). For the purposes of this Opinion, the Action Area includes all public lands managed by the Action Agencies, as well as all areas subject to increased ambient noise levels caused by activities associated with the proposed action (see the disturbance distances described below in the *Description of the Proposed Action* section of this document).

Public land administered by the District generally occurs in a checkerboard pattern of alternating sections of private land and federally managed public lands. Human populations are centered on the cities of Medford, Grants Pass, and Ashland. Private, state and other governmental lands comprise approximately 40 percent of the total acreage within the 14 Section Seven watersheds. Private forested lands managed for timber production will typically be harvested between 40 and 60 years of age, in accordance with the Oregon State Forest Practices Act standards. These lands are typically not expected to provide spotted owl nesting, roosting and foraging habitat. The conversion of intact suitable habitat in the low elevation woodlands and grasslands into pastures, vineyards, orchards, and home sites is increasing throughout the Rogue Valley.

A detailed description on the Action Area may be found in the Assessment (USDA/USDI 2006), which is incorporated to this opinion by reference.

## DESCRIPTION OF THE PROPOSED ACTION

The District is proposing a suite of management activities scheduled to occur during FY 06-08 (Table 1). Individual projects are grouped into the general categories described below. However, these categories are not necessarily distinct and may have considerable overlap. The predicted scope and amount (acres, miles, number of projects, etc) of these activities are reported annually under only one category. This reporting of projects avoids duplication or overestimation of miles of impact. Projects include, but are not limited to:

**Timber Harvest** encompasses various levels of regeneration harvest, commercial thinning, selective harvest, density management, commercial firewood, hazard tree removal, salvage, and roads related to timber sales.

**Vegetation Management** encompasses silvicultural activities consisting of stand density management, conversion, fertilization, pruning, pre-commercial thinning, Port-Orford-cedar sanitation, riparian thinning, animal damage control (gopher baiting), slash piling, and burning.

**Watershed Restoration** encompasses culvert repair/replacement, road restoration or decommissioning, slope stabilization, habitat improvement projects, stream improvement projects, including tree lining/felling, down wood, and snag creation. (See also Road Maintenance/Construction below).

**Fuels Management and Wildfire Suppression** encompasses fuel breaks, piling and prescribed burning, thinning, and brush treatments.

**Recreation** encompasses trail construction and maintenance, campground maintenance and development, and facilities maintenance and development.

**Road Maintenance/Construction** encompasses maintenance, restoration or decommissioning, culvert replacement and repair, bridge maintenance and repair, and road re-alignment.

**Mining and Quarry Operations** encompasses casual use, notice and plan level permits and operations, and commercial quarries.

**Table 1: Proposed FY 06-08 management activities on the Medford District BLM.**

Table 1. Proposed Action					
Project Category	Estimated Scope—Acres, Land Use Allocations				
	Northern Spotted Owls				
All Activities 06-08 (see Proposed Action spreadsheet for details)	Total Acres, and estimate of how much disturbance could occur	NRF Habitat		Dispersal Remove	Disturbance
		Remove	Downgrade		
		10,988	20,229		25,000
LSR subset			980		
CHU subset		1,424	3,246	388	
Vegetation management including silviculture	<p>Pre-commercial thinning, brushing, site preparation: 12,700 acres/year. Up to 50% in LSR<sup>1</sup>. Some riparian thinning.                      Planting: 6,150 acres/year                      Fertilization: little, no more than 35,500 acres (approx 11,000 ac/year)                      Gopher control: 500 acres/year: trapping</p> <p>Seed orchards involve treatments not used on all lands. These actions are covered under separate consultation. See BLM 2003-Draft ES Integrated Pest Management, Provolt Seed Orchard, Charles A. Sprague Seed Orchard. Medford BLM. June 2003.</p> <p>Could occur across all land use allocations. Matrix would be emphasized for planting and site preparation following timber sales. Treatments in LSR would be designed to improve LSR conditions. Some would occur in CHU<sup>2</sup>.</p>				

<b>Table 1. Proposed Action</b>	
<p>Watershed/ riparian restoration</p>	<p>BLM stream structures: 15/ year. Culvert replacement/repair: 12 large fish passage culverts/ year; 50 cross-culverts/year.</p> <p>Restore native plants: 2000 acres/year. Riparian restoration 300 acres/year. Wildlife habitat meadow restoration 500 acres/ year (see also Tree harvest for meadow restoration).</p> <p>Fish habitat improvement: 25 miles/ year</p> <p>General wildlife enhancement/ year: Tree top blasting; snag development: 200 trees Brushing: 200 acres. See also road restoration below.</p> <p>Could occur across all land allocations, with emphasis in riparian reserves and LSR. Most, if not all work would avoid or reduce impacts through implementation of project design criteria (PDC<sup>3</sup>) and distance buffers from known sites (and occupied habitat). Some would occur in CHU.</p>
<p>Fuels management</p>	<p>15,000 acres of mechanical or hand fuels reduction/ year.</p> <p>10,000 acres of prescribed burning/year</p> <p>Some acres are treated in subsequent steps: pile construction in one year, pile burning in subsequent year, and acres are counted in each year.</p> <p>Could occur across all land allocations, with emphasis in matrix and AMA<sup>4</sup>. Strong emphasis of fuels reduction in the Wildlands Urban Interface (WUI). Some fuels reduction occurs outside of habitat, but could have some disturbance effects if adjacent to occupied habitat or unsurveyed suitable habitat during the critical nesting period. PDC will be followed to the extent possible and known site information will be incorporated into fuels planning exercises. Some would occur in CHU and could occur in dispersal-only or NRF<sup>5</sup> habitat.</p>
<p>Recreation</p>	<p>Facility development—construction or reconstruction could occur on up to 50 acres/year. Estimate no more than 10 projects per year.</p> <p>Maintenance: 100 trail miles; 50 acres of campgrounds and other facilities;</p> <p>30 recreational projects/ year with noise disturbance potential.</p> <p>10 miles of new trail construction/year;</p> <p>Could occur across all land use allocations. PDC will be implemented to avoid/reduce impacts. Some trail maintenance must occur in occupied habitat during critical habitats due to elevation, and some disturbance may occur. This would be expected to be short duration and small areas. Some could occur in CHU.</p>
<p>Road use permits (private lands)</p>	<p>Glendale Resource Area: Jackpot Mine perpetual ROW. T 33S R 5W Sec. 20 . ¾ mile construction CHU OR-32, Matrix land use allocation. Josephine County.</p>

<b>Table 1. Proposed Action</b>	
Road maintenance and construction (outside of timbersales)	Up to 500 miles of road maintenance/ year. Some potential of hazard tree removal.  Construction up to 20 miles per year.  Hazard trees are reported in monitoring reports as acres degraded. Any greater impacts would be reported under tree harvest. Could occur across all land use allocations and CHU.
Mining and quarry operations	Notice-level operations: 10/year less than 30 acres total. Plan-level operations: 3 /year no more than 40 acres. Rock permits (existing quarries): 50/year; New quarries-potential of 1. Mine reclamations 1-5/year;  Could occur across all land use allocations and CHU.

<sup>1</sup> Late Successional Reserve; <sup>2</sup> Critical Habitat Unit; <sup>3</sup> Project Design Criteria; <sup>4</sup> Adaptive Management Area; <sup>5</sup> Nesting, Roosting Foraging

The effects of habitat removal for spotted owls have been analyzed by section seven watersheds (hydrologically defined units)(watersheds) in this document. Table 2 displays the spotted owl habitat modification portion of the proposed action by watershed.

**Table 2: Proposed Action by Watershed.**

Section Seven Watersheds	2006 Baseline NRF habitat (acres)	NRF habitat Removed (acres)	NRF habitat Acres Downgraded	Percent NRF habitat reduction	2006 dispersal baseline acres <sup>1</sup>	Dispersal-only acres removed within designated critical habitat units	Percent dispersal reduction
<b>Applegate</b>	114,362	1,220	3,475	4.1	192,550	335	0.2
<b>Bear</b>	21,175	670	1,160	8.6	31,526	0	0.0
<b>Cow Upper</b>	43,657	2,204	3,480	13.0	52,471	0	0.0
<b>Illinois</b>	135,763	171	1,800	1.5	221,170	0	0.0
<b>Klamath</b>	16,820	525	970	8.9	32,628	15	0.1
<b>Little Butte Creek</b>	39,719	880	295	2.9	54,093	0	0.0
<b>Rogue Lower-Wild</b>	105,072	383	754	1.1	138,272		0.0
<b>Rogue Middle</b>	88,774	3,967	5,424	10.6	134,917	3	0.002
<b>Rogue Upper</b>	179,492	968	2,861	2.1	292,031	35	0.01
<b>Total</b>	<b>744,834</b>	<b>10,988</b>	<b>20,219</b>	<b>4.1</b>	<b>1,149,680</b>	<b>388</b>	<b>0.03</b>

<sup>1</sup> NRF plus dispersal-only habitat

Detailed descriptions of individual projects associated with this proposed action are presented in Appendix A, in relation to the general categories described above. Although a proposed activity may overlap two or more of the above categories, to avoid duplication or overestimation of the acres or miles of habitat impacted, the District proposes to report

individual project impacts annually under only one category. The proposed action does not include the following activities which will be addressed under separate consultations, as appropriate: (1) new road use permits (other than existing applications); (2) off-highway vehicle authorizations; (3) land exchange/realty actions; (4) research projects; and (5) wildland fire control.

The District practices adaptive management as described in the Plan. Adaptive management allows minor project variations to meet site-specific conditions or landscape objectives. Therefore, there may be minor deviations in the projects described above over the 3-year term of the proposed action.

This Opinion will cover these minor alterations in project activities if the following conditions are met: (1) the project complies with the District's Resource Management Plan (RMP) (BLM 1995) to which it is tiered; (2) the impacts and extent of the project are within parameters of described activities in the Assessment; (3) any minor deviations are reviewed by the Level 1 team to ensure impacts to listed species remain the same or less than those described within the Assessment; (4) minimization measures proposed for the project are consistent with the intent and impacts of actions described in the Assessment; and (5) project impacts are reported to the Service in annual monitoring reports.

### Project Design Criteria

Project design criteria (PDC) are conservation measures developed to reduce impacts to listed species, and may include seasonal restrictions, establishment of buffers, altering project design or dropping an entire project. Mandatory PDC will be incorporated into all activities as integral to the proposed action, unless exempted by Level 1 team consensus. The Level 1 team will evaluate any deviations in mandatory PDC or proposed projects to ensure the deviations are consistent with the scope, extent, and effects of projects and PDC analyzed in the Assessment. PDC involving seasonal restrictions will be implemented unless surveys, following approved protocols, indicate either non-occupancy or non-nesting of target species. Recommended PDC will be incorporated during project implementation when practical. Project design criteria help the District comply with their responsibility to conserve listed species under the ESA Section 7(a)1. A detailed description of the PDC is located in Appendix A.

### Detailed Project Descriptions

Detailed descriptions of individual projects associated with this proposed action may be located in Appendix B.

## **STATUS OF THE SPECIES**

### Spotted Owl

#### Legal Status

The northern spotted owl (*Strix occidentalis caurina*) was listed as threatened on June 26, 1990. It was listed due to widespread habitat loss across its entire range and the inadequacy of existing regulatory mechanisms to provide for its conservation (USFWS 1990a).

### Life History

More detailed accounts of the taxonomy, ecology, and reproductive characteristics of the spotted owl are found in the 1987 and 1990 U.S. Fish and Wildlife Service Status Reviews (USFWS 1987, 1990b), the 1989 Status Review Supplement (USFWS 1989), the Interagency Scientific Committee (ISC) Report (Thomas *et al.* 1990), the Forest Ecosystem Management Assessment Team (FEMAT) Report (Thomas and Raphael 1993), final rule designating the spotted owl as a threatened species (USFWS 1990a), and the Scientific Evaluation of the Status of the Northern Spotted Owl (Courtney *et al.* 2004).

### Taxonomy

The northern spotted owl is one of three subspecies of spotted owls currently recognized by the American Ornithologists' Union and is typically associated with old-growth forested habitats throughout the Pacific Northwest. The taxonomic separation of these three subspecies is supported by genetic (Barrowclough and Gutiérrez 1990), morphological (Gutiérrez *et al.* 1995) and biogeographic information (Barrowclough and Gutiérrez 1990).

### Physical Description

The northern spotted owl is a medium-sized owl, approximately 46-48 cm in length and weighs approximately 490-850 g (Gutiérrez *et al.* 1995) and is the largest of the three subspecies (Gutiérrez *et al.* 1995). It is dark brown with a barred tail and white spots on the head and breast, and has dark brown eyes that are surrounded by prominent facial disks. Three age classes can be distinguished on the basis of plumage characteristics (Forsman 1981, Moen *et al.* 1991). The spotted owl superficially resembles the barred owl (*Strix varia*), a species with which it occasionally hybridizes (Kelly *et al.* 2003). Hybrids exhibit characteristics of both species (Hamer *et al.* 1994).

### Current and Historical Range

The current range and distribution of the northern spotted owl extends from southern British Columbia through western Washington, Oregon, and California, as far south as Marin County (USFWS 1990b). The southeastern boundary of its range is the Pit River area of Shasta County, California. The range of the spotted owl is partitioned into 12 physiographic provinces (provinces), based upon recognized landscape subdivisions exhibiting different physical and environmental features (Thomas *et al.* 1993). These provinces are distributed across the range as follows: 4 provinces in Washington (Washington Cascades East, Olympic Peninsula, Washington Cascades West, Western Lowlands); 5 provinces in Oregon (Oregon Coast Range, Willamette Valley, Oregon Cascades West, Oregon Cascades East, Klamath Mountains); and 3 provinces in California (California Coast, California Klamath, California Cascades). The current range of the spotted owl is similar to its historical range where forested habitat still exists. The relatively contiguous distribution of habitat is influenced by the natural insularity of habitat patches within geographic province, and by natural and man-caused fragmentation of vegetation. The spotted owl is extirpated or uncommon in certain areas such as southwestern Washington and British Columbia. Timber harvest activities have eliminated, reduced or fragmented spotted owl habitat sufficiently to decrease overall population densities across its range, particularly within the coastal provinces where habitat reduction has been concentrated (Thomas and Raphael 1993).

## Behavior

Spotted owls are territorial. However, home ranges of adjacent pairs overlap (Forsman *et al.* 1984, Solis and Gutiérrez 1990) suggesting that the area defended is smaller than the area used for foraging. Territorial defense is primarily effected by hooting, barking and whistle type calls.

Spotted owls are monogamous and usually form long-term pair bonds. “Divorces” occur but are relatively uncommon. There are no known examples of polygyny in this owl, although associations of three or more birds have been reported (Gutiérrez *et al.* 1995).

## Habitat Relationships

Home Range. Northern spotted owl home range size varies by province. Home range generally increases from south to north, which is likely in response to decreasing habitat quality (USFWS 1990b). Home range size was linked to habitat type, availability, and abundance of prey (Zabel *et al.* 1995).

Based on available radio-telemetry data (Thomas *et al.* 1990), the Service estimated median annual home range size for the spotted owl by province throughout the range of the spotted owl. Because the actual configuration of the home range is rarely known, the estimated home range of a spotted owl pair is represented by a circle centered upon a spotted owl activity center, with an area approximating the provincial median annual home range. For example, estimated home range area varies from 3,340 acres (based on a 1.3-mile radius area) in California to 14,271 acres (based on a 2.7-mile radius circle) in Washington. The Service uses a 0.7-mile radius circle (984 acres) to delineate the area most heavily used (core area) by spotted owls during the nesting season. Variation in the size of the actual core area also varies geographically. For example, spotted owls in northern California focused their activities in core areas that ranged from about 167 to 454 acres, with a mean of about 409 acres; approximately half the area of the 0.7-mile radius circle (Bingham and Noon 1997). Spotted owls maintain smaller home ranges during the breeding season and often dramatically increase their home range size during fall and winter (Forsman *et al.* 1984, Sisco 1990).

Although differences exist in natural stand characteristics that influence provincial home range size, habitat loss and forest fragmentation effectively reduce habitat quality in the home range. A reduction in the amount of suitable habitat reduces spotted owl abundance and nesting success (Bart and Forsman 1992, Bart 1995).

Habitat Use. Forsman *et al.* (1984) report that spotted owls have been observed in the following forest types: Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), Shasta red fir (*Abies magnifica shastensis*), mixed evergreen, mixed conifer hardwood (Klamath montane) and redwood (*Sequoia sempervirens*). Use of these types coincides with appropriate forest structure (see below). In parts of the Oregon Coast Range, spotted owls have been recorded in pure hardwood stands (Glenn *et al.* 2004). In California, spotted owls are found from near sea level in coastal forests to approximately 2130 m in the Cascades (Gutiérrez 1996). The upper elevation limit at which spotted owls occur decreases gradually with increasing latitude in Oregon and Washington (Lint 2005). In all areas, the upper elevation limit at which spotted owls occur corresponds to the transition to subalpine

forest, which is characterized by relatively simple structure and severe winter weather (Gutiérrez 1996).

Roost sites selected by spotted owls have more complex vegetation structure than forests generally available to them (Barrows and Barrows 1978, Forsman *et al.* 1984, Solis and Gutiérrez 1990). These habitats are usually multi-layered forests having high canopy closure and large diameter trees in the overstory.

Spotted owls nest almost exclusively in trees. Like roosts, nest sites are found in forests having complex structure dominated by large diameter trees (Forsman *et al.* 1984, Hershey *et al.* 1998). Even in forests that have been previously logged, spotted owls select forests having a structure (i.e., larger trees, greater canopy closure) different than forests generally available to them (Folliard 1993, Buchanan *et al.* 1995, Hershey *et al.* 1998).

Foraging habitat is the most variable of all habitats used by territorial spotted owls (Thomas *et al.* 1990). Descriptions of foraging habitat have ranged from complex structure (Solis and Gutiérrez 1990) to forests with lower canopy closure and smaller trees than forests containing nests or roosts (Gutiérrez 1996).

Habitat Selection. Spotted owls generally rely on older forested habitats because they contain the structures and characteristics required for nesting, roosting, foraging, and dispersal. These characteristics include the following: a multi-layered, multi-species canopy dominated by large overstory trees; moderate to high canopy closure; a high incidence of trees with large cavities and other types of deformities, especially dwarf mistletoe brooms; numerous large snags; an abundance of large, dead wood on the ground; and open space within and below the upper canopy for spotted owls to fly (Thomas *et al.* 1990, USFWS 1990b). Forested stands with high canopy closure also provide thermal cover (Weathers *et al.* 2001), as well as protection from predation. Recent landscape-level analyses in portions of the Klamath Province suggest that a mosaic of late-successional habitat interspersed with other vegetation types may benefit spotted owls more than large, homogeneous expanses of older forests (Zabel *et al.* 2003, Franklin *et al.* 2000, Meyer *et al.* 1998).

Dugger *et al.* (2005) found that apparent survival and reproduction was positively associated with the proportion of older forest near the territory center in the Klamath Province. Survival decreased dramatically when the amount of non-habitat exceeded approximately 50 percent (Dugger *et al.* 2005). Spotted owl territories with habitat fitness potentials (i.e., expressed as a lambda estimate for the territory) of less than 1.0 were generally characterized by less than 40 – 50 percent old forest habitat near the territory center (Dugger *et al.* 2005). The authors conclude that they found no support for either a positive or negative direct effect of intermediate-aged forest on either survival or reproduction.

Olson *et al.* (2004) found that survival in the Oregon Coast Range had a quadratic relationship with the amount of late- and mid-seral forest near nesting centers. Reproductive rates fluctuated biennially and were positively related to the amount of edge between late- and mid-seral forests and other habitat classes. Olson *et al.* (2004) conclude that their result indicate that while mid- and late-seral forests are important to owls, a mixture of these forest types with younger forest and non-forest may be best for owl survival and reproduction in their study area.

In redwood forests along the coast range of California, spotted owls may be found in younger forest stands with structural characteristics of older forests (Thomas *et al.* 1990). However, spotted owls do not generally appear to select for stands of intermediate or younger ages (Solis and Gutiérrez 1990, Thomas *et al.* 1990).

In mixed conifer forests of the Eastern Cascades, Washington, 27 percent of nest sites were in old-growth forests, 57 percent in the understory reinitiation phase of stand development, and 17 percent in the stem exclusion phase (Buchanan *et al.* 1995). In the Western Cascades, Oregon, 50 percent of spotted owl nests were in late-seral/old-growth stands (> 80-yrs-old) and none were found in stands less than 40-yrs-old (Irwin *et al.* 2000).

Ward (1990) found spotted owls foraged in areas that had lower variance in prey densities (prey were more predictable in occurrence) within older forests and near ecotones of old forest and brush seral stages. Zabel *et al.* (1995) showed that spotted owl home ranges are larger where flying squirrels (*Glaucomys sabrinus*) are the predominant prey and, conversely, are smaller where woodrats (*Neotoma* spp.) are the predominant prey.

In the Western Washington Cascades, spotted owls used mature/old forests dominated by trees greater than 50 cm diameter-at-breast height (dbh) with greater than 60 percent canopy closure more often than expected for roosting during the non-breeding season and used young forest (trees 20-50 cm dbh with > 60% canopy closure) less often than expected based on availability (Herter *et al.* 2002).

### Reproductive Biology

Spotted owls exhibit high adult annual survival rates and are relatively long-lived (USFWS 1992a, Anthony *et al.* 2004). Spotted owls do not typically reach sexual maturity until after 2 years of age (Miller *et al.* 1985 and Thomas *et al.* 1990). Adult females lay an average of 2 eggs per clutch with a range of 1 to 4 eggs. Spotted owl pairs do not typically nest every year, nor are nesting pairs successful every year (USFWS 1990b). The small clutch size, temporal variability in nesting success, and somewhat delayed maturation all contribute to the relatively low reproductive rate of this species (Gutiérrez 1996).

Nest sites are usually located within stands of old-growth and late-successional forest dominated by Douglas-fir (*Pseudotsuga menziesii*), and they contain structures such as cavities, broken tree tops, or mistletoe (*Arceuthobium* spp.) brooms (Forsman *et al.* 1984, Blakesley *et al.* 1992, LaHaye and Gutiérrez 1999). In general, courtship and nesting behavior begins in February to March with nesting occurring from March to June; however, timing of nesting and fledging varies with latitude and elevation (Forsman *et al.* 1984). After young fledge from the nest, they depend on their parents until they are able to fly and hunt on their own. Parental care continues post-fledging into September (USFWS 1990a), and sometimes into October (Forsman *et al.* 1984). During this time the adults may not roost with their young during the day, but they respond to begging vocalizations by bringing food to the young (Forsman *et al.* 1984).

Some spotted owls are not territorial but either remain as residents within the territory of a pair or move among territories (Gutiérrez 1996). These birds are referred to as “floaters.” Floaters have special significance in spotted owl populations because they may buffer the territorial

population from decline (Franklin 1992). Little is known about floaters other than that they exist and typically do not respond to calls as vigorously as territorial birds (Gutiérrez 1996).

### Dispersal Biology

Natal dispersal of spotted owls from Oregon and Washington typically begins from mid- to late-September, and it is remarkably synchronous across broad areas (Forsman *et al.* 2002). When data from many dispersing spotted owls are pooled, the direction of dispersal away from the natal site appears random (Miller 1989, Ganey *et al.* 1998, Forsman *et al.* 2002). Dispersal direction from individual territories, however, may be non-random in response to the local distribution of habitat and topography (Forsman *et al.* 2002). Natal dispersal occurs in stages, with juvenile spotted owls settling in temporary home ranges between bouts of dispersal (Forsman *et al.* 2002). Median natal dispersal distance is about 10 miles for males and 15.5 miles for females (Forsman *et al.* 2002, see also Miller 1989, Ganey *et al.* 1998). Successful dispersal of juvenile spotted owls may depend on their ability to locate unoccupied suitable habitat in close proximity to other occupied sites (LaHaye *et al.* 2001).

Breeding dispersal occurs among a small proportion of adult spotted owls; these movements were more frequent among females and unmated individuals (Forsman *et al.* 2002). Breeding dispersal distances were shorter than natal dispersal distances and also are apparently random in direction (Forsman *et al.* 2002). Large non-forested valleys are apparent barriers to natal and breeding dispersal. Forested foothills between valleys may provide the only opportunities for dispersal (Forsman *et al.* 2002). The degree to which water bodies, such as the Columbia River and Puget Sound, function as barriers to dispersal is unclear. Analysis of genetic structure of spotted owl populations suggests adequate rates of gene flow may occur across the Puget Trough between the Olympic Mountains and Washington Cascades and across the Columbia River between the Olympic Mountains and the Coast Range of Oregon (Haig *et al.* 2001). Both telemetry and genetic studies indicate inbreeding is rare.

Dispersing juvenile spotted owls experience high mortality rates, exceeding 70 percent in some studies (USFWS 1990a, Miller 1989). Leading known causes of mortality are starvation, predation, and accidents (Miller 1989, USFWS 1990a, Forsman *et al.* 2002). Parasitic infection may contribute to these causes of mortality (Forsman *et al.* 2002). In a study on habitat use by dispersing juvenile spotted owls in the Oregon Coast Range, Klamath and Western Oregon Cascades Provinces (Miller *et al.* 1997), mature and old-growth forest were used slightly more than expected based on availability during the transient phase and nearly twice its availability during the colonization phase. Closed pole-sapling-sawtimber habitat was used roughly in proportion to availability in both phases; open sapling and clearcuts were used less than expected based on availability during colonization.

Lint (2005) reported that nearly half of the federal forest acres are providing dispersal habitat for spotted owls. Their analysis showed that owl movement with resighting points inside Plan land allocations where logging is restricted (reserved blocks) accounted for 51 percent of juvenile movement records. Over 30 percent of juvenile movements were into reserved blocks from points outside of reserves. The movement records provide evidence that spotted owls are dispersing across the landscape under the Plan and genetic or demographic isolation of local populations is not likely because dispersal between reserves is likely to be a common occurrence even if the landscapes between the reserves consists of highly fragmented forests (Lint 2005; Forsman *et al.* 2002).

### Food Habits

Composition of prey in the spotted owl's diet varies regionally, seasonally, annually, and locally, which is likely in response to prey availability (Laymon 1988, Ganey 1992, Verner *et al.* 1992, Carey 1993, Ward and Block 1995, Forsman *et al.* 2001). Spotted owls are mostly nocturnal (Forsman *et al.* 1984), but they may forage opportunistically during the day (Laymon 1991, Sovern *et al.* 1984). Northern flying squirrels and woodrats are usually the predominant prey both in biomass and frequency (Barrows 1980; Forsman *et al.* 1984; Ward 1990; Bevis *et al.* 1997; Forsman *et al.* 2001, 2004) with a clear geographic pattern of diet, paralleling differences in habitat (Thomas *et al.* 1990). Northern flying squirrels are generally the dominant prey item in the more mesic Douglas-fir/western hemlock forests characteristic of the northern portion of the range, whereas woodrats are generally the dominant prey item in the drier mixed conifer/mixed evergreen forests typically found in the southern portion of the range (Forsman *et al.* 1984, Thomas *et al.* 1990, Ward *et al.* 1998, reviewed by Courtney *et al.* 2004). These prey items were found to be co-dominant in the southwest interior of Oregon (Forsman *et al.* 2001, 2004).

Other prey species such as the red tree vole (*Arborimus longicaudus*), red-backed voles (*Clethrionomys gapperi*), mice, rabbits and hares, birds, and insects) may be seasonally or locally important (reviewed by Courtney *et al.* 2004). For example, Rosenberg *et al.* (2003) showed a strong correlation between annual reproductive success of spotted owls (number of young per territory) and abundance of deer mice (*Peromyscus maniculatus*) ( $r^2 = 0.68$ ), despite the fact they only made up  $1.6 \pm 0.5$  percent of the biomass consumed. However, it is unclear if the causative factor behind this correlation was prey abundance or a synergistic response to weather (Rosenberg *et al.* 2003). Ward (1990) also noted that mice were more abundant in areas selected for foraging by owls. Nonetheless, spotted owls deliver larger prey to the nest and eat smaller food items to reduce foraging energy costs; therefore, the importance of smaller prey items, like *Peromyscus*, in the spotted owl diet should not be underestimated (Forsman *et al.* 1984, 2001, 2004).

### Population Dynamics

The spotted owl is a relatively long-lived bird; produces few, but large young; invests significantly in parental care; experiences later or delayed maturity; and exhibits high adult survivorship. The spotted owl's long reproductive life span allows for some eventual recruitment of offspring, even if recruitment does not occur each year (Franklin *et al.* 2000).

Annual variation in population parameters for spotted owls has been linked to environmental influences at various life history stages (Franklin *et al.* 2000). In coniferous forests, mean fledgling production of the California spotted owl (*Strix occidentalis occidentalis*), a closely related subspecies, was higher when minimum spring temperatures were higher (North *et al.* 2000), a relationship that may be a function of increased prey availability. Across their range, spotted owls have previously shown an unexplained pattern of alternating years of high and low reproduction, with highest reproduction occurring during even-numbered years (e.g., Franklin *et al.* 1999). Annual variation in breeding may be related to weather (i.e., temperature and precipitation) (Wagner *et al.* 1996 and Zabel *et al.* 1996 *In*: Forsman *et al.* 1996) and fluctuation in prey abundance (Zabel *et al.* 1996).

A variety of factors may regulate spotted owl population levels. These factors may be density-dependent (e.g., habitat quality, habitat abundance) or density-independent (e.g., climate). Interactions may occur among factors. For example, as habitat quality decreases, density-independent factors may have more influence on survival and reproduction, which tends to increase variation in the rate of growth (Franklin *et al.* 2000). Specifically, weather could have increased negative effects on spotted owl fitness for those owls occurring in relatively lower quality habitat (Franklin *et al.* 2000). A consequence of this pattern is that at some point, lower habitat quality may cause the population to be unregulated (have negative growth) and decline to extinction (Franklin *et al.* 2000).

Olson *et al.* (2005) used open population modeling of site occupancy that incorporated imperfect and variable detectability of spotted owls and allowed modeling of temporal variation in site occupancy, extinction, and colonization probabilities (at the site scale). The authors found that visit detection probabilities average less than 0.70 and were highly variable among study years and among their three study areas in Oregon. Pair site occupancy probabilities declined greatly on one study area and slightly on the other two areas. However, for all owls, including singles and pairs, site occupancy was mostly stable through time. Barred owl presence had a negative effect on these parameters (see barred owl discussion in the New Threats section below). However, there was enough temporal and spatial variability in detection rates to indicate that more visits would be needed in some years and in some areas, especially if establishing pair occupancy was the primary goal.

## Threats

### Reasons for Listing

The spotted owl was listed as threatened throughout its range “due to loss and adverse modification of suitable habitat as a result of timber harvesting and exacerbated by catastrophic events such as fire, volcanic eruption, and wind storms” (USFWS1990a). More specifically, significant threats to the spotted owl included the following: low populations, declining populations, limited habitat, declining habitat, distribution of habitat or populations, isolation of provinces, predation and competition, lack of coordinated conservation measures, and vulnerability to natural disturbance (USFWS 1992a). These threats were characterized for each province as severe, moderate, low, or unknown. Declining habitat was recognized as a severe or moderate threat to the spotted owl in all 12 provinces, isolation of provinces within 11 provinces, and declining populations in 10 provinces. Consequently, these three factors represented the greatest concern range-wide to the conservation of the spotted owl. Limited habitat was considered a severe or moderate threat in nine provinces, and low populations a severe or moderate concern in eight provinces, suggesting that these factors are a concern throughout the majority of the range. Vulnerability to natural disturbances was rated as low in five provinces.

The degree to which predation and competition might pose a threat to the spotted owl was unknown in more provinces than any of the other threats, indicating a need for additional information. Few empirical studies exist to confirm that habitat fragmentation contributes to increased levels of predation on spotted owls (Courtney *et al.* 2004). However, great horned owls (*Bubo virginianus*), an effective predator on spotted owls, are closely associated with fragmented forests, openings, and clearcuts (Johnson 1992, Laidig and Dobkin 1995). As

mature forests are harvested, great horned owls may colonize fragmented forests, thereby increasing spotted owl vulnerability to predation.

#### New Threats

*Barred Owls (Strix varia)*. Since the listing of the spotted owl under the Act, new information suggests that hybridization with the barred owl is less of a threat (Kelly and Forsman 2004) and competition with the barred owl is a greater threat than previously anticipated (Courtney *et al.* 2004). Since 1990, the barred owl has expanded its range south into Marin County, California and the central Sierra Nevada Mountains, such that it is now roughly coincident with the range of the spotted owl (Courtney *et al.* 2004). Further, notwithstanding the likely bias in survey methods towards underestimating actual barred owl numbers (Courtney *et al.* 2004), barred owl populations appear to be increasing throughout the Pacific Northwest, particularly in Washington and Oregon (Zabel *et al.* 1996, Dark *et al.* 1998, Wiedemeier and Horton 2000, Kelly *et al.* 2003, Pearson and Livezey 2003, Anthony *et al.* 2004). Barred owl numbers now may exceed spotted owl numbers in the northern Washington Cascades (Kuntz and Christopherson 1996) and British Columbia (Dunbar *et al.* 1991) and appear to be approaching spotted owl numbers in several other areas (e.g., Redwood National and State Parks in California [Schmidt 2003]). Barred owl populations in the Pacific Northwest appear to be self-sustaining based on current density estimates and apparent distribution (Courtney *et al.* 2004).

Barred owls apparently compete with spotted owls through a variety of mechanisms: prey overlap (Hamer *et al.* 2001), habitat overlap (Hamer *et al.* 1989, Dunbar *et al.* 1991, Herter and Hicks 2000, Pearson and Livezey 2003), and agonistic encounters (Leskiw and Gutiérrez 1998, Pearson and Livezey 2003). New information on encounters between barred owls and spotted owls comes primarily from anecdotal reports which corroborate initial observations that barred owls react more aggressively towards spotted owls than the reverse (Courtney *et al.* 2004). There is also limited circumstantial evidence of barred owl predation on spotted owls (Leskiw and Gutiérrez 1998, Johnston 2002). Information collected to date indicates that encounters between these two species tend to be agonistic in nature, and that the outcome is unlikely to favor the spotted owl (Courtney *et al.* 2004).

Although barred owls were initially thought to be more closely associated with early successional forests than spotted owls from studies conducted on the west slope of the Cascades in Washington, (Hamer 1988, Iverson 1993), recent studies conducted elsewhere in the Pacific Northwest indicate that barred owls utilize a broader range of habitat types than do spotted owls (Courtney *et al.* 2004). For example, a telemetry study conducted on barred owls in the fire prone forests of eastern Washington showed that barred owl home ranges were located on lower slopes or valley bottoms, in closed canopy, mature, Douglas-fir forest (Singleton *et al.* 2005). In contrast, spotted owl sites were characterized by closed canopy, mature, ponderosa pine or Douglas-fir forest, on southern or western exposure, mid-elevation areas (Singleton *et al.* 2005).

The only study comparing spotted owl and barred owl food habits in the Pacific Northwest indicated that barred owl diets overlapped strongly (greater than 75 %) with spotted owl diets (Hamer *et al.* 2001). However, barred owl diets were also more diverse than spotted owl diets, including species associated with riparian and other moist habitats, and more terrestrial and diurnal species.

Evidence that barred owls are causing the displacement of spotted owls is largely indirect, based primarily on retrospective examination of long-term data collected on spotted owls. Correlations between local spotted owl declines and barred owl increases have been noted in the northern Washington Cascades (Kuntz and Christopherson 1996, Herter and Hicks 2000, Pearson and Livezey 2003), on the Olympic peninsula (Wiedemeier and Horton 2000; Gremel 2000, 2003), in the southern Oregon Cascades (e.g., Crater Lake National Park [Johnston 2002]), and in the coastal redwood zone in California (e.g., Redwood National and State Parks [Schmidt 2003]).

Spotted owl occupancy was significantly lower in spotted owl territories where barred owls were detected within 0.8 km (0.5 mi) of the spotted owl territory center than in spotted owl territories where no barred owls were detected (Kelly *et al.* 2003). Kelly *et al.* (2003) also found that in spotted owl territories where barred owls were detected, spotted owl occupancy was significantly lower ( $P < 0.001$ ) after barred owls were detected within 0.8 km of the territory center. Occupancy was “only marginally lower” ( $P = 0.06$ ) if barred owls were located more than 0.8 km from spotted owl territory centers. In a Roseburg, Oregon study area, 46 percent of spotted owls moved more than 0.8 km, and 39 percent of spotted owls were not relocated again in at least 2 years after barred owls were detected within 0.8 km of the territory center. Observations provided by Gremel (2000) from the Olympic National Park are consistent with those of Kelly *et al.* (2003); he documented significant displacement of spotted owls following barred owl detections “coupled with elevational changes of northern spotted owl sites on the east side of the Park” (Courtney *et al.* 2004). Pearson and Livezey (2003) reported similar findings on the Gifford Pinchot National Forest where unoccupied spotted owl sites were characterized by significantly more barred owl sites within 0.8-km, 1.6-km, and 2.9-km from the territory center than in occupied spotted owl sites. Because barred owl presence is increasing within the range of northern spotted owls, Olson *et al.* (2005) suggest that further declines in the proportion of sites occupied by spotted owls are likely.

At two study areas in Washington, investigators found relatively high numbers of territories previously occupied by spotted owls that are now apparently not occupied by either spotted or barred owls (e.g., 49 of 107 territories in the Cascades [Herter and Hicks 2000]; 23 of 33 territories in the Olympic Experimental State Forest [Wiedemeier and Horton 2000]). Given that habitat was still present in these vacant territories, some factor(s) may be reducing habitat suitability or local abundance of both species. For example, weather conditions could cause prolonged declines in abundance of both species (Franklin *et al.* 2000). Because spotted owls have been anecdotally reported to give fewer vocalizations when barred owls are present, it is possible that these supposed vacant territories are still occupied by spotted owls that do not respond to surveys. Likewise, survey protocols for spotted owls are believed to under-detect barred owls (Courtney *et al.* 2004). Olson *et al.* (2005) showed that barred owl presence had a negative effect on spotted owl detection probabilities, and it had either a positive effect on local-extinction probabilities (at the territory scale) or a negative effect on colonization probabilities for 3 study areas in Oregon. Olson *et al.* (2005) conclude that future analyses of spotted owls must account for imperfect and variable detectability and barred owl presence to properly interpret results. Thus, some proportion of seemingly vacant territories may be an artifact of reduced detection probabilities. Nonetheless, previously occupied territories apparently vacant of both *Strix* species suggests that factors other than barred owls alone are contributing to declines in spotted owl abundance and territorial occupancy (Courtney *et al.* 2004).

Two studies (Kelly 2001, Anthony *et al.* 2004) attempted to determine whether barred owls affected fecundity of spotted owls in the long-term demographic study areas. Neither study was able to clearly do so, although the Wenatchee and Olympic demographic study areas showed possible effects (Anthony *et al.* 2004). However, both studies described the shortfalls of their methods to adequately test for this effect. Iverson (2004) reported no effect of barred owl presence on spotted owl reproduction, but his results could have been influenced by small sample size (Livezey 2005). Barred owls had a negative effect on spotted owl survival on the Wenatchee and Olympic study areas and possibly an effect on the Cle Elum study area (Anthony *et al.* 2004). Olson *et al.* (2005) found a significant (but weak) negative effect of barred owl presence on spotted owl reproductive output but not on survival at a Roseburg, Oregon study area (Courtney *et al.* 2004).

Uncertainties associated with methods, analyses, and possible confounding factors such as effects of past habitat loss and weather warrant caution in interpretation of the patterns emerging from the data and information collected to date on interactions between barred and spotted owls (Courtney *et al.* 2004). Further, data are currently lacking that would allow accurate prediction of how barred owls will affect spotted owls in the southern, more xeric provinces in California and Oregon Klamath regions. In spite of these uncertainties, the preponderance of the evidence gathered thus far is consistent with the hypothesis that barred owls are playing some role in spotted owl population decline, particularly in Washington and portions of Oregon and the northern coast of California (Courtney *et al.* 2004).

Although the barred owl currently constitutes a significantly greater threat to the northern spotted owl than originally thought at the time of listing (Courtney *et al.* 2004), at present it is unclear whether forest management influences the outcome of interactions between barred and spotted owls (Courtney *et al.* 2004, summarized by Lint 2005). Some of the most recent summaries compiled on the barred owl (Courtney *et al.* 2004, Lint 2005, USFWS 2004) do not provide recommendations about how to deal with this potential threat. However, Buchanan *et al.* (December 2005) offer research and management options to address inter-specific relationships between barred and spotted owls. In the status review, the Service (USFWS 2004) did not consider the increased risk to northern spotted owl populations due to the uncertainties surrounding barred owls and other factors sufficient to reclassify the subspecies as endangered.

Wildfire. The short-term effects of wildfires on spotted owl demography is an important consideration for resources managers. Bond *et al.* (2002) examined the demography of spotted owls post wildfire, in which wildfire burned through spotted owl nest and roost sites in varying degrees of severity. Depending on the severity of the burn, wildfires may have relatively little short-term impact on spotted owl demography (i.e., survival, reproduction and site fidelity). In a preliminary study conducted by Anthony and Andrews (2004) in the Klamath Province of Oregon, their sample of spotted owls appeared to be using a variety of habitat types within the Timbered Rock Fire, including areas which had experienced moderate burning. In 1994, the Hatchery Complex wildfires burned 17,603 ha in the Wenatchee National Forest, eastern Cascades, Washington, affecting six spotted owl activity centers (Gaines *et al.* 1997). Spotted owl habitat within a 2.9 km radius of the activity centers was reduced by 8 to 45 percent (mean = 31%) due to direct effects of the fire and by 10 to 85 percent (mean = 55%) due to delayed mortality of fire-damaged trees and insect caused tree mortality. Spotted owl habitat loss was greater on mid to upper slopes (especially south-facing) than within riparian areas or on

benches (Gaines *et al.* 1997). Direct mortality of spotted owls was assumed to have occurred at one site. Data were too sparse for reliable comparisons of site occupancy or reproductive output between sites affected by the fires and other sites on the Wenatchee National Forest. Two wildfires burned in the Yakama Indian Reservation, eastern Cascades, Washington, in 1994, affecting home ranges of two radio-tagged spotted owls (King *et al.* 1997). Although the amount of home ranges burned was not quantified, spotted owls were observed using areas that received low and medium intensity burning. No direct mortality of spotted owls was observed even though thick smoke covered several spotted owl site centers for a week.

At the time of listing there was recognition that large-scale wildfire posed a threat to the spotted owl and its habitat (USFWS 1990a). New information suggests fire may be more of a threat than previously thought. In particular, the rate of habitat loss in the relatively dry East Cascades and Klamath provinces has been greater than expected (see “Habitat Trends” below). Moeur *et al.* (2005) suggested that 12 percent of late-successional forest rangewide would likely be negatively impacted by wildfire during the first 5 decades of the Plan. Currently, the overall total amount of habitat affected by wildfires has been relatively small (Lint 2005). It may be possible to influence through silvicultural management how fire prone forests will burn and the extent of the fire when it occurs. Silvicultural management of forest fuels are currently being implemented throughout the spotted owl’s range, in an attempt to reduce the exceptional levels of fuels that have accumulated during nearly 100 years of effective fire suppression. However, our ability to protect spotted owl habitat and viable populations of spotted owls from large fires through risk-reduction endeavors is uncertain (Courtney *et al.* 2004). The Plan recognized wildfire as an inherent part of managing spotted owl habitat in certain portions of the range. The distribution and size of reserve blocks as part of the Plan design may help mitigate the risks associated with large-scale fire (Lint 2005).

West Nile Virus. (WNV) has killed millions of wild birds in North America since it arrived in 1999 (McLean *et al.* 2001, Caffrey 2003, Marra *et al.* 2004). Mosquitoes are the primary carriers (vectors) of the virus that causes encephalitis in humans, horses, and birds. Mammalian prey may also play a role in spreading WNV among predators, like spotted owls. Owls and other predators of mice can contract the disease by eating infected prey (Garmendia *et al.* 2000, Komar *et al.* 2001). Recent tests of tree squirrels from Los Angeles County, California, found over 70 percent were positive for WNV (R. Carney, pers. comm. 2004, cited in USFWS 2004). One captive spotted owl in Ontario, Canada, is known to have contracted WNV and died.

Health officials expect that WNV will eventually spread throughout the range of the spotted owl (Courtney *et al.* 2004), but it is unknown how WNV will ultimately affect spotted owl populations. Susceptibility to infection and mortality rates of infected individuals vary among bird species, even within groups (Courtney *et al.* 2004). Owls appear to be quite susceptible. For example, breeding Eastern screech owls (*Megascops asio*) in Ohio experienced 100 percent mortality (T. Grubb, pers. comm., cited in Courtney *et al.* 2004). Barred owls, in contrast, showed lower susceptibility (B. Hunter, pers. comm., cited in Courtney *et al.* 2004). Some level of innate resistance may occur (Fitzgerald *et al.* 2003), which could explain observations in several species of markedly lower mortality in the second year of exposure to WNV (Caffrey and Peterson 2003). Wild birds also develop resistance to WNV through immune responses (Deubel *et al.* 2001). The effects of WNV on bird populations at a regional scale have not been large, even for susceptible species (Caffrey and Peterson 2003), perhaps

due to the short-term and patchy distribution of mortality (K. McGowan, pers. comm., cited in Courtney *et al.* 2004) or annual changes in vector abundance and distribution.

Courtney *et al.* (2004) offer competing propositions for the likely outcome of spotted owl populations being infected by WNV. One proposition is that spotted owls can tolerate severe, short-term population reductions due to WNV, because spotted owl populations are widely distributed and number in the several hundreds to thousands. An alternative proposition is that WNV will cause unsustainable mortality, due to the frequency and/or magnitude of infection, thereby resulting in long-term population declines and extirpation from parts of the spotted owl's current range. Thus far, no mortality in wild, northern spotted owls has been recorded; however, WNV is a potential threat of uncertain magnitude and effect (Courtney *et al.* 2004).

*Sudden Oak Death.* Sudden oak death was recently identified as a potential threat to the spotted owl (Courtney *et al.* 2004). This disease is caused by the fungus-like pathogen, *Phytophthora ramorum* that was recently introduced from Europe and is rapidly spreading. At the present time, sudden oak death is found in natural stands from Monterey to Humboldt Counties, California, and has reached epidemic proportions in oak (*Quercus* spp.) and tanoak (*Lithocarpus densiflorus*) forests along approximately 300 km of the central and northern California coast (Rizzo *et al.* 2002). It has also been found near Brookings, Oregon, killing tanoak and causing dieback of closely associated wild rhododendron (*Rhododendron* spp.) and evergreen huckleberry (*Vaccinium ovatum*) (Goheen *et al.* 2002). It has been found in several different forest types and at elevations from sea level to over 800 m. Sudden Oak death poses a threat of uncertain proportion because of its potential impact on forest dynamics and alteration of key prey and spotted owl habitat components (e.g., hardwood trees - canopy closure and nest tree mortality); especially in the southern portion of the spotted owl's range (Courtney *et al.* 2004).

*Inbreeding Depression, Genetic Isolation, and Reduced Genetic Diversity.* Inbreeding and other genetic problems due to small population sizes were not considered an imminent threat to the spotted owl at the time of listing. Recent studies show no indication of reduced genetic variation and past bottlenecks in Washington, Oregon, or California (Barrowclough *et al.* 1999, Haig *et al.* 2004, Henke *et al.* unpublished). However, in Canada, the breeding population is estimated to be less than 33 pairs and annual population decline may be as high as 35 percent (Harestad *et al.* 2004). Canadian populations may be more adversely affected by issues related to small population size including inbreeding depression, genetic isolation, and reduced genetic diversity (Courtney *et al.* 2004). Low and persistently declining populations throughout the northern portion of the species range (see "Population Trends" below) may be at increased risk of losing genetic diversity.

*Climate change.* Climate change, a potential additional threat to northern spotted owl populations, is not explicitly addressed in the Plan. Climate change could have direct and indirect impacts on spotted owls and their prey. However, the emphasis on maintenance of seral stage complexity and related organismal diversity in the Matrix under the Plan should contribute to the resiliency of the federal forest landscape to the impacts of climate change (Courtney *et al.* 2004). There is no indication in the literature regarding the direction (positive or negative) of the threat.

Based upon a global meta-analysis, Parmesan and Yohe (2003) discussed several potential implications of global climate change to biological systems, including terrestrial flora and fauna. Results indicated that 62 percent of species exhibited trends indicative of advancement of spring conditions. In bird species, trends were manifested in earlier nesting activities. Because the spotted owl exhibits a limited tolerance to heat relative to other bird species (Weathers *et al.* 2001), subtle changes in climate have the potential to affect this. However, the specific impacts to the species are unknown.

Disturbance-Related Effects. The effects of noise on spotted owls are largely unknown, and whether noise is a concern has been a controversial issue. The effect of noise on birds is extremely difficult to determine due to the inability of most studies to quantify one or more of the following variables: 1) timing of the disturbance in relation to nesting chronology; 2) type, frequency, and proximity of human disturbance; 3) clutch size; 4) health of individual birds; 5) food supply; and 6) outcome of previous interactions between birds and humans (Knight and Skagen 1988). Additional factors that confound the issue of disturbance include the individual bird's tolerance level, ambient sound levels, physical parameters of sound and how it reacts with topographic characteristics and vegetation, and differences in how species perceive noise. Although information specific to behavioral responses of spotted owls to disturbance is limited, research indicates that recreational activity can cause Mexican spotted owls (*Strix occidentalis lucida*) to vacate otherwise suitable habitat (Swarthout and Steidl 2001) and helicopter overflights can reduce prey delivery rates to nests (Delaney *et al.* 1999). Additional effects from disturbance, including altered foraging behavior and decreases in nest attendance and reproductive success, have been reported for other raptors (White and Thurow 1985; Andersen *et al.* 1989; McGarigal *et al.* 1991).

Northern spotted owls may also respond physiologically to a disturbance without exhibiting a significant behavioral response. In response to environmental stressors, vertebrates secrete stress hormones called corticosteroids (Campbell 1990). Although these hormones are essential for survival, extended periods with elevated stress hormone levels may have negative effects on reproductive function, disease resistance, or physical condition (Carsia and Harvey 2000; Saplosky *et al.* 2000). In avian species, the secretion of corticosterone is the primary non-specific stress response (Carsia and Harvey 2000). The quantity of this hormone in feces can be used as a measure of physiological stress (Wasser 1997). Recent studies of fecal corticosterone levels of spotted owls indicate that low intensity noise of short duration and minimal repetition does not elicit a physiological stress response (Tempel and Gutiérrez 2003; Tempel and Gutiérrez 2004). However, prolonged activities, such as those associated with timber harvest, may increase fecal corticosterone levels depending on their proximity to spotted owl core areas (see Wasser *et al.* 1997; Tempel and Gutiérrez 2004).

Post-harvest fuels treatments may also create above-ambient smoke or heat. Although it has not been conclusively demonstrated, it is anticipated that nesting northern spotted owls may be disturbed by heat and smoke intrusion into the nest grove.

### Conservation Needs of the Spotted Owl

Based on the above assessment of threats, the spotted owl has the following habitat-specific and habitat-independent conservation (i.e., survival and recovery) needs:

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### Habitat-specific Needs

1. Large blocks of suitable habitat to support clusters or local population centers of spotted owls (e.g., 15 to 20 breeding pairs) throughout the owl's range;
2. Suitable habitat conditions and spacing between local spotted owl populations throughout its range to facilitate survival and movement;
3. Suitable habitat distributed across a variety of ecological conditions within the spotted owl's range to reduce risk of local or widespread extirpation;
4. A coordinated, adaptive management effort to reduce the loss of habitat due to catastrophic wildfire throughout the spotted owl's range, and a monitoring program to clarify whether these risk reduction methods are effective and to determine how owls use habitat treated to reduce fuels; and
5. In areas of significant population decline, sustain the full range of survival and recovery options for this species in light of significant uncertainty.

### Habitat-independent Needs

1. A coordinated research and adaptive management effort to better understand and manage competitive interactions between spotted and barred owls; and
2. Monitoring to better understand the risk that WNV and sudden oak death pose to spotted owls and, for WNV, research into methods that may reduce the likelihood or severity of outbreaks in spotted owl populations.

### Conservation Strategy

Since 1990, various efforts have addressed the conservation needs of the spotted owl and attempted to formulate conservation strategies based upon these needs. These efforts began with the ISC's Conservation Strategy (Thomas *et al.* 1990); they continued with the designation of critical habitat (USFWS 1992a, the Draft Recovery Plan (USFWS 1992b)), and the Scientific Analysis Team report (Thomas *et al.* 1993), report of the Forest Ecosystem Management Assessment Team (Thomas and Raphael 1993); and they culminated with the Plan (USDA/USDI 1994a). Each conservation strategy was based upon the reserve design principles first articulated in the ISC's report, which are summarized as follows:

Species that are well distributed across their range are less prone to extinction than species confined to small portions of their range.

Large blocks of habitat, containing multiple pairs of the species, are superior to small blocks of habitat with only one to a few pairs.

Blocks of habitat that are close together are better than blocks far apart.

Habitat that occurs in contiguous blocks is better than habitat that is more fragmented.

Habitat between blocks is more effective as dispersal habitat if it resembles suitable habitat.

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### Federal Contribution to Recovery

The Plan is the current conservation strategy for the spotted owl on federal lands. It is designed around the conservation needs of the spotted owl and based upon the designation of a variety of land-use allocations whose objectives are either to provide for population clusters (i.e., demographic support) or to maintain connectivity between population clusters. Several land-use allocations are intended to contribute primarily to supporting population clusters: late successional reserves (LSRs), Managed Late-Successional Areas (MSLAs), Congressionally Reserved Areas (CRAs), and Managed Pair Areas and Reserve Pair Areas. The remaining land-use allocations [Matrix, adaptive management areas (AMAs), Riparian Reserves (RRs), Connectivity Blocks, and Administratively Withdrawn Areas (AWAs)] provide connectivity between habitat blocks intended for demographic support.

The range-wide system of LSRs set up under the Plan captures the variety of ecological conditions within the 12 different provinces to which spotted owls are adapted. This design reduces the potential for extinction due to large catastrophic events in a single province. Multiple, large LSRs in each province reduce the potential that spotted owls will be extirpated in any individual province and reduce the potential that large wildfires or other events will eliminate all habitat within a LSR. In addition, LSRs are generally arranged and spaced so that spotted owls may disperse to two or more adjacent LSRs. This network of reserves reduces the likelihood that catastrophic events will impact habitat connectivity and population dynamics within and between provinces.

FEMAT scientists predicted that spotted owl populations would decline in the Matrix over time, while populations were expected to stabilize and eventually increase within LSRs, as habitat conditions improve over the next 50 to 100 years (Thomas and Raphael 1993, USDA/USDI 1994a and 1994b). Based on the results of the first decade of monitoring, it cannot be determined if the declining population trend will be reversed because not enough time has passed to provide the necessary measure of certainty (Lint 2005). However, the results from the first decade of monitoring do not provide any reason to depart from the objective of habitat maintenance and restoration as described under the Plan (Lint 2005). Other stressors that operate in intact suitable habitat, such as barred owls (already occurring) and West Nile virus (yet to occur) may complicate the conservation of the spotted owl. Recent reports about the status of the spotted owl offer few management recommendations to deal with the emerging threats. The arrangement and distribution and resilience of the Plan land use allocation system may prove to be the most appropriate strategy in responding to these unexpected challenges (Courtney *et al.* 2004).

Under the Plan, the agencies anticipated a decline of spotted owl populations during the first decade of implementation. Recent reports (Courtney *et al.* 2004, Anthony *et al.* 2004) identified greater than expected spotted owl declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in vital rates of spotted owls at the meta-population scale. However, at the territory scale, there is evidence of negative effects to spotted owl fitness due to reduced habitat quantity and quality. Also, there is no evidence to suggest that dispersal habitat is currently limiting (Courtney *et al.* 2004, Lint 2005). Even with the population decline, Courtney *et al.* (2004) noted that there is little reason to doubt the effectiveness of the core principles underpinning the Plan conservation strategy.

The current scientific information, including information showing northern spotted owl population declines, indicates that the spotted owl continues to meet the definition of a threatened species (USFWS 2004). That is, populations are still relatively numerous over most of its historic range, which suggests that the threat of extinction is not imminent, and that the subspecies is not endangered; even though, in the northern part of its range population trend estimates are showing a decline.

#### Conservation Efforts on Non-Federal Lands

FEMAT noted that limited federal ownership in some areas constrained the ability to form an extensive reserve network to meet conservation needs of the spotted owl. Thus, non-federal lands were an important contribution to the range-wide goal of achieving conservation and recovery of the spotted owl. The Service's primary expectations for private lands are for their contributions to demographic support (pair or cluster protection) to and/or connectivity with lands. In addition, timber harvest within each state is governed by rules that may provide protection of spotted owls and/or their habitat to varying degrees.

There are 16 current or completed Habitat Conservation Plans (HCPs) with incidental take permits issued for northern spotted owls, eight in Washington, three in Oregon, and four in California. They range in size from 40 acres to over 1.6 million acres, though not all acres are included in the mitigation for northern spotted owls because some HCP cover multiple species. In total, the HCPs cover approximately 2.9 million of the 32 million acres of non-federal forest lands in the range of the northern spotted owl. Most HCPs are of fairly long duration, though they range from only five years to 100 years. While each HCP is unique, there are several general approaches to mitigation of incidental take, including: 1) reserves of various sizes, some associated with adjacent federal reserves; 2) forest harvest that maintains or develops suitable habitat; 3) forest management that maintains or develops dispersal habitat; and 4) deferral of harvest near specific sites. Individual HCPs may employ one or more of these mitigation measures. Similarly the conservation objectives of individual plans vary from specified numbers of breeding owls, with specified levels of reproductive success, to management objectives for nesting/roosting/foraging habitat or dispersal habitat (Courtney *et al.* 2004).

Washington: In 1996, the State Forest Practices Board adopted rules (Forest Practices Board 1996) that would "contribute to conserving the spotted owl and its habitat on non-federal lands" based on recommendations from a Science Advisory Group which identified important non-federal lands and recommended roles for those lands in spotted owl conservation (Hanson *et al.* 1993, Buchanan *et al.* 1994). The 1996 rules designated 10 spotted owl special emphasis areas (SOSEAs) in Washington that comprise over 1.5 million acres of State and private lands where owl protections on non-federal lands would be emphasized. Within SOSEAs, all suitable habitat within 0.7 miles of spotted owl activity centers, and 40 percent of suitable habitat within the provincial median home range circle surrounding an occupied activity center is protected from timber harvest. Until recently, these habitat protections could be lifted if a spotted owl activity center was determined to be unoccupied. In 2005, the Forest Practices Board adopted emergency rules to protect suitable habitat in owl circles within SOSEAs regardless of site occupancy. Under the 1996 Forest Practice rules, suitable spotted owl habitat located on non-federal lands outside of owl management circles or located outside of a SOSEA boundary is not protected from timber harvest, unless the habitat is protected by an approved HCP. Spotted owl-related HCPs in Washington cover over 1.92 million acres and generally

provide both demographic and connectivity support as recommended in the draft spotted owl recovery plan (USFWS 1992b).

**Oregon:** The Oregon Forest Practices Act provides for protection of 70-acre core areas around known spotted owl nest sites, but it does not provide for protection of spotted owl habitat beyond these areas (ODF 2000). In general, no large-scale spotted owl habitat protection strategy or mechanism currently exists for non-federal lands in Oregon. The four spotted owl-related HCPs currently in effect cover over 300,000 acres of non-federal lands. These HCP's will provide some nesting habitat and connectivity over the next few decades.

**California:** In 1990, State Forest Practice Rules (FPRs), which govern timber harvest on private lands, were amended to require surveys for spotted owls in suitable habitat and to provide protection around activity centers (CDF 2001). Under the FPRs, no timber harvest plan (THP) can be approved if it is likely to result in incidental take of federally-listed species, unless authorized by a federal HCP. The California Department of Fish and Game initially reviewed all THPs to ensure that take was not likely to occur; the Service took over that review function in 2000. Several large industrial owners operate under Spotted Owl Management Plans that have been reviewed by the Service; the plans specify basic measures for spotted owl protection. Four HCP's, authorizing take of spotted owls, have been approved covering over 669,000 acres of non-federal lands. Implementation of these plans will provide for spotted owl demographic and connectivity support to Plan lands.

### Current Condition of the Spotted Owl

The current condition of the species incorporates the effects of all past human and natural activities or events that have led to the present-day status of the species and its habitat (USFWS/NMFS 1998).

### Range-wide Habitat and Population Trends

**Habitat Trends.** The Service has used information provided by the Forest Service, Bureau of Land Management, and National Park Service to update the habitat baseline conditions on federal lands for spotted owls on several occasions since the spotted owl was listed in 1990. The estimate of 7.4 million acres used for the Plan in 1994 (USDA/USDI 1994a) was believed to be representative of the general amount of spotted owl habitat on these lands. This baseline was used to track relative changes over time in the subsequently defined analyses. In 2005 a new map depicting spotted owl habitat throughout the range of the spotted owl was produced as a result of the plan's effectiveness monitoring program (Lint 2005). However, the spatial resolution of this new habitat map currently make it relatively less suitable for tracking habitat effects at the scale of individual projects; therefore, the following analyses indicate changes to the baseline condition established in 1994. The Service is evaluating the map for future use in tracking habitat trends. Additionally, there are no reliable estimates of spotted owl habitat on other land ownerships; consequently, consulted-on acres can be tracked, but not evaluated in the context of change with respect to a reference condition on non-federal lands. The production of the monitoring program habitat map does, however, provide an opportunity for future evaluations of trends in non-federal habitat.

Range-wide Analysis 1994 – 2001. In 2001, the Service conducted an assessment of habitat baseline conditions, the first since implementation of the Plan (USFWS 2001). This range-wide evaluation of habitat, compared to the FSEIS, was necessary to determine if the rate of potential change to spotted owl habitat was consistent with the change anticipated in the Plan. In particular, the Service considered habitat effects that were documented through the section 7 consultation process since 1994. In general, the analytical framework of these consultations focused on the reserve and connectivity goals established by the Plan land-use allocations (USDA/USDI 1994a), with effects expressed in terms of changes in suitable spotted owl habitat within those land-use allocations. The Service determined that actions and effects were consistent with the expectations for implementation of the Plan from 1994 to June, 2001 (USFWS 2001).

Range-wide Analysis 1994 – 2004 (first decade of the Plan). This section updates the information considered in USFWS (2001), relying particularly on information in documents the Service produced pursuant to section 7 of the Act and information provided by Plan agencies on habitat loss resulting from natural events (e.g., fires, windthrow, insect and disease).

In 1994, about 7.4 million acres of suitable northern spotted owl habitat were estimated to exist on federal lands managed under the Plan (Table 3). As of April 12, 2004, the Service had consulted on the proposed removal of 575,447 acres from all land management activities (Table 4). Of the total acres consulted on for removal, approximately 190,429 acres or 2.6 percent of 7.4 million acres of northern spotted owl habitat occurred on federal lands. Of the total federal acres consulted on for removal, approximately 167,134 acres or 2.3 percent of 7.4 million acres of northern spotted owl habitat were removed as a result of timber harvest. The changes in suitable spotted owl habitat within the first decade are consistent with the expectations for implementation of the Plan (ROD p. 46).

Habitat loss from federal lands has varied among the individual provinces with most of the impacts concentrated within the Non-Reserve (179,144 acres impacted) relative to the Reserve (11,285 acres impacted) land-use allocations (Table 5). Overall by State, the most pronounced habitat losses have occurred within Oregon and its Klamath Mountains and Cascades (East and West) Provinces (Table 5) followed by roughly similar habitat losses between Washington (9%) and California (8.5%) (Table 5 - calculated by % Range-wide Affected column).

In summary, habitat loss in Washington accounted for 9.06 percent of the range-wide loss, but it only resulted in a loss of 0.73 percent of available habitat on federal lands in Washington (Table 5). In Oregon, habitat loss accounted for 82.37 percent of the range-wide losses, but only 4.13 percent of available habitat on federal lands in Oregon (Table 5). Loss of habitat on federal lands in California accounted for 8.57 percent of the losses range-wide, but only 1.34 percent of habitat on federal lands in California (Table 5).

From 1994 through April 12, 2004, habitat lost due to natural events was estimated at approximately 186,931 acres range-wide (Table 6). About two-thirds of this loss was attributed to the Biscuit Fire that burned over 500,000 acres in southwest Oregon (Rogue River basin) and northern California in 2002. This fire resulted in a loss of approximately 113,451 acres of spotted owl habitat, including habitat within five LSRs. Approximately 18,630 acres of spotted owl habitat were lost due to the B&B Complex and Davis Fires in the East Cascades Province of Oregon.

April 13, 2004 marks the start of the second decade of the Plan. Baseline and summary of effects by state, physiographic province and land use function from proposed management activities and natural events for the second decade are recorded in Table 6.

There was little available information regarding spotted owl habitat trends on non-federal lands. Yet, we do know that internal Service consultations conducted since 1992 have documented the eventual loss of 407,849<sup>1</sup> acres of habitat on non-federal lands. Most of these losses have yet to be realized because they are part of large-scale, long-term HCPs.

In 2005, the Washington Department of Fish and Wildlife released the report, *An Assessment of Spotted Owl Habitat on Non-federal Lands in Washington between 1996 and 2004* (Pierce *et al.* 2005). This study estimates the amount of spotted owl habitat in 2004 on lands affected by state and private forest practices. The study area is a subset of the total Washington forest practice lands, and statistically-based estimates of existing habitat and habitat loss due to fire and timber harvest are provided. In the 3.2-million acre study area, Pierce and others (2005) estimated there was 816,000 acres of suitable spotted owl habitat in 2004, or about 25 percent of their study area. Based on their results, Pierce and others (2005) estimated there were less than 2.8 million acres of spotted owl habitat in Washington on all ownerships in 2004. Most of the suitable owl habitat in 2004 (56%) occurred on federal lands, and lesser amounts were present on state-local lands (21%), private lands (22%) and tribal lands (1%). Most of the harvested spotted owl habitat was on private (77%) and state-local (15%) lands. A total of 172,000 acres of timber harvest occurred in the 3.2 million-acre study area, including harvest of 56,400 acres of suitable spotted owl habitat. This represented a loss of about 6 percent of the owl habitat in the study area distributed across all ownerships (Pierce *et al.* 2005). Approximately 77 percent of the harvested habitat occurred on private lands and about 15 percent occurred on state lands. Pierce and others (2005) also evaluated suitable habitat levels in 450 spotted owl management circles (based on the provincial annual median spotted owl home range). Across their study area, they found that owl circles averaged about 26 percent suitable habitat in the circle across all landscapes. Values in the study ranged from an average of 7 percent in southwest Washington to an average of 31 percent in the east Cascades, suggesting that many owl territories in Washington are significantly below the 40 percent suitable habitat threshold used by the State as a viability indicator for spotted owl territories (Pierce *et al.* 2005).

Moer *et al.* 2005 estimated an increase of approximately 1.25 to 1.5 million acres of medium and large older forest (greater than 20 inches dbh, single and multi-storied canopies) on federal lands in the Northwest Forest Plan area between 1994 and 2003. The increase occurred primarily in the lower end of the diameter range for older forest. Net area in the greater than 30 inch dbh size class increased by only an estimated 102,000 to 127,000 acres. The estimates were based on change-detection layers for losses due to harvest and fire and re-measured inventory plot data for increases due to in-growth. Transition into and out of medium and large older forest over the 10-year period was extrapolated from inventory plot data on a subpopulation of Forest Service land types and applied to all federal lands. Because size class and general canopy layer descriptions do not necessarily account for the complex forest structure often associated with northern spotted owl habitat, the significance of these acres to northern spotted owl conservation remains unknown.

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<sup>1</sup> Data compiled by the U.S. Fish and Wildlife Service, Northern Spotted Owl Coordination Group.

Range-wide Analysis from 2004 (first decade) to the Present. This section updates the information considered in the first decade of the Plan (April 13, 1994 – April 12, 2004) to the present writing of this Opinion. In 1994, about 7.4 million acres of suitable habitat were estimated to exist on federal lands. As of April 2004, the Service had consulted on the removal of 575,447 acres of spotted owl habitat range-wide (Table 4), of which 190,429 acres occurred on federal lands managed under the Plan. From April 12, 2004, to the present, the Service has consulted on the removal or downgrading of 15,455 acres of spotted owl habitat range-wide on federal lands managed under the Plan (190,429 acres consulted on for removal through April 12, 2004 (Table 5) subtracted from 205,884 acres consulted on for removal through August 17, 2006 (Table 3)). This amount of habitat loss (0.21 %) is consistent with the expectations for timber management under the Plan for the second decade of implementation, using the 2004 baseline of 7,038,368 acres of suitable habitat (1994 baseline with all suitable habitat losses subtracted out (Table 3)). Currently, an estimated 4,876,646 acres of spotted owl habitat in Reserves receive protection under the Plan (Table 5).

Spotted Owl Numbers, Distribution, and Reproduction Trends There are no estimates of the historical population size and distribution of the spotted owl within preferred habitat, although spotted owls are believed to have inhabited most old-growth forests throughout the Pacific Northwest prior to modern settlement (mid-1800s), including northwestern California (USFWS 1989). According to the final rule listing the spotted owl as threatened (USFWS 1990a), approximately 90 percent of the roughly 2,000 known spotted owl breeding pairs were located on federally managed lands, 1.4 percent on State lands, and 6.2 percent on private lands; the percent of spotted owls on private lands in northern California was slightly higher (Forsman *et al.* 1984, USFWS 1989, Thomas *et al.* 1990).

Using data from 1986-1992, Gutiérrez (1994) tallied 3,753 known pairs and 980 singles throughout the range of the spotted owl. At the time the Plan was initiated (July 1, 1994), there were 5,431 known locations of, or site centers of spotted owl pairs or resident singles: 851 sites (16 %) in Washington, 2,893 (53 %) in Oregon, and 1,687 (31 %) in California (BLM 1995). The actual population of spotted owls across the range was believed to be larger than either of these counts because some areas were, and remain, unsurveyed (USFWS 1992a, Thomas *et al.* 1993).

Because existing survey coverage and effort are insufficient to produce reliable population-size estimates, researchers use other indices, such as demographic data, to evaluate trends in spotted owl populations. Analysis of demographic data can provide an estimate of the rate and direction of population growth [i.e., lambda ( $\lambda$ )]. A  $\lambda$  of 1.0 indicates a stationary population (i.e., neither increasing nor decreasing), a  $\lambda$  less than 1.0 indicates a declining population, and a  $\lambda$  greater than 1.0 indicates a growing population. Demographic data are analyzed during workshops that occur at 5 year intervals.

In January 2004, at a meta-analysis workshop spotted owl demographic studies, two meta-analyses were conducted on the rate of population change using the re-parameterized Jolly-Seber method ( $\lambda$ RJS); 1 meta-analysis for all 13 study areas and 1 meta-analysis for the 8 study areas that are part of the Effectiveness Monitoring Program of the Plan (Anthony *et al.* 2004). Data were analyzed separately for individual study areas, as well as simultaneously across all study areas (true meta-analysis). Estimates of  $\lambda$ RJS ranged from 0.896-1.005 for the 13 study

areas, and all but 1 (Tye [TYE]) of the estimates were  $<1.0$  suggesting population declines for most areas (Anthony *et al.* 2004) (Figure 1). There was strong evidence that populations on the Wenatchee (WEN), Cle Elum (CLE), Warm Springs (WSR), and Simpson (SIM) study areas declined during the study, and there also was evidence that populations on the RAI (Rainer), OLY (Olympic), COA (Oregon Coast Range), and HJA (HJ Andrews) study areas were decreasing (see Figure 1). Precision of the  $\lambda$ RJS estimates for RAI and OLY were poor and not sufficient to detect a difference from 1.00. However, the estimate of  $\lambda$ RJS for RAI (0.896) was the lowest of all of the areas. Populations on TYE, KLA (Klamath), CAS (South Oregon Cascades), NWC (NW California), and HUP (Hoopa) appeared to be stationary during the study, but there was some evidence that the CAS, NWC, and HUP were declining ( $\lambda$ RJS  $<1.00$ ). The weighted mean  $\lambda$ RJS for all of the study areas was 0.963 (SE = 0.009, 95% CI = 0.945-0.981), suggesting that populations over all of the study areas were declining by about 3.7 percent per year from 1985-2003. The mean  $\lambda$ RJS for the 8 demographic monitoring areas on federal lands was 0.976 (SE = 0.007, 95% CI = 0.962-0.990) and 0.942 (SE = 0.016, 95% CI = 0.910-0.974) for non-federal lands, an average of 2.4 versus 5.8 percent decline, respectively, per year. This suggests that spotted owl populations on federal lands had better demographic rates than elsewhere, but interspersed land ownership on the study areas confounds this analysis.

The number of populations that have declined and the rate at which they have declined are noteworthy, particularly the precipitous declines on the four Washington study areas (WEN, CLE, RAI, OLY) (estimated at 30-50 % population decline over 10 years) and WSR in Oregon (Anthony *et al.* 2004). Declines in adult survival rates may be an important factor contributing to declining population trends. Survival rates declined over time on five of the 14 study areas: four study areas in Washington, which showed the sharpest declines, and one study area in the Klamath province of northwest California (Anthony *et al.* 2004). In Oregon, there were no time trends in apparent survival for four of six study areas, and remaining areas had weak non-linear trends. In California, two study areas showed no trend, one showed a slight decline, and one showed a significant linear decline (Anthony *et al.* 2004). Like the trends in annual rate of population change, trends in adult survival rate showed clear declines in some areas, but not in others. Anthony *et al.* (2004) provides the only range-wide estimate of northern spotted owl demographic rates.

Loehle *et al.* (2005) sampled a small portion of the range of the species and questioned the accuracy of lambda estimates computed in Anthony *et al.* (2004), suggesting that the estimates were biased low by 3 to 4 percentage points. Loehle *et al.* (2005) contends the lambda estimates in Anthony *et al.* (2004) do not accurately account for spotted owl emigration. Therefore, more of the spotted owl demography study areas would have a lambda closer to 1.0, a stationary population. The Loehle *et al.* (2005) statement could be accurate if Anthony *et al.* (2004) used Leslie Matrix models to compute survival and lambda. Instead, Anthony *et al.* (2004) used Pradel reparameterized Jolly-Seber method to compute survival and lambda to avoid the biases associated with the Leslie Matrix method.

British Columbia has a small population of spotted owls. This population is relatively isolated and is apparently declining sharply and is absent from large areas of apparently-suitable habitat (Courtney *et al.* 2004). Breeding populations have been estimated at fewer than 33 pairs and may be declining as much as 35 percent per year (Harestad *et al.* 2004). The amount of interaction between spotted owls in Canada and the U.S. is unknown (Courtney *et al.* 2004).

The Canadian population has reached the point where it is now vulnerable to stochastic demographic events that could cause further declines and perhaps extirpation and conditions are not likely to improve in the short term (Courtney *et al.* 2004, pgs. 3-26 to 3-27).

**Table 3: Aggregate results of all adjusted, suitable habitat (NRF<sup>1</sup>) acres on Northwest Forest Plan (Plan) lands; range-wide changes by land use allocations from 1994 to August 17, 2006.**

	Reserves <sup>2</sup> (Late- successional Reserves (LSR), Managed Late-successional areas (MLSA) and Congressionally Reserved area (CRA))			Non-reserves <sup>3</sup> (Administratively withdrawn area (AWA), Adaptive Management Areas (AMA), and Matrix)			TOTAL
	LSR	MLSA	CRA	AWA	AMA	Matrix	
Evaluation Baseline <sup>4</sup>	3227014	28900	1638652	300219	364268	1838045	7397098
Removed/Downgraded (timber harvest only) <sup>5</sup>	-6119	-1109	-30	-749	-9908	-130229	-148144
Removed/Downgraded (all other activities) <sup>6</sup>	-1544	0	-2842	-54	-458	-19600	-24498
Consultation Subtotal	-7663	-1109	-2872	-803	-10366	-149829	-172642
Removed/Downgraded (natural disturbance) <sup>7</sup>	-11556	-309	-7126	-407	-27	-10553	-29978
Net Changes from Land Exchanges and Ownership Transfers	0	0	0	0	0	35	35
Other Activities Subtotal	-11556	-309	-7126	-407	-27	-10518	-29943
Total Net Change	-19219	-1418	-9998	-1210	-10393	-160347	-202585
BASELINE BALANCE <sup>8</sup>	3207795	27482	1628654	299009	353875	1677698	7194513
Degraded <sup>9</sup>	-36269	-187	-3446	-533	-13651	-436750	-490856

<sup>1</sup> Nesting, roosting, foraging (NRF) habitat. In California, suitable habitat is divided into two components; nesting-roosting (NR) habitat, and foraging (F) habitat. The NR component most closely resembles NRF habitat in Oregon and Washington. Due to differences in reporting methods, effects to suitable habitat compiled in this, and all subsequent tables include effects for nesting, roosting, and foraging (NRF) for 1994-6/26/2001. After 6/26/2001, suitable habitat includes NRF for Washington and Oregon but only nesting and roosting (NR) for California.

<sup>2</sup> Land-use allocations intended to provide large blocks of habitat to support clusters of breeding pairs.

<sup>3</sup> Land-use allocations intended to provide habitat to support movement of spotted owls among reserves.

<sup>4</sup> 1994 FSEIS baseline (USDA and USDI 1994b).

<sup>5</sup> Includes both effects reported by USFWS (2001) and subsequent effects compiled in the Spotted owl Consultation Effects Tracker (web application and database). Total effects from the timber sale program, presented in the right column, is the value to contrast with the expectation that Plan implementation would result in removal of 196,000 acres of NRF habitat per decade.

<sup>6</sup> Includes NRF habitat effects from recreation, roads, minerals, and other non-timber programs of work.

<sup>7</sup> Includes effects to NRF habitat resulting from wildfires (not from suppression efforts), insect and disease outbreaks, and other natural causes. Information from all fires occurring since 1994 is not yet available for entry into the database and thus is not included here but is compiled in Table 4.

<sup>8</sup> Calculated as (evaluation baseline) – [(total consulted-on changes) + (removed/downgraded as documented through TA process)].

<sup>9</sup> Degraded habitat means that function remains the same, but quality is reduced.

**Table 4: Changes to NRF<sup>1</sup> habitat acres from activities addressed in section 7 consultations (both formal and informal) and other causes range-wide from 1994 to April 2004.**

Northwest Forest Plan (Plan) Group / Ownership		Consulted On Habitat Changes <sup>2</sup>		Other Habitat Changes <sup>3</sup>	
		Removed/Downgraded	Degraded	Removed/Downgraded	Degraded
Federal - Northwest Forest Plan	Bureau of Land Management	61015	8627	760	0
	Forest Service	92834	414868	10946	5109
	National Park Service	908	2861	0	0
	Multi-agency <sup>4</sup>	15175	23314	0	0
	Plan Subtotal	169932	449670	11706	5109
Other Management and Conservation Plans (OMCP)	Bureau of Indian Affairs and Tribes	99062	27890	0	0
	Habitat Conservation Plans	295889	14430	0	0
	OMCP Subtotal	394951	42320	0	0
Other Federal Agencies and Lands <sup>5</sup>		241	434	28	70
Other Public and Private Lands <sup>6</sup>		10323	878	30240	20949
<b>TOTAL Changes</b>		<b>575447</b>	<b>493302</b>	<b>41974</b>	<b>26128</b>

<sup>1</sup> Nesting, roosting, foraging habitat. In California, suitable habitat is divided into two components; nesting – roosting (NR) habitat, and foraging (F) habitat. The NR component most closely resembles NRF habitat in Oregon and Washington. Due to differences in reporting methods, effects to suitable habitat compiled in this, and all subsequent tables include effects for nesting, roosting, and foraging (NRF) for 1994-6/26/2001. After 6/26/2001, suitable habitat includes NRF for Washington and Oregon but only nesting and roosting (NR) for California.

<sup>2</sup> Includes both effects reported by USFWS (2001) and subsequent effects compiled in the Spotted owl Consultation Effects Tracker (web application and database).

<sup>3</sup> Includes effects to NRF habitat (as documented through technical assistance) resulting from wildfires (not from suppression efforts), insect and disease outbreaks, and other natural causes, private timber harvest, and land exchanges not associated with consultation. Information from all fires occurring since 1994 is not yet available for entry into the database and thus is not included here but is compiled in Table 4.

<sup>4</sup> The ‘Multi-agency’ grouping is used to lump a variety of Plan mixed agency or admin unit consultations that were reported together prior to 6/26/2001, and cannot be split out.

<sup>5</sup> Includes lands that are owned or managed by other Federal agencies not included in the Plan.

<sup>6</sup> Includes lands not covered by Habitat Conservation Plans that are owned or managed by states, counties, municipalities, and private entities. Effects that occurred on private lands from right-of-way permits across Forest Service and FS lands are included here.

**Table 5: Aggregate results of all adjusted, suitable habitat (NRF<sup>1</sup>) acres addressed in section 7 consultation (both formal and informal) for the northern spotted owl; baseline and summary of effects by State, physiographic province and land use function from 1994 to April 12, 2004 (the first decade of the Northwest Forest Plan).**

Physiographic Province <sup>4</sup>	Evaluation Baseline <sup>2</sup>			Habitat Removed/Downgraded <sup>3</sup>			% Provincial Baseline Affected	% Range-wide Affected	
	Reserves <sup>5</sup>	Non-Reserves <sup>6</sup>	Total	Reserves <sup>5</sup>	Non-Reserves <sup>6</sup>	Total			
<b>WA</b>									
	<b>Olympic Peninsula</b>	548483	11734	560217	67	24	91	-0.02	0.05
	<b>Eastern Cascades</b>	506340	200509	706849	1746	4222	5968	-0.84	3.13
	<b>Western Cascades</b>	864683	247797	1112480	249	10952	11201	-1.01	5.88
	<b>Western Lowlands</b>	0	0	0	0	0	0	0	0
<b>OR</b>									
	<b>Coast Range</b>	422387	94190	516577	399	4145	4544	-0.88	2.39
	<b>Klamath Mountains</b>	448509	337789	786298	2434	80394	82828	-10.53	43.5
	<b>Cascades East</b>	247624	196035	443659	1813	12216	14029	-3.16	7.37
	<b>Cascades West</b>	1012426	1033337	2045763	2926	52514	55440	-2.71	29.11
	<b>Willamette Valley</b>	593	5065	5658	0	0	0	0	0
<b>CA</b>									
	<b>Coast</b>	47566	3928	51494	181	69	250	-0.49	0.13
	<b>Cascades</b>	61852	26385	88237	0	4808	4808	-5.45	2.52
	<b>Klamath</b>	734103	345763	1079866	1470	9800	11270	-1.04	5.92
	<b>Total</b>	<b>4894566</b>	<b>2502532</b>	<b>7397098</b>	<b>11285</b>	<b>179144</b>	<b>190429</b>	<b>-2.57</b>	<b>100</b>

<sup>1</sup> Nesting, roosting, foraging habitat. In California, suitable habitat is divided into two components; nesting – roosting (NR) habitat, and foraging (F) habitat. The NR component most closely resembles NRF habitat in Oregon and Washington. Due to differences in reporting methods, effects to suitable habitat compiled in this, and all subsequent tables include effects for nesting, roosting, and foraging (NRF) for 1994-6/26/2001. After 6/26/2001, suitable habitat includes NRF for Washington and Oregon but only nesting and roosting (NR) for California.

<sup>2</sup> 1994 FSEIS baseline (USDA and USDI 1994).

<sup>3</sup> Includes both effects reported by USFWS (2001) and subsequent effects compiled in the Northern Spotted Owl Consultation Effects Tracking System (web application and database).

<sup>4</sup> Defined by the Plan as the twelve physiographic provinces, as presented in Figure 3 and 4-1 on page 3 and 4-16 of the FSEIS.

<sup>5</sup> Land-use allocations intended to provide large blocks of habitat to support clusters of breeding pairs.

<sup>6</sup> Land-use allocations intended to provide habitat to support movement of spotted owls among reserves.

**Table 6: Change in suitable spotted owl habitat acres from 1994 to April 12, 2004, resulting from Federal management actions (Mgmt) and natural events by physiographic province.**

Physiographic Province	Northwest Forest Plan baseline	CAUSES OF HABITAT LOSS		TOTAL	Percent change in Province	Percent of Total Effects
		Mgmt <sup>1</sup>	Natural Events <sup>2</sup>			
Olympic Peninsula	560,217	-91	-299	-390	-0.07	0.10
WA East Cascades	706,849	-5968	-5,754	-11722	-1.66	3.14
WA West Cascades	1,112,480	-11201	0	-11201	-1.01	3.00
Western Lowlands	0	0	0	0	0.00	0.00
OR Coast	516,577	-4544	-66	-4610	-0.89	1.23
OR Klamath Mountains	786,298	-82828	-117,622	-200450	-25.49	53.61
OR Cascades East	443,659	-10,595	-22,638	-33,233	-7.49	8.89
OR Cascades West	2,045,763	-55440	-24,583	-80023	-3.91	21.40
Willamette Valley	5,658	0	0	0	0.00	0.00
CA Coast	51,494	-250	-100	-350	-0.68	0.09
CA Cascades	88,237	-4808	0	-4808	-5.45	1.29
CA Klamath	1,079,866	-11270	-15,869	-27139	-2.51	7.26
<b>TOTAL</b>	<b>7,397,098</b>	<b>-186,995</b>	<b>-186,931</b>	<b>-373,926</b>	<b>-4.85</b>	<b>100.00</b>

<sup>1</sup> Estimates from the spotted owl consultation effects tracker (Service 2005).

<sup>2</sup> Data compiled by the U.S. Fish and Wildlife Service, Northern Spotted Owl Coordination Group.

**Table 7: Suitable (NRF<sup>1</sup>) habitat loss on Federal lands from proposed management activities during the second decade (2004 - 2014) of the Plan and natural events. Baseline and summary of effects by State, physiographic province and land use function from April 2004 to August 17, 2006.**

Physiographic Province <sup>4</sup>		Evaluation Baseline <sup>2</sup>	Habitat Removed/Downgraded <sup>3</sup>				Percent Provincial Baseline Affected	Percent Range-wide Affected
		Total	Reserves <sup>5</sup>	Non-Reserves <sup>6</sup>	Habitat Loss to Natural Events <sup>7</sup>	Total		
WA	Olympic Peninsula	560217	-867	-24	-299	-1190	-0.16	0.56
	Eastern Cascades	706849	-1795	-4242	-5754	-11791	-0.85	3.82
	Western Cascades	1112480	-1181	-11001	0	-12182	-1.10	7.70
	Western Lowlands	0	0	0	0	0	0.00	0.00
OR	Coast Range	516577	-399	-4074	-66	-4539	-0.87	2.83
	Klamath Mountains	786298	-1318	-53956	-117622	-172896	-7.03	34.95
	Cascades East	443659	-1243	-9352	-4008	-14603	-2.39	6.70
	Cascades West	2045763	-2990	-49783	-24583	-77356	-2.58	33.37
	Willamette Valley	5658	0	0	0	0	0.00	0.00
CA	Coast	51494	-381	-69	-100	-550	-0.87	0.28
	Cascades	88237	0	-4808	0	-4808	-5.45	3.04
	Klamath	1079866	-1470	-9198	-15869	-26537	-0.99	6.75
<b>Total</b>		<b>7397098</b>	<b>-11644</b>	<b>-146507</b>	<b>-168301</b>	<b>-326452</b>	<b>-2.14</b>	

<sup>1</sup>Nesting, roosting, foraging (NRF) habitat. In California, suitable habitat is divided into two components; nesting - roosting (NR) habitat, and foraging (F) habitat. The NR component most closely resembles NRF habitat in Oregon and Washington. Due to differences in reporting methods, effects to suitable habitat compiled in this, and all subsequent tables include effects for nesting, roosting, and foraging (NRF) for 1994-6/26/2001. After 6/26/2001 suitable habitat includes NRF for Washington and Oregon but only nesting and roosting (NR) for California.

<sup>2</sup>1994 FSEIS baseline (USDA and USDI 1994).

<sup>3</sup>Includes both effects reported in USFWS 2001 and subsequent effects reported in the Northern Spotted Owl Consultation Effects Tracking System (web application and database.)

<sup>4</sup>Defined by the Northwest Forest Plan as the twelve physiographic provinces, as presented in Figure 3&4-1 on page 3&4-16 of the FSEIS.

<sup>5</sup>Land-use allocations intended to provide large blocks of habitat to support clusters of breeding pairs. <sup>6</sup>Land-use allocations intended to provide habitat to support movement of spotted owls among reserves. <sup>7</sup>Acres estimated from various database fields and other GIS databases.

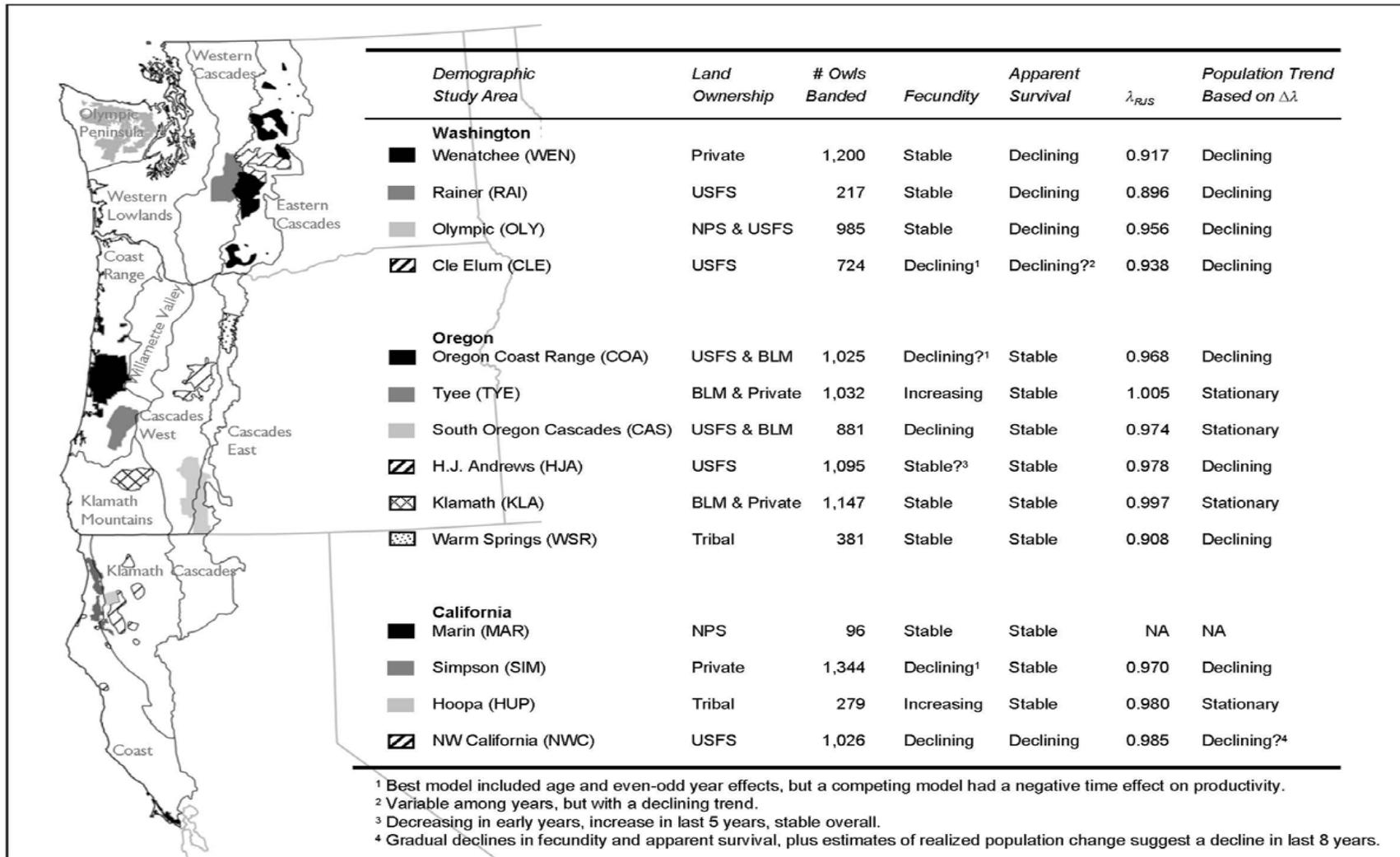


Figure 1: Physiographic provinces, northern spotted owl demographic study areas, and demographic trends (Anthony *et al.* 2004).

## STATUS OF NORTHERN SPOTTED OWL CRITICAL HABITAT

### Legal Status

On January 15, 1992, the Service designated critical habitat for the spotted owl within 190 CHUs which encompass nearly 6.9 million acres across Washington (2.2 million acres), Oregon (3.3 million acres), and California (1.4 million acres) (USFWS 1992b). The spotted owl critical habitat final rule states: "Section 7 analysis of activities affecting owl critical habitat should consider provinces, subprovinces, and individual CHUs, as well as the entire range of the subspecies (page 1823)." The rule goes on to assert the basis for an adverse modification opinion should be evaluated at the provincial scale (page 1823).

### Primary Constituent Elements

Primary constituent elements (PCEs) are the physical and biological features of critical habitat essential to a species' conservation. PCEs identified in the spotted owl critical habitat final rule include those physical and biological features that support nesting, roosting, foraging, and dispersal (USFWS 1992b). Features that support nesting and roosting habitat typically include a moderate to high canopy (60 to 90 percent); a multi-layered, multi-species canopy with large [ $> 30$  inches diameter at breast height] overstory trees; a high incidence of large trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for owls to fly (Thomas *et al.* 1990). Foraging habitat generally consists of attributes similar to those in nesting and roosting habitat, but may not always support successfully nesting pairs (USFWS 1992b). Dispersal habitat, at minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities: there may be variations over the owl's range (e.g., drier sites in the east Cascades or northern California) (USFWS 1992b).

### Conservation Role of Critical Habitat

Spotted owl critical habitat was designated based on the identification of large blocks of suitable habitat that are well distributed across the range of the spotted owl. Critical habitat units were intended to identify a network of habitats that provided the functions considered important to maintaining stable, self-sustaining, and interconnected populations over the range of the spotted owl, with each CHU having a local, provincial, and a range-wide role in spotted owl conservation. Most CHUs were expected to provide suitable habitat for population support, some were designated primarily for connectivity, and others were designated to provide for both population support and connectivity.

The Plan was developed using conservation principles similar to those used to designate critical habitat and is considered the federal contribution to the conservation of spotted owls and its habitat in the United States. Specifically, late successional reserves (LSRs) were created under the Plan to provide large blocks of suitable habitat capable of supporting multiple pairs of spotted owls. Standards and Guidelines of the Plan establish that LSRs will be managed to protect and enhance late-successional and old-growth forests ecosystems. Riparian Reserves and other Plan land use allocations provide for connectivity between reserves. Approximately 70 percent of

suitable habitat in CHUs overlaps with Plan LSRs on a range-wide basis and will therefore be managed to protect and enhance habitat characteristics.

### Current Condition of Critical Habitat

#### Range-wide

In 1994, the FSEIS for the Plan established that 3,141,987 acres of NRF habitat existed within spotted owl CHUs on federally administered public lands. To assess changes to the baseline condition since implementation of the Plan, the Service relies on information in section 7 consultations and available information on natural events. Hereafter, effects to critical habitat refer to NRF habitat within spotted owl critical habitat.

Across the range of the spotted owl between 1994 and July, 2006, the Service has consulted on the removal or downgrading of 47,380 acres (1.50 %) of critical habitat due to management-related activities (Table 8). The majority of these consulted-on effects, 33,589 acres, have been concentrated in the Oregon Cascades West and Oregon Klamath Mountains Provinces. In addition, natural events (including fire and insect outbreaks) have resulted in the removal or downgrading of approximately 42,679 acres (1.39 %) of critical habitat extant in 1994 (Table 9). In general, fires have had more of an impact to spotted owl critical habitat in the interior provinces of Washington and California and the southern and interior provinces of Oregon than the coastal provinces. Over 50 percent of spotted owl critical habitat removed or downgraded by fire can be attributed to the 1999 Megram Fire that burned in north-central California and the 2002 Biscuit Fire that burned in southwestern Oregon and northern California.

Although most provinces within the range of the spotted owl have experienced some degree of habitat loss between 1994 and December 2004, total effects have been disproportionately distributed. The majority of effects to critical habitat (approximately 98 percent) have been concentrated in just six physiographic provinces (Washington East Cascades, Washington West Cascades, Oregon Klamath Mountains, Oregon Cascades East, Oregon Cascades West, and California Klamath) (Table 7). Of the remaining six provinces, one (Oregon Willamette Valley) had no designated critical habitat, one (Washington Western Lowlands) had no suitable habitat within critical habitat, and four provinces (Olympic Peninsula, Oregon Coast Range, California Coast Range, California Cascades) had less than one percent of their critical habitat removed or downgraded since 1994.

#### Provinces

Washington East Cascades. This province, which contains 18 CHUs, is located east of the Cascade Crest and provides the easterly extension of the spotted owl in Washington.

Between 1994 and December 2004, approximately 8,492 acres of critical habitat, or 2.6 percent of its provincial baseline, have been removed or downgraded (Table 9). The majority of effects have been concentrated in the northern half of the province and resulted primarily from the Tyee, Needles, North 25 Mile, and Maple Fires. The largest of these fires, the Tyee, removed or downgraded approximately 3,600 acres of suitable habitat from WA-06, WA-09, and WA-11. The Maple Fire removed or downgraded an additional 300 acres of suitable habitat from to WA-

06. The Needles and North 25 Mile Fires removed or downgraded approximately 2,500 acres (23 %) and 474 acres (28 %) of suitable habitat from WA-02 and WA-04, respectively. Collectively, the units impacted by these fires are important for the range-wide distribution of the spotted owl as they occur on the eastern and northeastern edge of the species range (Tehan 1991). Additionally, these CHUs provide essential habitat for intra-provincial connectivity (Tehan 1991).

Between January 2005 and August 17, 2006, efforts have continued to refine estimates of additional critical habitat lost due to wildfires during recent seasons. Preliminary estimates indicate that as much as 3,600 acres of NRF habitat may have been removed or downgraded from critical habitat units in this province. At present, this estimate has not been finalized and entered in the range-wide database for tracking effects on critical habitat.

Washington West Cascades. This province, which contains 23 CHUs and the most critical habitat of the Washington provinces, is located west of the Cascade Crest. It is characterized by significant differences in topography and distribution of habitat between its northern and southern portions.

Between 1994 and December 2004, the removal or downgrading of approximately 4,994 acres of critical habitat within six CHUs, or one percent of its provincial baseline, has been consulted on since 1994. Although impacts to five of these units have been relatively minor (less than 2.5 percent of their baseline), WA-39 has had 1,776 acres of suitable habitat (46 %) consulted-on for removal or downgrading. WA-39 is expected to provide connectivity between the Western Cascades and Western Lowlands Provinces and improve the distribution of spotted owls and habitat in the portion of the province impacted by the 1980, Mount Saint Helens eruption (Tehan 1991). Fire has not resulted in measurable impacts to spotted owl critical habitat in this province.

Between January 2005 and August 17, 2006, no additional acres of suitable habitat have been consulted on for removal or downgrade from critical habitat within the Washington West Cascades Province.

Oregon Klamath Mountains. The Oregon Klamath Mountains Province contains 16 CHUs and provides the link between the Oregon Cascades West and Oregon Coast Ranges Province south into California.

Between 1994 and December 2004, this province has had more critical habitat removed or downgraded than any other province: 31,365 acres or 10 percent (Table 9). In general, effects to critical habitat have been evenly distributed between those consulted upon (13,912 acres) and those attributable to fire (17,453 acres) effects. Although consulted-on effects were distributed across 11 CHUs, approximately 36 percent of consulted-on effects have occurred in two adjacent units (OR-74 and OR-75). Together, these units provide an east-west linkage in the southern portion of the Klamath Mountains Province and provide essential NRF, and dispersal habitat in a highly fragmented area (Tveten 1992). The majority of fire effects in this province can be attributed to the Biscuit Fire. This fire removed or downgraded approximately 23, 46, and 37 percent of the suitable habitat within OR-68, OR-69, and OR-70, respectively. These units were

identified for their important contributions to inter- and intra-provincial connectivity and to provide essential NRF and dispersal habitat in areas where habitat is lacking (Tweten 1992).

Between January 2005 and August 17, 2006, the Oregon Klamath Mountains Province critical habitat baseline for consulted on activities that will remove or downgrade suitable habitat has been adjusted by -985 acres. This is usually due to modifications in proposed activities. Once projects are completed, and monitoring reports submitted, consulted on acres that are not affected are amended and the consultation is closed.

Oregon Cascades West. This province is located in the geographic center of the spotted owl's range and contains more critical habitat (over 894,000 acres) than any other province. It provides links with the Washington Cascades, Oregon Coast Range, and Klamath Mountains Provinces.

Between 1994 and December 2004, approximately 22,219 acres or 2.48 percent of its provincial baseline have been removed or downgraded (Table 9). Consulted-on effects have been widely dispersed within 26 of the 29 CHUs in this province. In general, this has resulted in relatively small impacts to individual units. However, two adjacent units, OR-23 and OR-24, have experienced relatively concentrated effects having 215 acres (14.3 %) and 946 acres (48.8 %) removed or downgraded, respectively. Together these units were identified as being important inter-provincial links between the Coast Ranges and the Oregon Cascades West Provinces (Tweten 1992). Fire has had limited effects to spotted owl critical habitat in this province: 1,216 acres or less than 0.5 percent of the provincial baseline have been removed or downgraded by fire.

Between January 2005 and August 17, 2006, the Oregon Cascades West Province critical habitat baseline for consulted on activities that will remove or downgrade suitable habitat has been adjusted by -922 acres. As stated above, this is usually due to modifications in proposed activities. Once projects are completed, and monitoring reports submitted, consulted on acres that are not affected are amended and the consultation is closed.

Oregon Cascades East. The Oregon Cascades East Province provides the easterly extension of the spotted owl's range in Oregon and contains all or portions of 10 CHUs.

Between 1994 and December 2004, 8,584 acres or 6.18 percent of its provincial baseline have been removed or downgraded (Table 9). The majority of these acres, approximately 6,878, are a result of several fires during 2002 and 2003. The impacts of these fires were concentrated in the central portion of this province where approximately 20 percent of the extant suitable habitat in OR-3 and OR-4 and over 36 percent of the suitable habitat in OR-7 were removed or downgraded. OR-3 and OR-4 were designated to maintain suitable habitat and support dispersal along the eastern slope of the Oregon Cascades (Tweten 1992). OR-7 provides a north-south link within the province and an inter-provincial link with the Oregon Cascades West Province. Consulted-on effects have been evenly distributed, occurring in 8 of 10 CHUs, and have resulted in less than a 5 percent reduction (through removal or downgrading) of suitable habitat within any individual CHU.

Between January 2005 and August 17, 2006, no additional acres of suitable habitat have been consulted on for removal or downgrade from critical habitat within the Oregon Cascades East Province.

California Klamath. The California Klamath Province contains all or portions of 36 CHUs and over 85 percent of spotted owl critical habitat in California.

Between 1994 and December 2004, approximately 10,483 acres of critical habitat (3.0 percent of the provincial baseline) have been removed or downgraded (Table 7) from 14 CHUs within this province. The majority of effects to these acres can be attributed to the Megram Fire. This fire removed or downgraded 9,390 acres (22 %) of the suitable habitat within CA-30; this CHU is located in the west/central portion of this province and links the interior subprovinces with the coastal provinces and is expected to provide for up to 24 spotted owl pairs overtime (Spangle 1992). Two other small CHUs, CA-10 (9,637 acres) and CA-35 (12,470 acres), have had approximately 20 percent of their suitable habitat removed or downgraded from consulted-on actions. The primary function of these CHUs is to provide intra-provincial connectivity in the eastern and south-central portion of this province, respectively (Spangle 1992).

Between January 2005 and August 17, 2006, no additional acres of suitable habitat have been consulted on for removal or downgrade from critical habitat within the California Klamath Province.

**Table 8: Aggregate results of all adjusted, critical habitat NRF<sup>1</sup> acres affected by Section 7 Consultation for the Northern spotted owl; baseline and summary of effects by state, Physiographic Province and land use function from 1994 to August 17, 2006.**

Physiographic Province <sup>4</sup>		Evaluation Baseline <sup>2</sup>	Habitat Removed/Downgraded <sup>3</sup>				Percent Provincial Baseline Affected	Percent Range-wide Affected
		Total	Reserves <sup>5</sup>	Non-Reserves <sup>6</sup>	Habitat Loss to Natural Events <sup>7</sup>	Total		
<b>WA</b>	Olympic Peninsula	197009	-12	-59	-299	-370	-0.04	0.17
	Eastern Cascades	326592	-87	-4549	-5754	-10390	-1.42	11.05
	Western Cascades	514578	-4	-5040	0	-5044	-0.98	12.02
	Western Lowlands	0	0	0	0	0	0.00	0.00
<b>OR</b>	Coast Range	348717	-50	-1200	-66	-1316	-0.36	2.98
	Klamath Mountains	313269	-6	-9213	-117622	-126841	-2.94	21.98
	Cascades East	138684	-138	-1372	-4008	-5518	-1.09	3.60
	Cascades West	894134	-63	-18874	-24583	-43520	-2.12	45.15
	Willamette Valley	0	0	0	0	0	0.00	0.00
<b>CA</b>	Coast	2616	0	0	-100	-100	0.00	0.00
	Cascades	50687	0	-472	0	-472	-0.93	1.13
	Klamath	355701	0	-808	-15869	-16677	-0.23	1.93
<b>Total</b>		<b>3141987</b>	<b>-360</b>	<b>-41587</b>	<b>-168301</b>	<b>-210248</b>	<b>-1.34</b>	

<sup>1</sup> Nesting, roosting, foraging (NRF) habitat. In California, suitable habitat is divided into two components.

<sup>2</sup> 1994 FSEIS baseline (USDA and USDI 1994).

<sup>3</sup> Includes both effects reported in USFWS 2001 and subsequent effects reported in the Northern Spotted Owl Consultation Effects Tracking System (web application and database.)

<sup>4</sup> Defined by the Northwest Forest Plan as the twelve physiographic provinces, as presented in Figure 3 and 4-1 on page 3 and 4-16 of the FSEIS.

<sup>5</sup> Land-use allocations intended to provide large blocks of habitat to support clusters of breeding pairs.

<sup>6</sup> Land-use allocations intended to provide habitat to support movement of spotted owls among reserves.

<sup>7</sup> Acres estimated from various database fields and other GIS databases.

**Table 9: Change in northern spotted owl suitable critical habitat from 1994 to December 10, 2004, resulting from Federal management actions and natural events by physiographic province.**

Physiographic Province	1994 FSEIS Provincial Critical Habitat Baseline (Acres)	Critical Habitat (acres) Removed/Downgraded, 1994-2004				Percent 1994 FSEIS Provincial Critical Habitat Baseline (Acres)	Percent of all Rangewide Habitat Effects
		Management	Fire	Insect/Disease	Total		
<b>WASHINGTON</b>							
Olympic Peninsula	197,009	71	0	0	71	0.04	0.08
East Cascades	326,592	1,035	6,925 <sup>1,2</sup>	532	8,492	2.60	9.67
West Cascades	514,578	4,994	0	0	4,994	0.97	5.69
Western Lowlands	0	0	0	0	0	0.00	0.00
<b>OREGON</b>							
Coast Range	348,717	1,224	0	0	1,224	0.35	1.39
Klamath Mountains	313,269	13,912	17,453	0	31,365	10.01	35.72
Cascades East	138,684	1,706	6,878 <sup>2</sup>	0	8,584	6.18	9.78
Cascades West	894,134	21,003	1,216	0	22,219	2.48	25.31
Willamette Valley	0	0	0	0	0	0.00	0.00
<b>CALIFORNIA</b>							
Coast Range	2,616	0	0	0	0	0.00	0.00
Cascades	50,687	365	0	0	365	0.72	0.41
Klamath	355,701	808	9,675	0	10,483	2.95	11.95
Total	3,141,987	45,118	42,147	532	87,797	2.79	100.00

<sup>1</sup> Habitat effects from some 1994 fires were included in the 2001 update, and thus, appear as consulted-on effects in the spotted owl Consultation Effects Tracking Database. For the purpose of this critical habitat update, habitat effects associated with those fires are included in the fire effects column. <sup>2</sup> Includes fires in 2003.

## ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the action area which have undergone Section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress. The following summarizes the environmental baseline for this consultation.

### SPOTTED OWL

A detailed account of the taxonomy, ecology, and reproductive characteristics of the spotted owl is found in the 1987 and 1990 U.S. Fish and Wildlife Service Status Reviews (USFWS 1987, 1989, 1990a); the Inter-Agency Scientific Committee (ISC) Report (Thomas *et al.* 1990); and the final rule designating the spotted owl as a threatened species (USFWS 1990b). Demographic analysis completed in 1999 indicates that the northern spotted owl population (range wide) is declining by approximately 4 percent per year, although reproducing age females appear to not exhibit a negative trend (Forsman and Anthony 1999, Franklin *et al.* 1999). The Plan was expected to limit the extent of this trend by protecting all spotted owl sites within LSRs and by providing spotted owl dispersal habitat through the matrix and AMA. Conservation of the species was also to be provided by allowing currently unsuitable habitat to develop within the LSRs. Active management designed to advance forest conditions in LSRs includes density management, pre-commercial thinning, and fertilization. As habitat develops within the LSRs, spotted owl populations are expected to stabilize across its range. The range expansion of barred owl into spotted owl territories is a complicating factor. The ultimate outcome of barred owl/spotted owl interactions is uncertain. Outside the LSR system, spotted owl sites known as of January 1994 have been designated as Known Spotted Owl Activity Centers and are also managed as LSR.

A report summarizing the meta-analysis of demography of the spotted owls throughout its range was released in September of 2004 (Anthony *et al.* 2004). The report showed a decline of approximately 3.7 percent across the range of the owl and showed significant declines of populations in some areas, in particular Washington State and northern Oregon. Only four study areas within the range of the spotted owl did not show evidence of spotted owl declines. In southern Oregon, three study areas did not show declines and appeared to have relatively stable or increasing populations based on the 95 percent confidence intervals.

The Service also conducted a status review in 2004 of the spotted owl across its range, in a document known as the Sustainable Ecosystem Institute Report, or SEI, which summarized the biology, ecology, habitat associations and trends, as well as current and potential threats to the species (Courtney *et al.* 2004). The three major operational threats they identified were timber harvest, large-scale stand replacement wildfire, and barred owls. Potential threats included effects associated with West Nile Virus, and Sudden Oak Death.

Courtney *et al.* (2004) found that habitat loss, the primary reason for listing of the spotted owl, had declined significantly across the range. However, there was also some concern as to the potential lag effects to spotted owl populations from past timber harvest. The greatest amount of habitat loss due to timber harvest had occurred in the Oregon Klamath and west Cascade provinces.

There have been recent large fires in southwest Oregon, in particular the Biscuit and the Timbered Rock fires, which reduced spotted owl suitable habitat within the provinces. There is uncertainty as to how spotted owls respond to fire in southwest Oregon. Research is currently being conducted in an attempt to answer that question. Analysis conducted on the effects of the Biscuit Fire by the Forest using recent work by Zabel *et al.* (2003) showed that of the 49 owl pairs affected by the fire, it was likely that only seven were no longer present. In addition, of the 15 spotted owl pairs affected by the Timbered Rock Fire, 11 of those pairs continue to occupy their historic activity centers even though their habitat was subjected to varying degrees of fire severity (USDA/USDI 2006).

Barred owls have increased in southwest Oregon but not to the extent of other areas within the range of the spotted owl. In the South Cascades demographic study area, there has been an increase of barred owls and they occupy up to 20 percent of historic or known spotted owl sites within that study area. However, there are far less barred owls known for southwest Oregon than other areas in the northern portion of the range and the spotted owl survival is stable in that study area as well as in the Klamath demographic study area (Anthony *et al.* 2004).

The other new threats of Sudden Oak Death and West Nile virus are thought to be potential stressors to the northern spotted owl population. Sudden Oak Death or Phytophthora canker disease kills or injures many species of trees and shrubs, and may affect habitat components important to spotted owls and their prey. West Nile virus infects birds, although as of April, 2005, no wild spotted owl infections have been documented. It is unknown when and to what extent these threats may become risks for the spotted owl.

#### Northern Spotted Owl Likelihood of Occupancy

As displayed in the Environmental Baseline Tables (Appendix C), 819 spotted owl activity centers are known to have occurred within the Action Area. Of those known sites, 728 occurred within the nine affected watersheds (Table 14).

Northern spotted owl surveys are routinely not conducted to protocol standards, except in demographic study areas and for project disturbance clearances. The Action Area has one demographic study area, approximately 110,000 acres in size, within the Glendale Resource Area on public lands managed by the Medford District BLM and on the Rogue-Siskiyou National Forest in the south Cascade Mountains. Other owl sites that were known as of 1994, receive seasonal protection when occupied during the nesting season. Any new owls that have moved into the area, or any existing owls that have changed location from the “known” site documented in 1994 may not be located except opportunistically. Biologists attempt to locate new owl sites on an opportunistic basis, as funding allows, but the Action Agencies cannot guarantee that all spotted owl sites are found. Harvest in Matrix or AMA is not delayed by seasonal restrictions, unless a historic owl site is known. Since project related protocol surveys

are no longer required, there may be situations where occupied suitable matrix or AMA owl habitat could be treated, and an unknown nesting owl adversely impacted. There are instances where other activities, such as roadwork, quarry activity, and recreation sometimes cannot be restricted during the nesting season, and often must occur prior to conducting nesting clearances.

Long-term spotted owl survey efforts in southwest Oregon and throughout the Pacific Northwest have shown that spotted owl pairs exhibit high site fidelity but often utilize multiple activity centers or “alternate nest sites” over the course of several years (Anthony 2005). Survey results have shown that when a group of alternate sites is vacated or when one member of a spotted owl pair leaves or dies another individual usually fills the void and the new pair continues to use the cluster of alternate nest sites. These alternate sites can be as much as a mile apart but are usually closer to each other. These long-term survey efforts have also shown that non-resident or “floater” spotted owls often occupy habitat patches peripheral to sites occupied by paired birds and that pairs are often located in habitat patches where occupancy has not previously been documented.

In 2005, an annual report of spotted owl surveys conducted in the South Cascades demography study area was released (Anthony 2005). During that year, 162 spotted owl locations in both Matrix and LSRs land allocations were surveyed to protocol, and spotted owls occupied 65% of the sites visited. The report showed that in the Matrix allocation, the percentage of occupied sites increased in 2005 (63 percent) compared to 2004 (55 percent). Between 2004 and 2005, the percentage of occupied sites in the LSRs increased from 53 to 66 percent and the percentage of sites occupied by owl pairs increased (44 to 53 percent).

The majority of other spotted owl surveys that have been conducted throughout western Oregon have not been of this long-term type. Most have been one or two-year protocol surveys designed to determine if a project area (e.g., a timber sale) was occupied by spotted owls at the time the surveys were conducted. Such short-term studies generally have not lasted long enough to document alternate nest sites or to determine which peripheral habitat patches are important to floaters. And, they were not designed to document the habitat patches in a given landscape that are likely to be occupied by spotted owls in the future; the long-term studies have born out this limitation.

Because of the manner in which spotted owls appear to utilize habitat patches at the landscape scale (high site fidelity, frequent use of alternate nest sites, the tendency for vacancies to be filled and the occurrence of “new” sites) the Service concludes that most sizable patches of unsurveyed (i.e., never surveyed or not surveyed in the past two or perhaps three years) suitable spotted owl nesting, roosting, foraging habitat are likely to be occupied by pairs of spotted owls attempting to nest, or by floaters attempting to attract mates at some point during the implementation period of the majority of forest management activities, especially multiple year projects. For these reasons, the Service concludes that it is likely that the suitable owl habitat throughout and adjacent to the proposed project sites is occupied by the spotted owl.

#### Spotted Owl Suitable Habitat (NRF)

Bart and Forsman (1992) generalized that the greater the amount of forest over 80 years old, the greater the probability of finding spotted owls within these forests. The environmental baseline

for suitable habitat at the time of the Plan has been periodically updated in programmatic biological assessments. There are minor differences in the calculations used for the Service' baseline information in the Alternative 9 biological opinion for the Plan and the Districts' information calculated since then. The District has improved their mapping and plotting ability and refined some estimates that were used in the original Alternative 9 analysis. Better information has been incorporated into the data layers.

The current spotted owl habitat baseline for the action area is approximately 915,000 acres of spotted owl suitable habitat (Appendix C) and approximately 490,000 acres of spotted owl dispersal habitat within the Rogue River and South Coast drainages (Appendix D).

In the FY 04-08 Biological Opinion, the BLM and Forest Service proposed to reduce habitat by 31,621 acres. To date, the actual reduction has been 1,783 acres. Tree harvest, vegetation management and wildfire changes to suitable habitat that have occurred to April, 2006, were calculated from annual monitoring reports and the updated information is depicted by Section Seven watersheds in the Environmental Baseline Tables.

Timber harvest (and related projects that removed or degraded suitable or dispersal habitat) within the Action Area by the Forest and the BLM since the October 2003 BO reduced suitable habitat by 1,783 acres, and increased dispersal-only habitat by 328 acres, as a result of suitable habitat that was thinned and downgraded to dispersal-only.

Wildfire changes in habitat since 1994 are also reported in the Environmental Baseline Tables (Appendix C). The District calculated wildfire changes through a combination of satellite evaluation, photo interpretation, and field exam. Although intensity and severity are different evaluation methods, for purposes of owl habitat, moderate to high fire intensity (and soil severity) was considered hot enough to kill overstory trees. Habitat that burned with moderate to high intensity/severity was classified as removed. Light intensity (severity) was considered an understory burn with no habitat loss. Fire estimates did not attempt to break out intermittent fire behavior (a few trees burned and some green trees retained). Fire acres reported in the Environmental Baseline Tables erred on the side of habitat lost, for analysis of impacts to owls in this BA. Wildfires removed 188 acres and degraded 1,148 acres of suitable habitat since 2004. For the time period of 2004 to present, wildfires and timber harvest reduced spotted owl suitable habitat by less than one percent.

#### Late-Successional Reserves

The intent of the LSRs network identified in the Plan is to protect and enhance conditions of old-growth forest ecosystems, which serve as habitat for old-growth related species including the northern spotted owl (USDA 1994b). The federal management strategy for the conservation of the spotted owl was planned to provide a system of large, interconnected reserves that support sustainable, intermixing populations of owls. This strategy was identified by the ISC (Thomas *et al.* 1990) and then adopted and refined by the Draft Recovery Plan for spotted owl, FEMAT, and the ROD for the Northwest Forest Plan. The action agency manages all or part of 18 LSRs as a portion of the network of reserves designed for the conservation of the spotted owl within the action area. These reserves theoretically either currently provide sufficient amounts of habitat and numbers of spotted owls to maintain local populations, or, if deficient in habitat or owls,

should provide sufficient habitat and owls in the future. All LSRs are to be managed to improve late-successional forest conditions, therefore habitat for northern spotted owls should improve accordingly over time.

LSRs cover 878,407 acres within the 2,539,760 acres of Federal Land within the Action Area, not including the 100-acre cores and unmapped LSRs (Appendix F). LSRs make up 35 percent of the Federal Lands within the Action Area. The Late-successional Reserve Network in the Pacific Northwest roughly covers three major mountain ranges: the Cascades, the Klamath, and the Coast Ranges of California and Oregon. Together they roughly form an “H.” One “leg” joins the Sierras in California to the Siskiyou, and north to the Cascades. The other “leg” joins the California and Oregon coastal mountains, and the Siskiyou. The Cascade crest, except for the Klamath and Columbia River gorges, forms a continuous north-south “backbone,” and the Siskiyou form the “cross-bar.” Twenty LSRs are wholly or partially within the Action Area. Appendix F contains a descriptive narrative of each LSR; Table E-1 displays 466,036 of suitable habitat for spotted owl in LSRs, as of May 2006. Wildfires since 1996 have reduced the suitable habitat for spotted owls by almost 52,000 acres in LSRs in the Action Area (10%); habitat removal through timber sales in LSRs is inconsequential. The Plan proposed the management of capable LSRs into functional late successional habitat over time. There has been some minor tree harvest (light thinning) within LSRs since 1994, designed to improve late successional habitat by expediting large tree establishment and structure over the long term.

### Spotted Owl Dispersal Habitat

Spotted owl dispersal habitat consists of those stands capable of providing for the safe movement of spotted owls across the landscape. The Plan identifies several habitats that serve as dispersal habitat for spotted owls, in addition to matrix, AMA and LSR lands that meet canopy conditions: riparian reserves, 15 percent leave trees in harvest units, 100 acre LSRs (known spotted owl activity centers), and 15 percent LS/OG retention guideline. Dispersing owls use habitats classified as NRF and dispersal-only habitat.

Dispersal-only habitat provides cover, food, and protection on a temporary basis to non-nesting owls moving between and among patches of suitable habitat. Dispersal-only habitat must be adequate to protect northern spotted owls from predation as they move through these less than optimal habitats. Genetic interchange among physiographic provinces is important to maintain a diverse and healthy gene pool. Small amounts of genetic interchange in terms of a few successful breeding individuals, can significantly add to the genetic variability of a population. Theoretically, a diverse genetic make-up allows greater resilience of a population to disease, climate change, and provides more robust response to changing conditions. Owl dispersal between LSRs is also necessary to provide for the interchange and replacement of individuals due to death or the loss of habitat within an LSR. The more closely the dispersal vegetation resembles suitable habitat, the more likely spotted owls will successfully complete the journey (Thomas *et al.* 1990).

Thomas *et al.* (1990) described dispersal habitat as stands averaging at least 11 inches DBH with a 40 percent canopy cover. Thomas *et al.* (1990) also described a landscape (quarter-townships)

with at least 50 percent dispersal habitat (suitable PLUS the dispersal only habitat) as being adequate for the movement of dispersing spotted owls across the landscape. These dispersal parameters are often referred to as “50-11-40”. Only lands ecologically capable of producing spotted owl habitat are considered in the 50 percent calculation. Incapable Lands, such as serpentine or natural shallow-soil meadows, are not included in the calculation.

An estimated 1,400,000 acres of dispersal habitat is currently available on federal lands within the Action Area. The District reports dispersal habitat by Section Seven Watershed (Appendix D). Dispersal habitat in relation to designated spotted owl critical habitat within the Action Area is shown in Appendix G.

Biologists characterize habitat using timber stand conditions, photo interpretation, field experience, and post-treatment modeling. Actual dispersal habitat may vary considerably depending on the agency data used. The Dispersal map (Appendix E) was developed as a GIS map, using interpretation of satellite data. This was calculated by a GIS exercise on a formula-driven map. Acreage figures represented by the dispersal map are depicted in Appendix D. Each section and watershed were evaluated by 1) dispersal, 2) capable but too young to provide dispersal or suitable habitat, and 4) non-capable. Total dispersal includes suitable and dispersal-only combined. The dispersal map incorporates habitat removed due to timber sales or fires since the listing of the northern spotted owl. All data used to generate these tables is based upon GIS information available through June 2003. On District administered lands, the current dispersal habitat was evaluated with Landsat photography to depict post-fire information

#### Areas of Concern for Dispersal

Dispersal of owls across areas of sparse or poor habitat is a concern. The Kalmiopsis Wilderness has large areas of serpentine soils that do not support conifer stands dense enough for spotted owl dispersal. The low elevation area along Interstate Highway 5 is predominantly private residential ownership and lacks the type of forest cover conducive to owl dispersal. Dispersal habitat is generally not a limiting factor to spotted owls, but the draft Recovery Plan for spotted owl identified one area in the Action Area for special scrutiny. One is the forested area that joins the Siskiyou, Cascades, and the Coast Range across the Interstate 5 corridor (Klamath, Bear, Applegate Section Seven Watersheds). Spotted owls have been documented to traverse this area (Forsman *et al.* 2002), but the prospect for long-term viability of movement in this area is uncertain. The map of dispersal habitat (Appendix E) reflects the wildfires since 1994 that have further reduced the dispersal habitat availability across the southern range of the northern spotted owl.

In 2001, the Level 1 team identified a specific area of dispersal concern in the lower portion of the Applegate Section Seven Watershed. The Service indicated the Slate-Cheney area in the Applegate drainage was a specific area where spotted owl dispersal might be at risk. The Biscuit Fire of 2002 had an effect on the approach to the habitat “bridge” across Slate-Cheney, but the Fire did not affect the “bridge” itself. The approach to the “bridge” from the north, through unburned area, is still functioning.

Since 2003, dispersal-only habitat has increased in the Action Area by approximately 325 acres due to downgrading of suitable (NRF) habitat. Suitable habitat was thinned and downgraded and dispersal increased. All of the watersheds in the action area currently are above fifty percent threshold for dispersal habitat (Appendix D).

#### Current Condition of the Spotted Owl in the Action Area

The action area is located within the range of the spotted owl and is comprised of spotted owl NRF and dispersal habitats. Spotted owl habitat occurs as fragmented stands of varying quality across the landscape. The current condition of spotted owl habitat is a result of habitat conversions associated with timber harvest, urban development, and wildland fires. These habitat alteration activities have caused varying degrees of edge effects to remaining NRF and dispersal habitats, dependant on the proximity of the activities.

Current survey information for spotted owls on the District was not provided in the Assessment. Based on historic and current field surveys, the District and Anthony *et al.* (2004) have documented spotted owls using NRF habitat on public lands administered by the District within the action area. The spotted owl population within southwest Oregon, where the action area is located, is considered to be relatively stable (Anthony *et al.* 2004) with successfully breeding spotted owl pairs and dispersing young distributed across the area. A discussion of the demography and status of spotted owls in southwest Oregon can be found in the *Status of the Species* section of this opinion.

In the absence of data on spotted owl occupancy of NRF habitat, the District and Service assume un-surveyed habitat is occupied based on the following rationale: (1) spotted owl densities are greater in areas with NRF habitat, which typically contains trees 80 years old and greater) than in younger forest habitat (O'Halloran 1989, Simon-Jackson 1989, Thomas *et al.* 1990, Bart and Forsman 1992, USFWS 1992a, Forsman *et al.* 1996, Zabel 2003, Courtney *et al.* 2004); (2) floater owls fill voids and/or occupy habitat patches peripheral to occupied sites; that is, if an owl site becomes unoccupied, the void is most often filled by another spotted owl (Gutiérrez 1996, Forsman *et al.* 2002). Many spotted owls do not obtain territories until they are at least 2 years old, suggesting that the number of floaters generally exceeds the number of available territories (Forsman *et al.* 2002), thus suggesting a high occupancy of available habitat; (3) spotted owls exhibit high site fidelity to a territory, which is likely due to the species' habitat specialization (Franklin 1992, Forsman *et al.* 2002, Courtney *et al.* 2004, Ackers and Anthony 2004, Andrews and Anthony 2004); and (4) demographic parameters of survival and fecundity are affected by habitat. For example, Franklin *et al.* (2000) showed that survival was positively correlated with the amount of interior older forest habitat, and also concluded that owls in territories of higher habitat quality had greater survival during inclement weather than those in poorer quality habitat. Also Olson *et al.* (2004) and Anthony *et al.* (2002) have documented benefits of spotted owls using higher quality habitat. Given that owls have been previously documented in the action area, that blocks of NRF habitat are present there that are capable of supporting breeding owls, and the known biology of this species, unsurveyed NRF habitat is likely to be occupied by spotted owls. However, the specific distribution and abundance of spotted owls within the action area is not known.

## Role of the Action Area in Spotted Owl Survival and Recovery

The proposed action is scheduled to occur in all Land Use Allocations (LUA) within the action area, as designated under the Plan. The same plan also provides a conservation framework for the spotted owl. This framework utilizes reserve and non-reserve allocations with the reserves allocations contributing primarily to supporting population clusters of breeding spotted owls, whereas, the non-reserve allocations are intended to provide for connectivity, or dispersal, habitat between the reserves.

The action area is located within the Oregon Western Cascades and Oregon Klamath physiographic provinces. At the beginning of the Plan monitoring period (1994), about 55 percent of the habitat-capable area in the Oregon Klamath province was in spotted owl habitat (Lint 2005). When examined in 2004, 51 percent of the habitat capable area was in spotted owl habitat. However, no recruitment of habitat was accounted for in this analysis (Lint 2005). Loss to stand-replacing events inside the habitat blocks was greater than outside in the Klamath province. About 11.5 percent of the habitat-capable area in spotted owl habitat inside the blocks was lost in contrast to 2.5 percent outside. In either case, a high percentage of habitat capable area most similar to that used by spotted owl pairs was maintained even in the province where the loss to wildfire was greatest (Lint 2005).

The non-reserve land-use allocations are intended to provide dispersal habitat supporting spotted owl movement between reserve habitat blocks. For the action area's Western Cascades and Oregon Klamath provinces, each have 65 and 48 percent of federal land in dispersal habitat (Lint 2005). The spatial assessment of dispersal habitat indicates that both numerically and visually, nearly half of the federal forest acres are providing dispersal habitat for spotted owls within the action area (Lint 2005). In addition, Forsman *et al* 2002 show movement patterns, regardless of LUA, of spotted owls within and among the provinces encompassing the action area. The movement records provide evidence that spotted owls are dispersing across the landscape under the Plan and genetic or demographic isolation of local populations is not likely because dispersal between reserves is likely to be a common occurrence even if the landscapes between the reserves consists of highly fragmented forests (Lint 2005; Forsman *et al.* 2002).

Recent reports (Courtney *et al.* 2004, Anthony *et al.* 2004) identified greater than expected spotted owl declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. For example, the Southern Oregon Cascades study population, which is located in a portion of the action area, showed nearly a stationary population trend for spotted owls, which may strengthen the overall meta-population dynamics of the species. Even with the overall recorded population decline, Courtney *et al* (2004) noted that there is little reason to doubt the effectiveness of the core principles underpinning the Plan conservation strategy.

## Spotted Owl Critical Habitat

The action area for this consultation lies within the Cascades West and Klamath Mountains Physiographic Provinces (CHU map Appendix H). Generally, designated critical habitat within the action area occurs as fragmented stands of varying quality habitat, ranging from intact stands

of late seral Douglas fir dominated forest to small patches of mid to late seral forest. Within all critical habitat units affected by the proposed action, forest structure has been modified as a result of timber harvest activities, conversion of forest lands to urban development as well as natural disturbance events such as wildland fires, resulting in a patchwork of age classes of forest throughout each CHU (Table 10). A description of the critical habitat units within the Action Area follows:

**OR-30: Rogue River and Umpqua National Forests; Douglas and Jackson Counties**

**OR-30** is located on the Rogue River and Umpqua National Forests. Sixty-eight percent of the unit is within the Rogue-Umpqua Divide LSR. This unit abuts the Rogue-Umpqua Divide Wilderness and provides an important link from Crater Lake National Park to units OR-29 and OR-28 to the west and northwest. This unit, along with the adjacent unit OR-34 to the south, is an important southern stronghold of essential nesting habitat in the core of the Western Cascades Province. Past management practices, checkerboard land ownership patterns, and a relatively low percentage of NRF habitat render this CHU marginally functional. However the high percentage of dispersal habitat present does provide habitat conditions for non-nesting owls to move between provinces.

**OR-32: Medford and Roseburg Districts-BLM and Umpqua National Forest; Douglas, Josephine, and Jackson Counties**

**OR-32:** Thirty-seven percent of this CHU is within the Cow Creek LSR. This unit coincides with the Rogue-Umpqua Area of Concern, which provides an essential link in connecting the Western Cascades Province with the southern portion of the Coast Ranges and northern end of the Klamath Mountains Province. This unit provides the single link from the Western Cascades Province to the Klamath Mountains Province and associated Area of Concern. The land ownership patterns elevate the importance of maintaining areas of owl nesting habitat to link the Western Cascades, Coast Ranges and the Klamath Mountains Provinces. Past management practices in addition to the checkerboard land ownership patterns, have contributed to the fragmented nature of suitable habitat within this CHU.

**OR-34: Medford District-BLM; Jackson County**

**OR-34** is located on the Medford District BLM and Rogue River NF. Seventy-four percent of the unit is within the Elk Creek and Lookout Mt/Black Butte LSRs. This unit was designated to maintain suitable and dispersal habitat in this area of high fragmentation, due primarily because of land ownership patterns. This CHU should provide north-south and east-west linkage from the Klamath/Siskiyou to the Western Cascades Provinces. The 2002 Timbered Rock Fire occurred in this CHU; 1.198 acres of suitable habitat for spotted owls was burned.

**OR-35: Rogue River National Forest; Jackson and Klamath Counties**

**OR-35** is located on the Rogue River National Forest. Seventy-six percent of the unit is within the Middle Fork LSR. This unit provides the single link from the southern end of the Western Cascades Province south to unit OR-37 toward the Klamath Mountains Province. This unit also leads to the bottleneck of the Ashland Area of Concern. The unit abuts the southwest edge of

Crater Lake National Park and the western edge of the Sky Lakes Wilderness. Both of these areas are primarily high elevation non-habitat.

**OR-36: Medford District-BLM; Jackson County**

**OR-36** is located on the Medford District BLM. No LSR allocation is within this unit. This unit provides an important link along the southern end of the Western Cascades Province, thereby assisting in the connectivity to the south and the Klamath Mountains Province. This unit provides east-west linkage to OR-34 and OR-35, and supports the north-south linkage for the Western Cascades Province. The placement of this unit helps to reduce the bottleneck just north of the Ashland Area of Concern. An area of limited habitat potential is along the Rogue River corridor and associated Lost Creek Reservoir, which separates units OR-35 and OR-36.

**OR-37: Medford District-BLM and Rogue River and Winema National Forests; Jackson and Klamath Counties (also see Eastern Cascades)**

**OR-37** is located on the Medford District BLM, the Rogue River, and Winema National Forests. Eighty-one percent of the unit is located within the Dead Indian LSR. This unit provides the single most important link connecting the Oregon Cascades Province to the Klamath Mountains Province across the south Ashland portion of the I-5 Area of Concern. By straddling the crest, this unit provides an important east-west connectivity for the southern Oregon Cascades. This unit also provides the only link to the north in the Oregon Cascades, and is the key link from Oregon to California south of Highway 66.

**OR-38: Medford District-BLM; Jackson County**

**OR-38** is located on the Medford District BLM. Fifty-two percent of the unit was located within the Cascade-Siskiyou National Monument. This unit provides the sole link between the Western Cascades and the Klamath Mountains Provinces. This unit makes up the majority of the connection between the two Provinces across the Ashland portion of the I-5 Area of Concern. This area is of concern because of past management practices, ownership patterns and current habitat conditions. The Cascade-Siskiyou National Monument is in development of a management plan separate from the Plan, but which incorporated the PDC described in Appendix A. Management in the monument will be designed to enhance and restore ecological values, including owl habitat, and it will be removed from the Medford BLM timber base.

**OR-62: Roseburg and Medford Districts-BLM; Douglas County**

**OR-62** is located on the Roseburg and Medford District BLM. No LSR allocation is within this unit. This unit provides the link from the Klamath Mountains Province to the Coast Ranges Province, and establishes the link from those two Provinces through the Rogue-Umpqua portion of the I-5 Area of Concern. This unit was designated because of the current habitat conditions, land ownership patterns and past management practices. This unit includes not only areas where linkage between physiographic provinces are of concern, but also areas with known owl pairs within a region of relatively low abundance of suitable owl habitat.

**OR-64: Medford District-BLM; Josephine and Douglas Counties**

**OR-64** is located on Medford District BLM. No LSR allocation is within this unit. This unit was established to maintain the remaining owl habitat between units OR-65 and OR-32. This unit is along the western end of the Rogue-Umpqua portion of the I-5 Area of Concern. This connection between the Coast Ranges Province and the Western Cascades Province is threatened by its current habitat condition, its high fragmentation by past management practices, and land ownership patterns. This unit provides a link where range-wide distribution can be maintained.

**OR-65: Medford District-BLM and Siskiyou National Forest; Josephine and Curry Counties**

**OR-65** is located on the Medford District BLM and the Siskiyou National Forest. Sixty-six percent of this CHU is located within the Fish Hook/Galice LSR. This unit provides two inter-provincial links: from the Klamath Mountains Province to the Western Cascades Province, and from the Klamath Mountains Province north to the Coast Ranges Province. This unit provides a core area of suitable habitat to help augment the severely fragmented Rogue-Umpqua portion of the I-5 Area of Concern. A portion of the 2002 Biscuit Fire occurred in the SW corner of this CHU; 1,642 acres of suitable habitat for spotted owl was lost.

**OR-66: Siskiyou National Forest and Coos Bay District-BLM; Curry County**

**OR-66** is located on the Siskiyou National Forest and the Coos Bay District BLM. One hundred percent of this CHU is located within the Northwest Coast LSR. This CHU provides the connecting link between the Oregon Cascades Province and the Klamath Mountains Province. This unit adjoins the Grassy Knob Wilderness, which currently supports suitable habitat.

**OR-67: Medford District-BLM and Siskiyou National Forest; Coos, Curry, and Douglas Counties**

**OR-67** is located on the Medford District BLM and the Siskiyou National Forest. Sixty-eight percent of this CHU is located within the Northwest Coast and Fish Hook/Galice LSRs. This CHU provides a portion of the link from the Klamath Mountains Province to the southern end of the Oregon Coast Ranges Province. It helps support the western end of the Rogue-Umpqua portion of the I-5 Area of Concern which connects the southwest edge of the Oregon Cascades Province to the Klamath Mountains Province. Lands immediately north of this unit are non-federal and lack suitable owl habitat. This unit also encompasses the Wild Rogue Wilderness, which supports suitable habitat in its lower elevations

**OR-68: Siskiyou National Forest; Curry County.**

**OR-68** is located on the Siskiyou National Forest. Eighty-seven percent of this CHU is located within the Fish Hook/Galice LSR. This unit provides a narrow band of suitable habitat that connects OR-67 and OR-69. A portion of the 2002 Biscuit Fire occurred in the southern end of this CHU; 2,971 acres of suitable habitat for spotted owl was lost.

**OR-69: Siskiyou National Forest; Curry and Josephine Counties**

**OR-69** is located on the Siskiyou National Forest. Ninety-one percent of this CHU is located within the Fish Hook/Galice LSR. This unit provides the single link through the northwest portion of the Klamath Mountains Province leading to the Coast Ranges Province. This unit provides the key link for north-south movement of owls between units OR-71, OR-67, OR-65, and OR-68. This unit also adjoins the northern end of the Kalmiopsis Wilderness, which currently supports little suitable owl habitat. The 2002 Biscuit Fire occurred encompassed much of this CHU; 9,482 acres of suitable habitat for spotted owl was lost in the fire, of the 13,109 acres which existed pre-fire.

**OR-70: Siskiyou National Forest; Josephine County**

**OR-70** is located on the Siskiyou National Forest. Seventy-six percent of this CHU is located within the Briggs and West IV LSRs. This unit provides the only link between CHUs OR-69 and OR-72. The Siskiyou National Forest and the Medford District BLM have identified the Highway 199 corridor between units OR-70 and OR-72 as an Area of Concern due to the geology, ownership and past management practices (SW OR LSR Assessment, USDA/USDI 1995). This unit also adjoins the eastern boundary of the Kalmiopsis Wilderness. The 2002 Biscuit Fire occurred encompassed much of the western portion of this CHU; 9,157 acres of suitable habitat for spotted owl was lost in the fire, of the 18,852 acres that existed pre-fire.

**OR-71: Siskiyou National Forest; Curry County**

**OR-71** is located on the Siskiyou National Forest. Ninety-five percent of this CHU is located within the South Chetco LSR. This unit provides the only north-south link within the Klamath Mountains Province to the California Coastal redwood zone. This unit adjoins the southwest portion of the Kalmiopsis Wilderness, and is the most westerly unit within the range of the northern spotted owl. The 2002 Biscuit Fire encompassed part of the east side of this CHU; 421 acres of suitable habitat for spotted owl was lost in the fire, of the 24,281 acres which existed pre-fire. The Repeater Fire of 1998 removed another 100 acres of suitable habitat for spotted owl.

**OR-72: Medford District-BLM and Siskiyou National Forest; Josephine County**

**OR-72** is located on the Medford District BLM and the Siskiyou National Forest. Eighty-nine percent of this CHU is located within the East IV/Williams LSR. This unit provides a very important east-west and north-south intra-provincial (Klamath Mountains Province) connectivity, in an area of high fragmentation. The high fragmentation is a result of the geology, fire history, ownership patterns, and past management practices. This unit is an important link for the Highway 199 Area of Concern (SW OR LSR Assessment, USDA/USDI 1995).

**OR-73: Siskiyou and Rogue River National Forests; Josephine County**

**OR-73** is located on the Siskiyou and the Rogue River National Forest. Eighty-six percent of the CHU is located within the East IV/Williams LSR. This unit provides a north-south link through the Central portion of the Klamath Mountains Province from Oregon to California and the Red

Buttes Wilderness. The unit also provides important east-west connectivity along the Oregon-California border. This area is naturally fragmented by serpentine soils and high elevation mountain ridges, and present habitat fragmentation has been compounded by past management practices.

**OR-74: Siskiyou National Forest and Medford District-BLM; Jackson and Josephine Counties**

**OR-74** is located on the Medford District BLM and the Siskiyou National Forest. Five percent of the unit is located within the East IV/Williams. This unit along with OR-75 provides the east-west connection along the southern portion of the Klamath Mountains Province. This region is highly fragmented from ownership patterns, geology, and past management practices.

**OR-75: Medford District-BLM; Jackson County**

OR-75 is located on the Medford District BLM and the Rogue River National Forest. No LSR allocation is located within this unit. This unit reduces the distance between OR-74 and OR-76. Along with OR-74, this unit provides the east-west connection along the southern portion of the Klamath Mountains Province. The Quartz fire of 2002 removed 340 acres on public lands administered by the BLM.

**OR-76: Rogue River National Forest; Jackson County**

**OR-76** is located on the Rogue River National Forest. Sixty-three percent of the unit is located within the Mt. Ashland LSR. This unit provides inter- and intra-provincial linkage between the Klamath Mountains Province and the Western Cascades Province. It is also the main link to the Ashland Area of Concern and provides east-west distribution of spotted owl habitat in the Oregon portion of the Klamath Mountains Province.

**CA 15: Rogue River and the Klamath National Forests**

**CA-15** is located on the Rogue River and the Klamath National Forests. Eighty-seven percent of the unit is located within the Applegate/Oak Knoll and Grider/Thomas LSRs. This unit surrounds the Red Buttes Wilderness and is the northernmost unit in the California portion of the Klamath Mountains Province. This unit supports the north-south inter-provincial link between California and Oregon.

**Table 10: Effects to Critical Habitat Acres within the Action Area from 1994 to Present.**

Acres and percentages below are suitable (NRF) habitat percent and changes compared to FSEIS Baseline Suitable acres.									
CHU #	Total Acres in CHU	*FSEIS Baseline NRF	NRF habitat lost to fires since 1996	Fire percent change	NRF habitat lost to Timber Harvest	Timber percent change	Current CHU NRF Baseline	Total percent change	Fire Name
CA 15	63,039	18,397	0	0 %	0	0 %	18,397	0 %	
OR 30	70,425	39,839	0	0 %	0	0 %	39,839		
OR 32	68,873	35,653	0	0 %	407	2 %	35,246	1 %	
OR 34	46,733	23,281	1,216	5 %	1,207	5.2 %	20,858	9 %	Timbered Rock
OR 35	68,895	27,066	0	0 %	471	2 %	26,530	2 %	
OR 36	7,080	3,992	0	0 %	977	24 %	3,015	25 %	
OR 37	86,484	50,748	0	0 %	1,961	4 %	48,787	4 %	
OR 38	41,511	13,950	0	0	39	0.007 %	13,911	0.007 %	
OR 62	49,562	24,470	0	0 %	283	1.15 %	24,187	0.9 %	
OR 64	7,538	3,833	0	0 %	80	2 %	3,753	2 %	
OR 65	74,664	55,578	1,642	3 %	1,303	2 %	52,633	5 %	
OR 66	8,384	4,939	0	0	0	0 %	4,939	0	
OR 67	98,238	50,316	0	0 %	817	1.62 %	49,499	1 %	
OR 68	13,382	8,493	2,971	35 %	0	0 %	5,520	35 %	Biscuit
OR 69	26,616	12,447	9,482	76 %	0	0 %	2,965	76 %	Biscuit
OR 70	36,943	17,623	9,157	52 %	0	0 %	8,466	52 %	Biscuit
OR 71	53,784	16,994	521	3 %	0	0 %	16,473	3 %	Biscuit Repeater
OR 72	53,380	29,005	0	0 %	590	2 %	28,415	2 %	
OR 73	12,330	6,276	0	0 %	0	0 %	6,276	0 %	
OR 74	25,231	13,553	0	0 %	781	6 %	12,772	6 %	
OR 75	19,365	5,809	340	6 %	455	8 %	5,014	14 %	Quartz/Sterling
OR 76	33,058	22,642	0	0 %	0	0 %	22,642	0 %	
<b>TOTAL</b>	<b>965,515</b>	<b>484,904</b>	<b>25,329</b>	<b>5.2</b>	<b>9,371</b>	<b>1.9</b>	<b>381,224</b>	<b>21 %</b>	

\* Source: G. Mayfield, FWS pers comm.. 2001 Spatial data were overlaid based on FSEIS data (USDA and USDI 1993, 1994) for Land Allocations, Northern spotted owl habitat, LSRs, ownership, and FWS data for CHU boundaries (FWS 1994) to produce these data.

**EFFECTS OF THE ACTION**

Effects of the action refer to the permanent or temporary direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time but are still reasonably certain to occur.

## Effects to Spotted Owl Suitable Habitat

The District anticipates the removal of 10,988 acres and downgrade of up to 20,229 acres of spotted owl NRF habitat over the next 3 years from the 913,609 acres of suitable habitat currently within the Action Area (Appendix C), or 3.4 percent of NRF habitat currently in the environmental baseline. The District predicts the additional removal of 388 acres of dispersal-only habitat within five designated critical habitat units (Table 13). Predicted changes of NRF and dispersal habitat associated with this proposed action are displayed below by Administrative Unit (Table 11), Late Successional Reserve (Tables 11 and 12), Section Seven Watershed (Table 13 and 14), and Critical Habitat Unit (Tables 15 and 16).

Of the 14 Section Seven Watersheds within the Action Area, the proposed action will remove and downgrade suitable habitat in nine of the 14 watersheds (Table 11). All activities will be scattered both spatially and temporally across the Action Area. Therefore, habitat removal will not be concentrated in a few areas, although some watersheds and portions of the Action Area may experience higher suitable habitat loss than other areas. Up to 13 percent of the suitable habitat will be removed from the affected watersheds under the proposed timber-harvest schedule (Table 11).

As discussed under the *Status of the Species* section above, one of the main threats to the spotted owl is the past loss of habitat due to timber harvest across its range. The effects of habitat modification activities on spotted owl habitat depend upon the type of silvicultural prescriptions used, and the location of the harvest relative to suitable habitat. Impacts may include loss of habitat, and/or degradation of habitat (from the harvest and/or from creating an exposed edge). Removal of spotted owl habitat and other harvest prescriptions that result in even-aged, monotypic forests produce forest stands which may be used for dispersal, but would not be suitable for nesting, roosting, or foraging. Silvicultural prescriptions that promote multi-aged and multi-storied stands may in some cases retain suitability for spotted owls and perhaps increase the quality of habitat over time.

**Table 11: Effects to spotted Owl NRF Habitat Acres by Watershed.**

Section Seven Watersheds	2006 Baseline NRF habitat Acres	NRF habitat Acres removed	NRF habitat Acres Downgraded	Percent NRF Habitat reduction
<b>Applegate</b>	114,362	1,220	3,475	4.1
<b>Bear</b>	21,175	670	1,160	8.6
<b>Cow Upper</b>	43,657	2,204	3,480	13.0
<b>Illinois</b>	135,763	171	1,800	1.5
<b>Klamath</b>	16,820	525	970	8.9
<b>Little Butte Creek</b>	39,719	880	295	2.9
<b>Rogue Lower-Wild</b>	105,072	383	754	1.1
<b>Rogue Middle</b>	88,774	3,967	5,424	10.6
<b>Rogue Upper</b>	179,492	968	2,861	2.1
<b>Total</b>	<b>744,834</b>	<b>10,988</b>	<b>20,219</b>	<b>4.1</b>

For the reasons discussed in the Environmental Baseline section above, the affected areas of suitable habitat are known or assumed to be occupied by the spotted owl.

These projects will not occur in “Known Owl Activity Centers”, which are 100-acre areas reserved from timber harvest that have been designated to protect known spotted owl nest sites found before 1994. Additionally, PDC (Appendix A) will be applied to these projects to minimize the possibility that activities will occur in suitable habitat occupied by pre-dispersal spotted owl fledglings. While these measures will minimize the possibility of directly injuring or killing individual owls, tree removal associated with these activity types will indirectly affect spotted owls by removing habitat elements necessary for nesting, roosting, foraging, and dispersal. Specific elements removed would include large-diameter trees with nesting cavities or platforms, multiple canopy layers, and hunting perches. Once these elements are removed, there is an increased likelihood that spotted owls remaining in project areas will be subject to:

- displacement from nesting areas;
- concentration into smaller, fragmented areas of suitable nesting habitat that may already be occupied;
- increased competition for suitable nest sites;
- decreased survival due to increased predation and/or limited resource (forage) availability;
- diminished reproductive success for nesting pairs;
- diminished population due to declines in productivity and recruitment;
- reduction of future nesting opportunities; and
- reduction of dispersal capabilities

#### Effects to LSRs

The District proposes to implement one timber harvest action in each of two LSRs (Table 12). In both cases, the affected NRF habitat is currently marginal for spotted owls. In LSR RO223 the treatment area consists of a fragmented, 80-year old monotypic stands of Douglas fir with a few scattered residual old-growth trees. The purpose of the treatment is to thin the monotypic stand to promote the development of old-growth forest which will benefit the spotted owl; the residual old-growth trees will be retained.

In the case of RO224, the treatment area consists of fragmented stands of mixed conifer tree species known to be used by spotted owls. The purpose of the proposed timber harvest is to promote restoration of pine species by thinning overstocked stands. Pine restoration treatments are not intended to enhance spotted owl habitat, but are intended to address the conservation needs of other species covered by the Plan. However, this action should not preclude continued use of affected stands by spotted owls.

Based on the above information, the Service concludes that implementation of these activities is not likely to substantially alter the capability of these two LSRs to provide for nesting, roosting, foraging, and dispersing spotted owls and, in the case of RO223, should enhance that capability in the future. No significant disruption of spotted owl nesting, roosting, foraging, or dispersal behavior within these LSRs is expected to be caused by the proposed action.

**Table 12: Effects to NRF Habitat within LSRs.**

FSEIS BASELINE LSR ID NRF HABITAT ACRES <sup>1</sup>		NRF HABITAT ACRES REMOVED	NRF HABITAT ACRES DOWNGRADED	PERCENT REMOVED/DOWNGRADED
<b>RO223</b>	33,804	0	680	2.0
<b>RO224</b>	8,370	0	300	3.6
<b>TOTAL</b>	<b>42,174</b>	<b>0</b>	<b>980</b>	<b>2.3</b>

## Effects to Dispersal habitat

The removal of dispersal-only habitat within designated critical habitat units is considered likely to adversely affect spotted owls because management actions will remove primary constituent elements of critical habitat. The District also plans to remove dispersal-only habitat outside of designated critical habitat. In these areas, the effects are considered not likely to adversely affect spotted owls because of the large amount of dispersal habitat available to spotted owls within the Action Area. The effects of dispersal habitat removal outside of critical habitat units have been analyzed in a separate consultation.

The District plans the removal of 388 acres of dispersal-only habitat from five individual critical habitat units (Table 15). The removal of NRF habitat (which also functions as dispersal), will reduce dispersal habitat by another 10,988 acres, for a total of 11,376 acres of dispersal habitat removed (Table 13). This amount of removal represents 1.0 percent of the 1,149,658 acres of dispersal habitat (NRF plus dispersal-only) within nine affected watersheds. The proposed action would not reduce any of those affected watersheds to less than 50 percent dispersal habitat on federal lands (meets 50-11-40) (Appendix D). The loss of dispersal habitat is generally considered temporary, as the physical structure that supports dispersal habitat will recover when canopy closure exceeds 40 percent and understory flying space is retained. In the Action Area, this is expected to take 10-20 years, depending on the extent of tree removal, precipitation, and elevation of the treatment area.

**Table 13: Effects to Dispersal Habitat within Affected Watersheds.**

Section Seven Watersheds	2006 dispersal baseline acres <sup>1</sup>	NRF habitat Acres removed	Dispersal-only Acres removed	Percent dispersal reduction
<b>Applegate</b>	192,550	1,220	335	0.8
<b>Bear</b>	31,526	670	0	2.1
<b>Cow Upper</b>	52,471	2,204	0	4.2
<b>Illinois</b>	221,170	171	0	0.1
<b>Klamath</b>	32,628	525	15	1.7
<b>Little Butte Creek</b>	54,093	880	0	1.6
<b>Rogue Lower-Wild</b>	138,272	383	0	0.3
<b>Rogue Middle</b>	134,917	3,967	3	2.9
<b>Rogue Upper</b>	292,031	968	35	0.3
<b>Total</b>	<b>1,149,658</b>	<b>10,988</b>	<b>388</b>	<b>1.0</b>

<sup>1</sup> NRF plus dispersal-only habitat

## Dispersal Areas of Concern

The Plan identified one area of dispersal concern in the Action Area. The I-5 area of concern joins the Siskiyou, Cascades, and the Coast Range across the Interstate 5 corridor (Klamath, Bear, Applegate Section Seven Watersheds). No dispersal habitat is scheduled for removal in this area under the proposed action.

As discussed above, the Slate-Cheney area in the Applegate drainage was a specific area where spotted owl dispersal might be at risk. The Biscuit Fire of 2002 had an effect on the approach to the habitat “bridge” across Slate-Cheney, but the fire did not affect the “bridge” itself. The approach to the “bridge” from the north, thru unburned area, is still believed to be functioning. No removal of dispersal habitat is planned in this area as part of the proposed action. In the Illinois Section Seven Watershed, 69 percent of the total capable federal land is currently dispersal habitat. The proposed action would reduce dispersal in this watershed by 0.007 percent. For these reasons, the Service concludes that implementation of the proposed action is likely to result in only minimal adverse effects to spotted owl dispersal habitat in the action area that will not preclude dispersal across affected watersheds.

Riparian area, unmapped LSRs, connectivity blocks and other timber retentions, combined with spaced entries of timber harvest and the predominance of thinning over regeneration harvest treatments proposed by the Forest combine to maintain adequate dispersal habitat for northern spotted owls, so they may move between physiographic regions and contribute to healthy genetic interchange.

## Impacts to Prey

The removal, downgrading and degrading of spotted owl habitat associated with the Proposed Action may impact foraging by spotted owls by changing habitat conditions for their prey. Sakai and Noon (1993) stated that dusky-footed wood rats, the primary prey of owls in our area, may benefit from some thinning or harvest which would increase shrub and pole stands. Bushy tailed woodrat presence is more dependent upon cover and food availability than on seral stage, and they often use areas previously disturbed by fire (Carey 1991). Bushy tailed woodrats are most abundant along streams, and riparian areas may serve as the principal avenue for woodrat recolonization (Carey *et al.* 1992).

Lemkuhl *et al.* (2006) found that fuels projects in Washington could have impacts on bushy-tailed woodrats, but confirmed the importance of maintaining snags, down wood and mistletoe. Gomez *et al.* (2005) noted that commercial thinning in young stands of Coastal Oregon Douglas-fir (35-45 yr) did not have a measurable short-term effect on density, survival or body mass of northern flying squirrels, another important prey species for spotted owls. Gomez *et al.* (2005) also noted the importance of fungal sporocarps, which were positively associated with large down wood.

Residual trees, snags and down wood that are retained in the thinned stands will provide some cover for prey species over time, and will help minimize harvest impacts to some prey species. Regeneration harvest areas will remove suitable habitat for arboreal prey species (flying squirrels, red tree voles), but may improve habitat for non arboreal species (western red backed

voles and deer mice). Some arboreal prey species will venture into harvest units a short distance for food. Northern spotted owls seldom venture far into non-forested stands to hunt. However, edges can be areas of good prey availability and potentially increased vulnerability (i.e. better hunting for owls) (Zabel, 1995). The retained trees may respond favorably to more light and resources and gain height and canopy over time. Prey animals may be more exposed in the disturbed area or may move away from the disturbed area over the short term. Some minor changes in prey availability may occur as cover is disturbed and animals move around in the understory. They may become more vulnerable and exposed. The disturbance might attract other predators such as other owls, hawks and mammalian predators. This may increase competition for owls in the treatment area, but the exposure of prey may also improve prey availability for northern spotted owls.

Some disturbance of habitat may improve forage conditions, provided under-story structure and cover are retained. Removal of some tree canopy, provided it is not too extreme, will bring more light and resources into the stand, stimulating forbs, shrubs and other prey food. Once the initial impact of disturbance recovers (6 months to two years), the understory habitat conditions for prey food would increase over the next few years, until shrubs and residual trees respond to again close in the stand.

A dispersal stand which resulted from the downgrade of NRF habitat would begin to reclaim the pre-treatment canopy cover within 25-40 years, depending on treatment type, plant association, and location. Treatment areas are small enough and dispersed enough that many resident prey species could move to adjacent patches until the stand recovers. At the provincial level, impacts would be difficult to separate from normal fluctuations in prey availability.

The removal of suitable habitat for owls reduces the amount of habitat available for nesting, roosting and impacts habitat available for flying squirrels, red tree voles, and wood rats, the primary prey species of the owl in this area. Opening a stand through tree harvest can also provide more light to the ground and increase understory trees and shrubs. The results of this treatment on owl habitat depends on the current stand condition (and how close it approximates old-growth characteristics considered important to owls), how many trees are removed, the residual overstory, the aerial extent of the treatment, the time of year the treatment occurs, and the type of yarding/tree removal. PDC and normal operating procedures by the Action Agencies reduce the impacts to the extent possible, while still facilitating tree harvest and other projects.

Application of PDC to all activities is expected minimize the effects of the activities on spotted owls.

## **DISTURBANCE**

### **General Discussion on Disturbance to Wildlife**

Disturbance of listed wildlife species occurs when noise, smoke, vibration, or visual stimuli cause impairment of normal behavior. In rare situations where these activities cause significant impairment such that reproduction or survival is compromised, a Likely to Adversely Affect situation could occur. Wildlife species are most vulnerable during the reproductive period. Adults have expended their energy into finding mates, building nests (in the case northern spotted owls), and females have invested considerable energy reserves into egg production.

While nesting and feeding/sheltering young, adults are less mobile than at other times of the year and less able to hunt. The demand by young for food increases. Young are most vulnerable during the reproduction period and during the period of learning to survive on their own (pre-fledging in birds). They are less mobile, less experienced, and less able to defend themselves than they will be as they are older and have developed flight ability and hunting experience. Disturbance during the reproductive period is most likely to have adverse impacts on listed species.

Seasonal and distance PDC can be effective at eliminating or reducing disturbance during this sensitive period. The District will incorporate all reasonable protections during this period of time to reduce disturbance effects to listed species. There are some situations where PDC may be inadequate to reduce impacts or the lack of knowledge about the presence of listed species may lead to PDC not being implemented. In those situations, adverse effects can result to undetected individuals if activities occur during sensitive periods of their life cycle – usually the reproductive season, and early young development.

#### Disturbance from the Proposed Action

Disturbance is difficult to evaluate. The combination of ambient noise levels, timing, duration, and intensity of noise, smoke or vibrations, and human presence associated with heavy equipment and management activities may risk disturbing or disrupting the natural and essential behaviors of owls such that harm may occur. Individual owls may respond to such activities with varying degrees of tolerance. Field observations suggest that some owls apparently exhibit no adverse response to management activities. However, since we have no way to quantify owl tolerances, nor can we ensure we know where all nesting owls occur during project activities, we presume a higher level of disturbance than probably occurs, as required by ESA. The following excerpt of disturbance is from the North Coast Province Biological Opinion for disturbance activities (FWS ref. # 1-7-02-F-422, 4 April 2002) and illustrates disturbance impacts to the northern spotted owl:

*Although there is little detailed information concerning the vulnerability of spotted owls to disturbance effects, research on a variety of other bird species suggest that such effects are possible (Henson and Grant 1991, Reijnen and others 1995, Rodgers and Smith 1995). Activities that may result in above ambient noise levels include the use of mechanized tree harvest equipment, road hauling, aircraft/helicopters, heavy equipment, and hydraulic hammers. In some instances, noise levels produced by these activities can remain above ambient levels out to 0.25 mile and may affect spotted owls. If potentially disturbing activities are implemented during the spotted owl critical nesting season, those activities may adversely affect spotted owls by causing adults to flush from their nest site, nest abandonment (SIC), causing juveniles to prematurely fledge or could interrupt foraging activity. After 30 June, it is presumed that most fledgling spotted owls are capable of sustained flight and can avoid harmful disturbances.*

The District will utilize mitigation measures to avoid or reduce the risks of adverse impact to nesting spotted owls wherever they occur, but acknowledge that some adverse impact is likely to occur to owls due to disturbance in unsurveyed suitable habitat adjacent to project areas. Seasonal restriction of all Matrix or AMA projects in suitable habitat during the critical breeding

period could preclude many harvest activities. In addition, clearance of potential adjacent spotted owl habitat is not required; therefore some disturbance to adjacent suitable habitat could occur.

The District estimated potential disturbance of owls by evaluating proposed projects and project types and comparing with known spotted owl sites and unsurveyed suitable habitat. District biologists calculated the maximum potential distance around proposed projects that could occur during the critical breeding season of known owl sites, and estimated the amount of unsurveyed suitable habitat that had the potential to be impacted within ¼ mile. The disturbance resulting from the timber activities over the life of the programmatic (06-08) is estimated to be 7,100 acres. Fuels activities have the potential of disturbing up to 3,500 acres, and an additional 13,600 acres of disturbance may occur as a result of implementation of other activities associated with this proposed action (Table 1). This estimate probably exceeds the actual disturbance impact to nesting spotted owls because:

- Application of mandatory PDC (Appendix A) that impose seasonal restrictions during the critical breeding season, and/or restrict activities within disturbance threshold distances of unsurveyed suitable habitat will significantly reduce the effects of the Proposed Action, while the application of the recommended PDC would further reduce potential impacts.
- Many Action Area project areas are larger than 50 acres (larger acreage would mean fewer perimeter impact areas along potentially occupied adjacent suitable habitat):
- The District attempts to locate nesting owls within the vicinity of project areas, and if sites are found, will impose seasonal protection during the critical nesting period to avoid impact—or may impose seasonal protection unless sites are confirmed to be inactive. Complete surveys are unlikely and not all sites may be located;
- Suitable habitat was generously estimated around project areas
- Many matrix or AMA projects would normally occur outside the nesting season for other reasons (silviculture, workload planning, weather and fire restrictions, or other seasonal protections for non-listed species)
- Many individual animals inherently tolerate or develop tolerance to disturbing activities that cause them no direct harm
- Noise, smoke and visual disturbances may be less than predicted because they are often screened by topographic features, vegetation, or are otherwise buffered due to reasons other than threatened and endangered species protection

The current plan of timber sales and project boundaries and acres, as well as type of harvest activity, may change over the three year period as a result of NEPA analysis, field review, watershed and other resource protection, and workload scheduling. Although individual project activities may vary, the overall projections of suitable habitat loss will be within the amounts predicted in the Assessment. Should the predicted removal of suitable habitat exceed the rate or amount anticipated, the District will discuss any potential changes well in advance of these activities with the Service to determine if an amendment or re-consultation is required.

## Effects to Spotted Owls

The Assessment did not provide information regarding the effects of the proposed action to individual spotted owl's home ranges within the Action Area. Therefore, the Service relied upon the following information to analyze those effects: maps of the proposed harvest units provided by the District; the Environmental Baseline tables in Appendix C; and historic spotted owl activity center information. Historic spotted owl site data were relied upon because a recent analysis of spotted owl demographic data found an approximate 72 percent likelihood of pair occupancy at historically-occupied sites considered in the study (Anthony 2005). Based on this finding, the Service concludes that historic owl activity centers within the Action Area are likely to be occupied by spotted owls.

Spotted owl home ranges have a 1.2-mile radius (consisting of 2,995 acres) in the West Cascades Physiographic Province; and a 1.3-mile radius (consisting of 3,340 acres) within the Klamath Mountains Physiographic Province (Thomas *et al.* 1990). The Service previously reviewed the best available information on the biological needs of the spotted owl (USFWS 1992) and estimated that home ranges with greater than 40 percent NRF habitat would likely provide for their biological needs. Conversely, home ranges consisting of less than 40 percent NRF habitat are not considered adequate for spotted owls to carry out their breeding, feeding and sheltering activities. Within the West Cascades Physiographic Province, sites that meet the 40 percent "guideline" will have at least 1,182 acres of NRF habitat, while sites within the Klamath Mountains Physiographic Province will have 1,336 acres of NRF.

Demographic studies conducted within the Action Area have documented long-term stability and successful reproduction by spotted owls within home ranges that consist of less than the 40 percent NRF habitat described above (Jim Harper, pers. comm.). The Environmental Baseline Tables (Appendix C) indicated over 50 percent of the known historic spotted owl activity centers consisted of less than 40 percent NRF habitat within the provincial home range area.

In analyzing the likelihood of the proposed action to cause significant disruptions of spotted owl nesting, roosting, and foraging activities such that it creates the likelihood of injury or results in the actual injury or death of spotted owl eggs, young, or adults, the Service: compared historic activity center data with maps of the proposed action; evaluated the number of historic sites and the number of those protected within individual watersheds (see Environmental Baseline tables in Appendix C); and evaluated the number of sites within each watershed that exceed the 40 percent guideline or are in a deficit condition.

For purposes of this analysis, the Service assumes the extant acres of NRF habitat within each affected watershed to be evenly distributed among all of the historic activity center home ranges within the respective watersheds. This results in an estimate of NRF habitat within each historic activity center. The Service then utilized maps of proposed timber harvest units and historic activity centers to determine how many historic activity center home ranges are close enough to be affected by proposed activities that will remove and downgrade spotted owl suitable NRF habitat.

Based on the above approach, the proposed removal of 10,988 acres and downgrade of 20,219 acres of NRF habitat are likely to reduce the extent of NRF habitat within a spotted owl home

range to less than 40 percent at 24 historic spotted owl activity centers (Table 14). Such a reduction is likely to cause significant disruptions of spotted owl nesting, roosting, and foraging activities such that it creates the likelihood of injury or results in the actual injury or death of spotted owl eggs, young, or adults based on information reported in Service (1992). The 24 historic spotted owl activity centers represent 2.9 percent of the 819 total historic sites (Appendix C), and 3.2 percent of the 728 sites within the affected watersheds (Table 14)

**Table 14: Estimated Affects to Historic Spotted Owl Activity Centers by Watershed.**

Watershed	NRF habitat Acres Removed	NRF habitat Acres Downgraded	# of Historic Spotted Owl Activity Centers	# Historic Spotted Owl Activity Centers likely to be affected
<b>Applegate</b>	1,220	3,475	145	7
<b>Bear</b>	670	1,160	44	1
<b>Cow Upper</b>	2,204	3,480	62	4
<b>Illinois</b>	171	1,800	82	0
<b>Klamath</b>	525	970	18	2
<b>Little Butte Creek</b>	880	295	39	1
<b>Rogue Lower Wild</b>	383	754	53	0
<b>Rogue Middle</b>	3,967	5,424	76	6
<b>Rogue Upper</b>	968	2,861	209	3
<b>Total</b>	<b>10,988</b>	<b>20,219</b>	<b>728</b>	<b>24</b>

While the Service agrees with the effects determination described in the Assessment that the proposed action may affect and is likely to adversely affect spotted owls in the Illinois and Rogue Lower-Wild watersheds, these effects are not likely to cause the take of spotted owls. The Service reached this conclusion because of the small amount of habitat proposed for removal at these sites and the location of that habitat removal in relation to historic spotted owl activity centers. Although the affected sites are likely to be occupied by spotted owls, the proposed action is not likely to reduce NRF habitat within historic spotted owl home ranges below the 40 percent guideline discussed above.

#### EFFECTS TO SPOTTED OWL CRITICAL HABITAT

Timber sales (regeneration, commercial thinning, density management) and other activities are proposed in 8 of 22 CHUs in the Action Area (Table 15). The District proposes to remove 1,424 acres and downgrade up to 3,246 acres of suitable NRF habitat from these CHUs over the next three years, as well as remove up to 388 acres of dispersal-only habitat.

Based on the description of the proposed action, all treated stands within CHUs will retain documented spotted owl nest trees, and many of the treated stands will retain snags, down wood, and some large trees that are important components of owl and owl prey habitats.

Based on the description of the proposed action, the treated stands may improve the function of some CHUs over time by reducing overly dense stands thereby reducing the risk of stand-replacing wildfires or extensive tree loss due to disease and competition.

**Table 15: Proposed NRF Habitat Removal within Individual Critical Habitat Units.**

CHU	2006 NRF habitat Acres Baseline	NRF habitat acres Removed	NRF habitat acres Downgraded	Dispersal Acres Removed
<b>OR 32</b>	35,246	504	1,186	35
<b>OR 34</b>	20,858	62	489	0
<b>OR 38</b>	13,911	205	410	15
<b>OR 62</b>	24,187	70	30	0
<b>OR 65</b>	52,633	498	682	3
<b>OR 67</b>	49,499	0	9	0
<b>OR 74</b>	12,772	10	325	240
<b>OR 75</b>	5,014	75	115	95
<b>Total</b>	<b>211,120</b>	<b>1,424</b>	<b>3,246</b>	<b>388</b>

#### Individual Critical Habitat Units (CHU)

**OR 32:** The proposed action will remove 504 acres and downgrade 1,186 acres of suitable NRF habitat resulting in a reduction of 4.8 percent of NRF habitat within this CHU. An additional 35 acres of dispersal-only habitat will be removed by the proposed action.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (inter- and intra-province connectivity by maintaining essential nesting habitat) is still likely to be met given the residual 33,556 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 34:** The proposed action will remove 62 acres and downgrade 489 acres of suitable NRF habitat resulting in a reduction of 2.6 percent of NRF habitat within this CHU.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 20,307 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 38:** The proposed action will remove 205 acres and downgrade 410 acres of suitable NRF habitat resulting in a reduction of 4.4 percent of NRF habitat within this CHU. An additional 15 acres of dispersal only habitat will be removed under the proposed action.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 13,296 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 62:** The proposed action will remove 70 acres and downgrade 30 acres of suitable NRF habitat resulting in a reduction of 0.4 percent of NRF habitat within this CHU.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 24,087 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 65:** The proposed action will remove 504 acres and downgrade 1,186 acres of suitable NRF habitat resulting in a reduction of 4.8 percent of NRF habitat within this CHU. An additional three acres of dispersal only habitat will be removed by implementation of the proposed action.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra- and inter-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 51,453 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 67:** The proposed action will downgrade 9 acres of suitable NRF habitat resulting in a reduction of 0.02 percent of NRF habitat within this CHU. The intended conservation function of this unit (maintain essential NRF and dispersal habitats) is still likely to be met given the residual 49,490 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 74:** The proposed action will remove 10 acres and downgrade 325 acres of suitable NRF habitat resulting in a reduction of 2.6 percent of NRF habitat within this CHU. An additional 240 acres of dispersal only habitat will be removed by implementation of the proposed action.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 12,437 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

**OR 75:** The proposed action will remove 75 acres and downgrade 115 acres of suitable NRF habitat resulting in a reduction of 3.8 percent of suitable NRF habitat within this CHU. An

additional 95 acres of dispersal only habitat will be removed by implementation of the proposed action.

The habitat removal and downgrade will reduce nesting, roosting, and foraging opportunities for spotted owls, and will contribute to further fragmentation of suitable NRF habitat within this CHU. However, the intended conservation function of this unit (intra-province connectivity by maintaining essential NRF and dispersal habitats) is still likely to be met given the residual 4,824 acres of suitable NRF habitat that will remain after the proposed action is implemented, and the habitat features retained in the treated stands as discussed above.

### Physiographic Provinces

#### Klamath Mountains Physiographic Province

Within the Klamath Mountains Physiographic Province, this Proposed Action would remove 653 acres and downgrade 1,161 acres of NRF habitat, which equals 1.0 percent of the 186,428 acres of NRF habitat currently within that province. This small magnitude of loss is not likely to measurably reduce the function of critical habitat at the provincial scale.

#### West Cascades Physiographic Province

In the West Cascades Physiographic Province, this Proposed Action will remove 771 acres and downgrade 2,085 acres of NRF habitat, which equals 0.3 percent of the 850,614 acres of NRF habitat currently within that province. This small magnitude of loss is not likely to measurably reduce the function of critical habitat at the provincial scale.

## **CUMMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

State and private lands within the action area support marginal habitats for the spotted owl and do not notably contribute to the viability of these species given the management practices on those lands. Portions of these lands also do not provide any habitat. These lands, however, support some dispersal habitat for spotted owls and may be used as connectivity between blocks of late-seral habitat contained within the federal reserves. Habitat conditions on these lands are not expected to improve significantly within the foreseeable future.

Cumulative effects to spotted owls are likely to continue in the future within the action area. To date, the Oregon Forest Practice Rules have not adopted regulations that provide adequate protection to spotted owl sites or a mechanism to identify sites on the landscape (e.g., surveys in suitable habitat). The rules require protection of a 70-acre core area around nest sites only, and do not provide any protection or conservation of other surrounding habitat. For a species that requires up to several thousand acres of habitat to persist, these rules allow for the progressive elimination of active spotted owl sites. Removal of large amounts of habitat around 70-acre cores would eventually render the core nest areas non-functional and displacement of spotted owls is the likely outcome. Additionally, if surveys show sites to be vacant for 3 years, the core area can be logged.

## CONCLUSION

After reviewing the current status of the spotted owl and spotted owl critical habitat, the environmental baseline, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the FY 2006-2008 management activities proposed by the District are not likely to jeopardize the continued existence of the spotted owl and are not likely to destroy or adversely modify designated critical habitat for the spotted owl. The Service reached these conclusions based on the following factors:

### *Spotted Owl*

The adverse effects caused by the proposed action involving the removal or downgrading of 31,207 acres of spotted owl suitable NRF habitat are compatible with the survival and recovery needs of the spotted owl for the following reasons:

- (1) With the exception of 960 acres of NRF habitat downgrade in two LSRs, all of the affected NRF habitat lies within the Matrix and Adaptive Management LUA where timber harvest was expected to occur under the conservation strategy for the spotted owl in the Plan. In its 1994 biological opinion addressing adoption of the Plan by the Forest Service and the BLM, the Service determined that harvest activities in the Matrix were compatible with the survival and recovery of the owl in the context of implementing the Plan's conservation program (USDA/USDI 1994a). As noted above in the *Status of the Species* section of this Opinion, Courtney et al. (2004) affirmed the validity of the Plan's conservation program for the spotted owl. On that basis, the proposed action is not likely to impair the ability of the action area to adequately provide for large blocks of habitat (i.e., LSRs) that support clusters of breeding spotted owls and for dispersal habitat between LSRs.
- (2) Based on information provided in the *Environmental Baseline* section of this Opinion, the spotted owl population within the Action Area is currently considered to be relatively stable. The estimated 24 historic owl sites where habitat loss caused by the proposed action is likely to result in significant disruptions to the nesting, roosting, and foraging activities of spotted owls represent 2.9 percent of the 819 owl sites in the Action Area, and 3.3 percent of the 728 owl sites in the affected watersheds.
- (3) Some treatments associated with the proposed action (such as LSR restoration and fuels reduction; thinning in dense stands, road management, silvicultural treatments, and snag development) may have long-term benefits in restoring owl habitat to more sustainable ecological conditions.
- (4) Over two-thirds of the NRF harvest proposed by the District involves thinning or other selective harvest methods and the affected stands would retain dispersal-only habitat (or better).
- (5) Less than 4.1 percent of the 910,800 acres of suitable NRF habitat in the Action Area would be removed or downgraded by timber harvest activities.

### *Spotted Owl Critical Habitat*

The proposed action will remove or downgrade 4,668 acres of suitable NRF habitat and remove 388 acres of spotted owl dispersal-only habitat within 8 CHUs that collectively contain 211,120 acres of suitable NRF habitat. These effects are compatible with the conservation/recovery needs of the spotted owl because:

- (1) The intended function of each affected CHU and province is still likely to be met due to the large extent of suitable NRF and dispersal habitats that will remain post-project at the CHU and provincial scales.
- (2) All treated stands will retain documented spotted owl nest trees, and many of the treated stands will retain snags, down wood, and some large trees that are important components of owl and owl prey habitats.
- (3) Treated stands may improve the function of affected CHUs over time by reducing overly dense stands thereby reducing the risk of stand-replacing wildfires or extensive tree loss due to disease and competition.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act prohibits taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the federal agencies or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), take that is incidental to and not intended as part of the agencies' action is not prohibited provided that such take is in compliance with the terms and conditions of this Incidental Take Statement.

Sections 7 (b)(4) and 7 (o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that the Act requires a federal permit for the removal or reduction to possession of endangered plants from areas under federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any state or in the course on any violation of a state criminal trespass law.

#### Amount or Extent of Take

The Service anticipates that the removal of 10,434 acres and downgrading of 17,665 acres of spotted owl NRF habitat as a result of the proposed action is likely to result in the incidental take of owls within 24 spotted owl activity centers distributed within the Applegate, Bear, Cow Upper, Klamath, Little Butte Creek, Rogue Middle and Rogue Upper watershed. These and

other activity centers are likely to be occupied by spotted owls based on an evaluation of historic activity centers in a portion of the Action Area using demographic study area data. The incidental take is expected to be in the form of harm. Although this habitat removal and downgrade is not expected to result in direct injury or killing of individual owls, it will likely result in the affected areas having a reduced capability to support nesting, roosting, foraging, and dispersing owls.

The basis for this determination is the Service's finding that spotted owl home ranges consisting of less than 40 percent NRF habitat are not considered adequate for spotted owls to carry out their breeding, feeding and sheltering activities (USFWS 1992). The Service utilized maps of proposed timber harvest units and historic activity centers to estimate how many spotted owl home ranges would be likely to fall below 40 percent NRF habitat with implementation of timber harvest activities under the proposed action.

#### Effect of Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the spotted owl or destruction or adverse modification of its critical habitat.

### **REASONABLE AND PRUDENT MEASURES**

Under the proposed action, the District has committed to implementing project design criteria that the Service believes will minimize the impacts of anticipated take on the spotted owl by timing and distance restrictions. The Service has no other measures to minimize those impacts. On that basis, the only non-discretionary term and condition included herein concerns monitoring requirements.

#### Monitoring Requirements

The District shall annually report to the Service (using a jointly prepared reporting form) the amount and location of spotted owl NRF habitat removed or downgraded. This information will then be used, in part, to characterize the current condition of the spotted owl at the range-wide and Action Area scales.

As discussed above in this Incidental Take Statement and the *Effects of the Action* section of the accompanying biological opinion, the use of habitat as a surrogate for expressing the extent of take is appropriate because these effects are likely to cause harm to the species and are quantifiable.

The District shall use the Level 1 team forum to: review projects to be included in the annual monitoring report; discuss specific data needs; and review assessment results prior to submission to the Service.

If the amount or distribution of habitat impacts for any individual project differs at the time of implementation from the configuration described in the Assessment and maps provided to the Service, the District shall provide up-to-date Geographic Information System coverages

delineating the limits of actual harvest units in relation to those limits as depicted on maps of proposed activities considered in the *Effects of the Action* section of the accompanying biological opinion. The Service shall use these data to determine if anticipated levels of incidental take of listed species have been exceeded.

This Incidental Take Statement is effective only for those activities that are implemented prior to October 1, 2008, which represents the term of the proposed action.

The Service analyzed the impact of the above reasonable and prudent measures on the proposed action and believes that these measures comply with the minor change requirement as defined by 50 CFR 402.14(I)(2).

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service believes the following conservation recommendations would reduce the impact of the proposed action on listed species within the action area:

1. Information regarding the impacts of specific timber sales in reserved and unreserved allocations would be particularly useful to determine the contribution of these areas to the spotted owl population in the short-term. Monitor all currently known spotted owl activity centers within the median provincial home range distance of proposed projects before and after project implementation. Submit annual monitoring results to the Service.
2. Minimize the loss or degradation of suitable spotted owl habitat within 0.7 miles of known spotted owl nest sites by deferring harvest within that zone.
3. Important information regarding the specific effects of human disturbance on spotted owls has been collected; however more is needed to assess the effects of proposed activities on this species. If, in the course of regular survey work, action agency biologists detect a spotted owl pair nesting in proximity to the proposed activities, the District biologists should monitor the behavioral response of the birds to noise associated with construction or other human activities. We also request that our office be informed if an opportunity arises for cooperative studies of behavioral response.
4. Monitor the habitat utilization and occupancy rates of barred owls in southwestern Oregon to determine if there are unique dynamics between spotted owls and barred owls that may affect spotted owl recovery.

5. Defer timber harvest for one to three decades around spotted owl activity centers in the Matrix and AMA that have been discovered since January 1, 1994.
6. Conduct annual Level 1 team implementation monitoring of timber sales that have been harvested and were addressed in either this or a previous consultation.
7. Conduct annual monitoring of species status and report known adverse impact incidents to species to Service.

The reasonable and prudent measure, with its implementing term and condition, is designed to provide for monitoring of the project. The District shall report to the Service the actual impacts of the proposed projects annually, which will be used to make adjustments to the baseline. If take that is authorized in this incidental take statement is exceeded, consultation will be reinitiated, and the District and the Service will review the need for possible modification of the reasonable and prudent measures and the terms and conditions. This incidental take statement is effective only for those activities that are associated with this proposed action.

The Service analyzed the impact of the above reasonable and prudent measure on the proposed action and believes that this measure complies with the minor change requirement as defined by 50 CFR 402.14(I)(2).

If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the nearest Service Law Enforcement Office, located at 9025 SW Hillman Court, Suite 3134, Wilsonville, OR 97070; phone: 503-682-6131. Care should be taken in handling sick or injured specimens to ensure effective treatment or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Notice: The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein. The incidental take statement contained in this BO does not constitute an exemption for non-listed migratory birds and bald or golden eagles from the prohibitions of take under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (U.S.C. 668-668d), respectively. Proposed federal actions, including those by applicants, should (through appropriate means) avoid, reduce, or otherwise minimize such take which is subject to prosecution under these statutes.

## **REINITIATION NOTICE**

This concludes formal consultation on the actions outlined in your Biological Assessment. As provided in (50 CFR § 402.16), reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new

information reveals effects of the agencies' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation of formal consultation.

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### **Personal Communication**

Jim Harper, Wildlife Biologist, Medford BLM, August 2006.

## APPENDICES A - H

### Appendix A: Project Design Criteria

Project design criteria (PDC) are measures applied to project activities designed to minimize potential detrimental effects to proposed or listed species. PDC usually include seasonal restrictions and may also include clumping of retention trees around nest trees, establishment of buffers, dropping the unit(s)/portions, or dropping the entire project. Use of project design criteria may result in a determination of no effect for a project which would have otherwise been not likely to adversely affect. In other cases, project design criteria have resulted in a determination of not likely to adversely affect for a project which might have otherwise been determined to be likely to adversely affect. The goal of project design criteria is to reduce adverse effects to listed or proposed threatened or endangered species.

Physical impacts to habitat and disturbances to individual species will be reduced or avoided with PDC. Listed are species-specific project design criteria designed for the programmatic impacts discussed in the *Effects of the Action* section below. For each species, project design criteria have been separated into those that reduce or avoid habitat removal and those that reduce or avoid disturbance and/or disruption. Under the proposed action, the unit wildlife biologist may increase or decrease the disturbance distance-related project design criteria, based on site-specific conditions, subject to Level 1 concurrence.

Medford BLM and the Rogue River-Siskiyou National Forest retain discretion to halt and modify all projects, anywhere in the process, should new information regarding proposed and listed threatened or endangered species arise. Minimization of impacts would then, at the least, include an appropriate seasonal restriction; and could include clumping of retention trees around the nest trees, establishment of buffers, dropping the unit(s)/portions, or dropping the entire project.

The seasonal or daily restrictions listed below may be waived at the discretion of the decision maker if necessary to protect public safety (as in the case of emergency road repairs or hazard tree removal). Emergency consultation with the Service will then be initiated in such cases, where appropriate.

Should new information arise that significantly changes impacts to listed threatened or endangered species, the Action Agencies retain discretion to halt and modify all projects, anywhere in the process. Modifications could include an appropriate seasonal restriction; clumping of retention trees around the nest trees, establishment of buffers, dropping the unit(s)/portions, or dropping the entire project.

PDCs may be waived at the discretion of the decision-maker, if necessary to protect public safety (as in the case of emergency road repairs). The FWS will be notified of all such occurrences to determine if emergency consultation is required and to adjust environmental baselines if necessary. The Action Agencies will be prudent in evaluating public safety deviations. They will attempt to predict potential problems (such as road failures) such that remedies can occur during times and using methods that minimize impacts to the extent possible. In the event emergency consultation is initiated, the Action Agencies will act prudently and efficiently to

complete or close consultation in a timely manner, preferably within 6 months or less of the emergency action.

There are two types of PDCs:

**Mandatory:** must be incorporated in all projects to reduce adverse affects (LAA) to listed species – required unless a specific exemption is mentioned in a “recommended” PDC and

Mandatory PDCs are incorporated in all appropriate planned actions. The effects determination reflects their implementation. Projects unable to incorporate mandatory PDCs will be analyzed under separate consultation.

**Recommended:** discretionary; incorporated in projects where appropriate to further reduce adverse affects.

In some cases, application of PDCs may reduce the impact of the projects to listed species and may change the effects determinations (from LAA to NLAA, or from LAA or NLAA to NE). In all cases, effects determinations for projects have been made using applicable PDCs. The goal is to reduce the detrimental effects of any projects which “may affect” any endangered or threatened species. Some PDCs apply to multiple species although most PDCs apply to specific species. PDCs are described by project type. The Plant PDCs apply to all listed plants unless specifically mentioned.

This consultation effort updates some PDCs that were used on projects covered by previous consultation efforts. These updated PDCs will be incorporated into actions covered under previous consultations that have not yet been implemented, unless incorporating new PDCs is not practical. In those cases, PDCs in place under the previous consultation will apply.

The PDCs in this consultation will be incorporated into those projects that will be implemented, in FY06-08.

Fire firefighter safety must be taken into account at all times when using the **PDCs**. If implementation of PDCs might cause human safety risks, the Action Agencies will respond to the human safety threat and will determine if that response is grounds for reconsultation.

Impacts	Species: <b>Northern Spotted Owl</b>
	Any of the following Mandatory PDCs may be waived in a particular year if nesting or reproductive success surveys conducted according to the FWS-endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known sites/activity centers are assumed occupied unless protocol surveys indicate otherwise.
Disturbance	1) <b>Work activities</b> (such as tree felling, yarding, road construction, hauling on roads not generally used by the public, prescribed fire, muffled blasting) that produce loud noises above ambient levels, or produce thick smoke that would enter the stand, <b>will not occur within specified distances (see table below) of any nest site or activity center of known pairs and resident singles between 1 March and 30 June (or until two weeks after the fledging period) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. The restricted zone is 1.0 mile for any unmuffled blasting.</b> This distance may be shortened if significant topographical breaks or blast blankets (or other devices) muffle sound traveling between the blast and nest sites. March 1 – June 30 is considered the critical early nesting period; the action agency biologist has the option to extend the restricted season during the year of harvest, based on site-specific knowledge (such as a late or recycle nesting attempt). The boundary of the prescribed area may be modified by the action agency biologist using topographic features or other site-specific information. The restricted area is calculated as a radius from the assumed nest site (point). See Appendix F of the Assessment for a discussion of the rationale for the 30 June restriction date. See Fuels management PDCs for direction regarding site preparation and prescribed fire.
Disturbance	2) <b>If an active spotted owl nest or activity center is located within or adjacent to a project area, delay the project activity until September 30th</b> or until an action agency biologist determines that young are not present. For a given situation, the “adjacent” distance is determined by the action agency biologist – if needed, contact Level 1 team for guidance. If any project activity is so close to a known or suspected owl site that the disturbance would flush a nesting spotted owl, curtail the project activity until September 30. The field biologist has the discretion to conduct surveys and determine fledging activity.
Fuels	3) <b>Broadcast burning (for site preparation) will not take place within 0.25 mile of known active northern spotted owl nests between 1 March and 30 June (or until two weeks after the fledging period) unless smoke will not drift into the nest stand.</b>

<p><b>Vegetation management</b></p>	<p><b>Mandatory – Gopher Baiting</b> (occurs only on Rogue River National Forest) (I) Strychnine baiting will not occur within 0.25 mile a of known spotted owl activity center. The following general criteria will be used with Gopher Baiting</p> <ul style="list-style-type: none"> <li>a. Experienced contractors will conduct field training of workers as needed in the identification and location of gopher burrows, application of bait, and safety procedures.</li> <li>b. The baiting projects will be supervised and administered by experienced personnel.</li> <li>c. All baiting will be underground.</li> <li>d. Any spilled bait will be completely removed from the ground surface and buried.</li> </ul>
<p><b>Restoration projects</b></p>	<p><b>Mandatory. To minimize the number of potential spotted owl or murrelet nest trees used for instream structures, only the following sources shall be used:</b></p> <p><b>(I) Trees already on the ground in areas where large woody material is adequate;</b></p> <p><b>(II) Trees lacking suitable nesting structure for spotted owls or murrelets or contributing to trees with suitable nesting structure, as determined by an action agency wildlife biologist.</b></p>
<p><b>Wildfire</b></p>	<p><b>Mandatory</b> Whenever possible, protect known nest sites of any listed species from high intensity fire. Update Resource Information Book annually; incorporate new nests or sites as soon as possible.</p>
<p><b>Wildfire</b></p>	<p><b>Mandatory</b> (I) From 1 March – 30 June noise disturbance should be minimized inside occupied stands and within 0.25 mile of the edge of these stands. In order to accomplish this objective, minimize repeated aircraft flights that are less than 1,500 feet Above Ground Level (AGL). Also, minimize the use of fire line explosives within 1 air mile of occupied stands during the protection period.</p>
<p><b>Wildfire</b></p>	<p>Light Hand Tactics or Minimize Impact Suppression Tactics (MIST) should receive consideration for use within the protection zones for northern spotted owls and murrelets.</p>

Harassment distances from various activities for spotted owls.

<b>Type of Activity</b>	<b>Distance at which spotted owl may flush or abort a feeding attempt</b>
a blast larger than 2 pounds of explosives	1 mile
a blast of 2 pounds or less	120 yards
an impact pile driver, a jackhammer, or a rock drill	60 yards
a helicopter or a single-engine airplane	120 yards for small helicopters; 0.25 miles for Type 1 or 2 helicopters
chainsaws (hazard trees, precommercial and commercial thinning)	65 yards
heavy equipment	35 yards

Above-ambient noises further than these Table 11 distances from spotted owls are expected to have either negligible effects or no effect to spotted owls. The types of reactions that spotted owls could have to noise that the Service considers to have a negligible impact, include flapping of wings, the turning of a head towards the noise, hiding, assuming a defensive stance, etc. (USFWS 2003).

### **Marbled Murrelet**

PDCs apply to two different inland “belts.” Appendix H shows these two Areas. PDCs deal with *removal/degradation* of habitat and *disturbance* of nesting murrelets.

Occasionally individual hazard trees are found which have not been surveyed for murrelet use and which have the potential to support a murrelet nest. If these trees are an immediate threat to human safety, they will be cut. Otherwise, these trees will be removed during the non-nesting season (16 September to March 31).

*What is the minimum site (size/quality) where survey protocol will be applied? Guidance:* Field assessments conducted to make the determination of habitat suitability are of vital importance to the conservation and protection of marbled murrelet breeding sites. Any stand with a residual tree component or small patches of suitable habitat should be considered potential nesting habitat, and surveyed to protocol. Any assessment of habitat must include a walk-through of every acre of the area that will be impacted by a project.

*Brief Description of the two Areas (“bands”)* (Appendix I): **Area A** = Area west of the line between the coastal Western Hemlock/Tanoak Zone and inland Mixed Conifer/Mixed Evergreen Zone; this area is the known range for marbled murrelet in SW Oregon. **Area B** = Area 6.5 miles (10 km) east of Area A (although Area B is outside the known range for this species, potential nesting habitat will continue to be surveyed in this “buffer” area, where projects may affect this potential habitat). No surveys for marbled murrelets are required on land outside of (east of) Areas A and B.

Impacts	Species: <b>Marbled Murrelet</b>
Habitat	(I) For Survey Areas <b>A and B</b> , if the project removes or degrades <b>suitable habitat, the project must be surveyed to protocol</b> (current Pacific Seabird Group two year protocol – to document presence/absence of murrelet). If it is not feasible to complete the two-year protocol, the FWS will be contacted on a case-by-case basis to discuss other means of insuring that potential nest trees are not impacted. The action agency has the option of not surveying suitable habitat and classifying these stands as “Occupied.” A “new” LSR must be established for any timber stand in Areas A or B that is determined to be or assumed to be occupied by marbled murrelet (per NWFP ROD, page C-10).
Disturbance	(II) For <b>Survey Areas A and B work activities</b> (such as tree felling, yarding, road and other construction activities, hauling on roads not generally used by the public, muffled blasting) which produce noises above ambient levels <b>will not occur within specified distances (see table below) of any occupied stand or unsurveyed suitable habitat between April 1 – August 5. For the period between August 6 – September 15, work activities will be confined to between 2 hours after sunrise to 2 hours before sunset.</b> See Fuels management PDCs for direction regarding site preparation and prescribed fire.
Disturbance	(III) <b>Clean up trash and garbage daily</b> at all construction and logging sites. Keep food out of sight so as to not attract crows and ravens (predators on eggs or young murrelets).
Disturbance	(IV) <b>Blasting</b> (open air/unmuffled) – <b>No blasting/pile driving activities 1 April through 15 September within 1.0 mile of occupied stands or unsurveyed suitable habitat.</b> This distance may be shortened if significant topographical breaks or blast blankets (or other devices) muffle sound traveling between the blast and nest sites or less than 2 lbs of explosives are used. If so, then use described distance.
Disturbance	1) <b>Recommended</b> Delay project implementation until after September 15 where possible
Disturbance	2) <b>Recommended</b> Between 1 April and 15 September, concentrate disturbance activities spatially and temporally as much as possible (e.g., get in and get out, in as small an area as possible; avoid spreading the impacts over time and space).
Restoration projects	<b>Mandatory</b> To minimize the number of potential spotted owl or murrelet nest trees used for instream structures, only the following sources shall be used: (I) Trees already on the ground in areas where large woody material is adequate; (II) Trees lacking suitable nesting structure for spotted owls or murrelets or contributing to trees with suitable nesting structure, as determined by an action agency wildlife biologist.

<b>Fuels</b>	<p><b>Mandatory</b></p> <p>(I) Burning would not take place within 0.25 mile of known occupied marbled murrelet sites, or unsurveyed marbled murrelet habitat between April 1 and August 6 unless smoke will not drift into the occupied site.</p> <p>(II) All broadcast and under-burning operations (except for residual “smokes”) will be completed in the period from two hours after sunrise to two hours before sunset.</p> <p>(IV) During helicopter operations, flights over suitable habitat will be restricted (helicopter should be a least 1,500 feet above ground level); if not possible, fly a minimum of 500 feet above suitable habitat (above canopy).</p>
<b>Wildfire</b>	<p><b>Mandatory</b></p> <p>Whenever possible, protect known nest sites of any listed species from high intensity fire. Update Resource Information Book annually; incorporate new nests or sites as soon as possible.</p>
<b>Wildfire</b>	<p><b>Mandatory</b></p> <p>(I) From 1 April - 5 August noise disturbance should be minimized inside occupied stands and within 0.25 mile of the edge of these stands. In order to accomplish this objective, minimize repeated aircraft flights that are less than 1,500 feet Above Ground Level (AGL). Also, minimize the use of fire line explosives within 1 air mile of occupied stands during the protection period.</p>
	<p>Light Hand Tactics or Minimize Impact Suppression Tactics (MIST) should receive consideration for use within the protection zones for northern spotted owls and murrelets.</p>
<b>Quarries</b>	<p><b>Mandatory</b></p> <p>1) For any occupied stands or unsurveyed suitable habitat within 0.5 mile of the quarry operation, restrict operation of the quarry from April 1 to September 15. Agency biologists also have the discretion to modify the 0.5-mile zone depending on topography and the level of noise - what equipment will be present (crusher or dozer/ripper or only loading of existing stockpiled rock).</p>
<b>Quarries</b>	<p>1) For active nest sites or unsurveyed suitable habitat within 0.25 mile of the quarry operation (1.0 mile for blasting), restrict operation of the quarry from March 1 through June 30 (unless protocol surveys demonstrate non-nesting).</p> <p><b>Recommended</b></p> <p>2) For active nest sites or unsurveyed suitable habitat within 0.25 mile of the quarry operation, restrict operation of the quarry from March 1 through September 30 (unless protocol surveys demonstrate non-nesting).</p>

Type of Activity – Prescribed Distances for Marbled Murrelet	Zone of Restricted Operation
Blast of more than 2 pounds of explosive	1 mile
Blast of 2 pounds or less of explosive	360 feet
Impact pile driver, jackhammer, or rock drill	360 feet
Type III-IV Helicopter or single-engine airplane	360 feet
Type I or II Helicopter	0.25 miles
Chainsaws (hazard trees, tree harvest, etc.)	360 feet
Heavy equipment	360 feet

### Wildland Fire - General PDCs – All Species

- a. Resource Advisors/Environmental Specialists will advise Line Officers and Incident Commanders to minimize impact to listed species and their habitat during suppression activities.
- b. Information on species and habitat location will be available to fire staff through pre-suppression briefings, through maps showing areas of concerns (readily accessible through GIS), and pertinent species management plans, *i.e.*, bald eagle site management plans. With this information, fire staff can determine possible needs during initial attack, if the behavior of the fire dictates the need for emergency fire suppression action.
- c. Resource specialists, resource advisers, advisors/environmental specialists will give biological input to personnel in charge of fire suppression activities. The resource advisor/environmental specialist will work for the Line Officer and with the Incident Commander to relay biological concerns.
- d. Whenever possible, protect known nest sites of any listed species from high intensity fire.

## Appendix B: Detailed Project Descriptions

### Tree Harvest

Tree harvest may include both commercial and non-commercial removal of mature overstory and/or understory trees. Harvest prescriptions may include regeneration harvest, seed-tree cuts, selective harvest, density management, commercial thinning, and individual tree removal. Tree harvest also covers miscellaneous projects, including the removal of hazard trees for public safety, commercial firewood and salvage. Salvage may result from blowdown (other than hazard trees), disease, or fires. Typically, a blowdown salvage project may cover 500 acres or more along at least 50 miles of roadway. However, based on past experience, salvage can occur on as much as 10,000 acres in a given year. This type of salvage may occur within LSRs and Riparian Reserves; providing the standards and guidelines in the Northwest Forest Plan and LSR Assessments are met.

Harvest can result in the removal of a few trees within a stand or can result in removal of the majority of trees within the project area. Openings may occur in an even or patchy distribution, depending on objectives of the treatment and constraints of the land use allocation. Trees are harvested by individual sawyers, or crews of people with chain saws or machine-mounted saws. Harvest includes the layout, marking, falling, limbing, yarding, and decking the trees to be removed from the site. In all cases but biomass removal, the limbs and needles/branches remain within the project area, and the bole of the harvested tree is removed. Trees are hauled to landings (decks) by cable or heavy equipment or helicopter and subsequently removed from those areas by logging trucks or helicopters. Access to the timber sale involves the use of existing roads in areas where roads already occur, and may also involve the design and development of new roads or redevelopment of old roads. New roads involve cutting trees from the road prism, occasional blasting, grading, hauling gravel, cutting into side banks, installing culverts and waterbars, stabilizing adjacent areas. Trees removed from road prisms are often decked for inclusion in the timber sale, or could be sold in unrelated sales, or could occasionally be used on-site or off-site for watershed restoration, down wood supplementation, or in-stream structures.

Regeneration harvests could occur in the Adaptive Management Area (AMA) and Matrix Land Use Allocations (LUAs), but do not occur in Late Successional Reserves (LSRs) or Riparian Reserves (RR). Meadow Restoration projects in LSR will result in the removal of some suitable habitat (see Table 1). Timber sales within LSRs will comply with pre-approved LSR direction (*i.e.* completed LSR assessments, as per the Northwest Forest Plan ROD).

Timber harvest is seasonally restricted around known spotted owl nest sites (see PDC for details). Some harvest could occur in suitable Matrix and AMA habitat that has not been surveyed for northern spotted owls, as the District is not required to survey these lands. All timber sale contracts will contain special provision C6.25. These are standard contract provisions which require purchasers to discontinue operations upon receiving

written notice from the District that listed species may be affected by the action; an example situation might be when a previously unknown spotted owl nest is discovered in an active timber sale.

### **Vegetation Management - including Silvicultural Projects**

Silvicultural projects usually involve plantation maintenance and the removal of trees and shrubs to enhance growth, and can include maintenance brushing (release), precommercial thinning, prescribed burning for site preparation (see also fuels reduction), planting, Port-Orford-cedar clearing (sanitation) to control *Phytophthora lateralis*, animal damage control, fertilization, and pruning. Silvicultural activities are sometimes collectively referred to as TSI projects (Timber Stand Improvement). Thinning work is usually done with hand crews, but mechanical thinning can occur. Strychnine alkaloid treated grain is in use on District lands to control gophers where they have been identified as a cause of plantation failure or unacceptable conifer stocking. The Action Agencies also use underground traps. Fertilizer is applied to accelerate growth of young trees or to improve native plant restoration. Fertilizer is applied at a rate of no more than 200 lbs of nitrogen per acre. Fertilizer is usually aurally applied, but is hand applied in some habitat improvement projects on small acres (e.g. grass seeding in meadow habitat improvement projects).

### **Watershed Restoration**

Watershed restoration projects anticipated in the Action Area include: road decommissioning, storm proofing of roads (see road maintenance/decommissioning below), upslope erosion rehabilitation, riparian silviculture, in-stream habitat improvement, large wood restoration, wildlife tree development, wildlife habitat restoration and enhancement (such as meadows), and prescribed burning (see fuels management). Some blasting (such as snag creation) may occur with watershed restoration projects.

Roads no longer essential for forest management may be gated, closed or decommissioned (put back to natural contours). Roads with the potential to fail or deliver large amounts of sediment to stream segments may be decommissioned, closed or improved. Improvements include repairing road drainage facilities (culverts, drain dips, etc.) and surfacing (to reduce sediment). Restoration activities also may include snag creation, down wood development and/or placement. Effects of these actions are considered similar to those of tree harvest or silviculture projects. Expected activities and effects specific to roads are evaluated under road construction and maintenance (below), although road construction, restoration, maintenance, and drainage work is interdependent and interrelated to most Action Agency activities.

Meadow restoration, fencing, native plant seeding and planting, and weed removal may occur to restore or repair healthy ecosystems. Most watershed restoration projects will take place in Key Watersheds identified in the amended District plans. Other restoration

work may be required as the result of future wind, snowstorms, rain, and flooding. No ground disturbance will occur without an evaluation for habitat of listed species.

### **Fuels Management**

The Action Area historically experienced short natural fire return intervals (9-12 years). Fire suppression and management actions have resulted in habitat conditions much brushier and denser than would occur under natural burn regimes. Fuels management practiced by the District has three primary purposes: fuels reduction to reduce wildfire hazard, site preparation/slash reduction for improving conifer planting (covered in silviculture above), and restoration of ecosystem function where wildfire has been suppressed.

Fuels management treatments may include manual and/or mechanical treatments using chainsaws or other mechanical equipment such as slash busters, often proceeded with a prescribed fire treatment that may include pile burning, under-burns. Broadcast burning without pre-treatment (brush fields) can also occur. Mechanical treatment is designed to convert abnormally high amounts of shrubs and ladder fuels so that subsequent prescribed burning or wildfire won't be as severe. The material (piled) with manual treatment is usually burned once that material dries out. A small portion of the acres treated by mechanical equipment may also be later burned to remove treated material.

Prescribed fire use is dependent upon management objectives. The primary role of prescribed fire has traditionally been for site preparation and fuels reduction. Recently, natural fuels reduction and ecological "improvement" have become end goals of prescribed fire. The effects of prescribed natural fire, when limited to the prescription, can usually be controlled or manipulated.

Prescribed burning is generally restricted to spring or a small window in the fall, due to risks of escapes, smoke concerns, and weather. When successful understory treatments have been completed, and risks of escape are reduced, more burning during late summer or fall could be anticipated. Mechanical treatments can occur at any time of the year.

Natural and created fuel breaks across the landscape may be developed to help with the suppression of large-scale wildfires. In this case, treatment of fuels along a ridge or topographic break would occur to reduce the fuels and facilitate suppression activities. Fire line construction and blasting may occur as a tool to help create fire lines. No treatments will occur without an evaluation for habitat of listed species.

### **Recreation**

Recreation management includes trail construction and maintenance, campground and physical facilities maintenance, boat landing maintenance, observation decks and guard rails, signing, foot bridges, and permits for rafting and boating (see special use permits). Ground or habitat disturbing actions will not occur without an evaluation for habitat of listed species. Occasional heavy equipment use could cause short-term (less than one

week) high noise levels, and occasional groups of people may be concentrated along short sections of a trail or river for various periods of time. Trees may be felled in developed areas or along trails where public safety is a concern (this is generally an annual activity).

### **Road Maintenance/construction**

Road construction involves ground disturbance, removal of vegetation, use of heavy equipment, occasional blasting, and periods of high noise and activity, and would be tied to tree harvest, recreation, and several other project categories. Road maintenance consists of grading, brushing, culvert maintenance and repair, installing and repairing waterbars, minor resurfacing, and hazard tree removal or minor re-routing. The District maintains roads on a schedule, but also responds to unanticipated repairs due to weather, accident, or landslide. Most activity is limited to short periods of time (*i.e.*, one or two passes with a grader). Road grading generally affects the ditch and a foot or so of the cut-slope; some loose material is spilled over the fill-slope. Maintenance brushing generally entails mechanically cutting brush down to less than a foot high within four feet of the edge of road tread. Brush more than four feet from the edge of the road tread is not treated. Heavy trucks and heavy equipment such as graders, gravel trucks, backhoes, and chainsaws and/or brush removal machinery, can increase noise in the area of activity for short, but intense, periods of time, and can occur for up to one week in time. Most activities would require a few hours of work or less within any 0.25-mile road segment in a 24-hour period. Some blasting may be required with road projects removing unstable portions of the cut-slope, often at rockfaces.

Road decommissioning is tied to Watershed Restoration and covers activities that reduce or eliminate traffic use on the road by installing gates, barriers, rocks, ripping the tread, pulling culverts, and seeding grass and herbs. Full obliteration of the road returns the road back to natural contour levels using excavators. Full obliteration can remove vegetation along the top of the cut slope to create a stable slope.

### **Mining and Quarry Operations**

For all mining activities on District-managed land, operators must submit a Notice of Intent and get approval, if causing surface disturbance on 5 acres or less. Operators only have to file a plan of operations for activities that remove more than 1,000 tons of material, which is generally on more than 5 acres. Plans of operations are required to comply with the Act, and the operator must take such action as necessary to prevent adverse impacts to listed species. Habitat evaluation or surveys for new notice-level and plan-level operations will be done prior to commencement of operations.

Each year, many small-scale suction dredge operations are conducted in the Action Area. Field inspection will be conducted and where actions are likely to significantly affect surface resources, a Plan of Operations will be required and site-specific National Environmental Policy Act (NEPA) and consultation will result. In many of these cases, the miner will choose to simply minimize or cease their operations to protect the resource

and avoid the paperwork. Other, larger-scale operations are likely and the operator will provide a Notice of Intent or a Plan of Operations. Where actions are likely to significantly affect surface resources, a Plan of Operations will be required and site-specific NEPA and consultation will result.

Most mining operations presently operating on federal lands use suction dredges to sort streambed materials in search of gold. Much of the suction dredge mining is in key watersheds, e.g., Palmer Creek, Little Applegate River, Taylor Creek, Dunn Creek, East Fork Illinois River, Sucker Creek, Silver Creek, Elk River and South Fork Coquille River. Other watersheds with suction dredge activities on Federal lands include Briggs Creek, Evans Creek, and the Chetco River. Except for a few large dredge operations, most suction dredging is performed with small (intake hose of less than four inches) portable dredge equipment. Suction dredging is widespread throughout the summer operating season - June 15th to September 15th – but operations vary from an occasional weekend to two weeks.

Most rock crushing operations take place in existing quarries. We often authorize an increase in quarry boundaries for timber sales. All actions take place within the developed quarry limits. Standard operations include drilling which takes approximately 2-3 weeks, blasting which is quick (less than one minute) but may extend over several days, and crushing which takes 2-3 weeks.

**Appendix C: Environmental Baseline Tables**

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs. 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>All Basins</b> 12 Aug 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-03	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				5,051,868		
-Private, State and other Government				2,512,108		
-Federal Acres				2,539,760		
2. Land Allocations - Federal (hierarchical, no acres double-counted)						
-Congressionally Reserved Areas				352,740		
-Late Successional Reserves (not incl 100 ac owl LSRs)				878,407		
-Adaptive Management Areas				178,193		
-Administratively Withdrawn Areas				187,383		
-Riparian Reserves (Matrix and AMA Riparian acres only)				240,893	Unmapped Class IV streams counted as within Matrix	
-Matrix				702,144		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				435,687	205,705 (47%)	227,965 (53%)
-Total Spotted Owl Habitat - Suitable Acres (NRF) (* Unprotected = 278,034 acres combined timber sales-fires.)	914,432 (-13%)*	-101,766 (-10%)	-34,337 (-3%)	1,053,409	730,647 (69%)	322,762 (31%)
-Total Acres in Critical Habitat within <b>All Basins</b>				772,722	582,798 (75%)	189,924 (25%)
-Total Acres in Critical Habitat which is suitable (NRF)	356,651-9%)	-25,329 (-6%)	-9,005 (-3%)	390,985	304,070 (78%)	86,915 (22%)
4. SPOTTED OWL SITES - # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				305	247 (81%)	58 (19%)
-# Spotted Owl Sites (30-40% NRF)				143	76 (53 %)	67 (47%)
-# Spotted Owl Sites (<30% NRF)				371	127 (34%)	244 (66%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				692,263	536,867 (76%)	155,396 (24%)
-Total Marbled Murrelet - Suitable Habitat (to 50 miles) [Suitable habitat known range = 66,726 (wi -1,639 Biscuit)]	280,543 (-13%)	-37,089 (-12%)	-3,075 (-1%)	320,707	238,263 (74%)	82,444 (26%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00			200	200 (100%)	0 (0%)
-Total Sites With MM Presence (not incl occupied sites)				486	Not Calculated	Not Calculated

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFS 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Applegate</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				471,329		
-Private, State and other Government				157,195		
-Federal Acres				314,134		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				16,626		
-Late Successional Reserves (not incl 100 ac owl LSRs)				40,318		
-Adaptive Management Areas				178,193		
-Administratively Withdrawn Areas				25,808		
-Riparian Reserves (Matrix and AMA Riparian acres only)				52,955	Unmapped Class IV streams counted as within Matrix	
-Matrix				234		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				55,707	14,953 (27%)	40,754 (73%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	114,362 (-9%)	-3,126	-8,895	126,383	48,980 (39%)	77,403 (61%)
4. SPOTTED OWL SITES - Total # Activity Center (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				34	19 (56%)	15 (44%)
-# Spotted Owl Sites (30-40% NRF)				26	11 (44%)	15 (56%)
-# Spotted Owl Sites (<30% NRF)				85	16 (19%)	69 (81%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				37,914	22,618 (60%)	15,296 (40%)
-Total Marbled Murrelet - Suitable Habitat (to 50 miles)	28,517 (>-1%)	0	-59 (>-1%)	28,576	20,363 (71%)	8,213 (29%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	0	N/A	N/A		
-Total Sites With MM Presence (not incl occupied sites)		0	N/A	N/A		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Bear 11 July 03</b> Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				231,110		
-Private, State and other Government				182,593		
-Federal Acres				48,517		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				0		
-Late Successional Reserves (not incl 100 ac owl LSRs)				12,579		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				13,567		
-Riparian Reserves (Matrix and AMA Riparian acres only)				5,319	Unmapped Class IV streams counted as within Matrix	
-Matrix				17,052		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				5,795	2,476 (43%)	3,319 (57%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	21,174 (-1%)	-72	-39	21,285	14,405 (68%)	6,880 (32%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				22	22 (100%)	0
-# Spotted Owl Sites (30-40% NRF)				4	4 (100%)	0
-# Spotted Owl Sites (<30% NRF)				18	7 (39%)	11 (61%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				N/A		
-Total Marbled Murrelet - Suitable Habitat				N/A		
-Total Sites With MM Presence (not incl occupied sites)		N/A				

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WTRSHDS = <b>Chetco/South Coast</b> 12 Aug 03 Ranger Dist/Resource Areas = SIS, ROR, Med/Coos BayBLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				382,849		
-Private, State and other Government				133,603		
-Federal Acres				249,246		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				99,639		
-Late Successional Reserves (not incl 100 ac owl LSRs)				79,805		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				20,294		
-Riparian Reserves (Matrix and AMA Riparian acres only)				9,917	Unmapped Class IV streams counted as within Matrix	
-Matrix				39,591		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				22,469	16,612 (74%)	5,857 (26%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	68,916 (-25%)	-23,245	-261	92,422	79,609 (85%)	12,813 (15%)
4. SPOTTED OWL SITES - Total # Activity Centers(Fed Land)						
-# Spotted Owl Sites (>40% NRF)				28	25 (89%)	3 (11%)
-# Spotted Owl Sites (30-40% NRF)				12	9 (75%)	3 (25%)
-# Spotted Owl Sites (<30% NRF)				4	4 (100%)	0
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				144,736	117,027 (81%)	27,709 (19%)
-Total Marbled Murrelet - Suitable Habitat This Area is in the Known Range	32,871 (-5%)	-1,607 (-5%)	-261 (-1%)	34,639	30,940 (89%)	3,699 (11%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	58	58 (100%)	0		
-Total Sites With MM Presence (not incl occupied sites)		130	Not Calculated	Not Calculated		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Coquille/Sixes</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				864,757		
-Private, State and other Government				775,604		
-Federal Acres				89,153		
2. Land Allocations - Federal (hierarchical, no acres double-counted)						
-Congressionally Reserved Areas				8,366		
-Late Successional Reserves (not incl 100 ac owl LSRs)				57,321		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				4,772		
-Riparian Reserves (Matrix and AMA Riparian acres only)				3,708	Unmapped Class IV streams counted as within Matrix	
-Matrix				14,986		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				9,963	7,891 (79%)	2,072 (21%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	40,713 (0%)	n/a	-170	40,883	35,577 (87%)	5,306 (13%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				13	11 (85%)	2 (15%)
-# Spotted Owl Sites (30-40% NRF)				9	7 (78%)	2 (12%)
-# Spotted Owl Sites (<30% NRF)				2	1 (50%)	1 (50%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				55,304	51,252 (93%)	4,052 (7%)
-Total Marbled Murrelet - Suitable Habitat This Area is in the Known Range	18,370 (-1%)	0	-175 (-1%)	18,545	16,840 (91%)	1,705 (9%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	25	26 (100%)	0		
-Total Sites With MM Presence (not incl occupied sites)		130	Not Calculated	Not Calculated		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Cow-Upper</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				214,169		
-Private, State and other Government				133,775		
-Federal Acres				80,394		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				0		
-Late Successional Reserves (not incl 100 ac owl LSRs)				26,653		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				2,212		
-Riparian Reserves (Matrix and AMA Riparian acres only)				8,480	Unmapped Class IV streams counted as within Matrix	
-Matrix				43,049		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				23,971	9,710 (41%)	14,261 (59%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	43,657 (-2%)	n/a	-1,006 (-2%)	45,108	18,336 (41%)	26,772 (59%)
4. SPOTTED OWL SITES - Total # Activity Centers(Fed Land)						
-# Spotted Owl Sites (>40% NRF)				9	3 (33%)	6 (67%)
-# Spotted Owl Sites (30-40% NRF)				14	2 (14%)	12 (86%)
-# Spotted Owl Sites (<30% NRF)				39	14 (36%)	25 (64%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				14,605	883 (6%)	13,722 (94%)
-Total Marbled Murrelet - Suitable Habitat (to 50 miles) This Area is not in Known Range	21,530 (-4%)	0	-862 (-4%)	22,393	4,418 (20%)	17,975 (80%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	0	N/A	N/A		
-Total Sites With MM Presence (not incl occupied sites)		1	N/A	N/A		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = Elk + 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				96,099		
-Private, State and other Government				47,741		
-Federal Acres				48,358		
2. Land Allocations - Federal (hierarchical, no acres double-counted)						
-Congressionally Reserved Areas				9,998		
-Late Successional Reserves (not incl 100 ac owl LSRs)				22,996		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				6,683		
-Riparian Reserves (Matrix and AMA Riparian acres only)				1,893	Unmapped Class IV streams counted as within Matrix	
-Matrix				6,788		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				5,386	4,452 (83%)	934 (17%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	22,533	n/a	0	22,533	19,661 (86%)	2,872 (14%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				6	6 (100%)	0
-# Spotted Owl Sites (30-40% NRF)				0	0	0
-# Spotted Owl Sites (<30% NRF)				0	0	0
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				31,514	27,135 (86%)	4,379 (14%)
-Total Marbled Murrelet - Suitable Habitat This Area is in the Known Range	0	0	0	10,881	9,545 (88%)	1,336 (14%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	44	44 (100%)	0		
-Total Sites With MM Presence (not incl occupied sites)		105	Not Calculated	Not Calculated		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = Illinois 12 Aug 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				630,785		
-Private, State and other Government				119,253		
-Federal Acres				511,532		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				71,359		
-Late Successional Reserves (not incl 100 ac owl LSRs)				220,617		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				66,751		
-Riparian Reserves (Matrix and AMA Riparian acres only)				30,588	Unmapped Class IV streams counted as within Matrix	
-Matrix				122,217		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				44,394	28,477 (64%)	15,917 (36%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	135,772 (-32%)	-61,149	-2,907	199,828	158,266 (79%)	41,562 (21%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				49	38 (78%)	11 (22%)
-# Spotted Owl Sites (30-40% NRF)				18	13 (72%)	5 (28%)
-# Spotted Owl Sites (<30% NRF)				15	8 (53%)	7 (47%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				231,506	176,694 (76%)	54,812 (24%)
-Total Marbled Murrelet - Suitable Habitat (to 50 miles) This Area is not in Known Range; some in survey buffer	57,456 (-37%)	-33,248 (-36%)	-513 (-1%)	91,217	72,834 (82%)	18,383 (18%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	2	2 (100%)	0		
-Total Sites With MM Presence (not incl occupied sites)		5	Not Calculated	Not Calculated		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Klamath-Upper</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				164,213		
-Private, State and other Government				99,211		
-Federal Acres				65,002		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				0		
-Late Successional Reserves (not incl 100 ac owl LSRs)				25,613		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				12,385		
-Riparian Reserves (Matrix and AMA Riparian acres only)				4,795	Unmapped Class IV streams counted as within Matrix	
-Matrix				22,209		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				7,978	3,002 (38%)	4,976 (62%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	16,820 (-4%)	n/a	-745	17,565	10,348 (59%)	7,217 (41%)
4. SPOTTED OWL SITES - Total # Activity Centers (FedLand)						
-# Spotted Owl Sites (>40% NRF)				0	N/A	N/A
-# Spotted Owl Sites (30-40% NRF)				2	1 (50%)	1 (50%)
-# Spotted Owl Sites (<30% NRF)				16	13 (81%)	3 (19%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				N/A		
-Total Occupied Marbled Murrelet Sites		N/A				
-Total Sites With MM Presence (not incl occupied sites)		N/A				

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Little Butte</b> 11 July 03 Ranger Dist/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				238,506		
-Private, State and other Government				126,026		
-Federal Acres				112,480		
2. Land Allocations - Federal (hierarchical, no acres double-counted)						
-Congressionally Reserved Areas				2,005		
-Late Successional Reserves (not incl 100 ac owl LSRs)				47,599		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				1,118		
-Riparian Reserves (Matrix and AMA Riparian acres only)				16,919	Unmapped Class IV streams counted as within Matrix	
-Matrix				44,839		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				10,334	2,846 (28%)	7,488 (72%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	39,719 (-7%)	-279	-3,693	43,691	25,291 (58%)	18,400 (42%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				5	3 (60%)	2 (40%)
-# Spotted Owl Sites (30-40% NRF)				15	8 (53%)	7 (47%)
-# Spotted Owl Sites (<30% NRF)				19	9 (47%)	10 (53%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				N/A		
-Total Occupied Marbled Murrelet Sites		N/A				
-Total Sites With MM Presence (not incl occupied sites)		N/A				

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WTRSHDS = <b>Rogue Lwr-Lobster</b> June 24, 2003 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				126,882		
-Private, State and other Government				55,783		
-Federal Acres				71,099		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				0		
-Late Successional Reserves (not incl 100 ac owl LSRs)				45,932		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				2,671		
-Riparian Reserves (Matrix and AMA Riparian acres only)				11,823	Unmapped Class IV streams counted as within Matrix	
-Matrix				10,673		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				8,611	6,836 (79%)	1,775 (21%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	31,076	n/a	0	31,076	27,050 (87%)	4,026 (13%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				11	10 (91%)	1 (9%)
-# Spotted Owl Sites (30-40% NRF)				2	2 (100%)	0
-# Spotted Owl Sites (<30% NRF)				2	2 (100%)	0
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				41,899	34,402 (82%)	7,497 (18%)
-Total Marbled Murrelet - Suitable Habitat This Area is in the Known Range	0	0	0	14,053	12,411 (88%)	1,642 (12%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	71	71 (100%)	0		
-Total Sites With MM Presence (not incl occupied sites)		115	Not Calculated	Not Calculated		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Rogue Lwr-Wild</b> June 24, 2003 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				186,248		
-Private, State and other Government				14,577		
-Federal Acres				171,671		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				32,720		
-Late Successional Reserves (not incl 100 ac owl LSRs)				105,006		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				10,244		
-Riparian Reserves (Matrix and AMA Riparian acres only)				4,168	Unmapped Class IV streams counted as within Matrix	
-Matrix				19,533		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat - Capable Acres (not incl disp/suit)				22,309	16,927 (76%)	5,382 (24%)
-Total Spotted Owl Habitat - Suitable Acres (NRF)	105,073 (>-1%)		-315	105,388	90,448 (86%)	14,940 (14%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				44	35 (80%)	9 (20%)
-# Spotted Owl Sites (30-40% NRF)				4	4 (100%)	0
-# Spotted Owl Sites (<30% NRF)				5	2 (40%)	3 (60%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				72,240	65,187 (90%)	7,053 (10%)
-Total Marbled Murrelet - Suitable Habitat This Area is not in Known Range	65,867 (>-1%)	0	-308 (>-1%)	66,175	55,135 (83%)	11,040 (17%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	0	N/A	N/A		
-Total Sites With MM Presence (not incl occupied sites)		0	N/A	N/A		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Rogue-Middle</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				599,369		
-Private, State and other Government				353,845		
-Federal Acres				245,524		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				6,136		
-Late Successional Reserves (not incl 100 ac owl LSRs)				22,780		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				2,247		
-Riparian Reserves Matrix and AMA Riparian acres only)				39,351	Unmapped Class IV streams counted as within Matrix	
-Matrix				175,010		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat – Capable Acres (not incl disp/suit)				62,745	4,960 (8%)	57,785 (92%)
-Total Spotted Owl Habitat – Suitable Acres (NRF)	88,774 (-6%)	n/a	-6,237 (-6%)	98,362	24,934 (25%)	73,428 (75%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				5	1 (25%)	4 (75%)
-# Spotted Owl Sites (30-40% NRF)				18	0	18 (100%)
-# Spotted Owl Sites (<30% NRF)				53	0	53 (100%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				34,891	14,015 (40%)	20,876 (60%)
-Total Marbled Murrelet - Suitable Habitat (to 50 miles) This Area is not in Known Range	28,620 (-4%)	0	-1,318 (-4%)	29,938	11,487 (38%)	18,451 (62%)
-Total Occupied Marbled Murrelet Sites	Data through FY 00	0	N/A	N/A		
-Total Sites With MM Presence (not incl occupied sites)		0	N/A	N/A		

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Rogue-Upper</b> 11 July 03 Ranger Dist/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				787,409		
-Private, State and other Government				312,262		
-Federal Acres				475,147		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				85,613		
-Late Successional Reserves (not incl 100 ac owl LSRs)				136,729		
-Adaptive Management Areas				N/A		
-Administratively Withdrawn Areas				15,865		
-Riparian Reserves (Matrix and AMA Riparian acres only)				50,977	Unmapped Class IV streams counted as within Matrix	
-Matrix				185,963		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat – Capable Acres (not incl disp/suit)				150,679	81,217 (54%)	69,462 (46%)
-Total Spotted Owl Habitat – Suitable Acres (NRF)	180,071 (-10%)	-1,168	-10,069	191,308	160,165 (84%)	31,143 (16%)
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				77	72 (94%)	5 (6%)
-# Spotted Owl Sites (30-40% NRF)				19	15 (79%)	4 (21%)
-# Spotted Owl Sites (<30% NRF)				113	51 (45%)	62 (55%)
5. MARBLED MURRELET (Fed Land)						
-Total Marbled Murrelet - Capable Acres (not incl suitable)				N/A		
-Total Occupied Marbled Murrelet Sites		N/A				
-Total Sites With MM Presence (not incl occupied sites)		N/A				

Environmental Baseline Tables. Medford BLM, Rogue River & Siskiyou NFs 1. Protected = "large" land allocations with no programmed timber harvest (Wilderness, LSR, Riparian Reserves except intermittent, etc. Unprotected incl all Matrix, as well as Known Spotted Owl Activity Centers and other small "protected" areas)						
SECTION SEVEN WATERSHEDS = <b>Smith</b> 11 July 03 Ranger Dists/Resource Areas = SIS, ROR, Med/Coos Bay BLM	Changes from 96 Baseline			Baseline Acres 18Oct96 (BO 1-7-96-F-392)		
	New Total (% change)	Fires 96-03	Timber Sales 96-05	Total	Total Protected <sup>1</sup> (+ % of Total)	Total Un-protected (+ % of Total)
1. Total Acreage within Sub-Basin, all Ownerships				58,143		
-Private, State and other Government				640		
-Federal Acres				57,503		
2. Land Allocations - Federal (hierarchal, no acres double-counted)						
-Congressionally Reserved Areas				20,278		
-Late Successional Reserves (not incl 100 ac owl LSRs)				34,459		
-Adaptive Management Areas				0		
-Administratively Withdrawn Areas				2,766		
-Riparian Reserves (Matrix and AMA Riparian acres only)				0	Unmapped Class IV streams counted as within Matrix	
-Matrix				0		
3. SPOTTED OWL HABITAT - Federal Land						
-Total Spotted Owl Habitat – Capable Acres (not incl disp/suit)				5,346	5,346 (100%)	0
-Total Spotted Owl Habitat – Suitable Acres (NRF)	6,186 (-65%)	-11,391	0	17,577	17,577 (100%)	0
4. SPOTTED OWL SITES - Total # Activity Centers (Fed Land)						
-# Spotted Owl Sites (>40% NRF)				2	2 (100%)	0
-# Spotted Owl Sites (30-40% NRF)				0	0	0
-# Spotted Owl Sites (<30% NRF)				0	0	0
5. MARBLED MURRELET (Fed Land)						
	* = Siskiyou NF data not included					
-Total Marbled Murrelet - Capable Acres (not incl suitable)				27,654	27,654 (100%)	0
-Total Marbled Murrelet - Suitable Habitat (to 50 miles) This Area is not in Known Range	2,056 (-52%)	- 2,234 (-52%)	0	4,290	4,290 (100%)	0
-Total Occupied Marbled Murrelet Sites	Data through FY 00	0	0	0		
-Total Sites With MM Presence (not incl occupied sites)		0	0	0		

**Appendix D: Dispersal Habitat by 5<sup>th</sup> Section Seven Watershed.**

Northern spotted owl dispersal habitat - Rogue River National Forest (ROR), Siskiyou National Forest (SIS) and Medford BLM (MED), by 5 <sup>th</sup> Field Watershed. Grouped by Section Seven Watersheds. Federal lands outside of ROR/SIS/MED not included in Table. Many HUC5's are peripheral to the land managed by the Rogue River and Siskiyou National Forests, and the Medford District of the Bureau of Land Management. HUC5's are based on the 2002 update of HUC5 boundaries. Acre totals based on Biscuit Fire effects analysis June 03.							
HUC5 ID	Huc5 Watershed Name	HUC5 Acres	Federal Land				
			Total Federal (ROR, SIS, MED) (% of HUC5)	Total Capable (Dispersal + Capable) (% of HUC5)	All Dispersal Habitat (% of Total Capable)	Capable Only (not presently Dispersal)	Non-Capable Only
<b>Applegate</b>							
1710030901	Upper Applegate River	142,208	128,293 (90)	109,340 (77)			18,953
1710030902	Applegate River/Mckee Bridge	52,258	45,382 (87)	35,124 (67)			10,258
1710030903	Little Applegate River	72,261	52,086 (72)	37,744 (52)			14,342
1710030904	Middle Applegate River	82,571	48,904 (59)	34,933 (42)			13,971
1710030905	Williams Creek	52,942	28,078 (53)	25,794 (49)			2,284
1710030906	Lower Applegate River	90,635	39,056 (43)	34,841 (38)			4,215
<b>TOTALS</b>		<i>492,875</i>	<i>341,799 (69)</i>	<i>277,776 (56)</i>	<i>192,550 (69)</i>	<i>85,226</i>	<i>64,023</i>
<b>Bear</b>							
1710030801	Bear Creek	231,094	45,549 (20)	39,602 (17)	31,526 (80)	8,076	8,947
<b>TOTALS</b>		<i>231,094</i>	<i>45,549 (20)</i>	<i>39,602 (17)</i>	<i>31,526 (80)</i>	<i>8,076</i>	<i>8,947</i>
<b>Chetco and South Coast</b>							
1710031201	Chetco River	225,073	175,143 (78)	151,026 (67)			24,117
1710031204	Pistol River	66,820	35,013 (52)	33,046 (49)			1,967
1710031205	Hunter Creek	28,451	6,922 (24)	6,811 (24)			111
1710031207	Winchuck River	45,578	32,209 (71)	31,934 (70)			275
<b>TOTALS</b>		<i>365,922</i>	<i>249,287 (68)</i>	<i>222,817 (61)</i>	<i>119,515 (54)</i>	<i>103,302</i>	<i>26,470</i>
<b>Coquille/Sixes</b>							
1710030501	Coquille S Fork, Lower	108,300	64,492 (60)	62,744 (58)			1,748
1710030502	Middle Fork Coquille	197,121	1,690 (1)	1,690 (1)			0
1710030603	Sixes River	85,831	21,499 (25)	21,398 (25)			101
<b>TOTALS</b>		<i>394,252</i>	<i>87,681 (22)</i>	<i>85,832 (22)</i>	<i>62,065 (72)</i>	<i>23,767</i>	<i>1,849</i>
<b>Cow-Upper</b>							
1710030201	Upper South Umpqua River	87,055	0 (>1)	0 (>1)			0
1710030202	Jackson Creek	102,312	5 (>1)	4 (>1)			1
1710030204	Elk Creek/South Umpqua	54,329	190 (>1)	190 (>1)			0
1710030205	South Umpqua River	141,460	555 (>1)	554 (>1)			1
1710030206	Upper Cow Creek	47,436	9,454 (20)	8,394 (18)			1,060
1710030207	Middle Cow Creek	113,048	63,553 (67)	42,383 (37)			21,170
1710030208	West Fork Cow Creek	55,871	29,016 (52)	27,579 (49)			1,437
1710030209	Lower Cow Creek	102,417	401 (>1)	397 (>1)			4
<b>TOTALS</b>		<i>703,928</i>	<i>103,174 (15)</i>	<i>79,501 (11)</i>	<i>52,471(67)</i>	<i>27,030</i>	<i>23,673</i>

<b>Elk</b>							
1710030601	Humbug Nesika Frontal	55,637	2,881 ( 5)	2,832 ( 5)			58
1710030602	Elk River	59,332	45,054 (76)	44,553 (75)			501
<b>TOTALS</b>		<i>114,969</i>	<i>47,935 (42)</i>	<i>47,385 (41)</i>	<i>36,728 (78)</i>	<i>10,648</i>	<i>559</i>
<b>Illinois</b>							
1710031101	East Fork Illinois River	57,624	40,517 (70)	34,924 (61)			5,593
1710031102	Althouse Creek	29,242	18,210 (62)	15,839 (54)			2,371
1710031103	Sucker Creek	62,495	48,963 (78)	44,589 (71)			4,374
1710031104	West Fork Illinois River	76,931	49,139 (64)	22,370 (29)			26,769
1710031105	Deer Creek	72,572	37,612 (52)	32,634 (45)			4,978
1710031106	Illinois River/Josephine Creek	81,672	70,683 (87)	42,701 (52)			27,982
1710031107	Briggs Creek	43,729	41,390 (95)	36,539 (84)			4,851
1710031108	Illinois River/Klondike Creek	67,063	67,061 (100)	57,179 (85)			9,882
1710031109	Silver Creek	51,592	51,293 (99)	43,984 (85)			7,309
1710031110	Indigo Creek	49,063	48,872 (99)	46,360 (95)			2,512
1710031111	Illinois River/Lawson Creek	41,157	39,000 (95)	33,952 (82)			5,048
<b>TOTALS</b>		<i>633,140</i>	<i>512,740 (82)</i>	<i>411,071 (68)</i>	<i>210,183(57)</i>	<i>200,888</i>	<i>101,669</i>
<b>Klamath</b>							
1801020301	Wood River	122,654	73 (>1)	65 (>1)			8
1801020302	Klamath Lake	265,442	61 (>1)	43 (>1)			18
1801020303	Fourmile Creek	74,504	1,102 ( 1)	456 ( 1)			646
1801020601	Spencer Creek	54,157	28 (>1)	26 (>1)			2
1801020603	Klamath/Copco	86,728	807 ( 1)	120 (>1)			687
1801020604	Jenny Creek	134,329	47,468 (35)	34,434 (26)			13,034
1801020605	Klamath River/Iron Gate	42,123	13,810 (33)	4,209 (10)			9,601
1801020607	Cottonwood Creek	63,544	5,668 ( 9)	1,200 ( 2)			4,468
1801020609	West Fork Beaver Creek	69,661	292 (>1)	241 (>1)			51
1801020610	Beaver Creek	98,606	36 (>1)	29 (>1)			7
1801020611	Grider Creek	81,768	10 (>1)	4 (>1)			6
1801020901	China Peak	67,170	503 ( 1)	421 ( 1)			82
1801020902	Indian Creek	86,270	2,116 ( 2)	1,157 ( 1)			959
1801020904	Clear Creek	71,307	1 (>1)	0 ( 0)			1
<b>TOTALS</b>		<i>1,318,263</i>	<i>71,975 ( 5)</i>	<i>42,405 ( 3)</i>	<i>32,628 (77)</i>	<i>9,777</i>	<i>29,570</i>
<b>Little Butte</b>							
1710030708	Little Butte Creek	238,594	111,480 (47)	80,341 (34)			31,139
<b>TOTALS</b>		<i>238,594</i>	<i>111,480 (47)</i>	<i>80,341 (34)</i>	<i>54,093 (67)</i>	<i>26,248</i>	<i>31,139</i>
<b>Rogue-Lower-Lobster</b>							
1710031007	Lobster Creek	44,254	26,793 (61)	26,186 (59)			607
1710031008	Lower Rogue	82,691	44,462 (54)	41,613 (50)			2,849
<b>TOTALS</b>		<i>126,945</i>	<i>71,255 (56)</i>	<i>67,799 (53)</i>	<i>47,457 (70)</i>	<i>20,342</i>	<i>3,456</i>

<b>Rogue-Lower-Wild</b>							
1710031004	Rogue River/Horseshoe Bend	104,084	99,843 (96)	95,064 (91)			4,779
1710031005	Rogue River/Stair Creek	36,476	35,524 (97)	34,575 (95)			949
1710031006	Rogue River/Illahe Creek	44,938	43,492 (97)	41,447 (92)			2,045
<b>TOTALS</b>		<i>185,498</i>	<i>179,859 (97)</i>	<i>171,086 (92)</i>	<i>138,273 (81)</i>	<i>32,813</i>	<i>7,773</i>
<b>Rogue-Middle</b>							
1710031001	Rogue River/Hellgate	93,317	66,794 (72)	60,124 (64)			6,670
1710031002	Jumpoff Joe Creek	69,698	21,471 (31)	19,476 (28)			1,995
1710031003	Grave Creek	104,417	50,044 (48)	45,861 (44)			4,183
1710030802	Rogue River/Gold Hill	135,959	33,053 (24)	18,184 (13)			14,869
1710030803	Evans Creek	143,280	59,231 (41)	52,497 (37)			6,734
1710030804	Rogue River/Grants Pass	53,636	12,490 (23)	10,202 (19)			2,288
<b>TOTALS</b>		<i>600,307</i>	<i>243,083 (40)</i>	<i>206,344 (34)</i>	<i>134,917 (66)</i>	<i>71,427</i>	<i>36,739</i>
<b>Rogue-Upper</b>							
1710030101	Diamond Lake	42,946	10 (>1)	10 (>1)			0
1710030104	Clearwater	49,654	6 (>1)	6 (>1)			0
1710030105	Fish Creek	53,621	9 (>1)	8 (>1)			1
1710030701	Upper Rogue River	245,447	167,476 (68)	156,954 (64)			10,522
1710030702	South Fork Rogue River	159,016	118,510 (75)	110,852 (70)			7,658
1710030703	Rogue River/Lost Creek	36,291	12,938 (36)	9,364 (26)			3,574
1710030704	Big Butte Creek	158,211	87,168 (55)	75,896 (48)			11,272
1710030705	Elk Creek/Rogue River	85,427	50,403 (59)	45,026 (53)			5,377
1710030706	Trail Creek	35,309	14,680 (42)	12,828 (36)			1,852
1710030707	Rogue River/Shady Cove	74,230	22,591 (30)	6,746 (9)			15,845
<b>TOTALS</b>		<i>940,152</i>	<i>473,791 (50)</i>	<i>417,690 (44)</i>	<i>292,039 (70)</i>	<i>125,651</i>	<i>56,101</i>
<b>Smith</b>							
1801010101	North Fork Smith River	101,099	56,362 (56)	38,214 (38)			18,148
1801010102	Middle Fork Smith River	83,719	259 (>1)	132 (<1)			127
1801010104	Lower Smith River	88,745	624 ( 1)	624 ( 1)			0
<b>TOTALS</b>		<i>273,563</i>	<i>57,245 (21)</i>	<i>38,970 (14)</i>			<i>18,275</i>
<b>GRAND TOTALS</b>		<i>6,616,502</i>	<i>2,595,853 (39)</i>	<i>2,188,619 (33)</i>	<i>1,420,042 (65)</i>	<i>761,956</i>	<i>410,243</i>



## **Appendix F: Descriptive narratives of Late Successional Reserves (LSR) located on the Rogue River and Siskiyou National Forests and the Medford District Bureau of Land Management.**

This Appendix was originally developed for the 1 August 96 BA (1-7-96-F-392). It has been updated to reflect the changes from large forest fires since that time. See table E-1.

### **South Chetco LSR**

The South Chetco LSR is located west of the Smith River and West IV LSR. Most of the area consists of National Forest with a small amount of BLM land (Coos Bay District) that exists between the National Forest and the Pacific Ocean. Ninety-five percent of the LSR is capable of growing spotted owl habitat. Post-Biscuit Fire, 44 percent of the capable lands are currently older forests.

Pre-Biscuit Fire, the LSR historically supported 20 activity centers for the northern spotted owl. Twelve of the 20 (60%) centers had less than 30 percent of their home range in suitable owl habitat. Only one of the 20 home ranges encompassed more than 40 percent suitable owl habitat. Post-Biscuit Fire, four activity centers in the Fire area suffered reductions in NRF habitat. Occupied behaviors by marbled murrelets have been detected on 20 occasions in this LSR, and presence has been detected on an additional 52 occasions.

The areas of older forest habitat that connect to other areas are along the rivers. The north slopes along these streams support large trees and form stringers to connect older forests. For example, the Wild and Scenic Chetco River has older forest habitat that links this LSR to the Kalmiopsis Wilderness. In addition, older forest connections also link this LSR to the Six Rivers National Forest to the South.

The 2002 Biscuit Fire and 1999 Repeater Fire encompassed a small portion of this LSR; 855 acres of suitable habitat for spotted owl was lost in the fires, of the 30,542 acres that existed pre-fire (100 lost acres from the Repeater Fire, the rest from Biscuit).

### **North Chetco LSR**

The North Chetco LSR consists of National Forest lands, and is a continuation of the South Chetco LSR. The hardwood component is not as dominant, although the tanoak plant series covers much of this LSR. Ninety-four percent of the LSR has the potential to grow large trees and older forests suitable for the northern spotted owl. Post-Biscuit Fire, 28 percent of the capable lands are currently in older forests.

Pre-Biscuit Fire, the LSR historically supported four activity centers for the northern spotted owl. One of these owl home ranges had less than 30 percent suitable owl habitat. Another home range had greater than 40 percent suitable owl habitat. Post-Biscuit Fire, all activity centers in the Fire area suffered reductions in NRF habitat. Occupied behaviors by marbled murrelet have been detected on four occasions in this LSR, and presence has been detected on an additional 14 occasions.

North-facing slopes close to riparian areas contain extremely large trees. These older forest areas connect to the Fish Hook/Galice LSR through the riparian zones of Lawson Creek downstream to the Illinois River.

The 2002 Biscuit Fire encompassed a portion of this LSR; 2,458 acres of suitable habitat for spotted owl was lost in the fire, of the 9,910 acres that existed pre-fire.

### **Northwest Coast LSR**

The Northwest Coast LSR consists of mostly National Forest land, except for small BLM areas on the west, north, and northeast borders. The majority of this large LSR is within the tanoak and hemlock plant series. Ninety-five percent of the LSR is capable of growing spotted owl habitat. Forty-eight percent of the capable land is currently older forest.

This LSR presently supports 37 known activity centers for the northern spotted owl. Fourteen (38%) of these home ranges contain less than 30 percent suitable owl habitat. Nineteen (51%) of the 37 home ranges contain more than 40 percent suitable owl habitat. Occupied behaviors by marbled murrelets have been detected on 70 occasions in this LSR, and presence has been detected on an additional 150 occasions. The boundary between the Northwest Coast and Fish Hook/Galice LSRs defines the known inland extent for the range of the marbled murrelet.

This coastal LSR is large (146,000 acres), with many linkages of older forest habitat. A large older forest links the Rogue River/Agness area to Agness Pass via the late-successional habitat in Foster Creek. A relatively large area of older forest habitat exists in the Elk River drainage, including the Grassy Knob Wilderness. The older vegetation along the Coquille River corridor links with Agness Pass and Elk River. Hall Creek in the Coquille drainage supports a relatively large unfragmented block of habitat with numerous Port-Orford-cedar stands containing many large trees, murrelets, and spotted owls. The boundary between Fish Hook LSR and the Northwest Coast LSR, and the North/South Chetco LSRs and the Kalmiopsis Wilderness is a 3,000' or greater ridge. Nesting murrelets have not been detected inland from this ridge during protocol surveys (except for three "presence" sightings just east of the line). The summer fog and western hemlock plant series also do not cross this ridge.

### **Fish Hook/Galice LSR**

The Fish Hook/Galice LSR contains a mixture of BLM and National Forest lands. The tanoak and Douglas-fir plant series occupy the majority of this LSR, with a major component of white fir. Ninety-three percent of the LSR is capable of growing spotted owl habitat. Of these capable lands, 42 percent are currently older forests, Post-Biscuit Fire.

Pre-Biscuit Fire, the LSR historically supported 53 activity centers for the northern spotted owl. Forty-one activity centers (77%) had greater than 30 percent of their home range as suitable owl habitat, and 45 (88%) of the 51 home ranges contained greater than 40 percent suitable owl habitat. Two spotted owl activity centers (4%) had less than 30 percent suitable owl habitat. Post-Biscuit Fire, 19 activity centers in the Fire area suffered reductions in NRF habitat.

This is the central LSR on the Siskiyou National Forest and consequently provides many connections. It provides a corridor of older forest habitat between the Kalmiopsis and Wild

Rogue Wildernesses. It has a connection of existing older forest habitat through Lawson Creek and the Illinois River to the Northwest Coast LSR. Another connection is the Foster Creek drainage where older forest habitat connects to the Northwest Coast LSR. In addition, the areas not harvested in Silver, Shasta Costa, and Indigo watersheds provide unfragmented habitat (Silver Creek drainage was hit especially hard by the Biscuit Fire). The east/west older forest link helps connect the coastal mountains east across the valley to the Rogue-Umpqua divide.

The 2002 Biscuit Fire encompassed a major portion of this LSR; 24,872 acres of suitable habitat for spotted owl was lost in the fire, of the 117,252 acres that existed pre-fire (1,465 acres lost on BLM; the rest of the loss on NF).

### **Taylor LSR**

The Taylor LSR consists entirely of National Forest lands. This LSR is a small area, designated for its critical anadromous fish habitat and stair step (low elevation to high elevation) characteristics. Douglas-fir plant series is the major ecological classification. Ninety-four percent of the lands are capable of growing spotted owl habitat. Currently, 54 percent of the capable lands are in older forests.

It presently supports two known activity centers for the northern spotted owl. One home range contains less than 30 percent suitable owl habitat. The other contains between 30 percent and 40 percent suitable owl habitat.

Stringers of older forest habitat in the northeast and west link BLM-managed lands to the Fish Hook/Galice LSR. Habitat corridors along riparian reserves also connect Taylor LSR to the southwest.

### **Briggs LSR**

The Briggs LSR consists entirely of National Forest lands. The tanoak and Douglas-fir plant series occupy the majority of this LSR. Only 66 percent of the LSR is capable of growing spotted owl habitat. Of these capable lands, 31 percent are currently older forests, Post-Biscuit Fire (late successional habitat occupied 66 percent, pre-fire).

Pre-Biscuit Fire, the LSR historically supported eight activity centers for the northern spotted owl. All activity centers had greater than 30 percent of their home range as suitable owl habitat, and of these 6 (75%) centers had greater than 40 percent of their home range in suitable owl habitat. Post-Biscuit Fire, five activity centers in the Fire area suffered reductions in NRF habitat.

Important characteristics of this LSR are the Illinois River connection between the Illinois Valley and the Rogue River. In addition, the older forest habitat in the Briggs LSR connects to the Kalmiopsis Wilderness and to the Taylor Creek LSR.

The 2002 Biscuit Fire encompassed a major portion of this LSR; 13,300 acres of suitable habitat for spotted owl was lost in the fire, of the 23,773 acres that existed pre-fire.

**East IV/Williams-Deer LSR**

The East IV/Williams-Deer LSR contains a combination of National Forest and BLM lands. The white fir, tanoak, and Douglas-fir plant series occupy most of this LSR. Eighty-eight percent of the LSR is capable of growing spotted owl habitat. Of these capable lands, 49 percent are currently older forests.

It presently supports 42 activity centers for the northern spotted owl. Fourteen of these activity centers (33%) have less than 30 percent of their home range in suitable owl habitat. Twenty-two of these 42 (52%) activity centers contain greater than 40 percent of their home range in suitable owl habitat.

Other characteristics and functions of this LSR are the high elevation older forest connections between the mountains east of the Illinois Valley and the coastal part of the Siskiyou. Most of this high elevation connection occurs in the white fir and red fir plant series. Parts of this LSR also connect the Rogue and Illinois River Valleys. In addition, this LSR provides contiguous forest reserves from the lower elevations to the higher elevations. This LSR connects with scattered older forest habitat on BLM lands to the north and east (part of the Applegate AMA) and larger blocks of older forest habitat in the Siskiyou and Red Buttes Wildernesses to the south and east (on Klamath and Rogue River NFs, respectively). Older forest connections directly to the east and west are lacking.

**West IV LSR**

National Forest lands dominate within the West IV LSR; a small amount of BLM land is also present. It has a large component of Jeffrey pine plant series and Douglas-fir/tanoak plant series. Only 22 percent of the LSR has the potential to grow large trees and older forests suitable for the northern spotted owl. Nineteen percent of these capable lands are in late-successional conditions, Post-Biscuit Fire. Acres of capable NRF habitat for the West IV LSR are inherently low, because serpentine soils overlay much of this LSR; most serpentine sites are not capable of producing NRF habitat (see Table B-1).

Pre-Biscuit Fire, the LSR historically supported three known activity centers for the northern spotted owl. One of these centers had less than 30 percent of its home range in suitable owl habitat. One of the centers had greater than 40 percent of its home range in suitable owl habitat. Post-Biscuit Fire, two activity centers in the Fire area suffered reductions in NRF habitat.

This LSR connects Briggs, South Chetco, and East IV LSRs and connects to an administrative study area in the Siskiyou National Forest, the North Fork Smith Recreation area to the south (Six Rivers National Forest), and the Kalmiopsis Wilderness to the north. Important areas for older forest connections are the Illinois River corridor and the BLM lands which connect to the Sucker-Grayback drainage. Only limited connections of older forests are available to the east, west, and south due to private land, geology, and past management practices.

The 2002 Biscuit Fire encompassed much of this LSR; 5,094 acres of suitable habitat for spotted owl was lost in the fire, of the 7,240 acres that existed pre-fire.

**Grider/Thomas LSR**

The Grider/Thomas LSR consists entirely of National Forest lands. Analysis for this LSR has not yet been completed by the Klamath National Forest, so USDI FWS data was used. Data on capable lands were not available; however, currently 26 percent of the land is in older forests.

It presently supports 13 activity centers. Two (15%) activity centers have greater than 40 percent of their home range in suitable owl habitat. Eleven of the 13 (85%) have between 30-40 percent suitable owl habitat within their home range. However, most of the LSR has not been surveyed to protocol.

This LSR connects the East IV/Williams LSR to the north, the Red Buttes Wilderness to the east, and the Marble Mountains Wilderness to the south. Older forest connections are present in these areas. However, lack of older forest connections is expected to the southeast towards the Siskiyou Wilderness and to the east towards Critical Habitat Unit CA-16. Reasons for this are the land ownership patterns and typical past management practices.

**Applegate/Oak Knoll LSR**

The Applegate/Oak Knoll LSR consists entirely of National Forest lands. White-fir plant series is the major ecological classification. Eighty-nine percent of the land is capable of growing spotted owl habitat. Currently, 56 percent of the capable lands are in older forests.

It presently supports 18 activity centers for the northern spotted owl. Two centers have less than 40 percent suitable owl habitat.

This LSR has older forest connections across the Applegate Ranger District east to the Mt. Ashland LSR and west to the East IV/Williams LSR. It also has older forest connections through the Red Buttes Wilderness to the Grider/Thomas LSR. This region is naturally fragmented by climate, ecotype, and fire regime. There are high elevation ridges along these connections; however, the abundance of dispersal habitat allows no greater than 3/4-mile distance from dispersal/suitable owl habitat.

**Mt. Ashland LSR**

The Mt. Ashland LSR consists entirely of National Forest lands. The majority of the LSR is coniferous forest. Douglas-fir and ponderosa pine communities dominate at the lower elevations. White fir communities dominate the middle elevations, with Shasta red fir dominating the higher elevations, and giving way to mountain hemlock at the highest elevations. Ninety-one percent of the lands are capable of growing spotted owl habitat. Currently, 64 percent of the capable lands are in older forests.

It presently supports 26 activity centers for the northern spotted owl. One (0.5%) activity center has less than 30 percent suitable owl habitat, and three (14%) centers have 30 percent to 40 percent suitable owl habitat.

The Mt. Ashland LSR links the high elevation Siskiyou range of the Klamath Geological Province with the Southern Oregon Cascades. This link is a critical node in the overall migratory patterns in the Pacific Northwest. It allows flow to and from all legs and arms of the

'H,' a process important to the Region as a whole for the last 60 million years. The Cascade-Siskiyou National Monument to the east is highly fragmented by ownership patterns and past land use, substantially decreasing its function as a link in the LSR network. It is separated from the Mt. Ashland LSR by private lands and Interstate Highway 5, which is a barrier for some animal species.

LSRs to the west are more continuous, lack significant migratory barriers, and over half the area in each is in late-successional condition.

### **Soda Mt. LSR — Now Cascade-Siskiyou National Monument**

The Cascade-Siskiyou National Monument consists entirely of BLM lands. White fir and mixed conifer plant series dominate this LSR. Fifty-five percent of the lands are capable of producing spotted owl habitat. Currently, 31 percent of the capable lands are in older forests/suitable habitat.

It presently supports 18 activity centers for the northern spotted owl. Two centers (11%) have 30 percent to 40 percent suitable owl habitat, and the remaining 16 centers (89%) have less than 30 percent suitable owl habitat within their home ranges.

This LSR is highly fragmented as a result of ownership patterns, and past management actions. However, it does provide a crucial link along with the Ashland LSR between the Western Cascades and the Klamath Provinces in the southern portion of the I-5 Area of Concern. There has been at least one confirmed spotted owl migration from west of the Applegate District to this LSR. However, forest connectivity for dispersal remains a concern.

### **Dead Indian LSR**

The Dead Indian LSR consists entirely of National Forest lands. This LSR straddles the Cascade Crest. The eastern half is located in the Oregon Eastern Cascades Physiographic Province and the western half is in the Oregon Western Cascades Physiographic Province. White fir and Shasta red fir plant associations dominate the LSR. Sixty-three percent of the lands are capable of growing spotted owl habitat. Currently, 71 percent of the capable lands are in older forests.

It presently supports 67 activity centers for the northern spotted owl. Thirty-six centers (54%) have less than 30 percent suitable owl habitat within their home ranges. Fourteen of the 67 (21%) centers have between 30 percent and 40 percent suitable owl habitat.

The east half of Dead Indian LSR lacks connectivity to the west side habitat, as a result of natural and manmade fragmentation. Fragmentation is caused by high elevation plant communities, lava fields from Mt. McLoughlin and Brown Mt., and past land management activities. The east half of the LSR appears to be weakly connected through older forest habitat to Crater Lake National Park to the north. However, dispersal habitat is strongly connected to the Park through subalpine and lodgepole pine plant communities in the Sky Lakes Wilderness. Mixed areas of BLM and privately owned lands occur south of the LSR. These areas are highly fragmented, caused by natural conditions, past land use, and ownership patterns. Connectivity north to the Middle Fork LSR is a concern. A fragmented landscape of private land and

scattered remnants of older forest dominate the landscape between these two LSRs. The very eastern boundary of the LSR approximates the eastern edge of the range of the spotted owl.

### **Middle Fork LSR**

The Middle Fork LSR consists entirely of National Forest lands. The majority of the LSR is coniferous forest. Douglas-fir and Western hemlock communities dominate at lower elevations. White fir and Shasta red fir communities dominate the middle to upper elevations, giving way to mountain hemlock and lodgepole pine at the highest elevations. Ninety-nine percent of the lands are capable of growing spotted owl habitat. Currently, 56 percent of the capable lands are in older forest.

It presently supports 38 activity centers for the northern spotted owl. Twenty-three centers (61%) have greater than 40 percent suitable owl habitat. Eight centers (21%) have 30-40 percent suitable owl habitat, and the remaining 7 centers (18%) have less than 30 percent suitable owl habitat within their home ranges.

Large blocks of older forest located within Red Blanket Creek, Middle, and South Fork drainages of the Rogue River provide good dispersal across this LSR. Mountain hemlock and lodgepole pine communities dominate the eastern boundary of this LSR. Older forests, in the Sky Lakes Wilderness, occur along the stream bottoms and sides of the systems previously described.

### **Elk Creek LSR**

The Elk Creek LSR contains a mixture of National Forest and BLM lands. Elevations range from 1,600- 4,000 feet in the mixed conifer series. It is considered a key watershed (deferred watershed). Fifty-one percent of the lands are capable of growing spotted owl habitat.

It presently supports 17 activity centers for the northern spotted owl. Two-thirds of the LSR is within a study area on owl density (OSU-Wagner) that has undergone an intensive owl monitoring effort since 1986. Many of the active owl sites seem to be barely hanging on and not producing young.

The 2002 Timbered Rock Fire encompassed a portion of this LSR; 1,198 acres of suitable habitat for spotted owl was lost in the fire, of the 10,402 acres that existed pre-fire.

### **Rogue-Umpqua Divide LSR**

The Rogue-Umpqua Divide LSR consists entirely of National Forest lands. The majority of the LSR is coniferous forest. Douglas-fir and Western hemlock communities dominate at the lower elevations. White fir and Shasta red fir communities dominate the middle to upper elevations, giving way to mountain hemlock and lodgepole pine at the highest elevations. Ninety-four percent of the lands are capable of growing spotted owl habitat. Currently, 53 percent of the capable lands are in older forest.

It presently supports 24 activity centers for the northern spotted owl. Twenty-three centers (96%) have greater than 40 percent suitable owl habitat. One owl center (4%) have 30-40 percent suitable owl habitat within its home range.

Riparian reserves, Administratively Withdrawn Areas (Research Natural Area, and Pileated/Pine Marten areas) provide the connective web across the LSR. There is a lack of older forest connections on the eastern boundary (Crater Lake National Park) of the LSR and forest connectivity for migration is a concern.

### **Lookout Mt./Black Butte LSR**

The Rogue River Basin portion of this large LSR (528,000+ acres) represents 5 percent of the area. Two to three National Forests and three BLM Districts make up the Federal ownership. Information for the entire LSR will be forthcoming after the assessment is completed. Discussion and figures are for the five percent portion of this LSR located on the Rogue River NF.

The portion of the Lookout Mt./Black Butte LSR in the Rogue Basin consists entirely of National Forest lands. The majority of this part of the LSR is mixed coniferous forest. Douglas-fir/hardwood communities dominate at the lower elevations. Shasta red fir communities dominate the middle and upper elevations. Ninety-eight percent of these lands are capable of growing spotted owl habitat. Currently, 53 percent of the capable lands are in older forest.

This LSR presently supports 24 activity centers for the northern spotted owl. Twenty centers (83%) have >40 percent suitable owl habitat. Three centers (13%) have 30-40 percent suitable owl habitat.

Large blocks of older forest are present in this part of the LSR and provide very good connectivity. In addition, several large blocks of older forest are located north of this portion, on the Umpqua National Forest, which provide an excellent connective link across the Western Cascade Mountain Range.

### **South Umpqua River/Galesville LSR**

The South Umpqua River/Galesville LSR is a combination of National Forest and BLM lands. There is a checkerboard ownership pattern within the LSR. This LSR plays a critical function in East-West connectivity, linking the Coast Province with the Cascades Province. The western hemlock and Douglas-fir/chinkapin plant series comprise approximately 75 percent of the vegetation within the LSR. An estimated 43 percent of the federal lands in the LSR are in late-successional stands, and an additional 12 percent are expected to grow to late-successional stage within 40 years.

This LSR currently supports 46 northern spotted owl activity centers. Eleven of these activity centers (24%) contain greater than 40 percent of their home range in suitable owl habitat. Thirty-five (76%) activity centers do not have 40 percent of their home range in suitable condition.

Important characteristics of this LSR include the South Umpqua River and the critical function of connectivity that this LSR is expected to perform. Because of topography, land management patterns, and existing stands, the northern portion of the LSR is expected to play a greater role in connectivity.

**West Glendale Resource Area - Four Sections LSR**

This LSR consists of portions of four sections in the NW corner of the Glendale Resource Area. These sections were designated LSR primarily because they had previously been designated as Critical Habitat for marbled murrelet. Two spotted owl activity centers are present; for both, over 40 percent of the habitat within their home ranges is suitable. NRF habitat predominates in these four sections.

**Baseline and Effects to LSRs in Rogue and South Coast Basins 2003 to Present.**

FSEIS BASELINE		LSR EFFECTS, 2003 TO PRESENT				
LSR ID	NRF HABITAT ACRES <sup>1</sup>	NRF HABITAT REMOVED/DOWNGRADED FIRES (%)	NRF HABITAT REMOVED/DOWNGRADED HARVEST	TOTAL REMOVED/DOWNGRADED (%)	NRF HABITAT DEGRADED	CURRENT NRF HABITAT BASELINE
RC352	51,521	0	0	0	0	51,521
RC354	23,270	0	0	0	0	23,270
<sup>1</sup> RO222	310,629	0		0	0	310,629
RO223	33,804	0	0	0	0	33,804
RO224	8,370	0	0	0	0	8,370
RO225	19,848	0	0	0	0	19,848
RO226	22,762	0	0	0	0	22,762
RO227	47,049	0	0	0	0	47,049
RO247	9,647	0	0	0	0	9,647
RO248	19,355	0	0	0	0	19,355
RO249	40,224	0	0	0	0	40,224
RO250	23,108	0	0	0	0	23,108
RO251	672	0	0	0	0	672
RO252	6,833	0	0	0	0	6,833
RO253	5,584	0	0	0	0	5,584
RO254	3,163	0	0	0	0	3,163
RO255	107,343	0	0	0	27	107,343
RO256	1,977	0	0	0	0	1,977
RO258	33,643	2	0	0	1,336(1,204 Blossom Fire)	33,641
RO259	21,350	0	0	0	0	21,350
<b>TOTAL</b>	<b>466,036</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1,363</b>	<b>466,036</b>

SOURCE: G. Mayfield, FWS, pers. comm, 2001. Spatial data were overlaid based on FSEIS data (USDA and USDI 1993,1994) for Land Allocations, Northern spotted owl habitat, LSRs, ownership and FWS data for CHU boundaries (FWS 1994) to produce these data

1-Only a small portion of this LSR lies within the action area and none of the NRF habitat loss from fire occurred within the action area.

1-Reported percentages of NRF habitat are relative to the total LSR acreage. Many LSRs extend outside the action area.

**Appendix G: Map of Dispersal Habitat and Critical Habitat Units within the Action Area.**

